MRGO ECOSYSTEM RESTORATION PLAN FEASIBILITY STUDY

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY, CIVIL WORKS, THE DEPARTMENT OF DEFENSE

TRANSMITTING

MRGO ECOSYSTEM RESTORATION PLAN FEASIBILITY STUDY

PART 4 OF 7



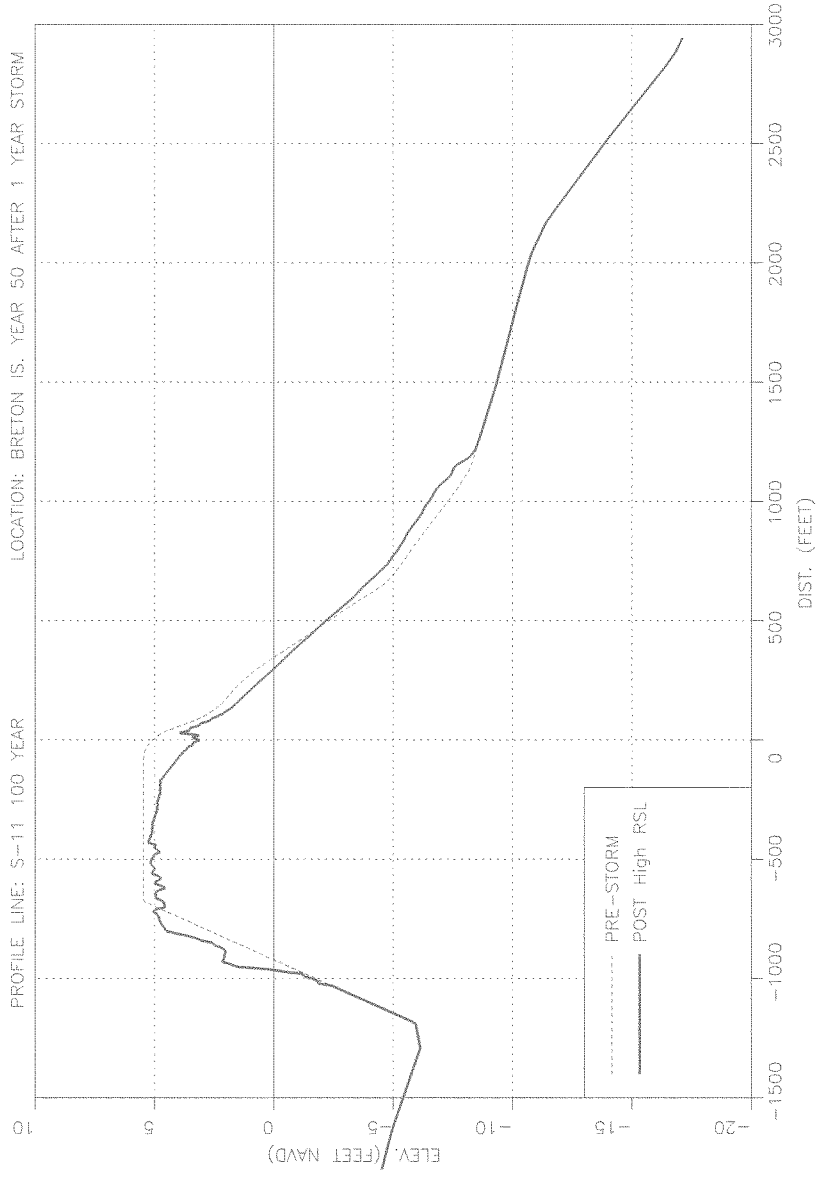
DECEMBER 19, 2013.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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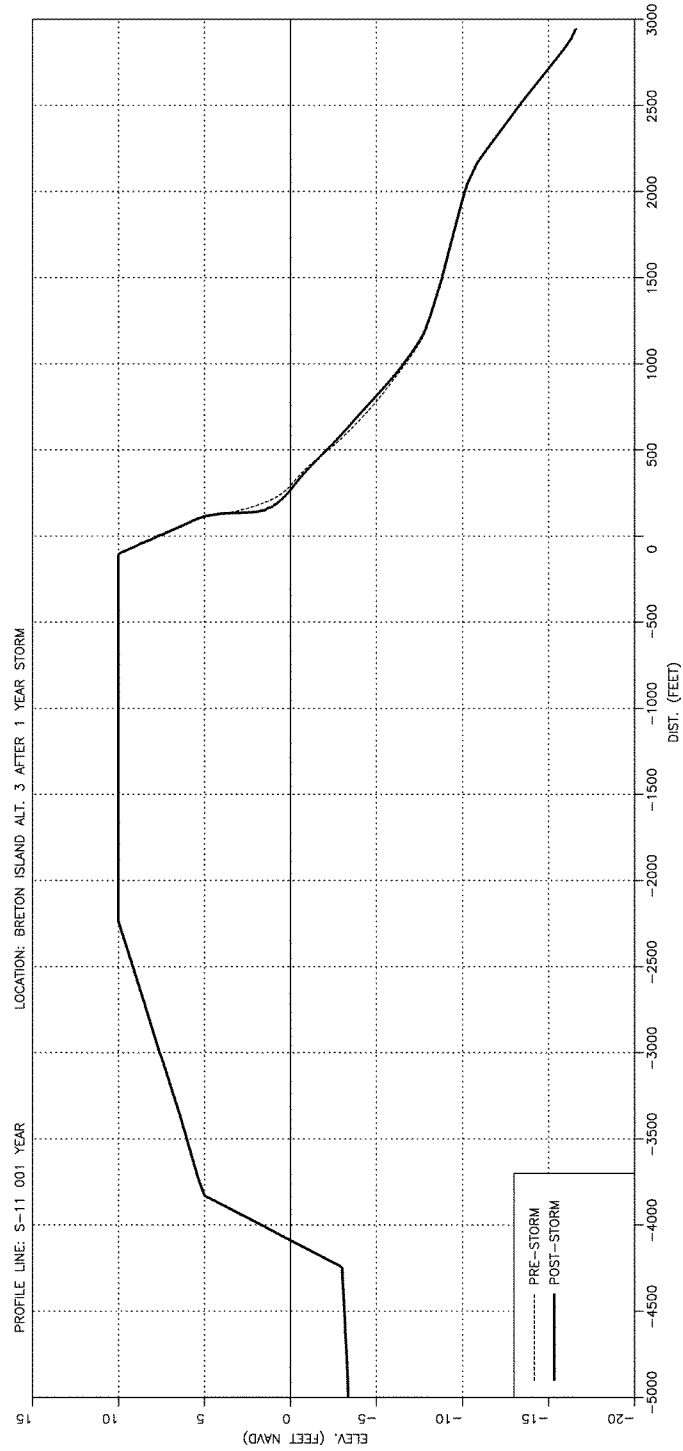
87–146 WASHINGTON : 2013

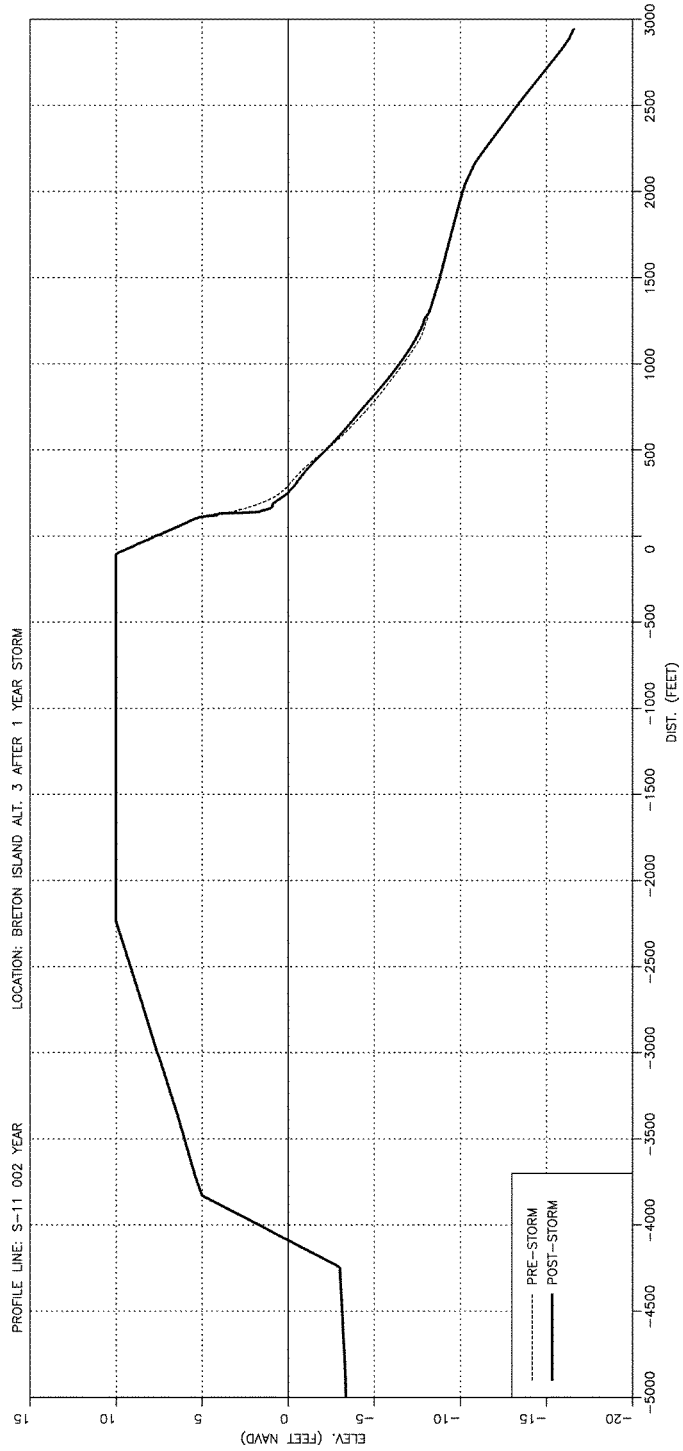
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INFORMATION
GPO

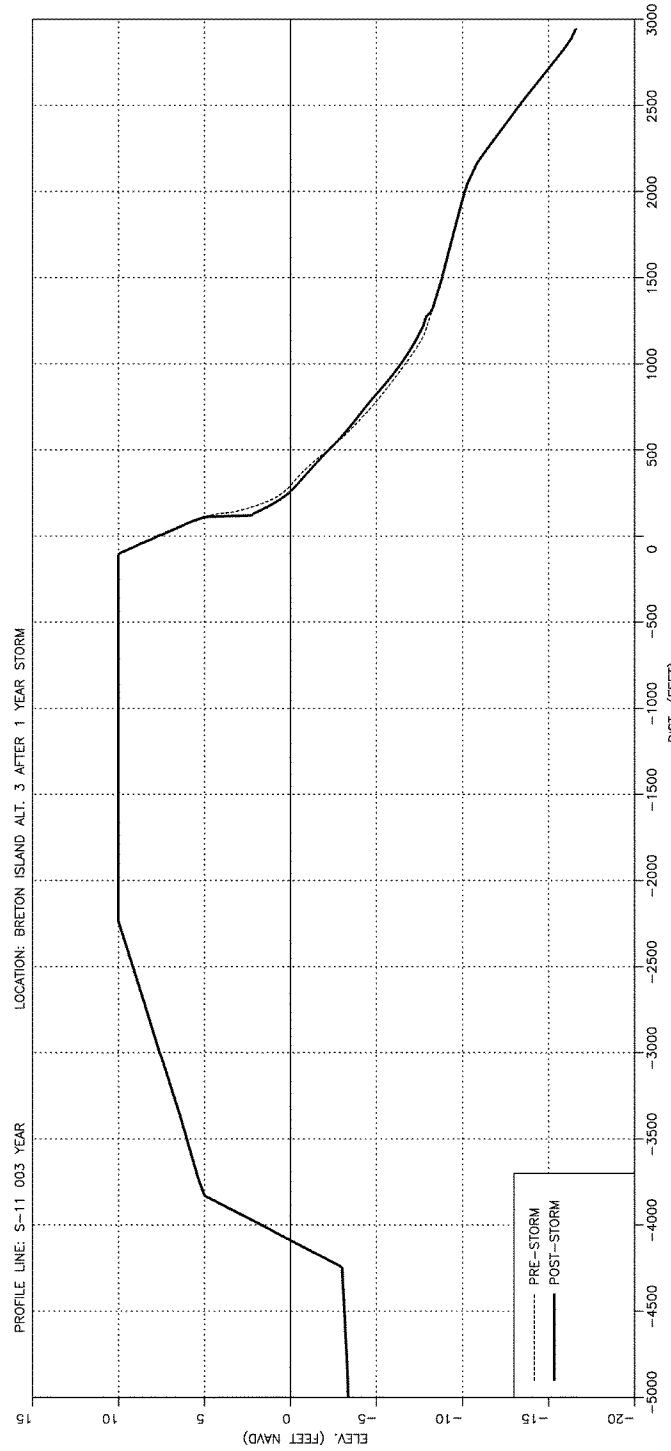

PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON IS. YEAR 50 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
10
5
0
-5
-10
-15
-20
-1500
-1000
-500
0
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3000

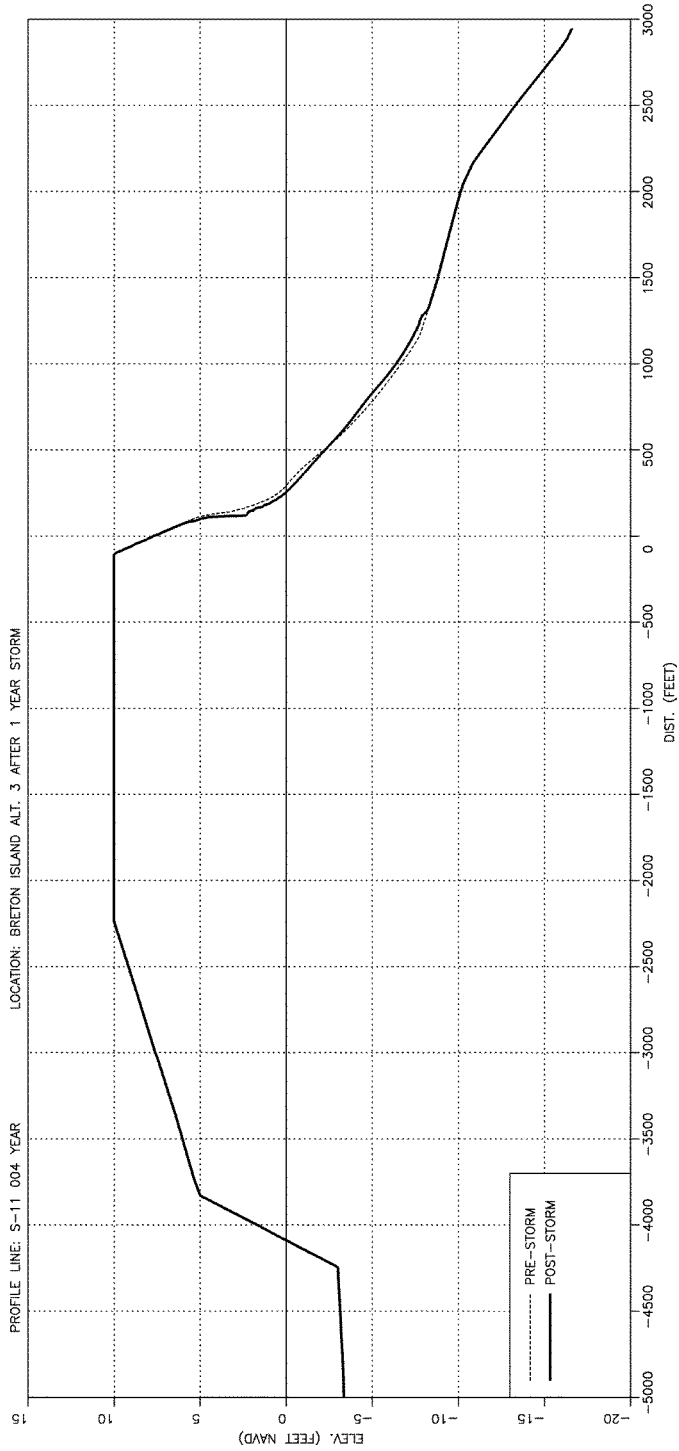
Breton Island Profile S-11

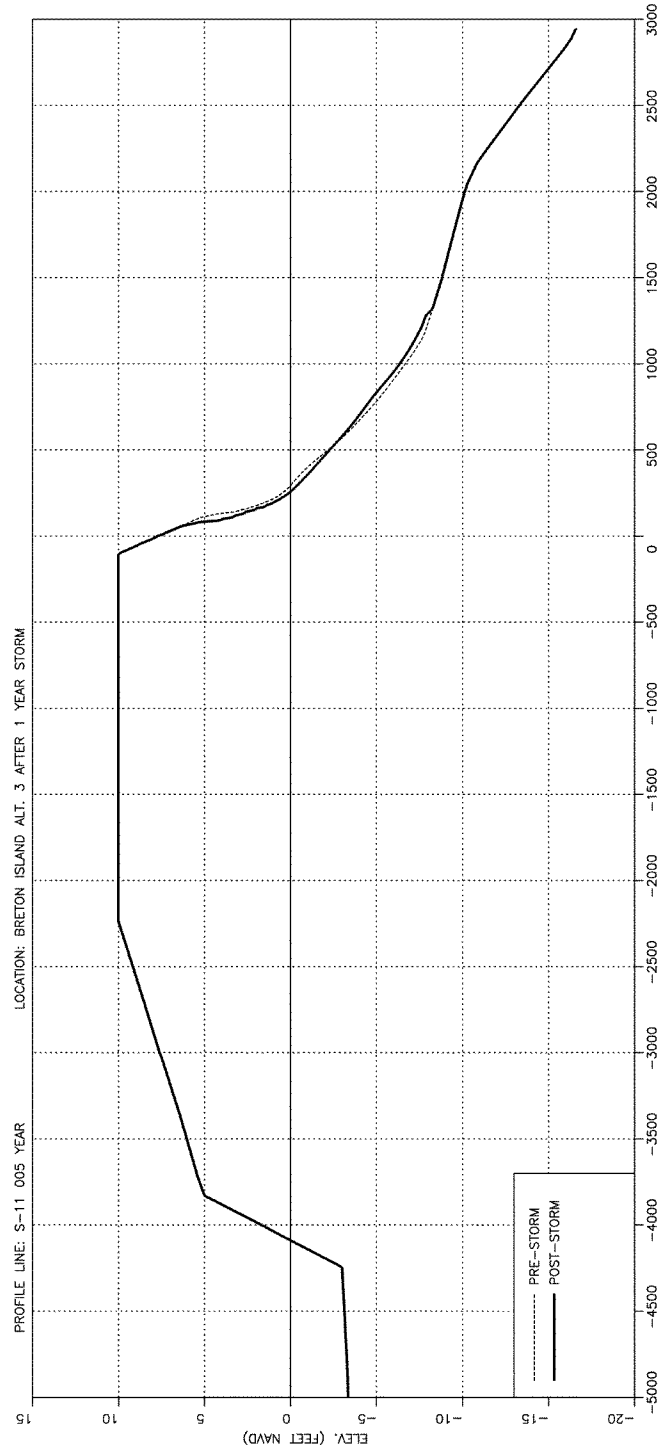
Alternative 3

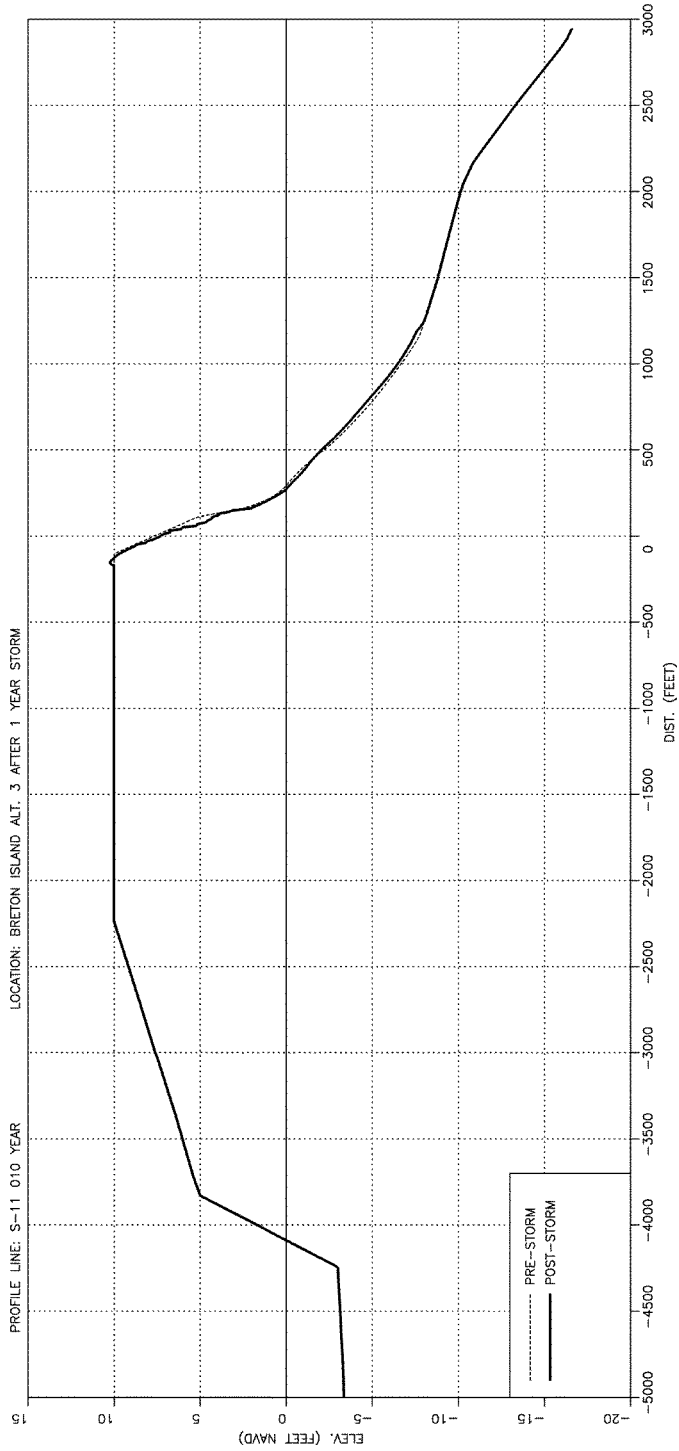

PROFILE LINE: S-11 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
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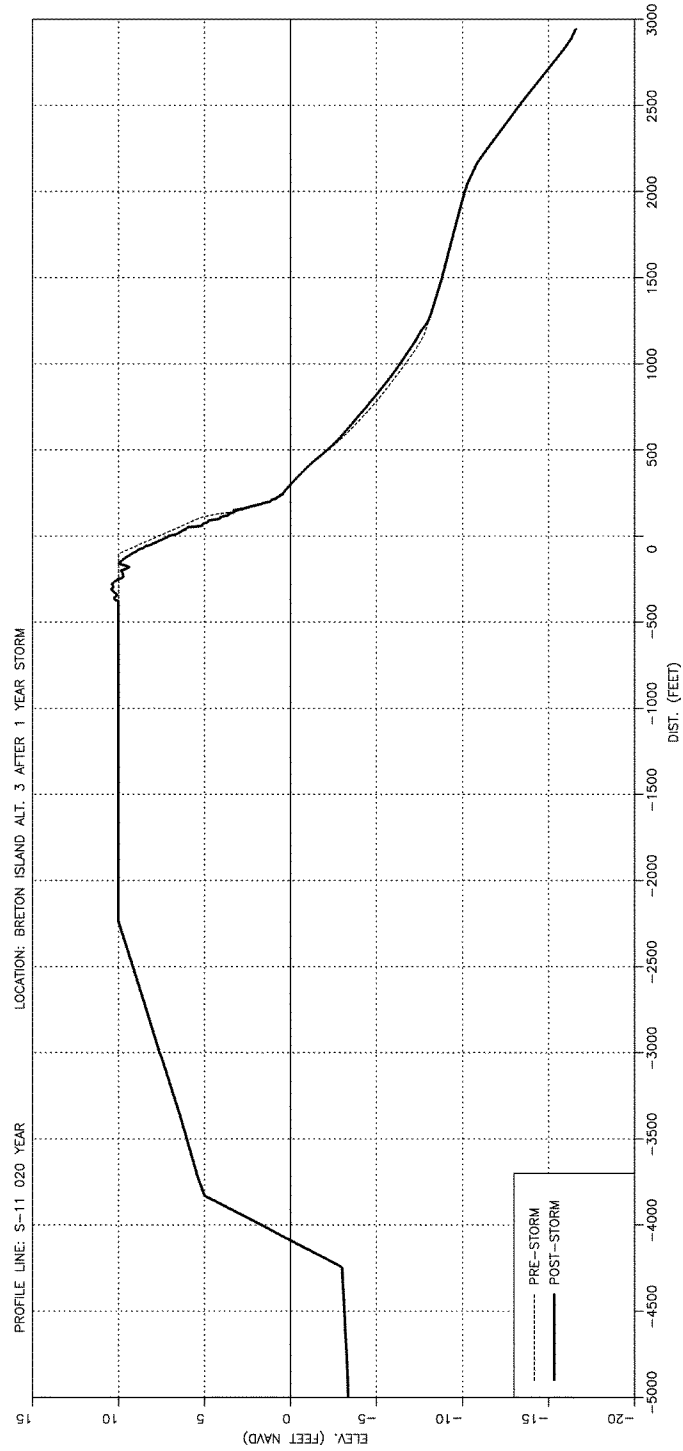

PROFILE LINE: S-11 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
10
5
0
-5
-10
-15
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-5000
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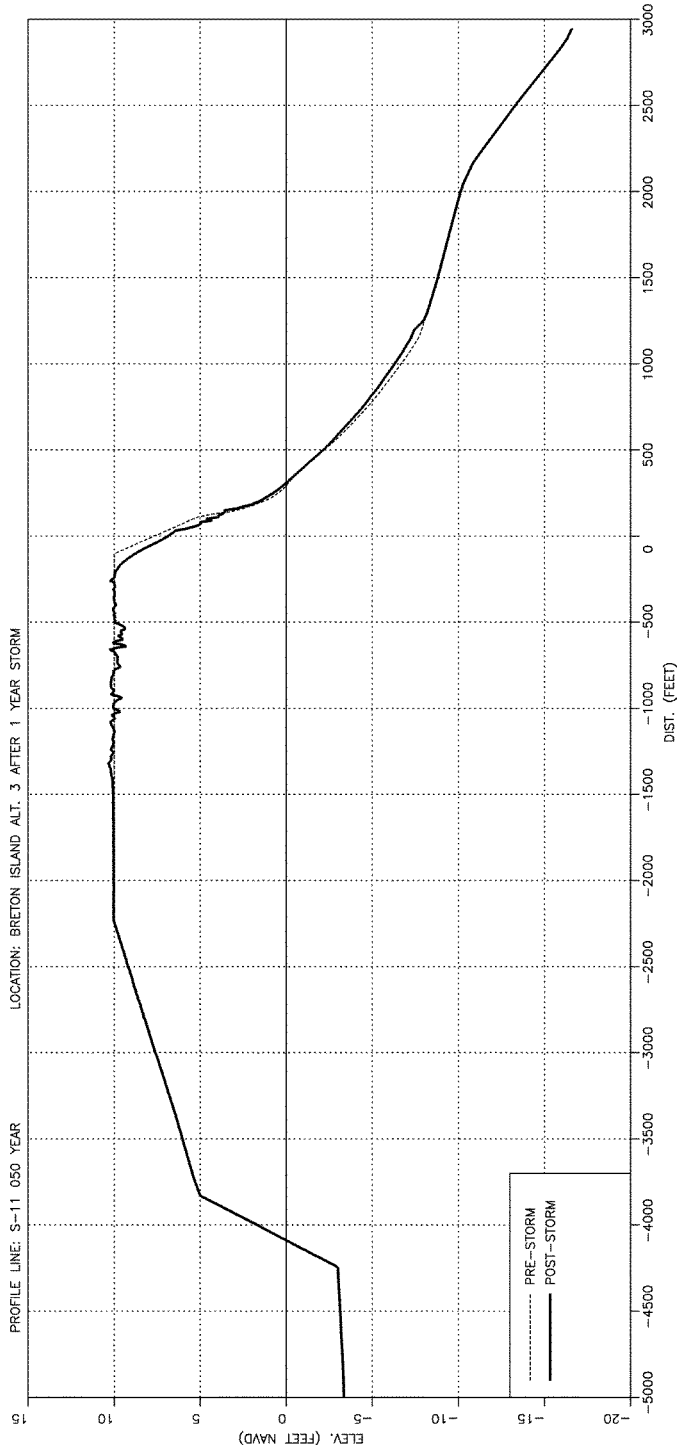

PROFILE LINE: S-11 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
10
5
0
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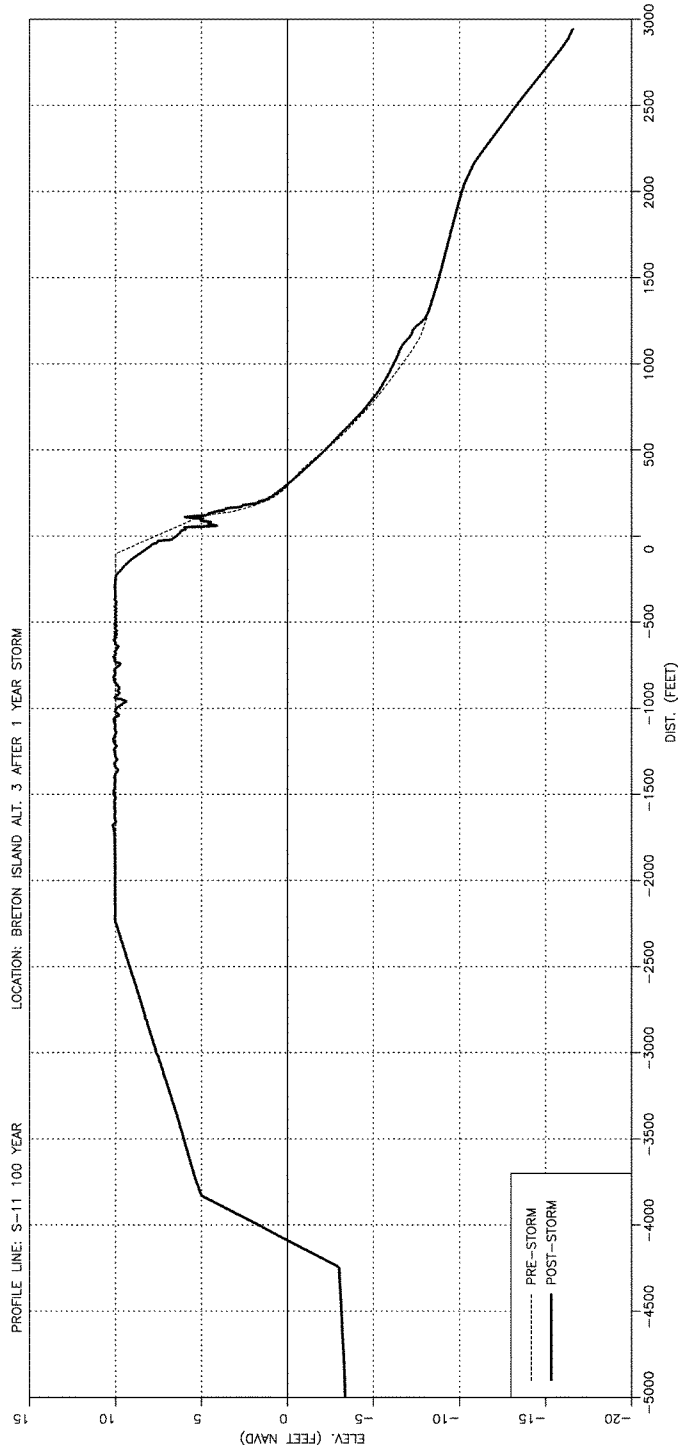

PROFILE LINE: S-11 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
10
5
0
-5
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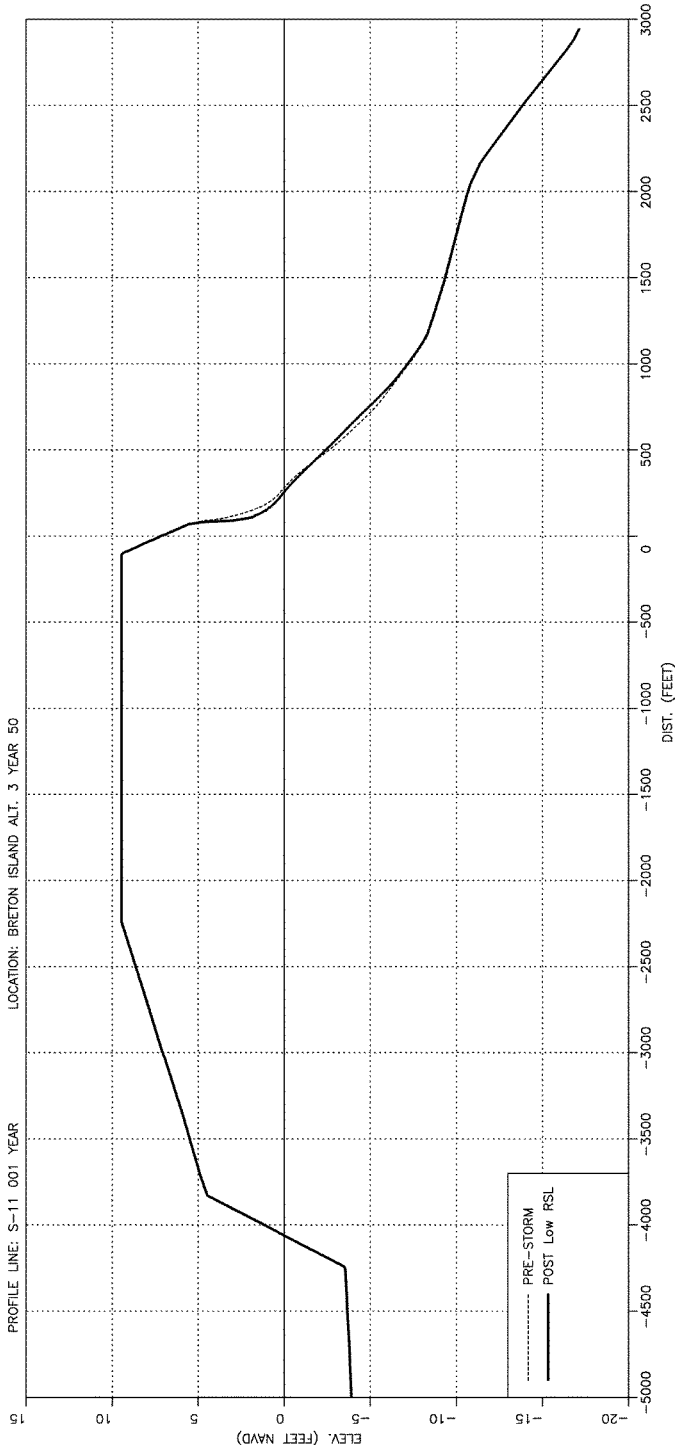

PROFILE LINE: S-11 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
10
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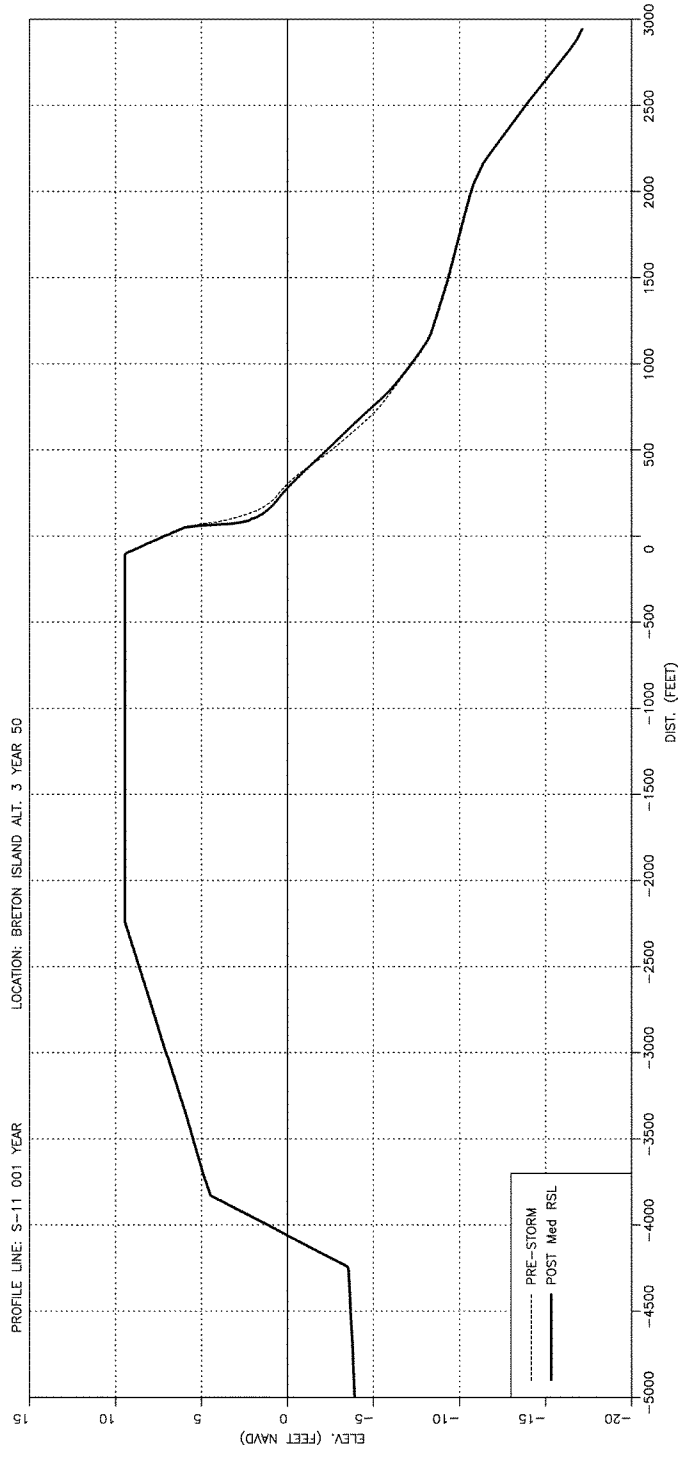

PROFILE LINE: S-11 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
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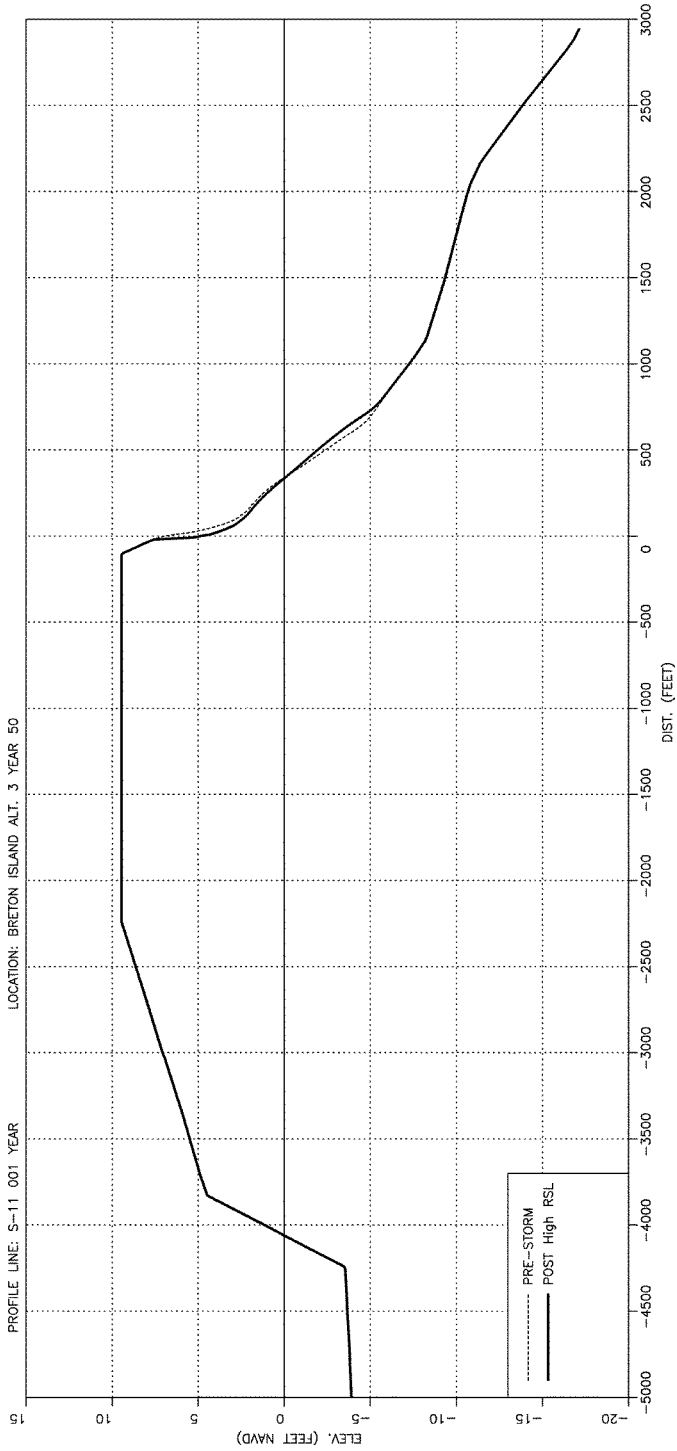

PROFILE LINE: S-11 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
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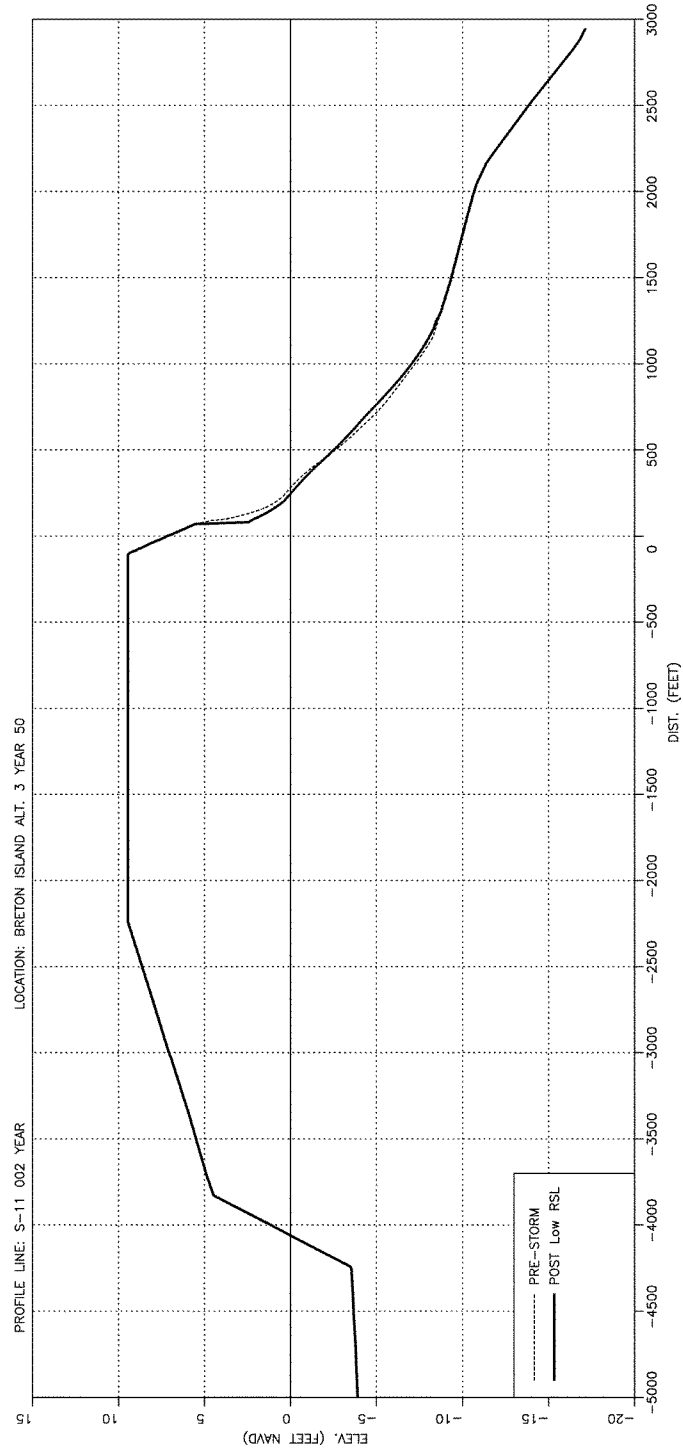

PROFILE LINE: S-11 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
15
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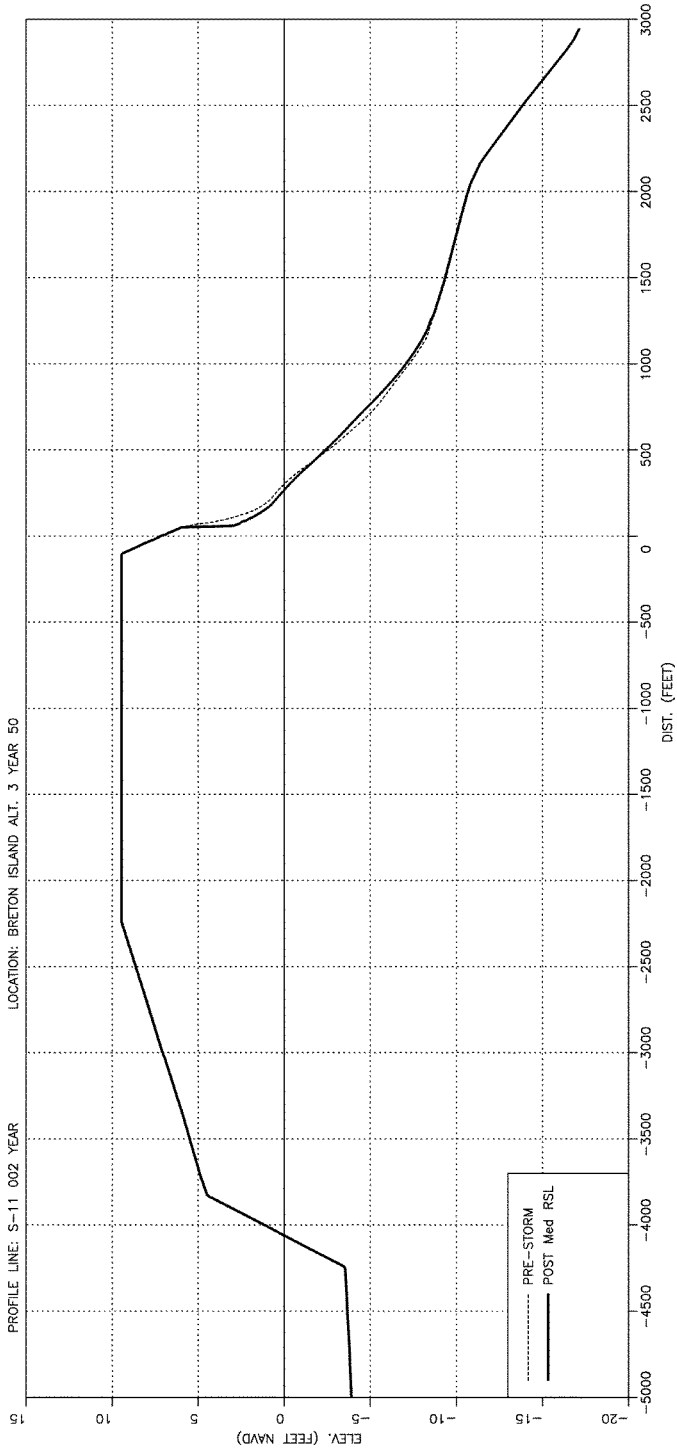

PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 AFTER 1 YEAR STORM
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST-STORM
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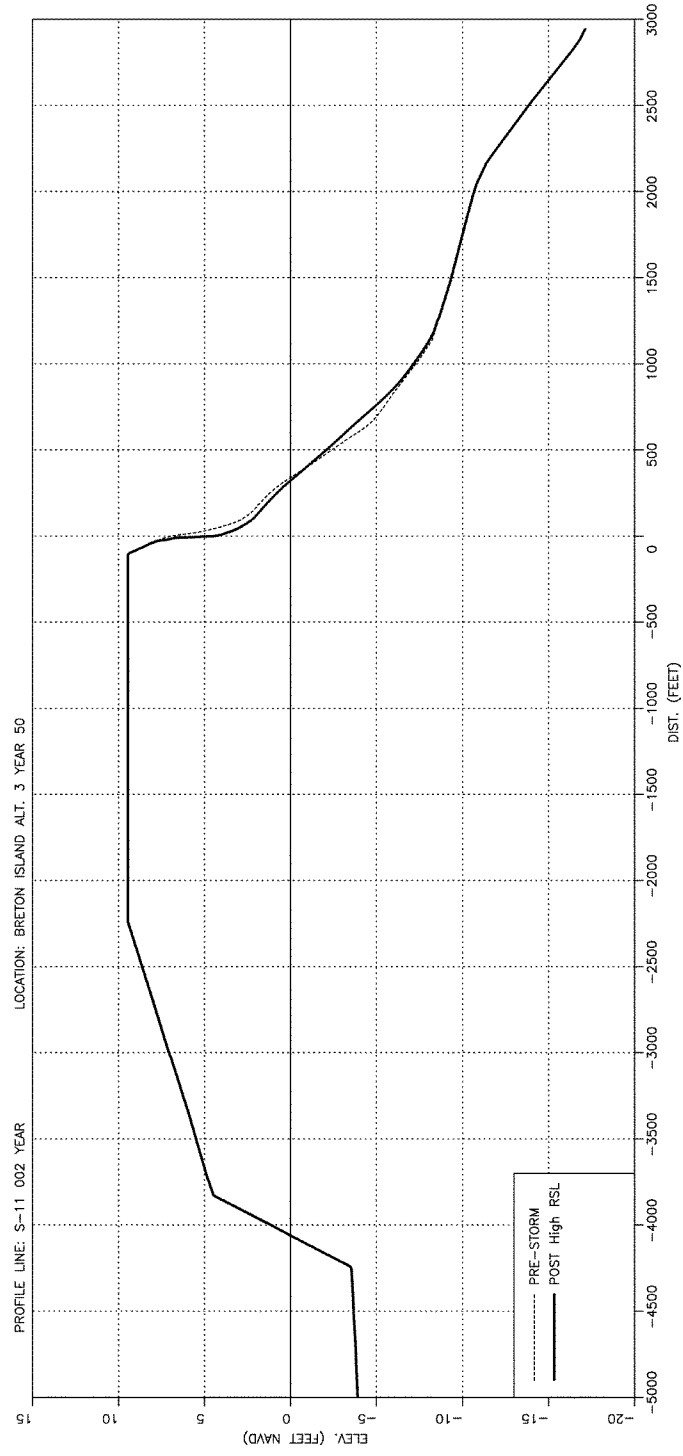

PROFILE LINE: S-11 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
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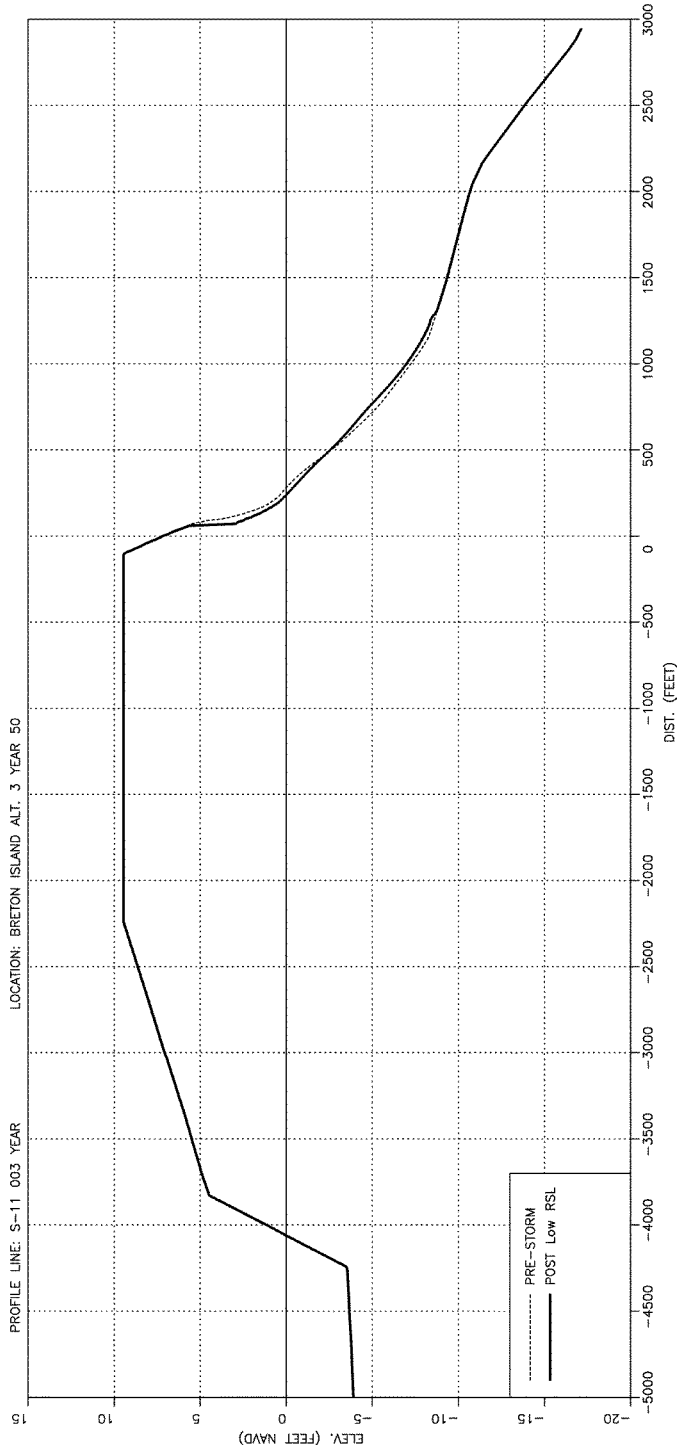

PROFILE LINE: S-11 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
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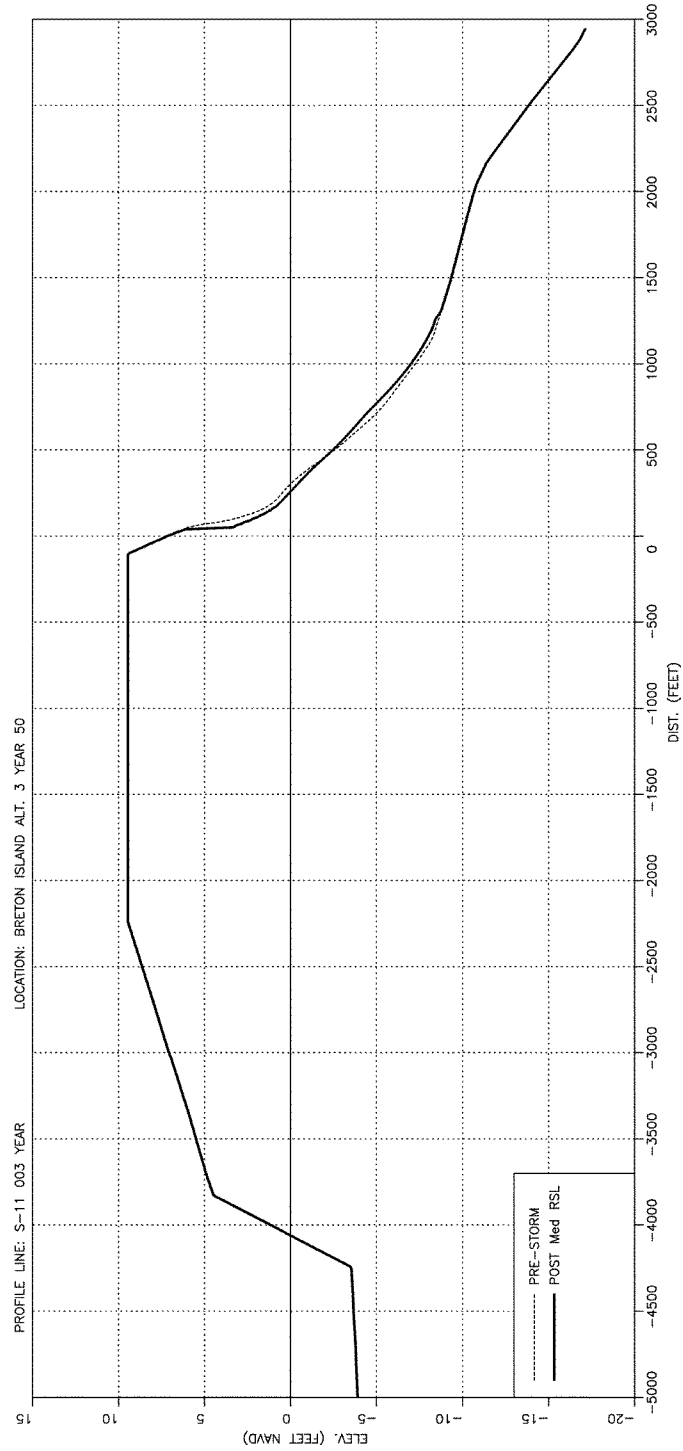

PROFILE LINE: S-11 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
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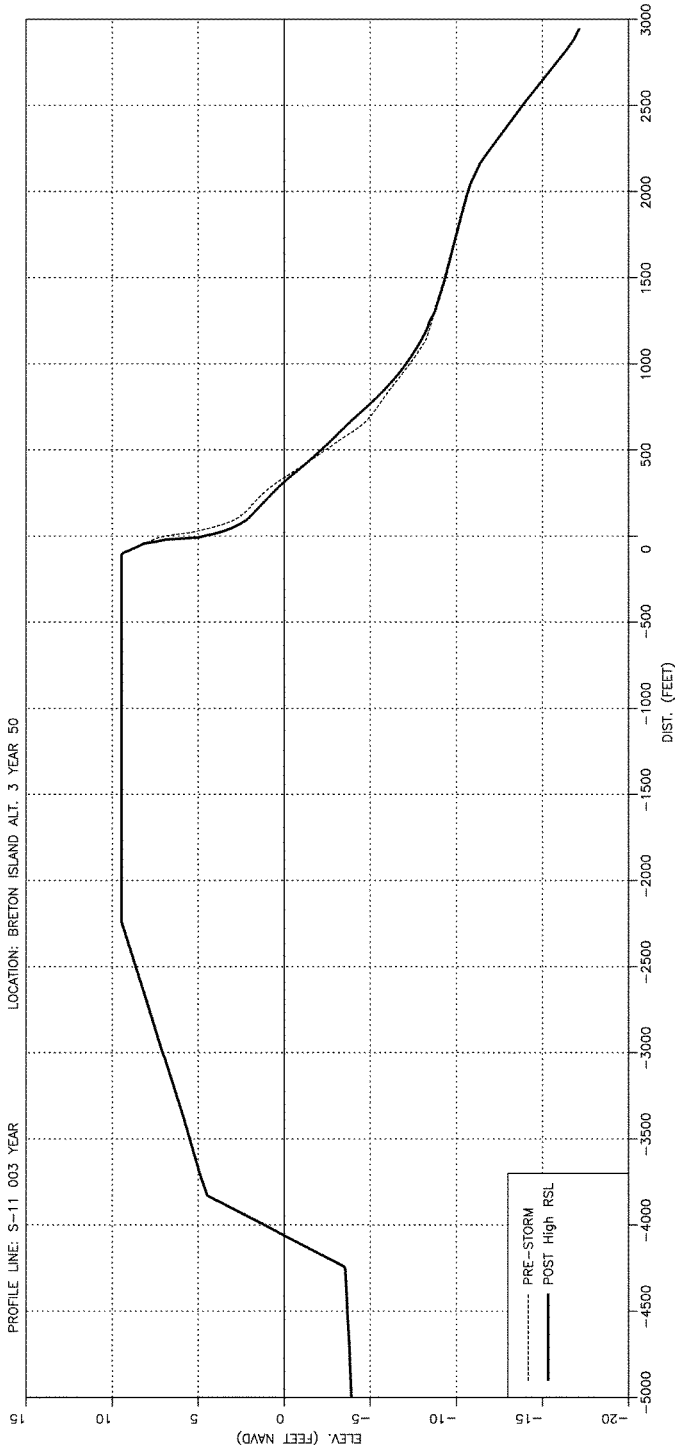

PROFILE LINE: S-11 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
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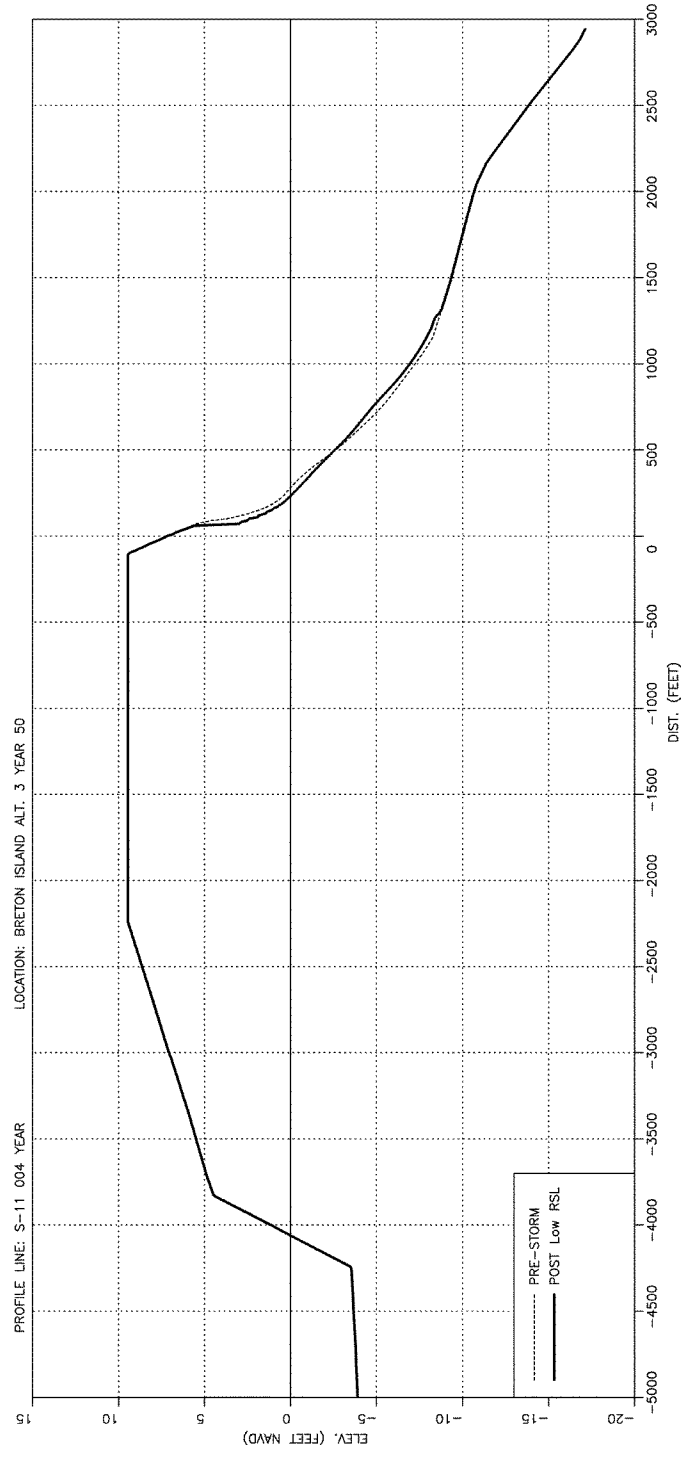

PROFILE LINE: S-11 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
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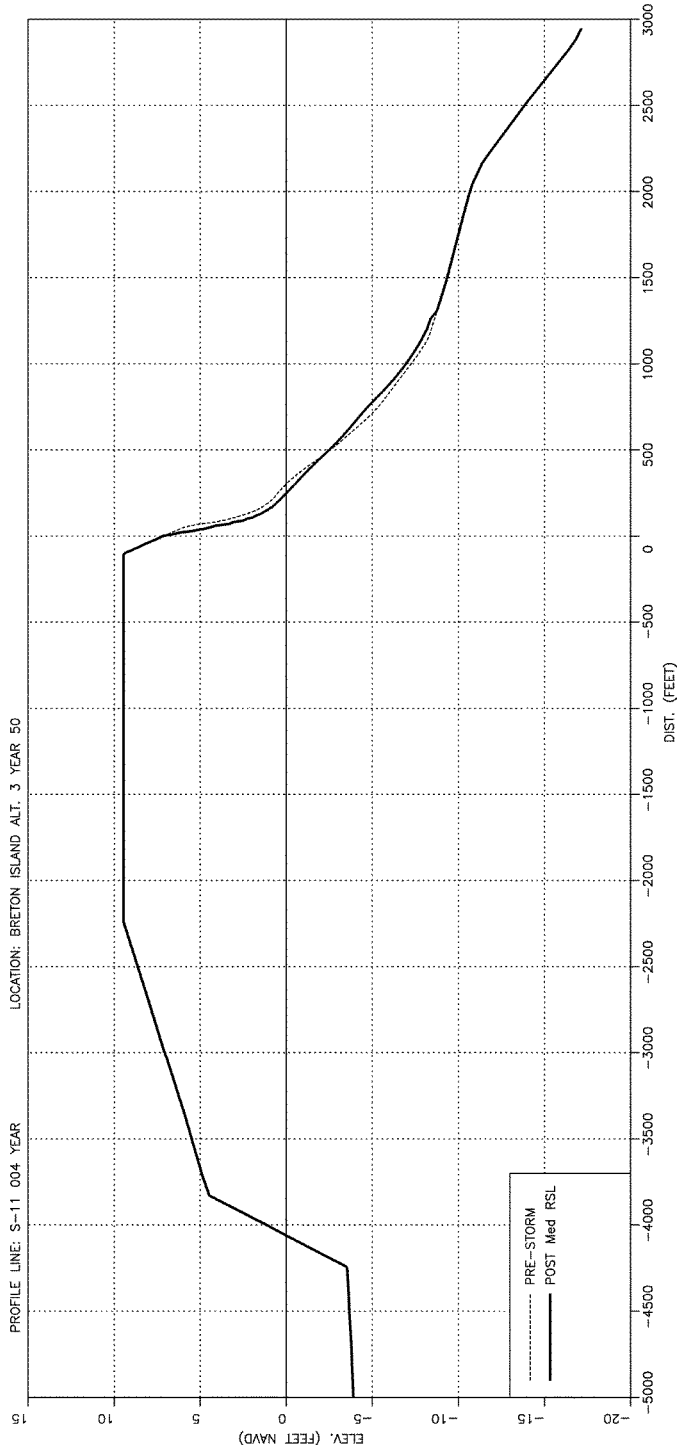

PROFILE LINE: S-11 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
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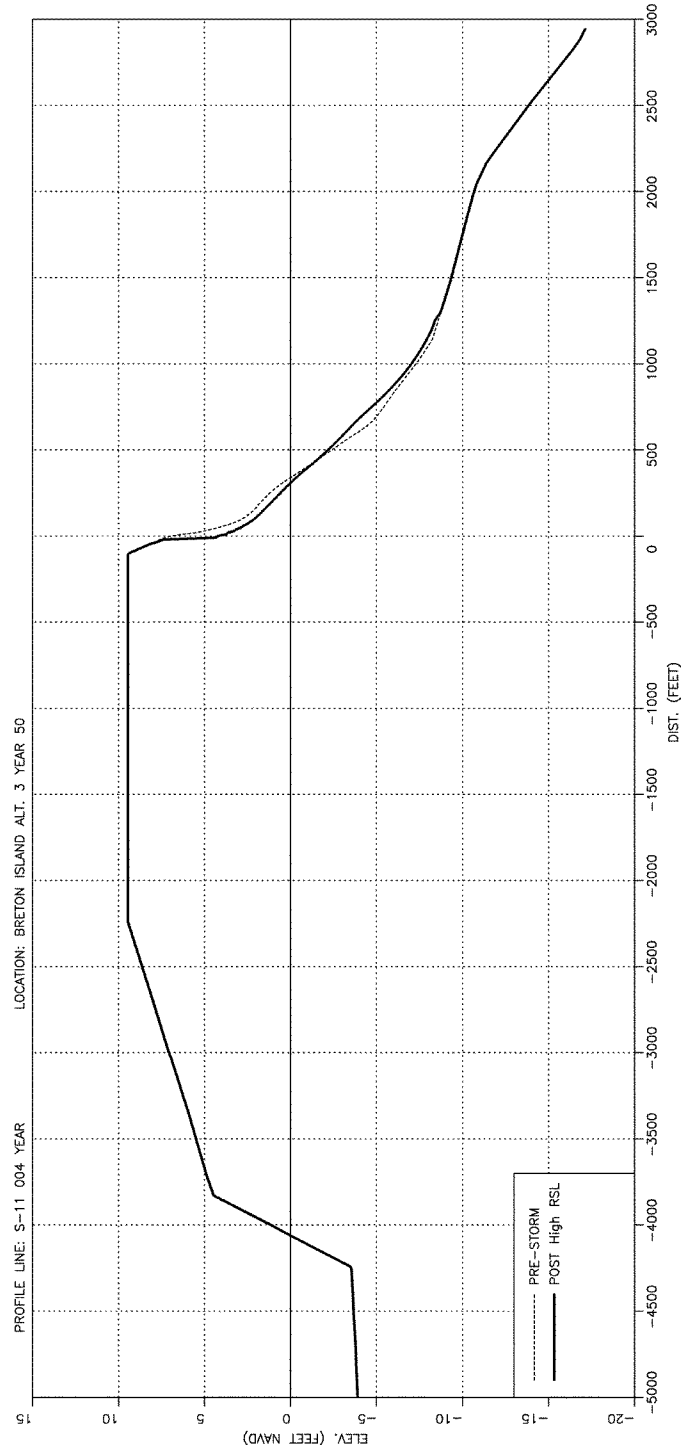

PROFILE LINE: S-11 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
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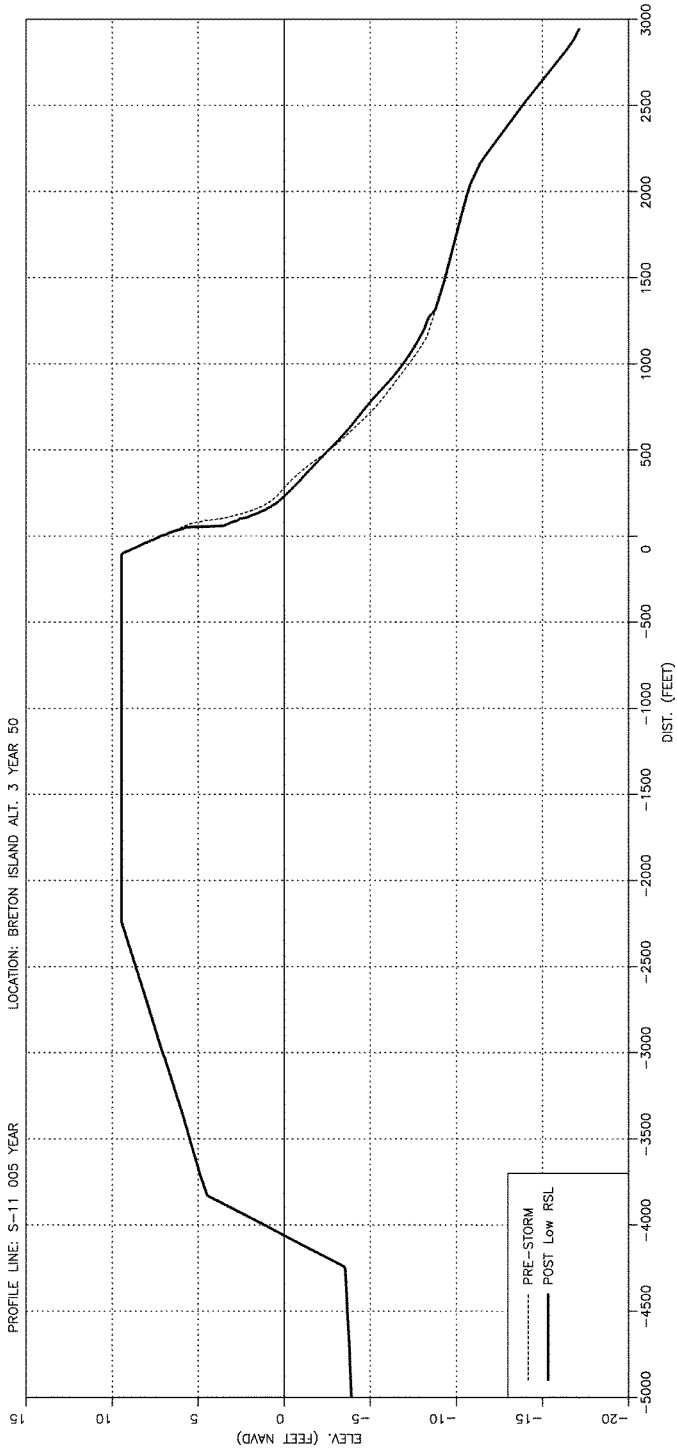

PROFILE LINE: S-11 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
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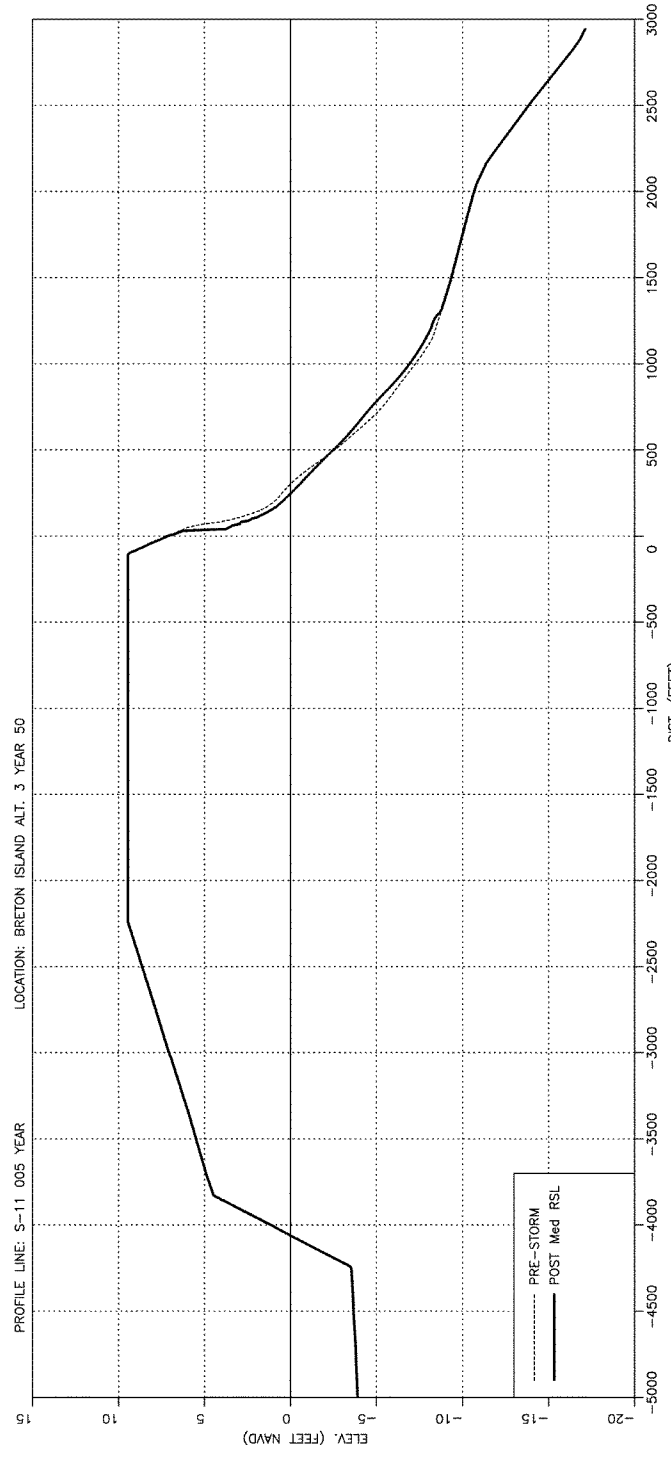

PROFILE LINE: S-11 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
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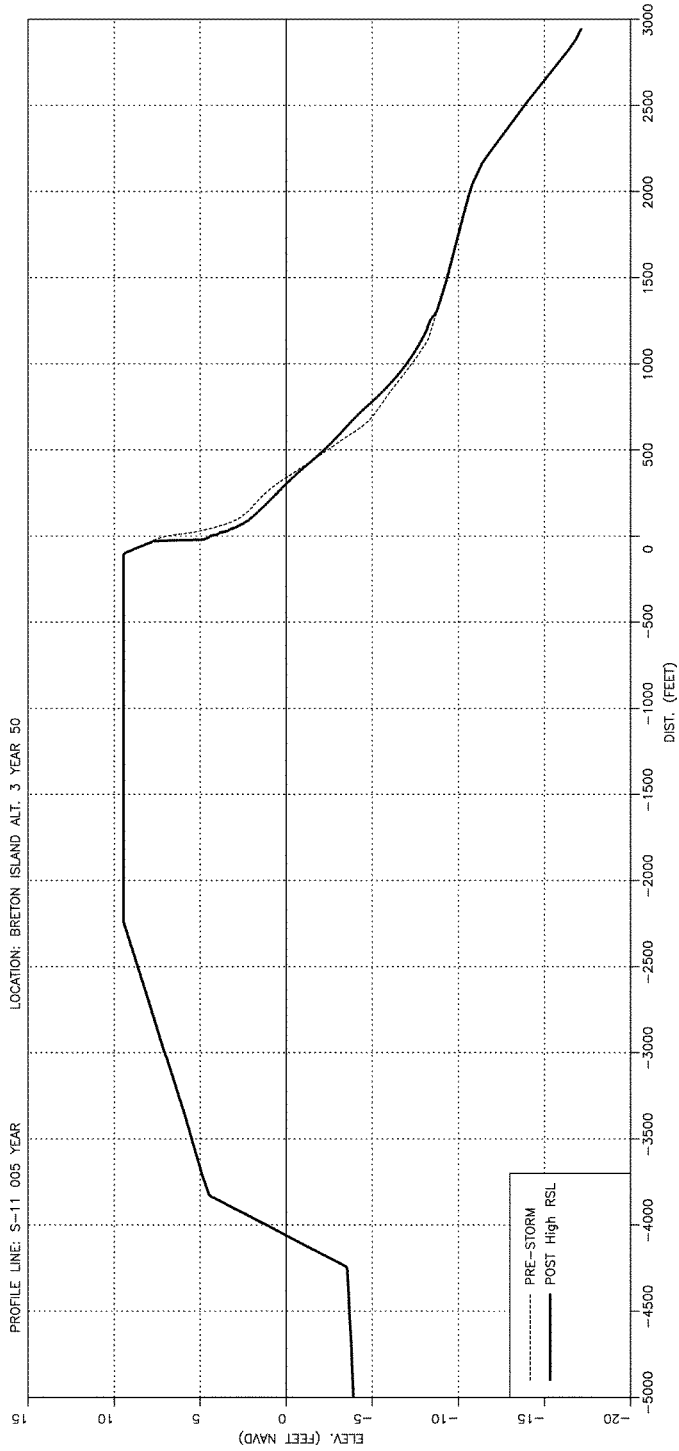

PROFILE LINE: S-11 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
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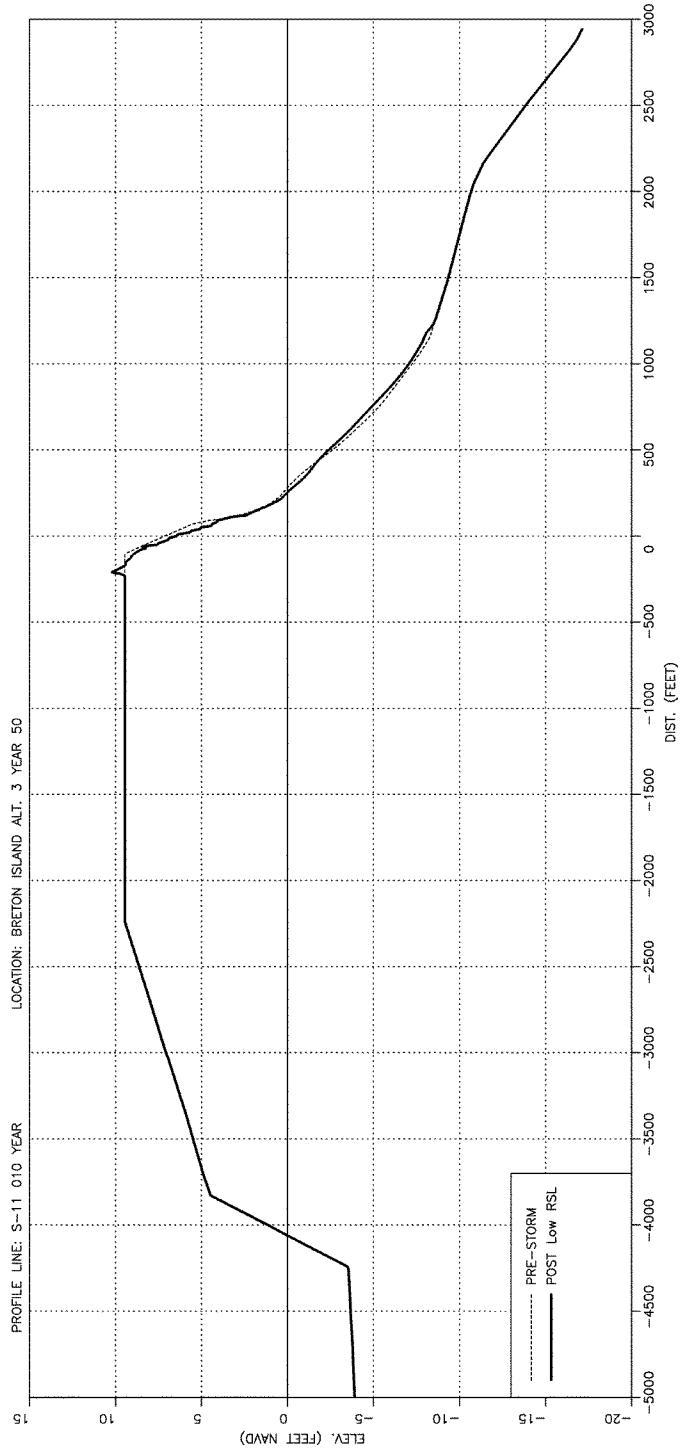

PROFILE LINE: S-11 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
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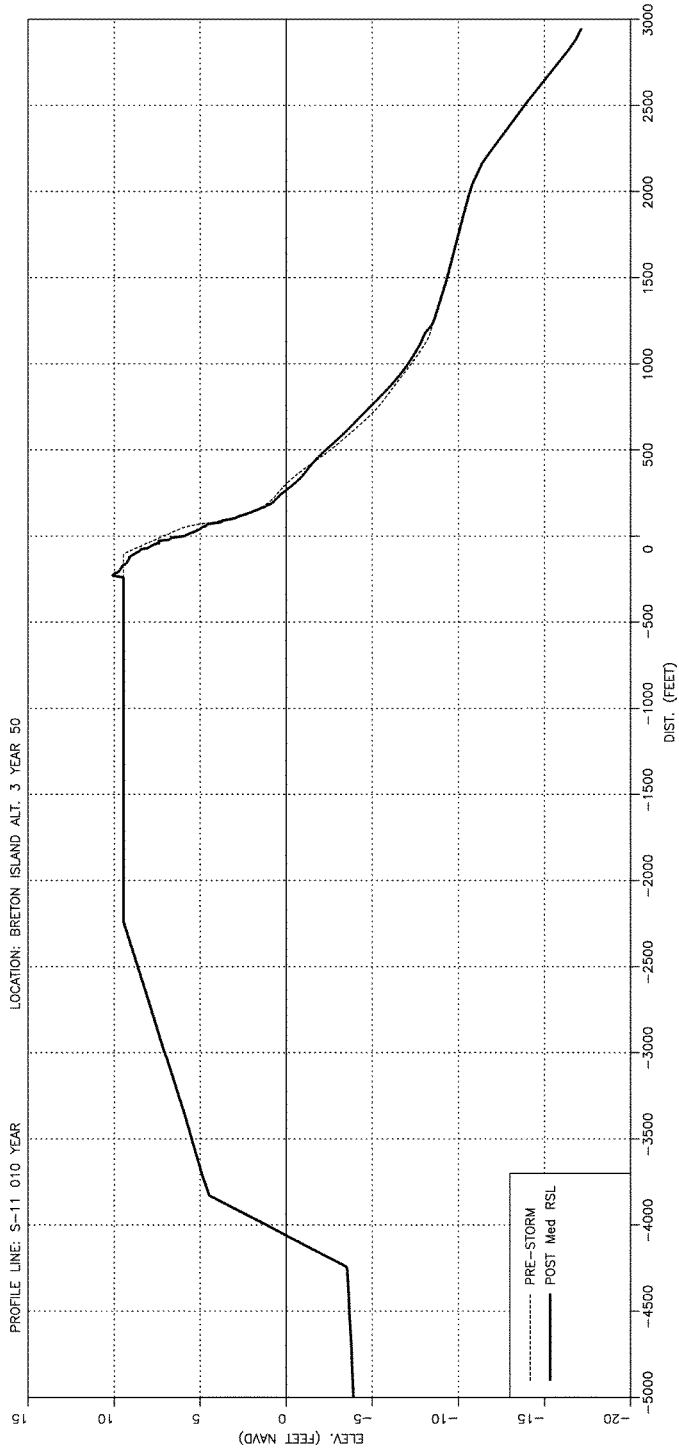

PROFILE LINE: S-11 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
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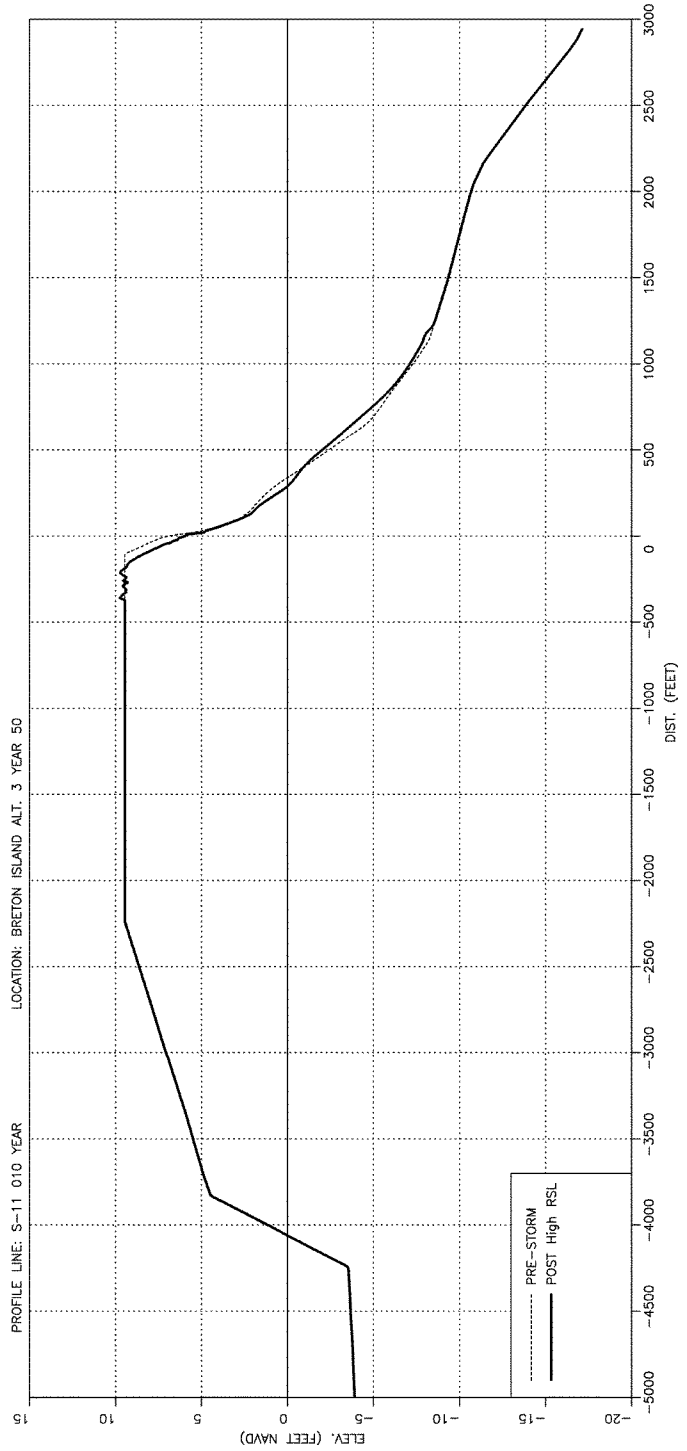

PROFILE LINE: S-11 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
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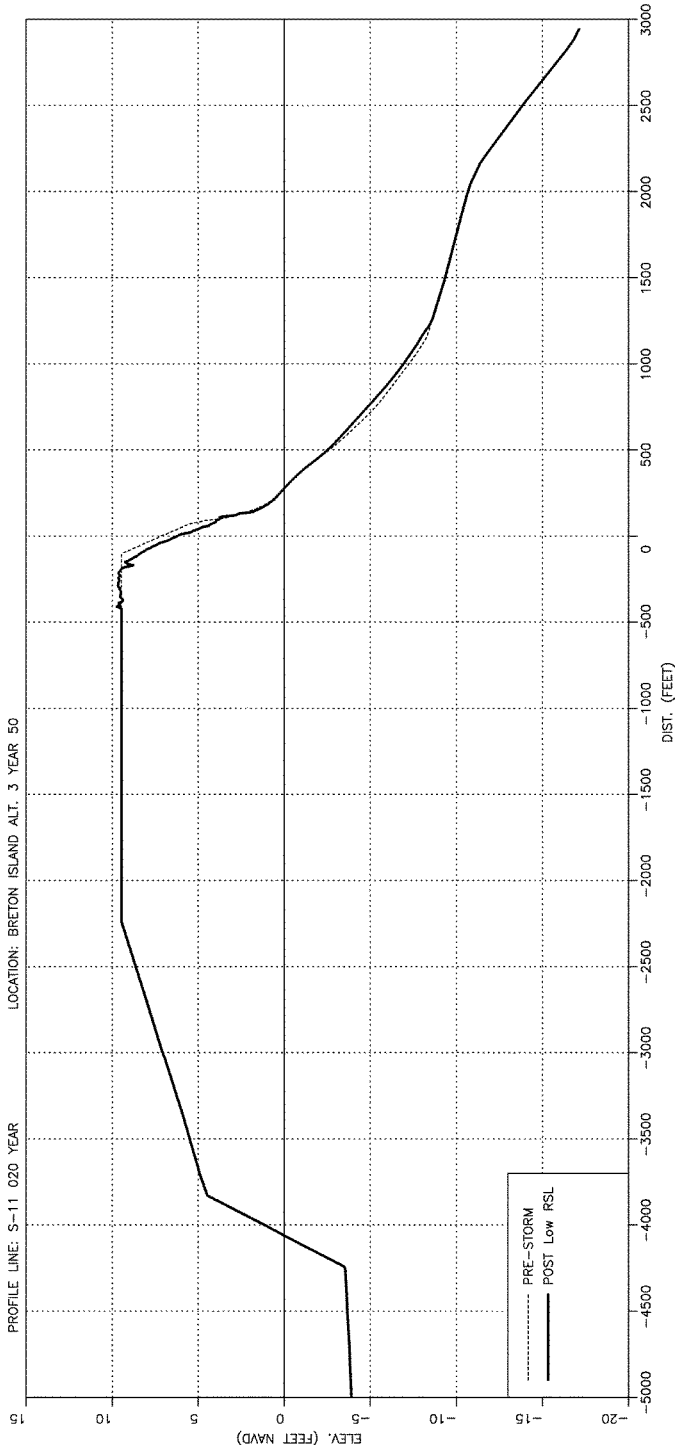

PROFILE LINE: S-11 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
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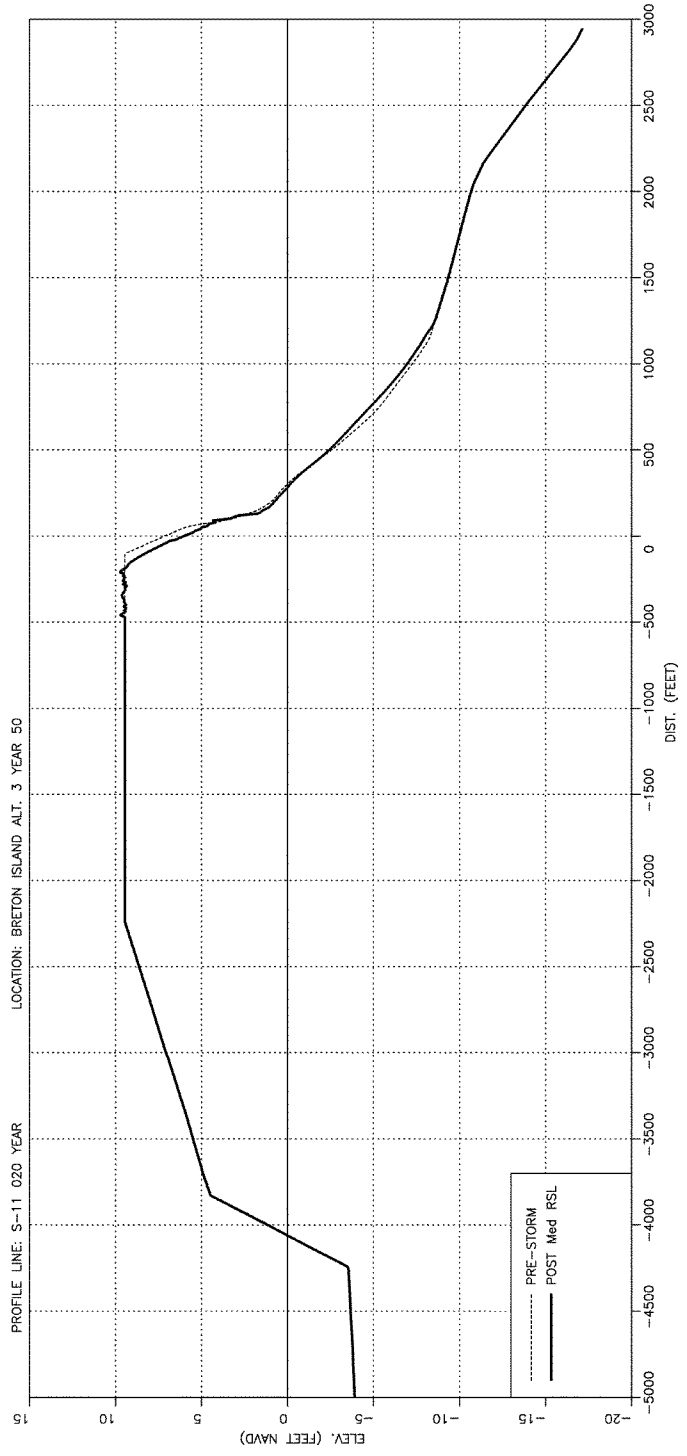

PROFILE LINE: S-11 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
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2500
3000

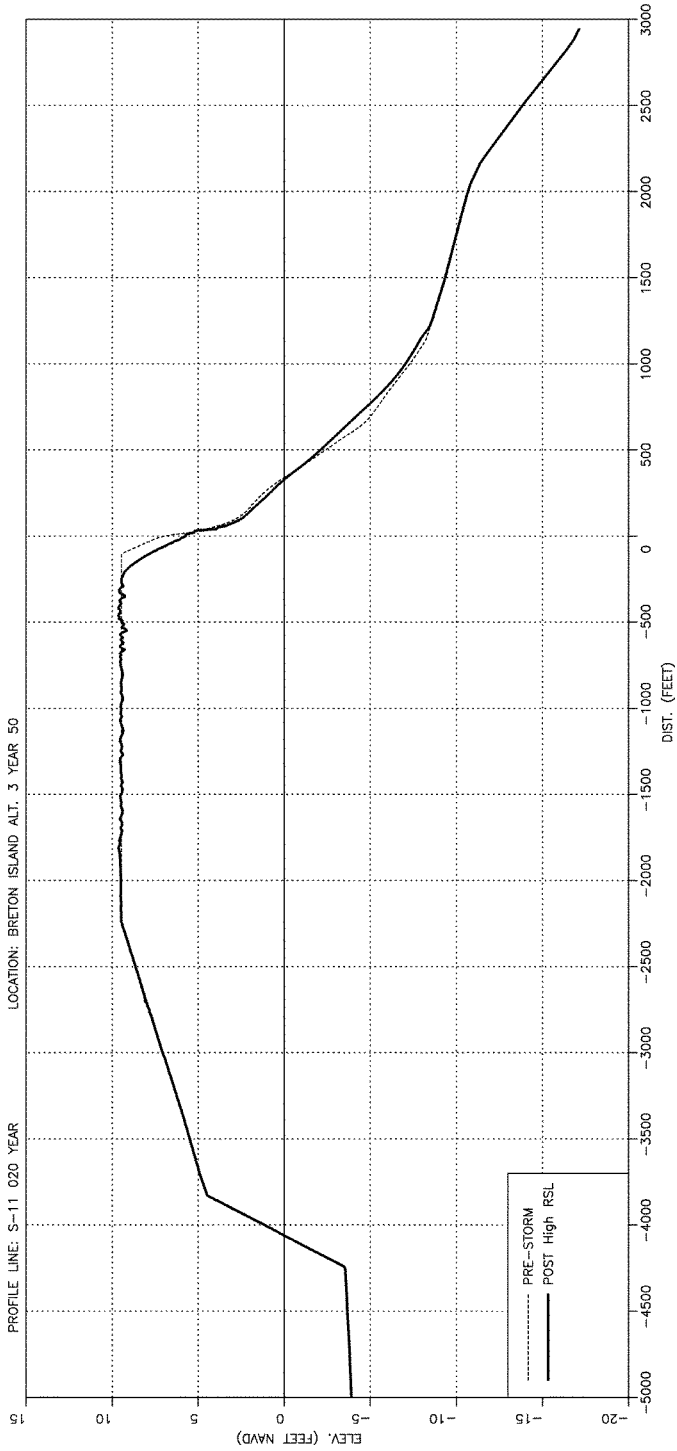

PROFILE LINE: S-11 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

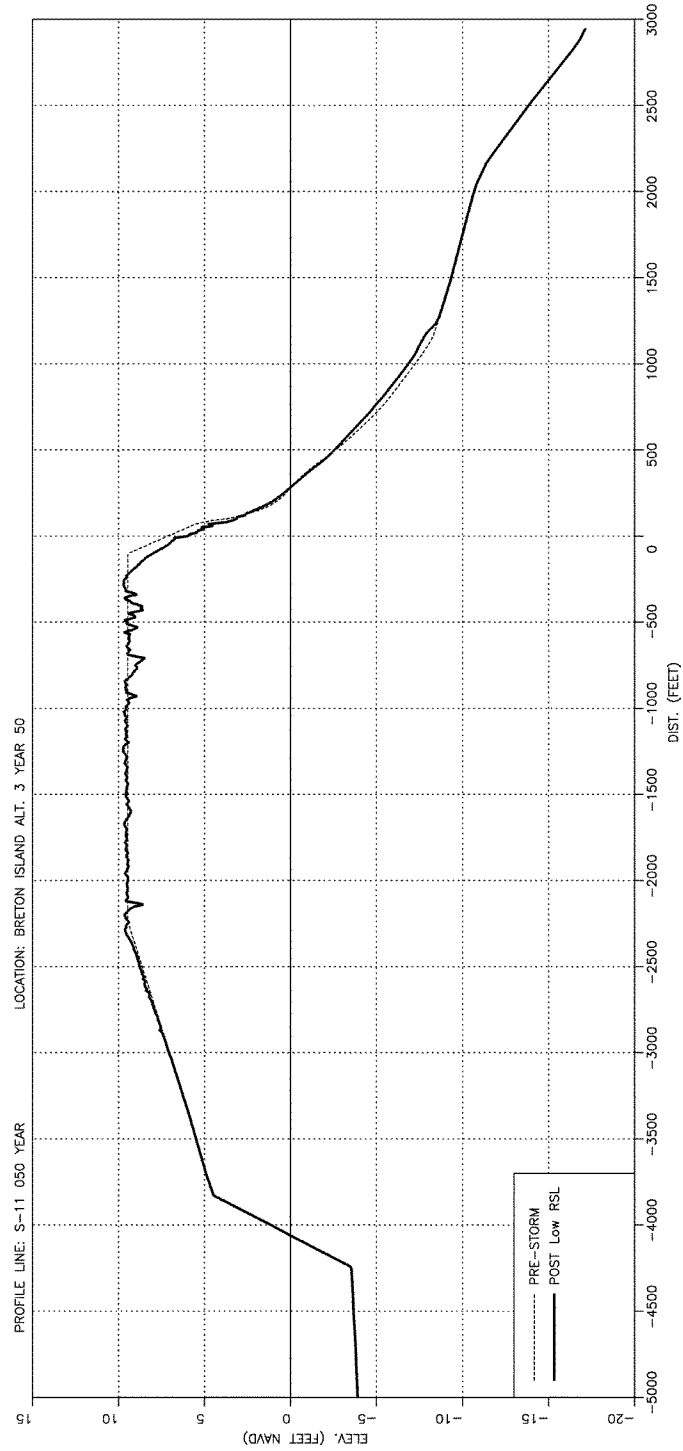

PROFILE LINE: S-11 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

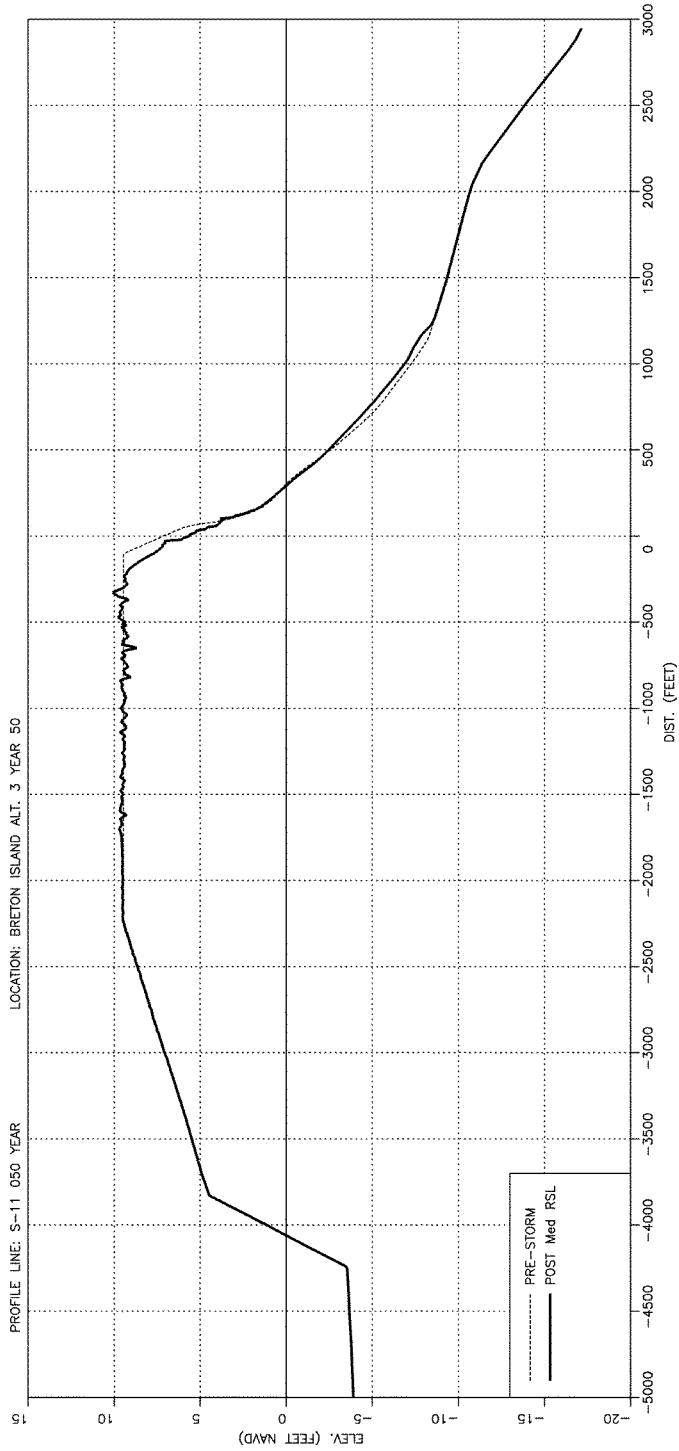

PROFILE LINE: S-11 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

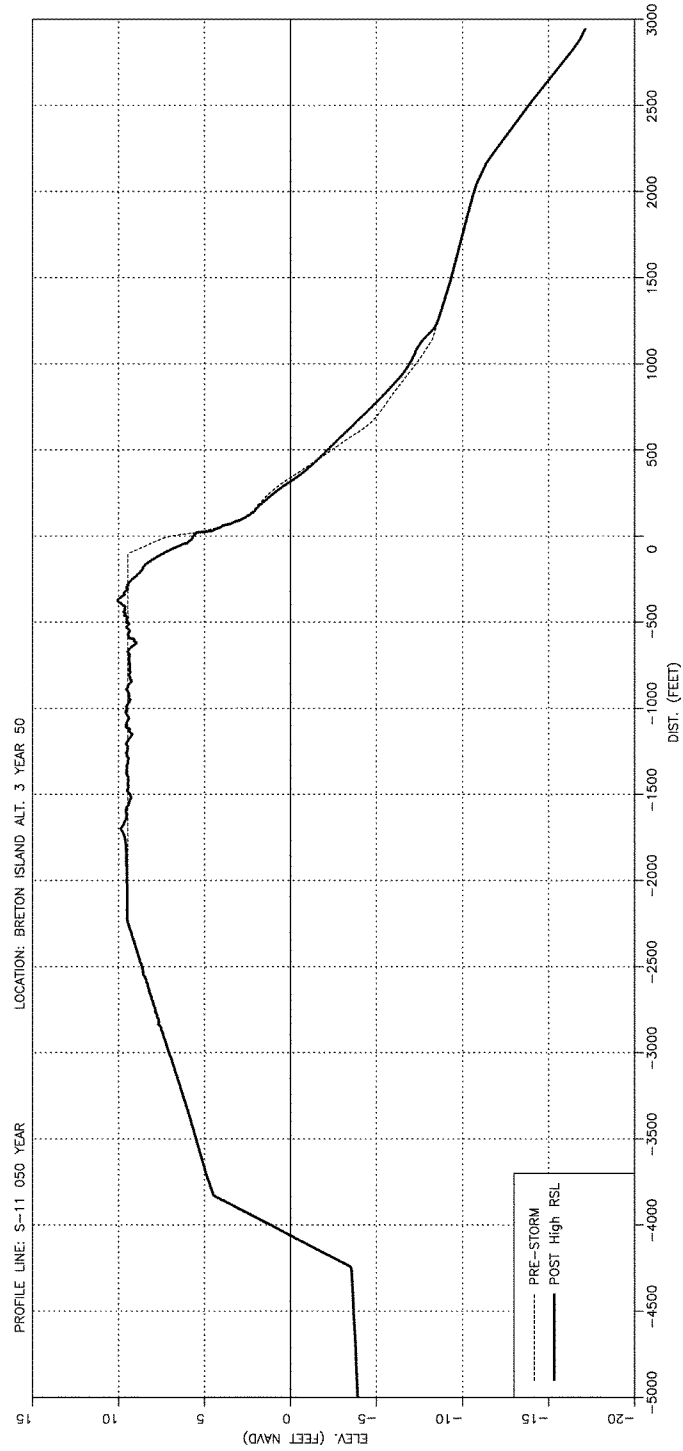

PROFILE LINE: S-11 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

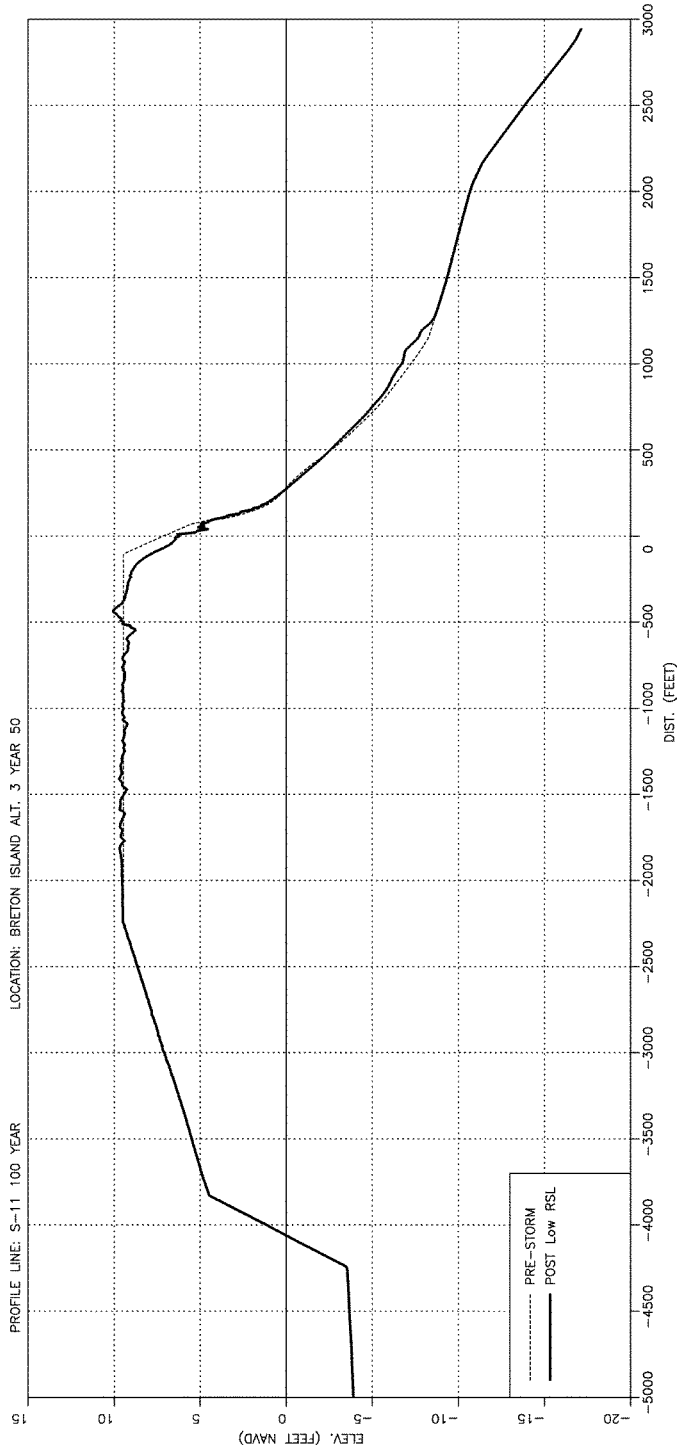

PROFILE LINE: S-11 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

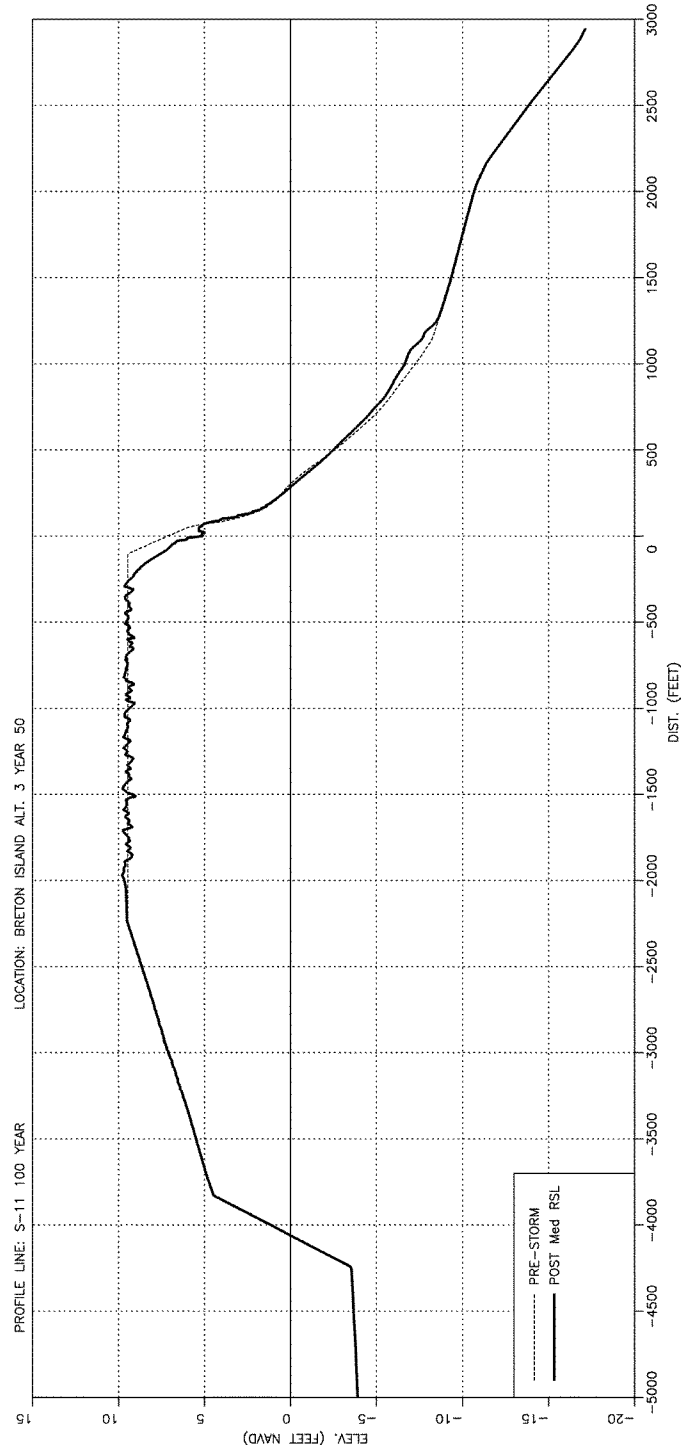

PROFILE LINE: S-11 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
PRE-STORM
POST High RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

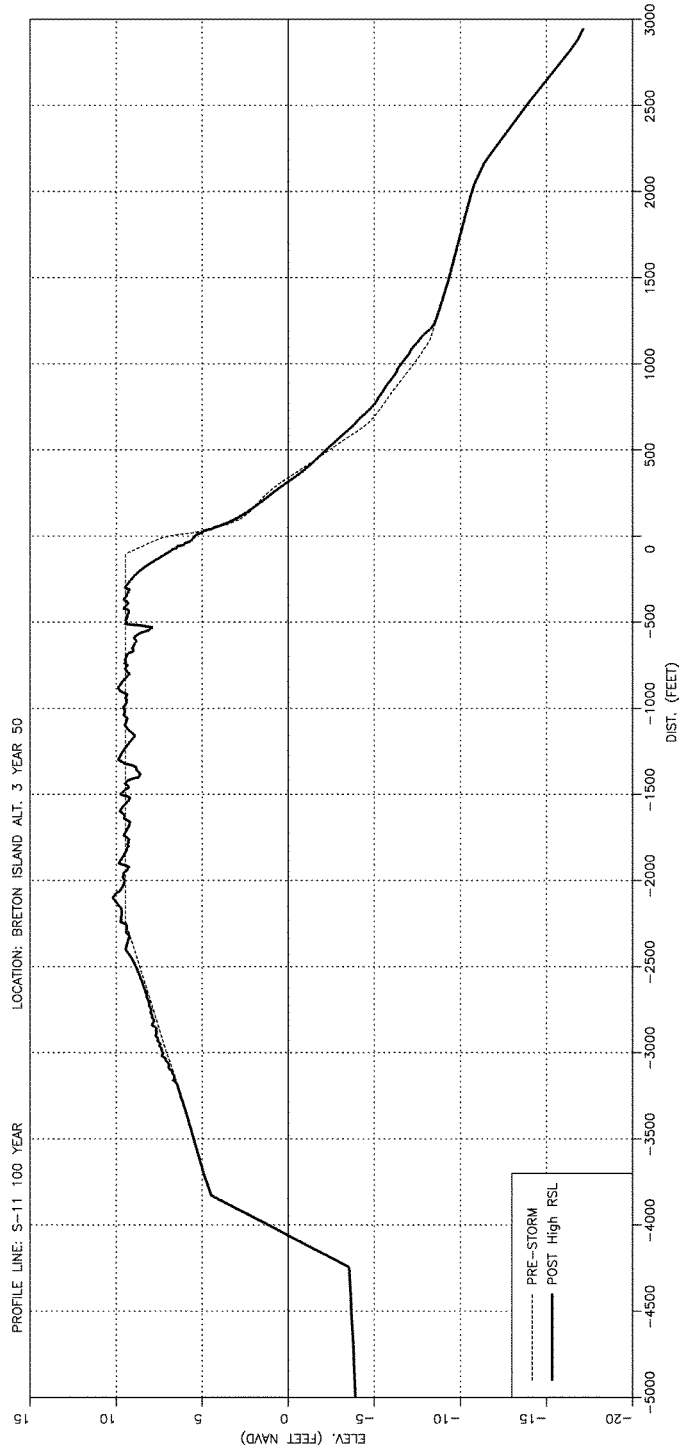

PROFILE LINE: S-11 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST High RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Med RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 50
PRE-STORM
POST High RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

SUB-APPENDIX C-5

SBEACH SENSITIVITY ANALYSIS

General

The sensitivity of the model to the parameters examined during the model calibration is summarized in Table C-5-1.

Transport Rate Coefficient

The sensitivity of the SBEACH model to the Transport Rate Coefficient is examined in calibration runs 1, 2, 3, and also in runs 9 and 10. Changing this parameter did not substantially alter the average shoreline change. When the surf zone depth was set to 1 foot, the moderate value of the Transport Rate Coefficient (1.5×10^{-6} m^4/N) produced the highest overwash. However, when the surf zone depth was set to 1.6 feet, the higher value of the Transport Rate Coefficient (1.5×10^{-6} m^4/N) produced the most overwash.

Overwash Coefficient

The default value of the Overwash Coefficient is 0.005, and the maximum recommended value is 0.008. However, higher values (0.01) have been used in Louisiana (CPE, 2009, p. E-6). Increasing the Overwash Coefficient to a very high value (0.02) raised the average overwash to 7.1 c.y./foot. This value was almost twice its observed value. Accordingly, the default value of the Overwash Coefficient was used in the final calibration run and the future conditions simulations.

Slope Dependent Term

In calibration runs 1, 4, and 5, increasing the Slope Dependent Term increased the average shoreline retreat and the amount of overwash. However, the influence of the Slope Dependent Term diminished when the parameter was greater than its median value of 0.003. For this reason, variation of this parameter alone was not enough to increase the shoreline retreat to its observed range.

Transport Decay Multiplier

In calibration runs 6 and 7, changing the Transport Decay Multiplier had little influence on the results.

Landward Surf Zone Depth

Increasing the Landward Surf Zone Depth to 1.6 feet substantially increased the amount of shoreline change, raising it to the observed range.

Grain Size

An 11^{th} simulation was conducted using a grain size of 0.30 mm. This grain size was more typical of the majority of settings in which SBEACH is used (i.e.: Florida Gulf Coast, U.S. Atlantic Coast). All other parameters used in this simulation were equal to those of simulation

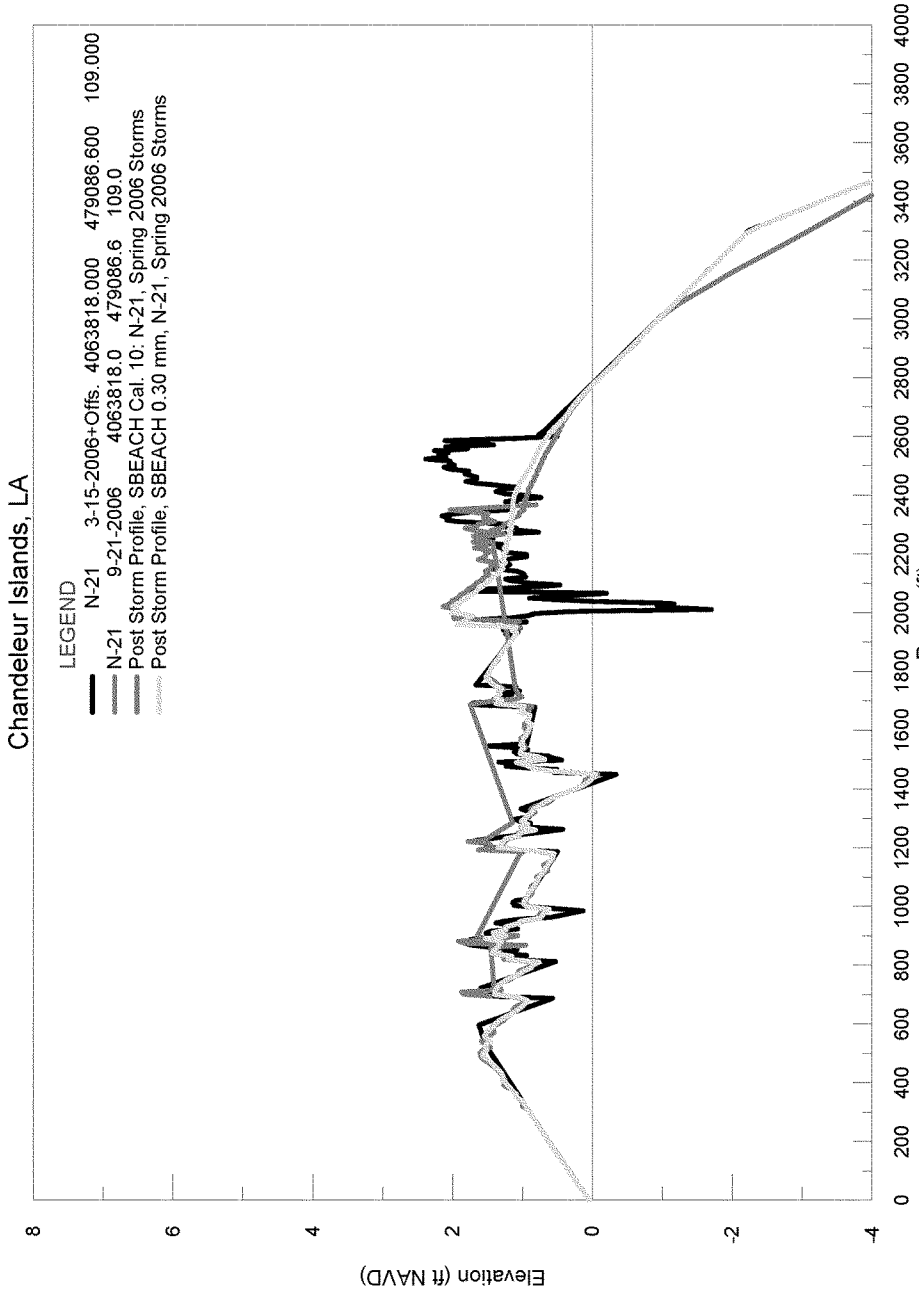
10. The objective of the 11th simulation was to evaluate whether a substantial increase in grain size would steepen the slope of the seaward dune face, and bring it closer to the observed slope above +1 feet NAVD. The results on profile N-21 appear at the end of this Sub-Appendix. Increasing the grain size to 0.30 mm did not steepen the post-storm dune slopes.

A more typical variation of the grain size on the Chandeleur Islands would be in the 0.10 to 0.15 mm range. However, based on the results on profile N-21, the post-storm dune slope did not appear to change substantially with a large alteration of the grain size. Therefore, a smaller alteration of the grain size (i.e. to 0.15 mm) was not examined.

TABLE C-5-1

SBEACH SENSITIVITY ANALYSIS
CHANDELEUR ISLANDS SOUTH REACH
(Profiles N-20, N-21, N-25, N-26, N-32, N-36, and N-39)

Cal.	Transport Rate Coef. K (m^4/N)	Overwash Coef. C_o	Slope Dep. Term ε (m^2/s)	Transport Decay Multiplier λ	Landward Surf Zone Depth (feet)	Avalanche Slope (deg.)	Grain Size (mm)	Average Shoreline Change (feet)	Average Overwash (c.y./foot)
MIN	2.50E-07	0.002	0.001	0.1	0.5	15	0.10		
Default	1.50E-06	0.005	0.003	0.3	1.1	53	-N/A-		
Default w/ Overwash	2.50E-06	0.005	0.003	0.3	1.1	53	-N/A-		
MAX	2.50E-06	0.008	0.005	0.5	1.6	90	1.00		
Cal. 1	1.50E-06	0.005	0.003	0.3	1.0	45	0.10	-86	3.5
Cal. 2	2.50E-07	0.005	0.003	0.3	1.0	45	0.10	-92	3.2
Cal. 3	2.50E-06	0.005	0.003	0.3	1.0	45	0.10	-81	3.4
Cal. 4	1.50E-06	0.005	0.001	0.3	1.0	45	0.10	-79	2.3
Cal. 5	1.50E-06	0.005	0.005	0.3	1.0	45	0.10	-103	3.5
Cal. 6	2.50E-07	0.005	0.003	0.1	1.0	45	0.10	-84	3.9
Cal. 7	2.50E-06	0.005	0.003	0.5	1.0	45	0.10	-72	4.1
Cal. 8	1.50E-06	0.020	0.003	0.3	1.0	45	0.10	-55	7.1
Cal. 9	1.50E-06	0.005	0.005	0.3	1.6	45	0.10	-175	2.7
Cal. 10 (Selected)	2.50E-06	0.005	0.005	0.3	1.6	45	0.10	-171	3.7
Observed								-172	3.8


Chandeleur Islands, LA
LEGEND
N-21 3-15-2006+Offs. 4063818.000 479086.600 109.000
N-21 9-21-2006 4063818.0 479086.6 109.0
Post Storm Profile, SBEACH Cal. 10: N-21, Spring 2006 Storms
Post Storm Profile, SBEACH 0.30 mm, N-21, Spring 2006 Storms
Elevation (ft NAVD)
8
6
4
2
0
-2
-4
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200 3400 3600 3800 4000
Range (ft)

SUB-APPENDIX C-6

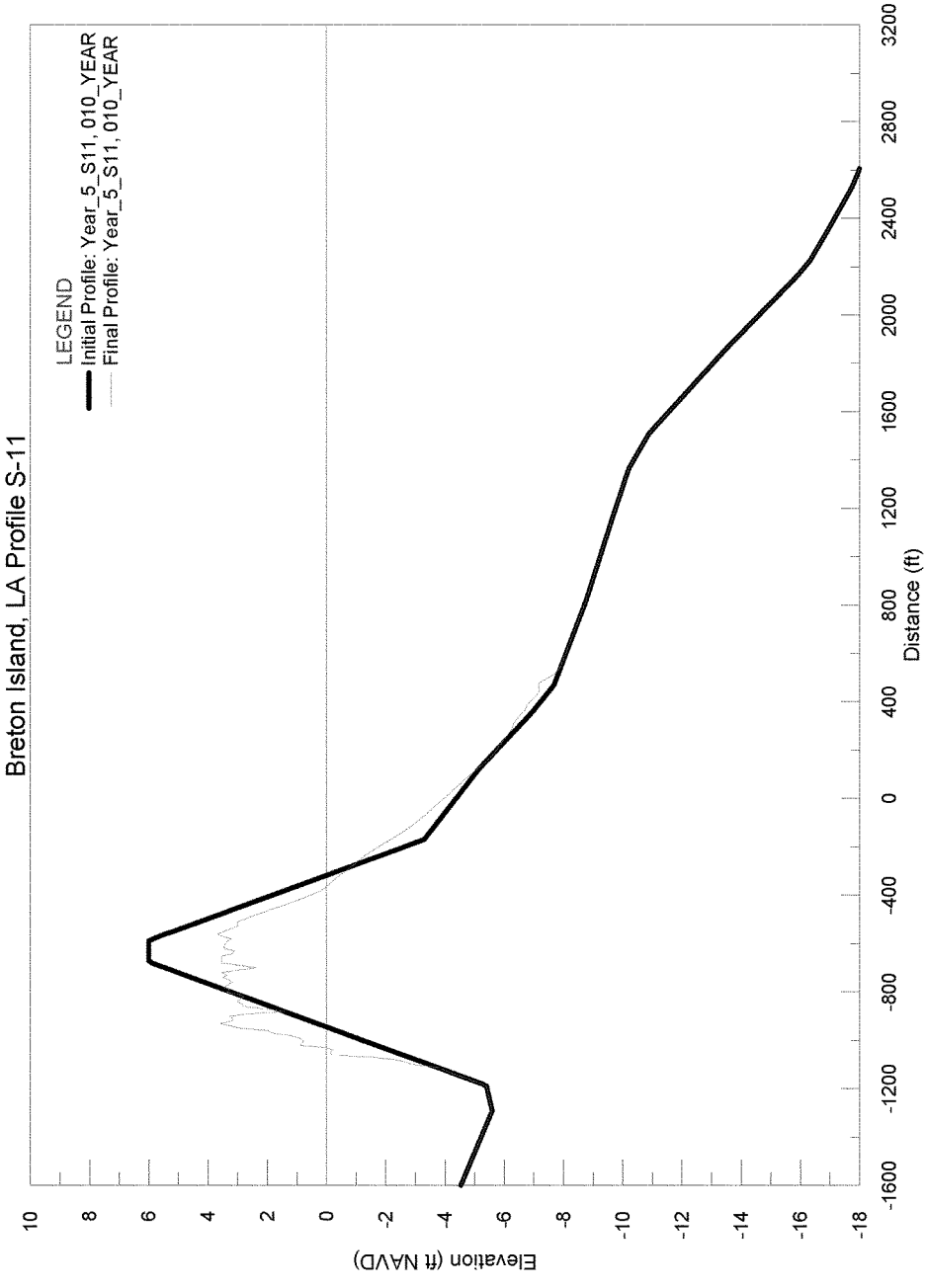
BRETON ISLAND RESULTS USING ERODED PROFILES AS INPUT

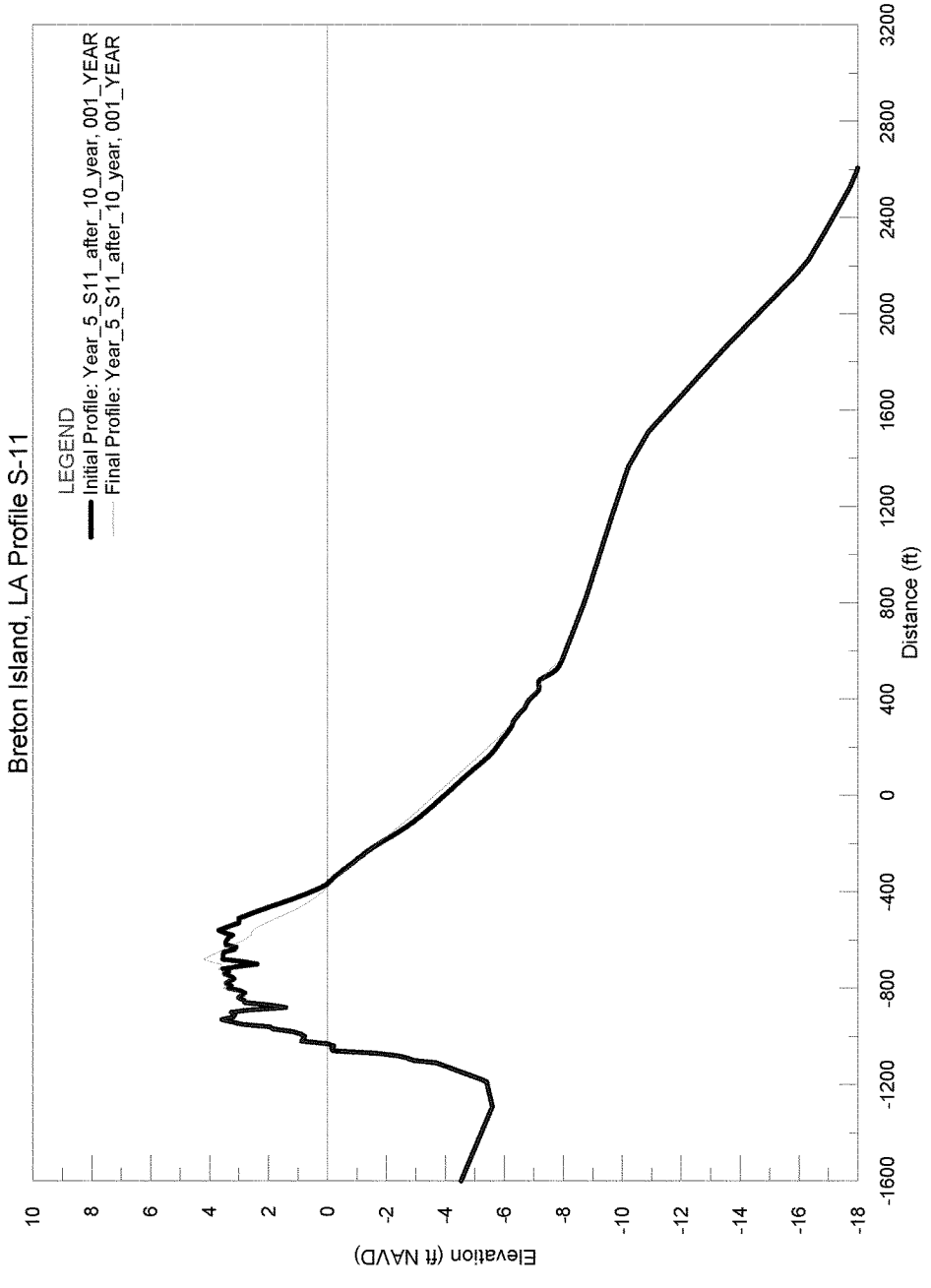
BRETON ISLAND ALTERNATIVES 2 & 3 ONLY

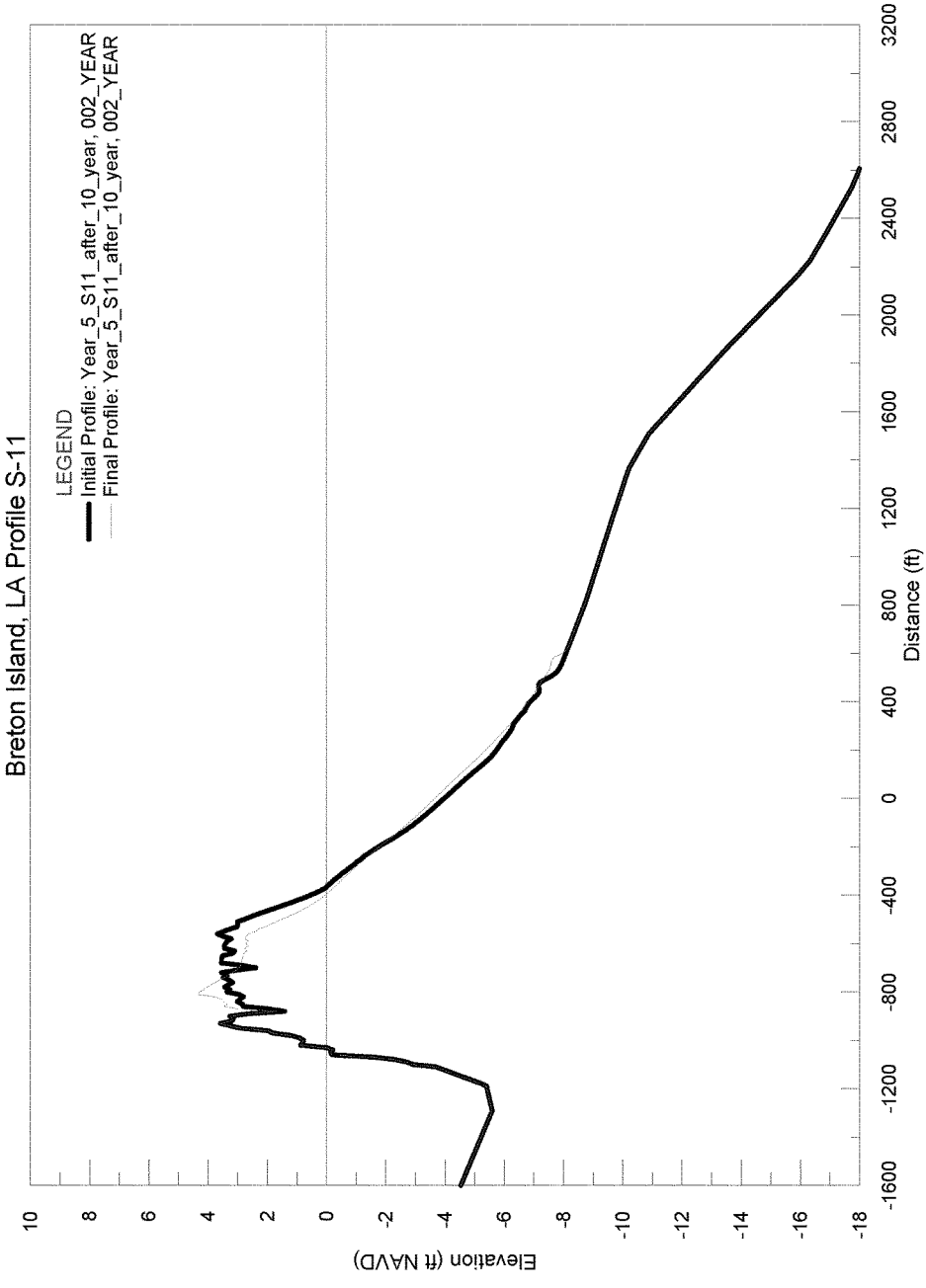
(Profiles are presented in electronic PDF format only)

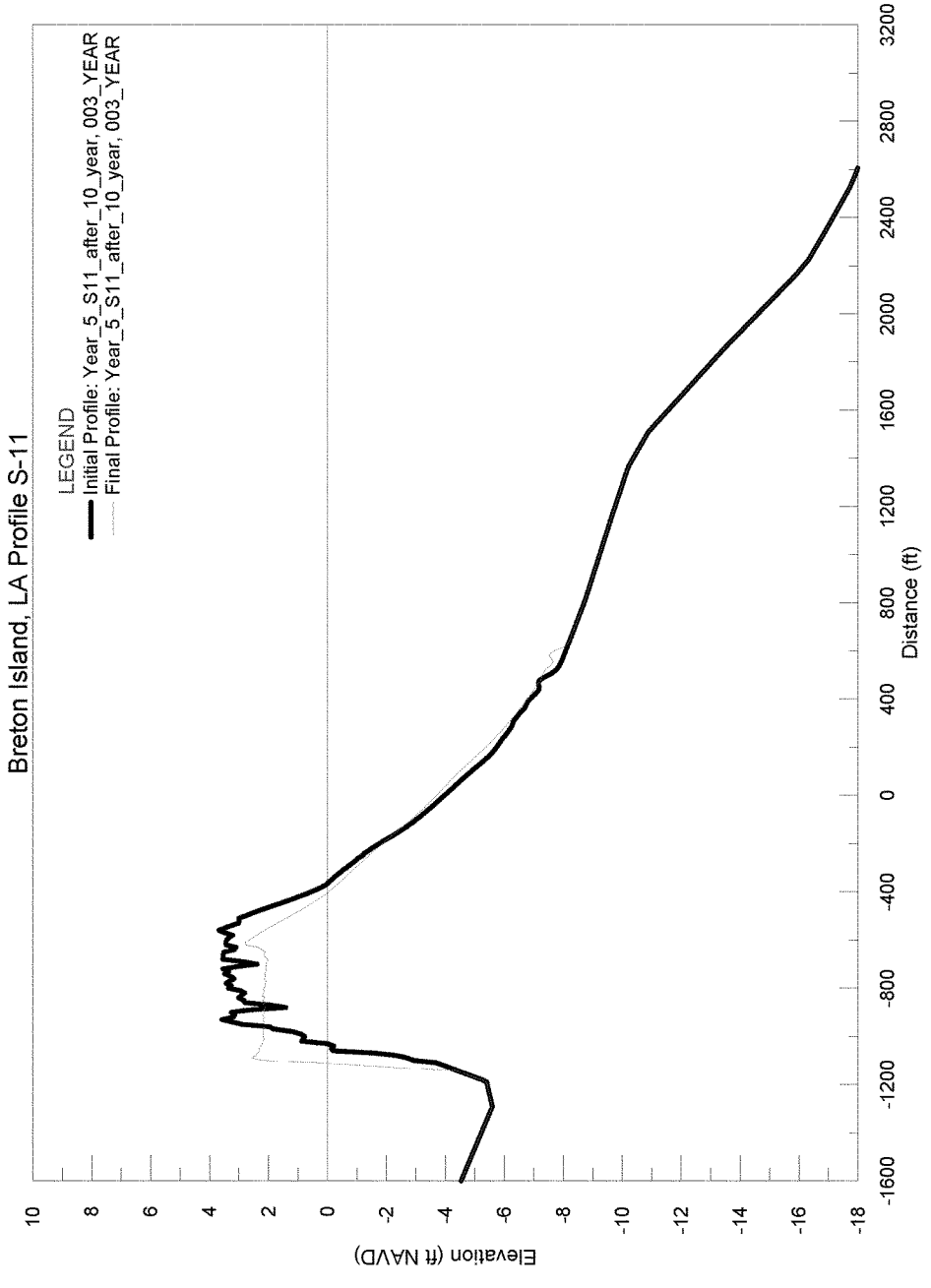
Breton Island Profile S-11

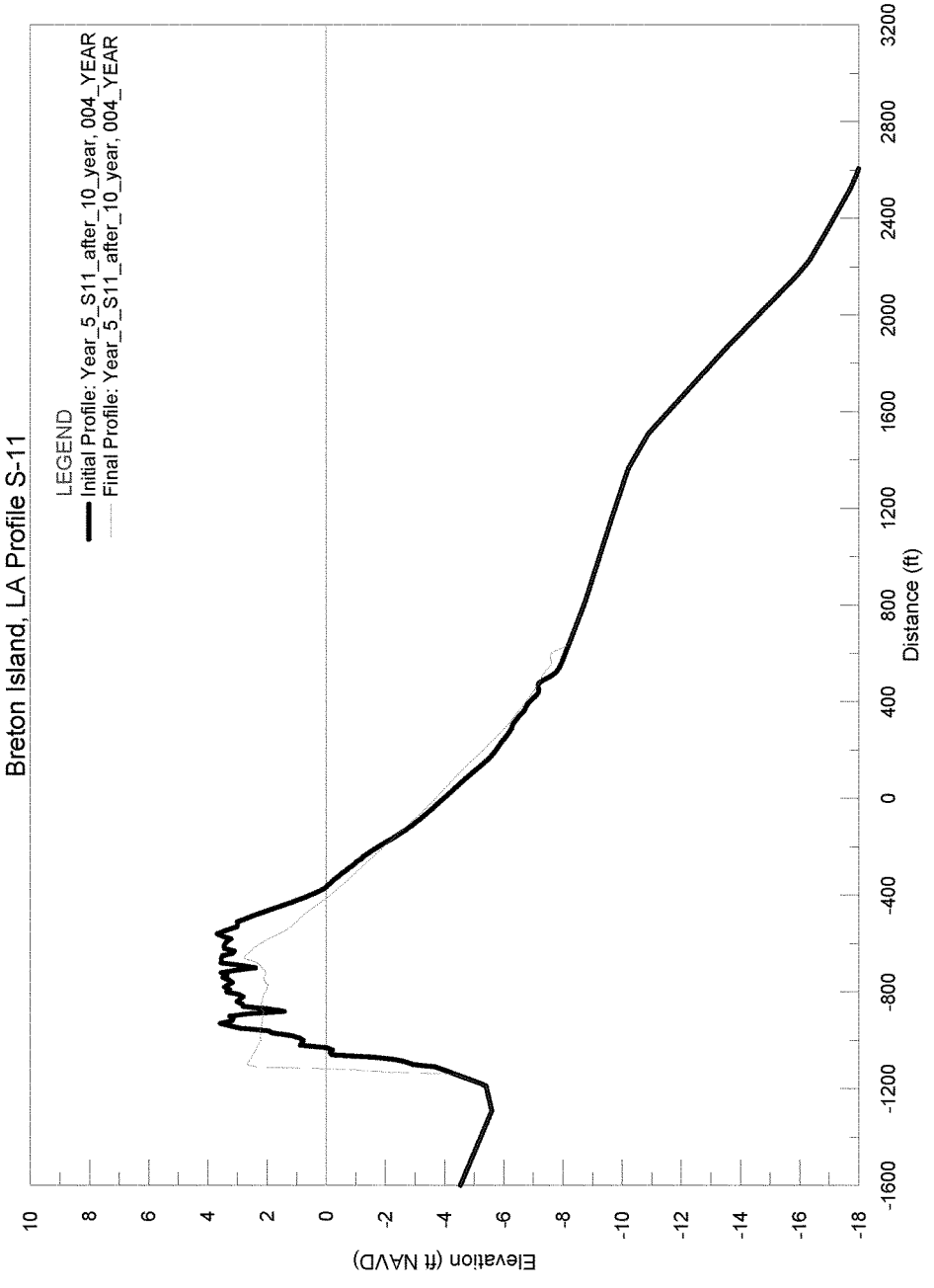
Alternative 2

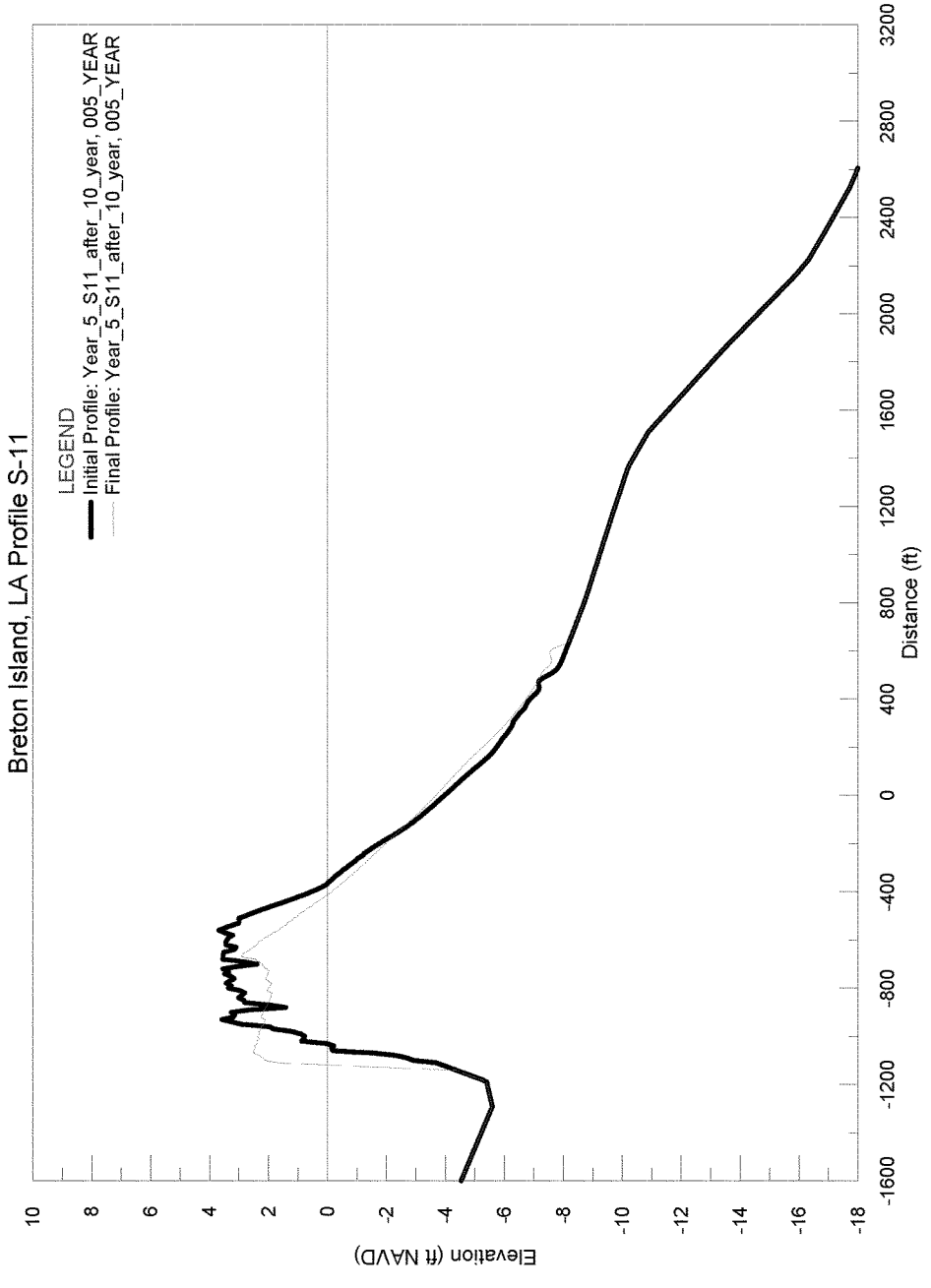

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11, 010_YEAR
Final Profile: Year_5_S11, 010_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

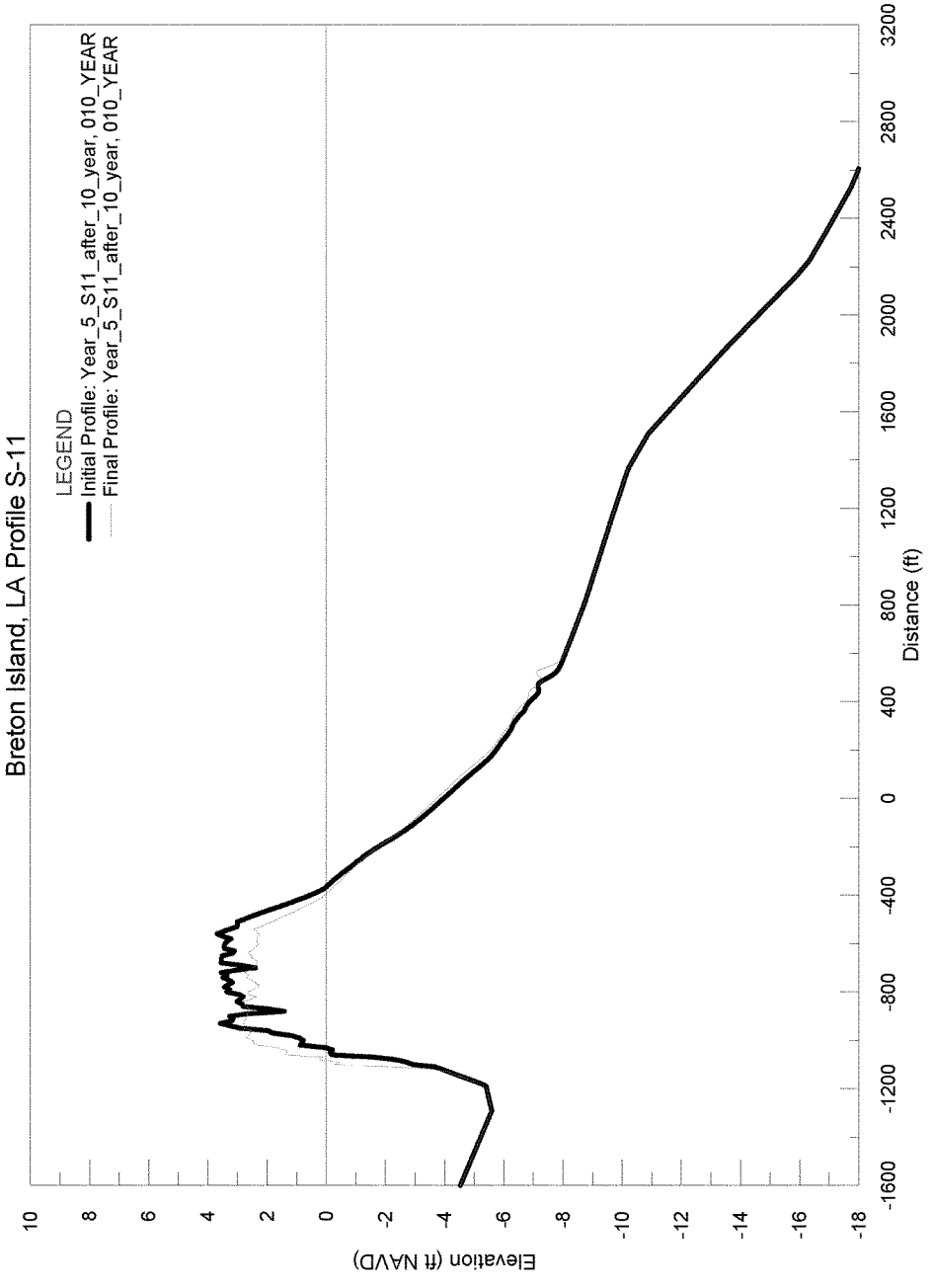

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 001_YEAR
Final Profile: Year_5_S11_after_10_year, 001_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

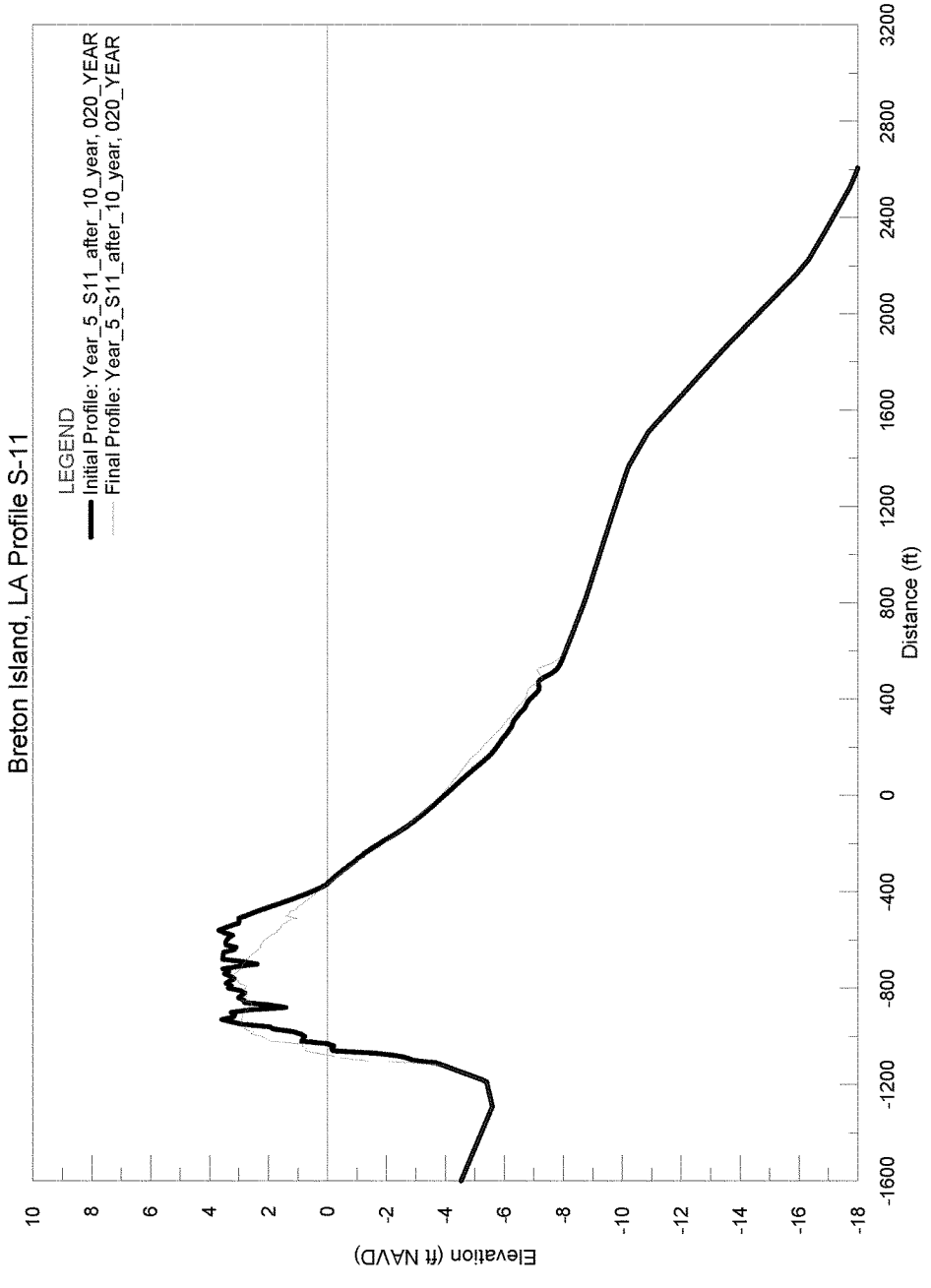

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 002_YEAR
Final Profile: Year_5_S11_after_10_year, 002_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

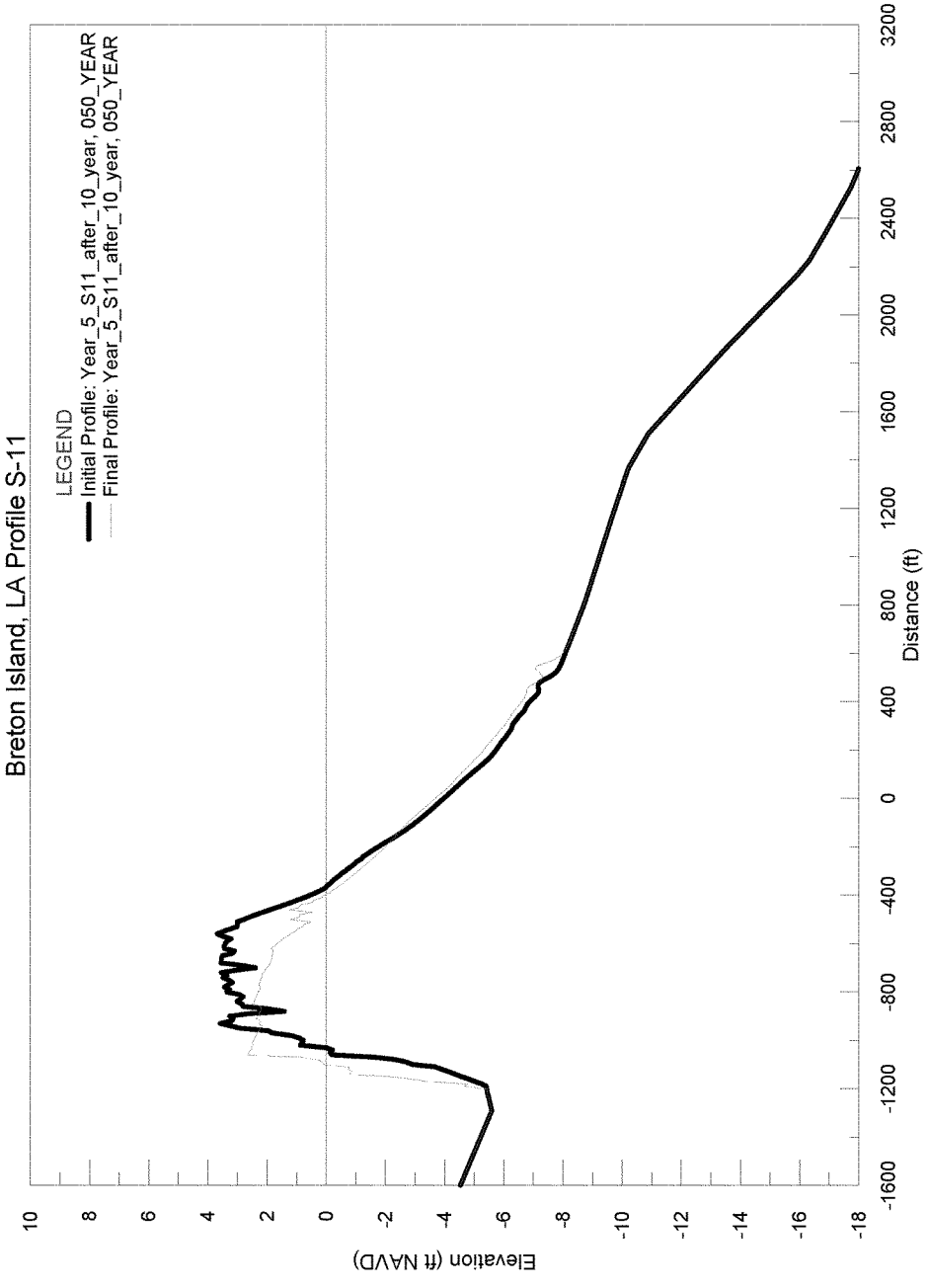

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 003_YEAR
Final Profile: Year_5_S11_after_10_year, 003_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

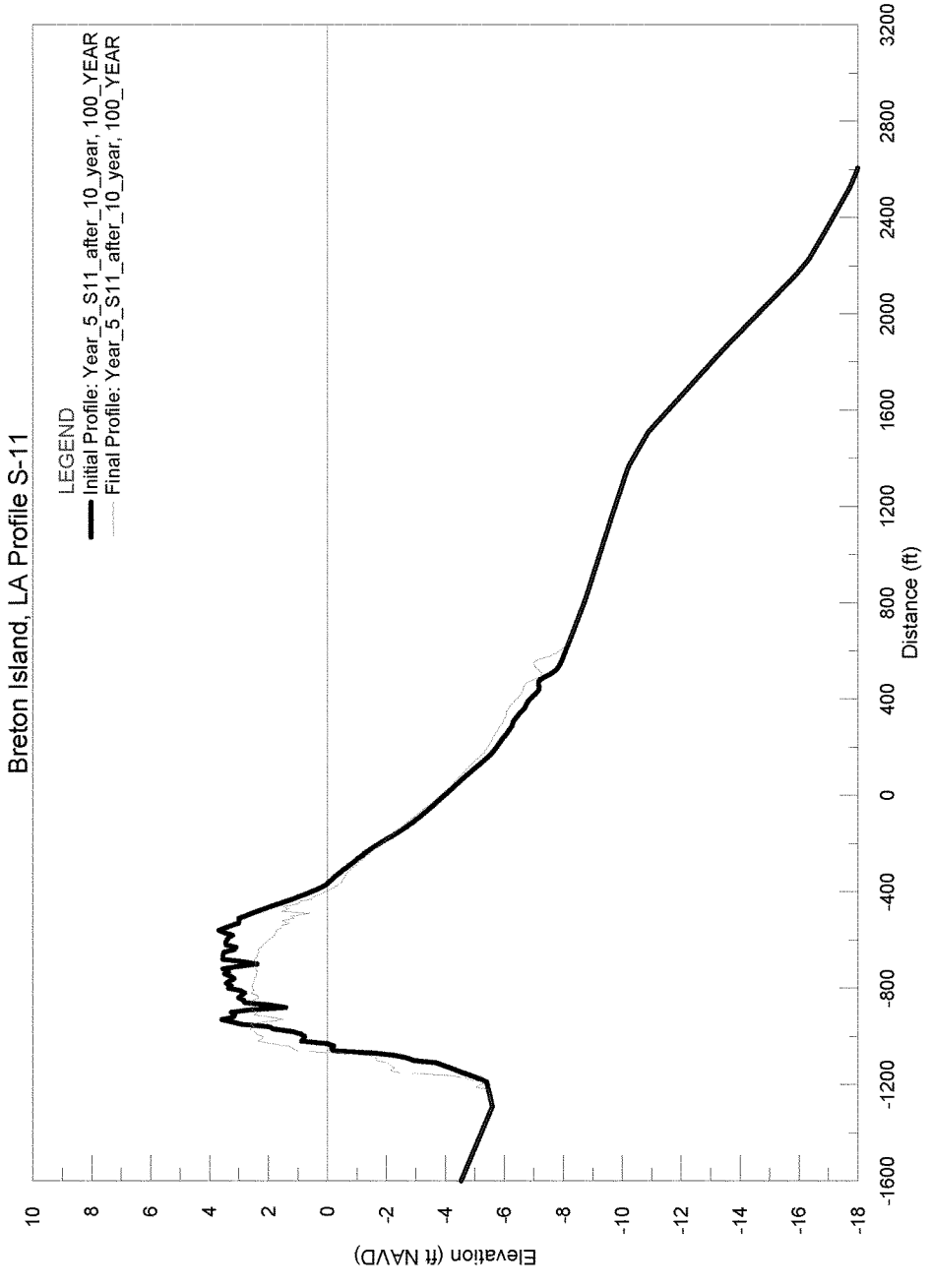

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 004_YEAR
Final Profile: Year_5_S11_after_10_year, 004_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)


Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 005_YEAR
Final Profile: Year_5_S11_after_10_year, 005_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)


Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 010_YEAR
Final Profile: Year_5_S11_after_10_year, 010_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

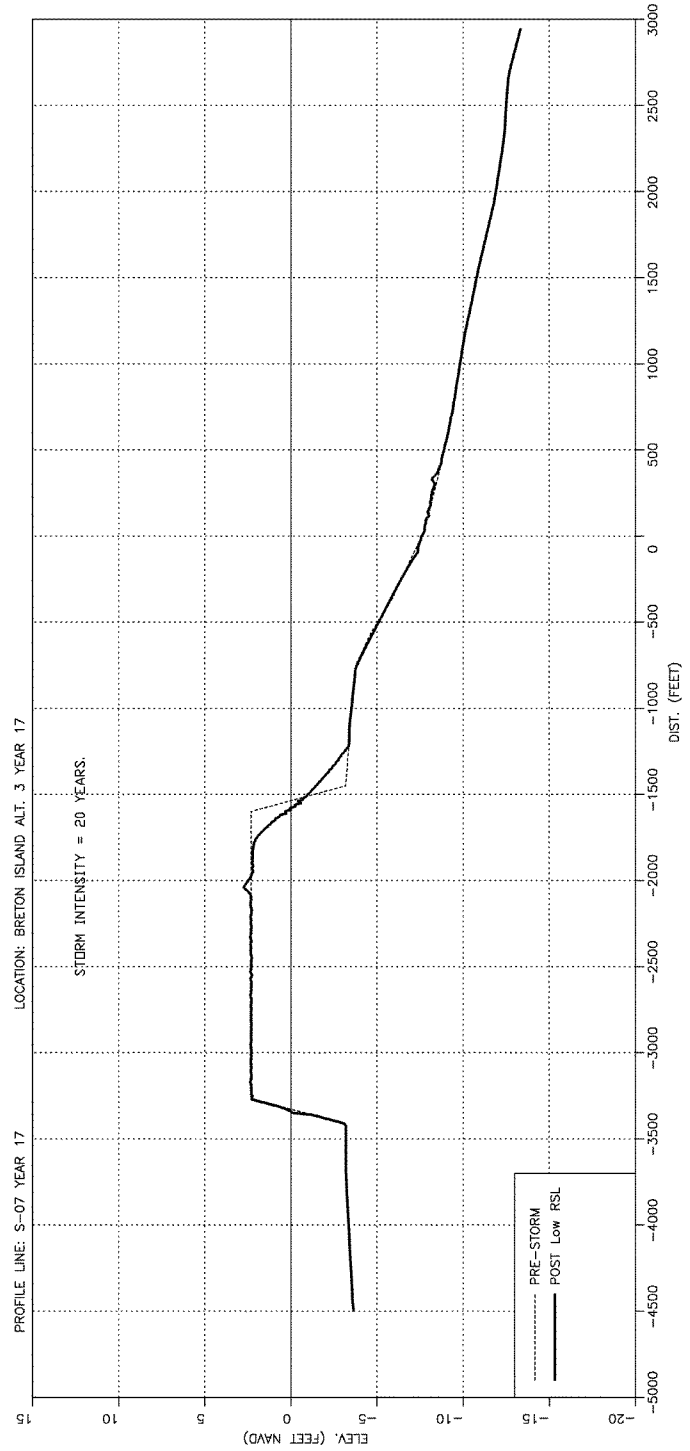

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 020_YEAR
Final Profile: Year_5_S11_after_10_year, 020_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

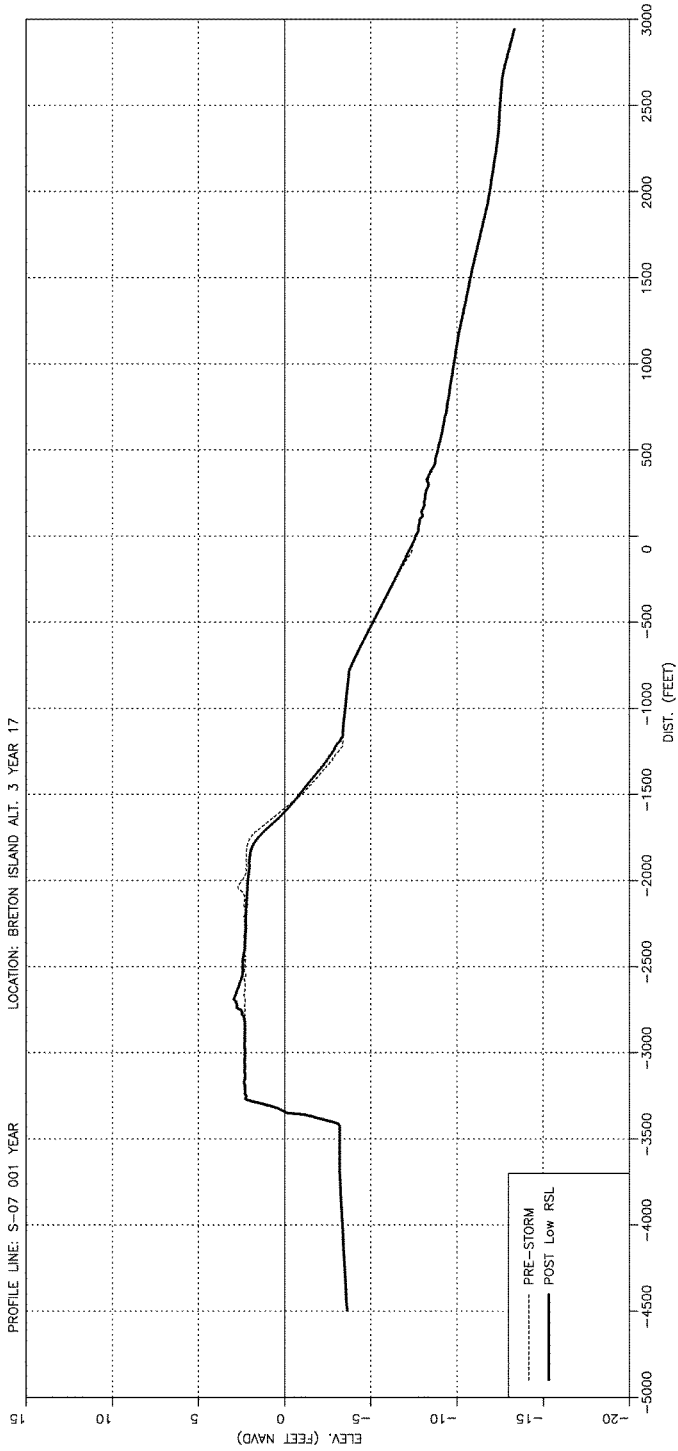

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 050_YEAR
Final Profile: Year_5_S11_after_10_year, 050_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

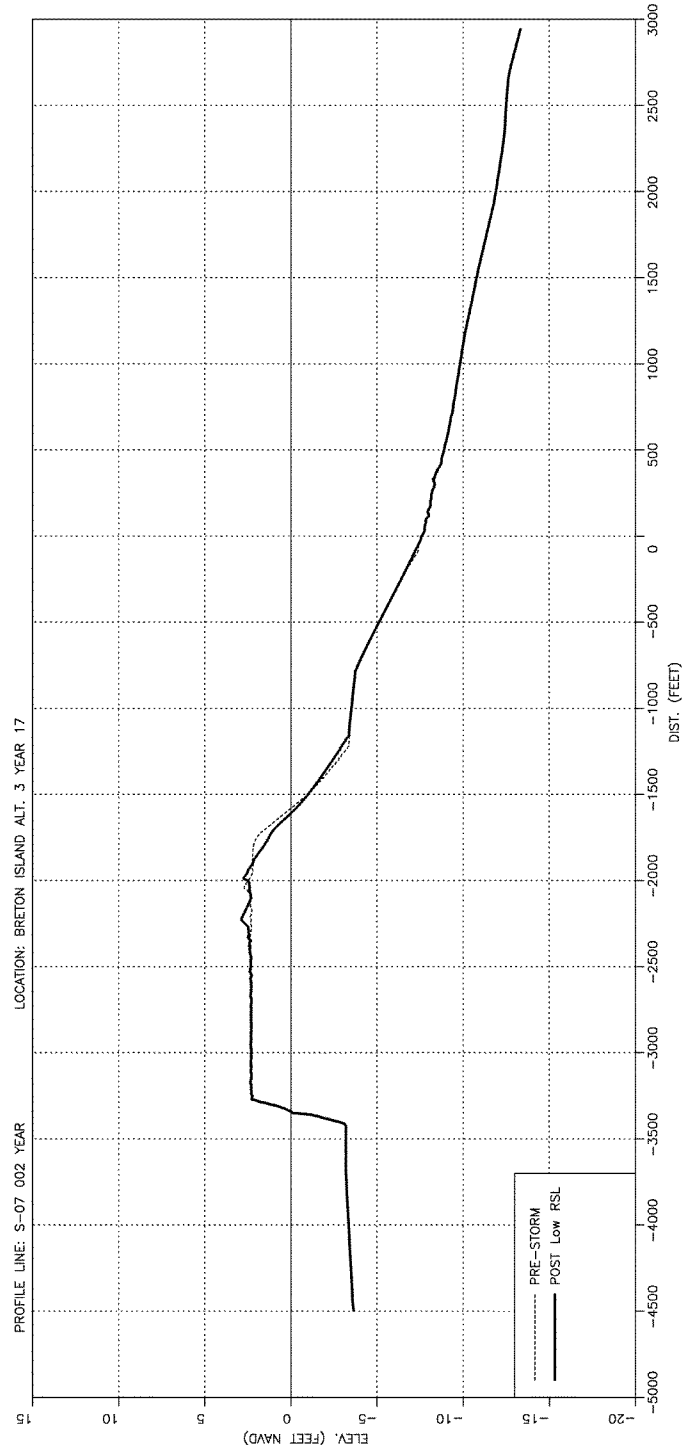

Breton Island, LA Profile S-11
LEGEND
Initial Profile: Year_5_S11_after_10_year, 100_YEAR
Final Profile: Year_5_S11_after_10_year, 100_YEAR
Elevation (ft NAVD)
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-1600
-1200
-800
-400
0
400
800
1200
1600
2000
2400
2800
3200
Distance (ft)

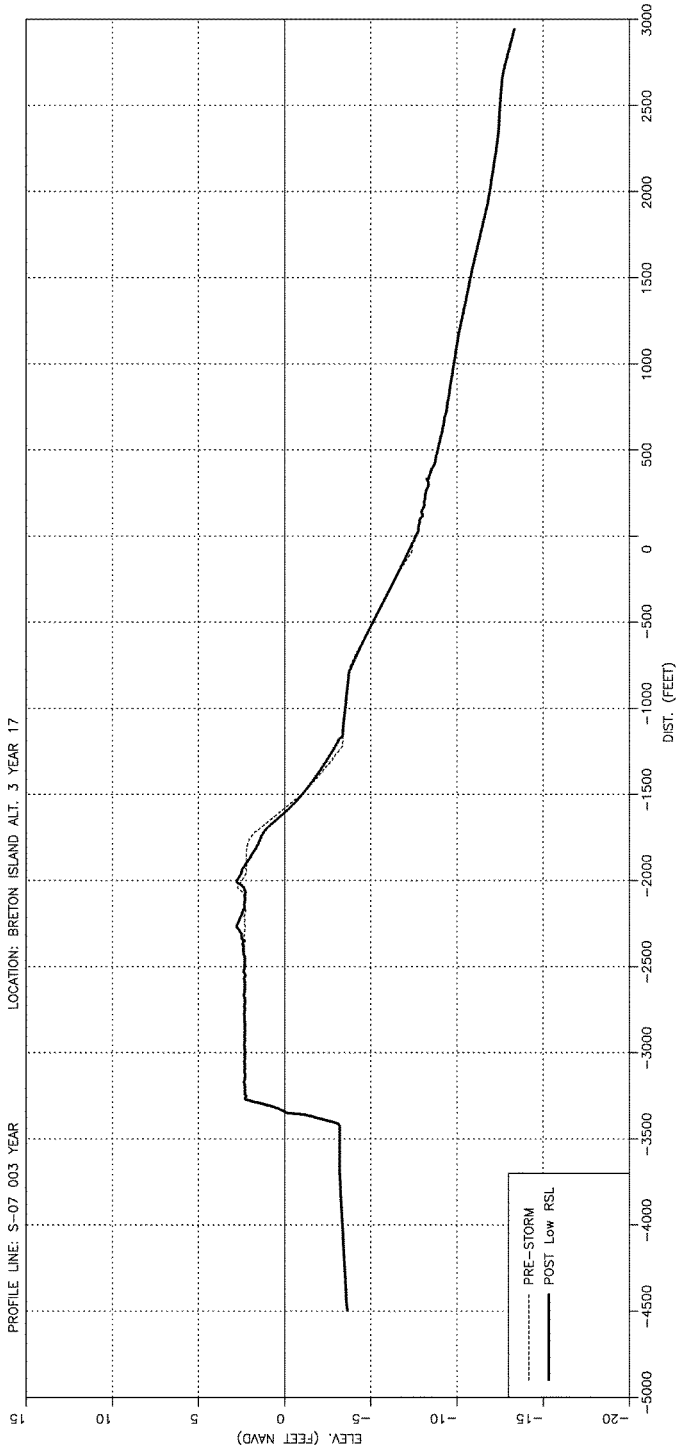
Breton Island Profiles S-08, S-09, and S-11

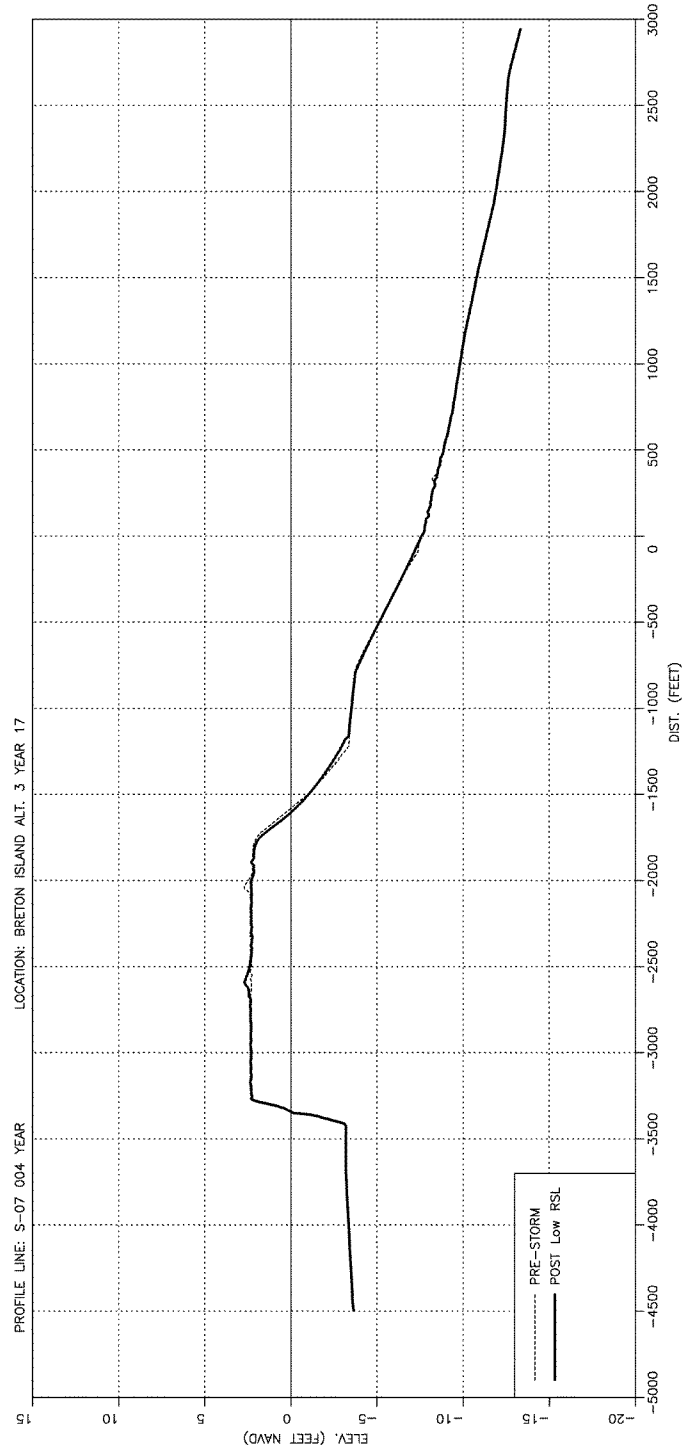
Alternative 3

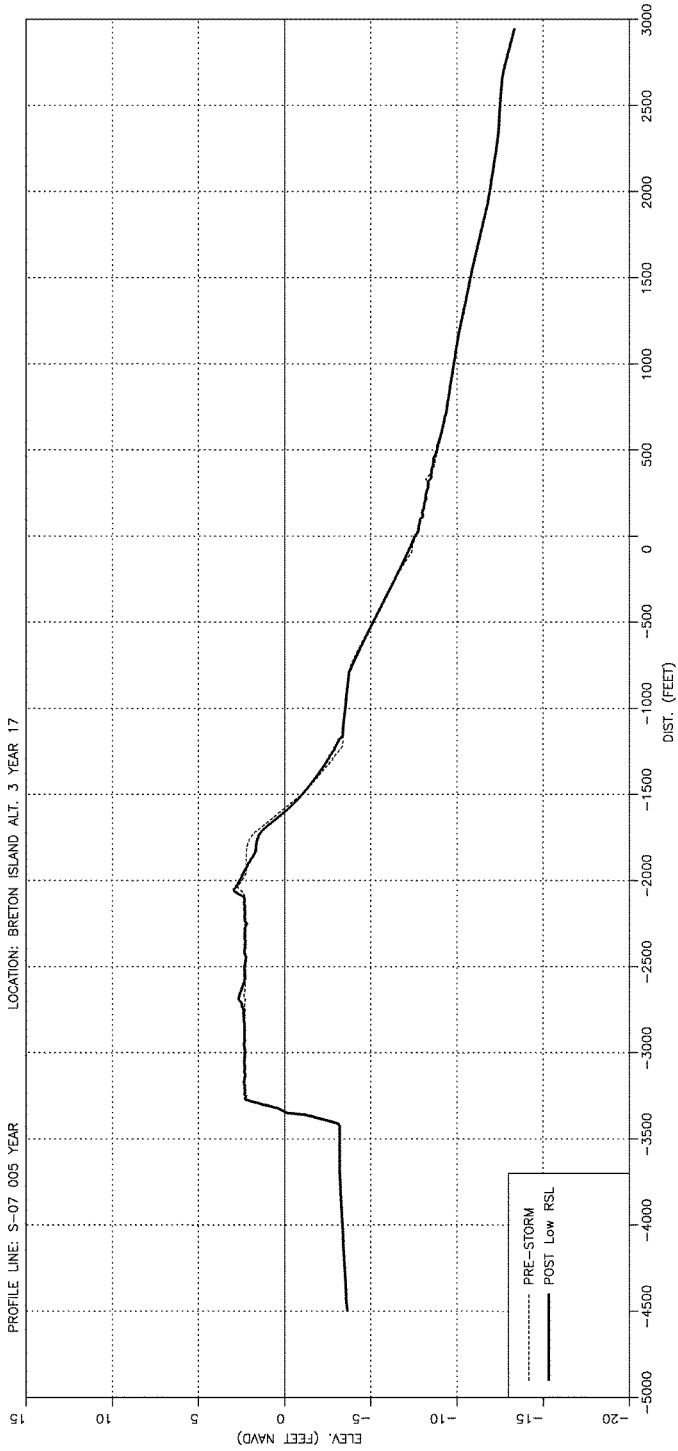

PROFILE LINE: S-07 YEAR 17
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
STORM INTENSITY = 20 YEARS.
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

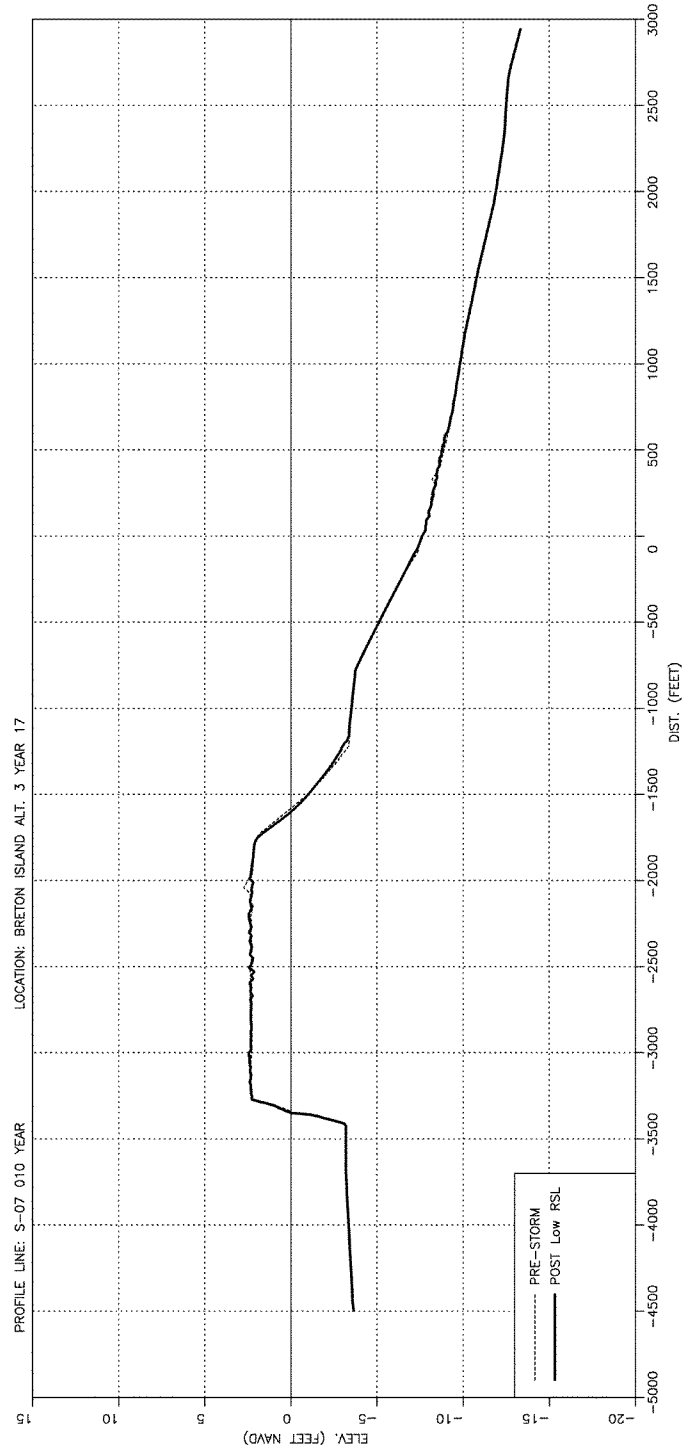

PROFILE LINE: S-07 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

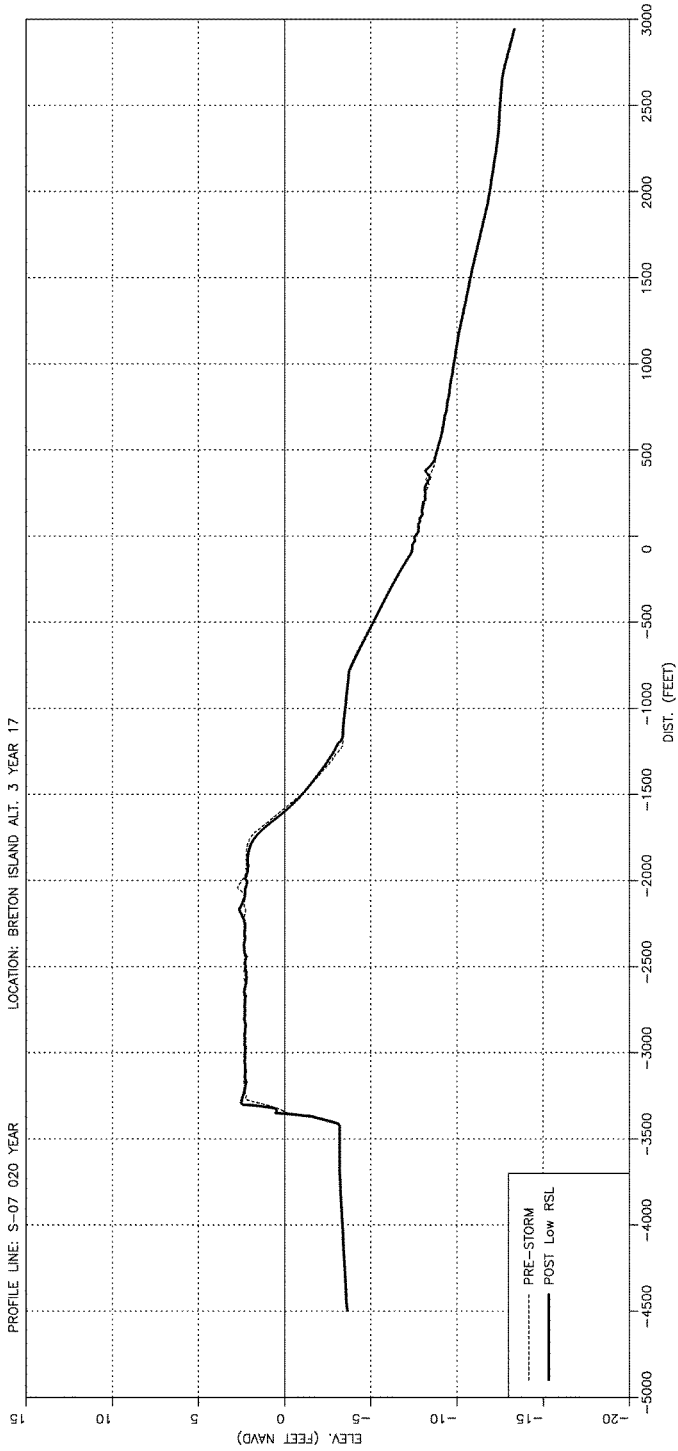

PROFILE LINE: S-07 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

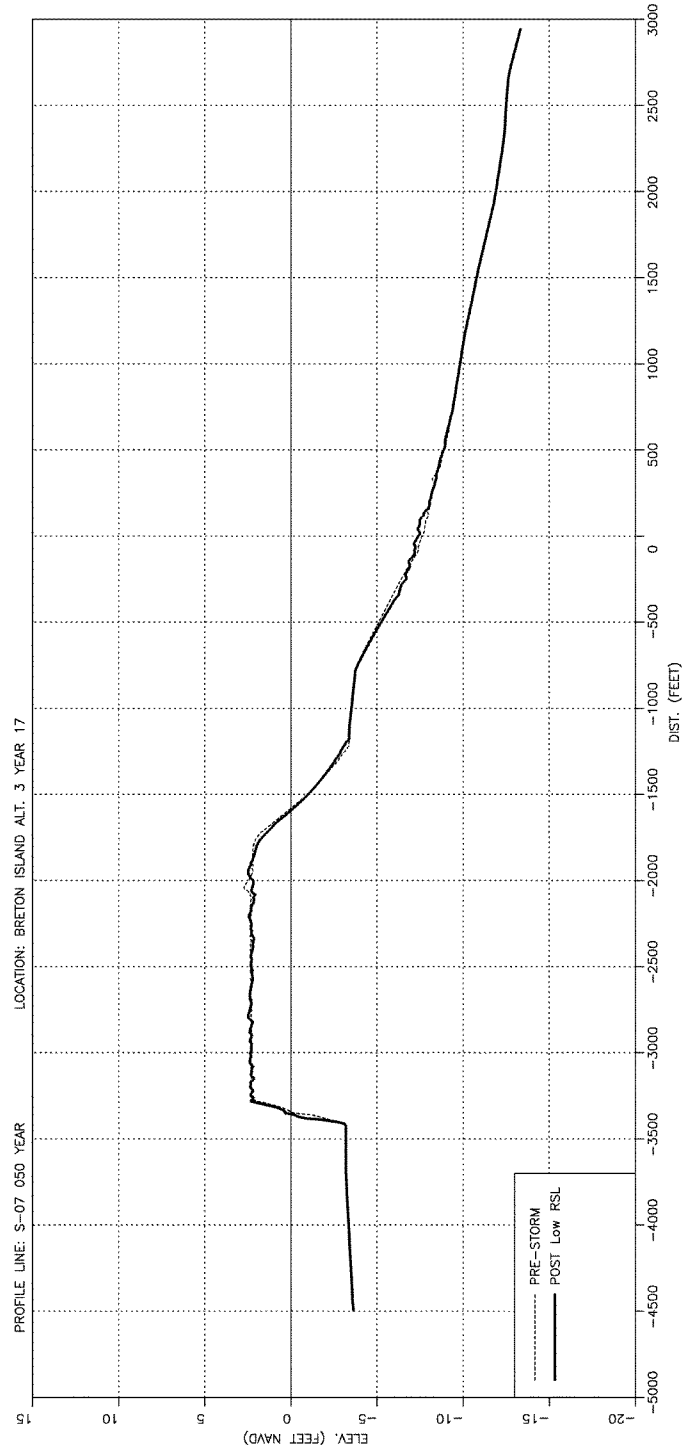

PROFILE LINE: S-07 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

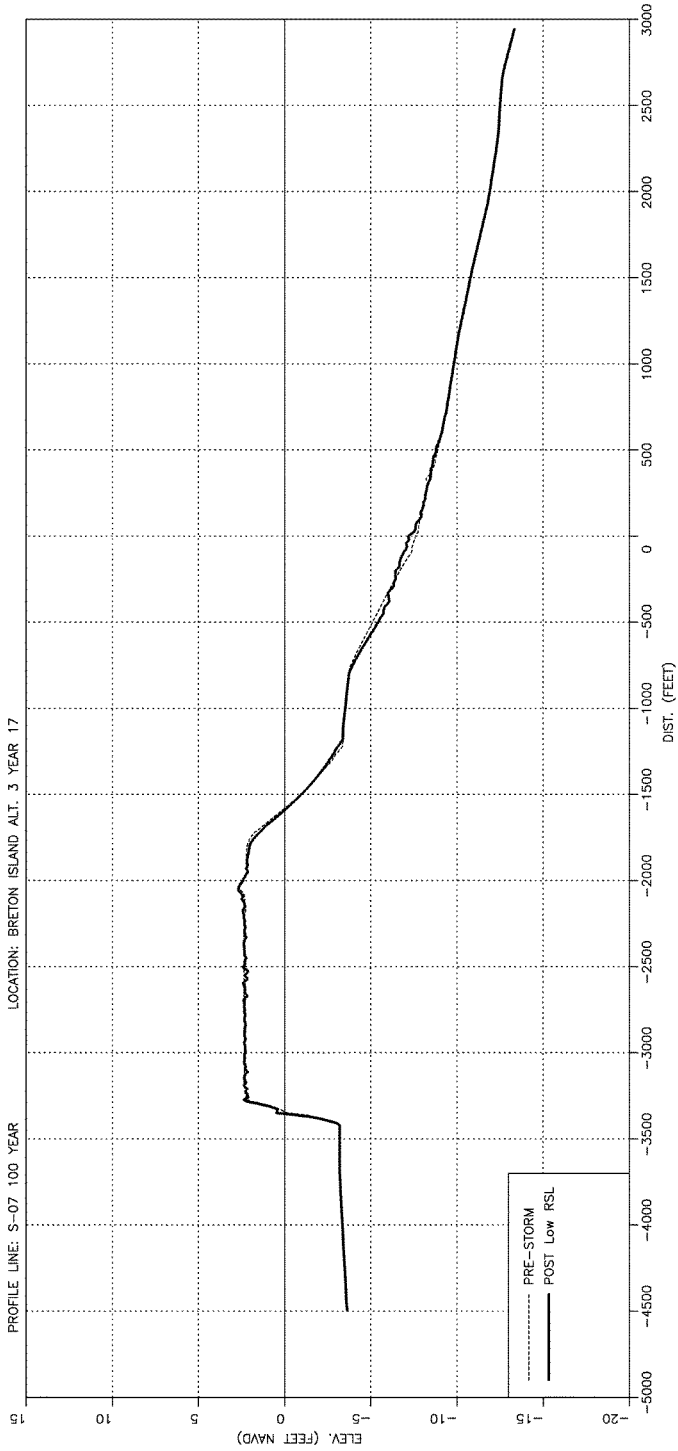

PROFILE LINE: S-07 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

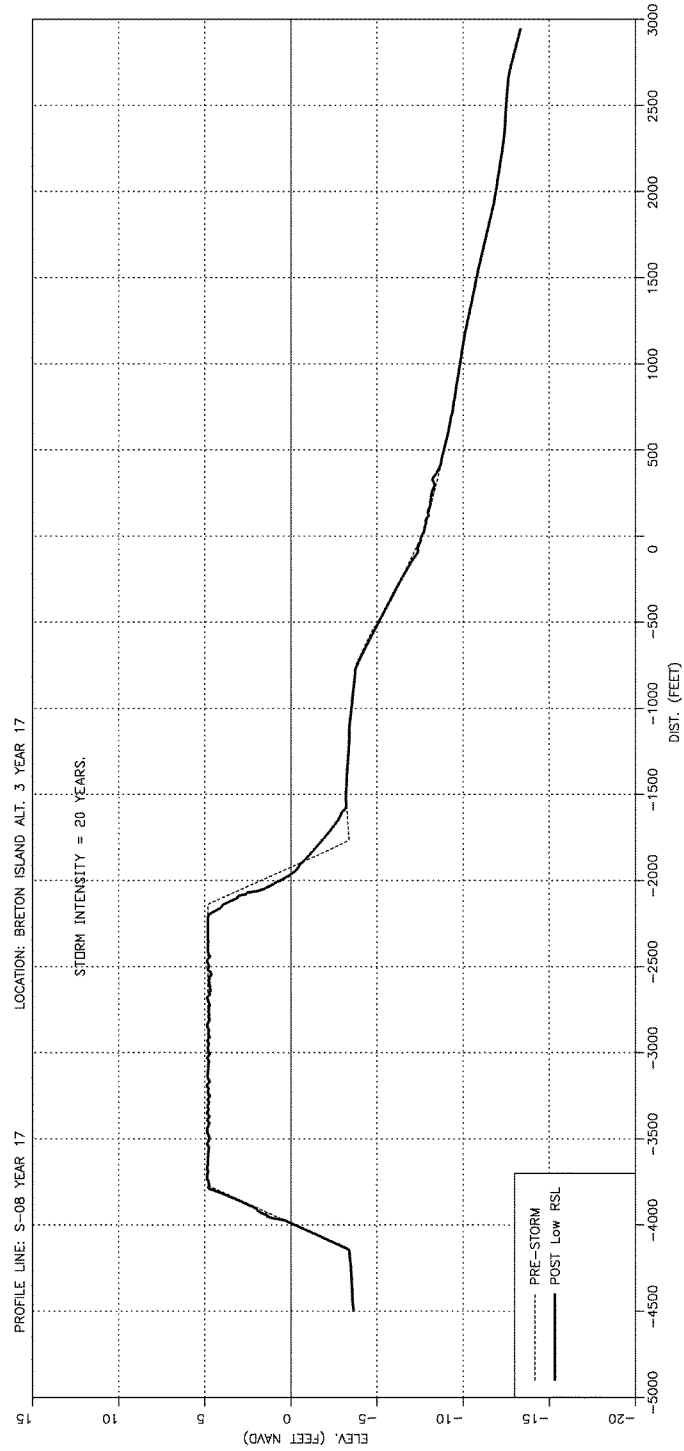

PROFILE LINE: S-07 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

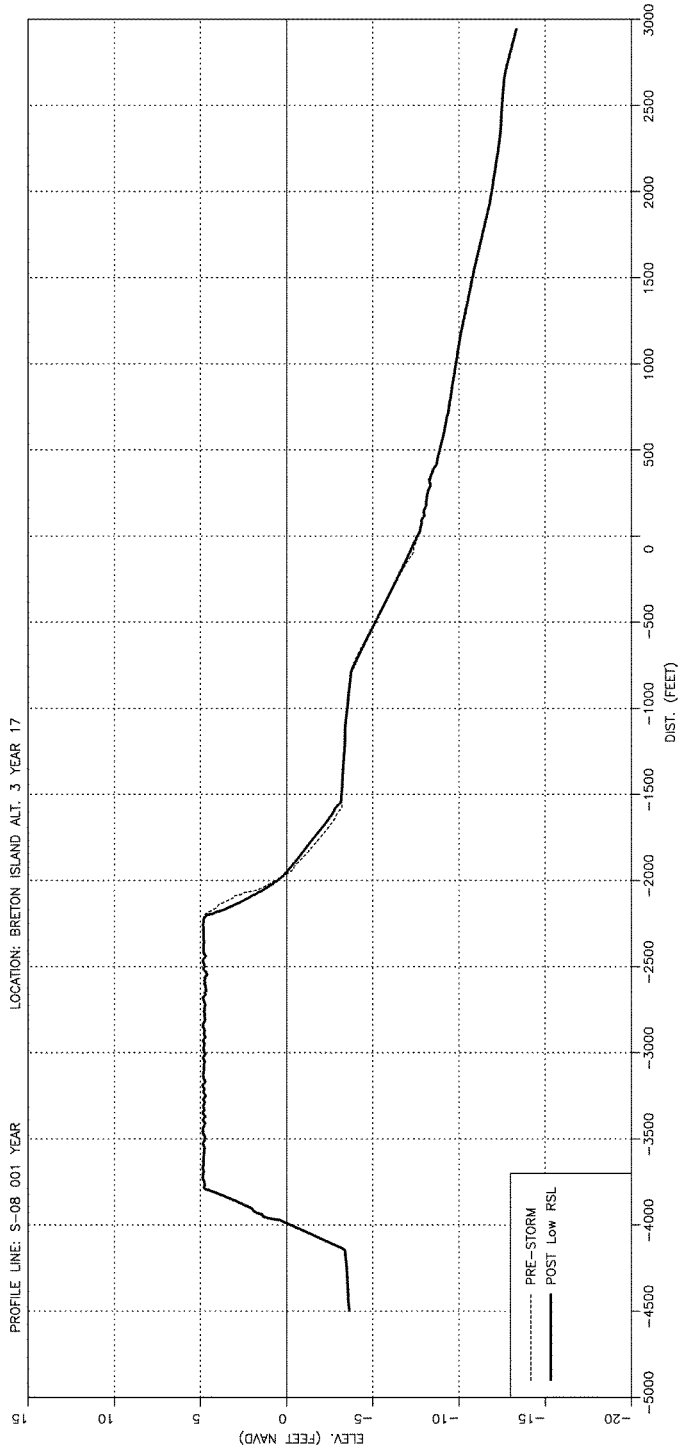

PROFILE LINE: S-07 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

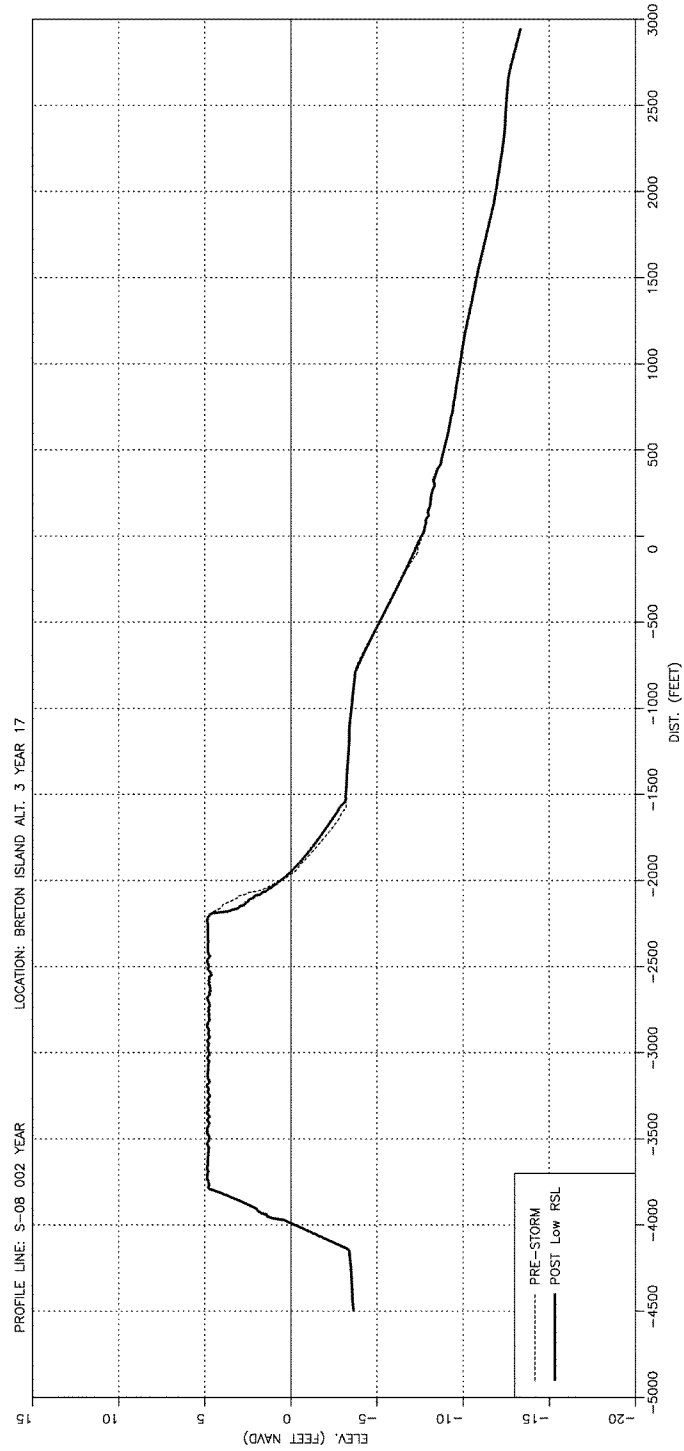

PROFILE LINE: S-07 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

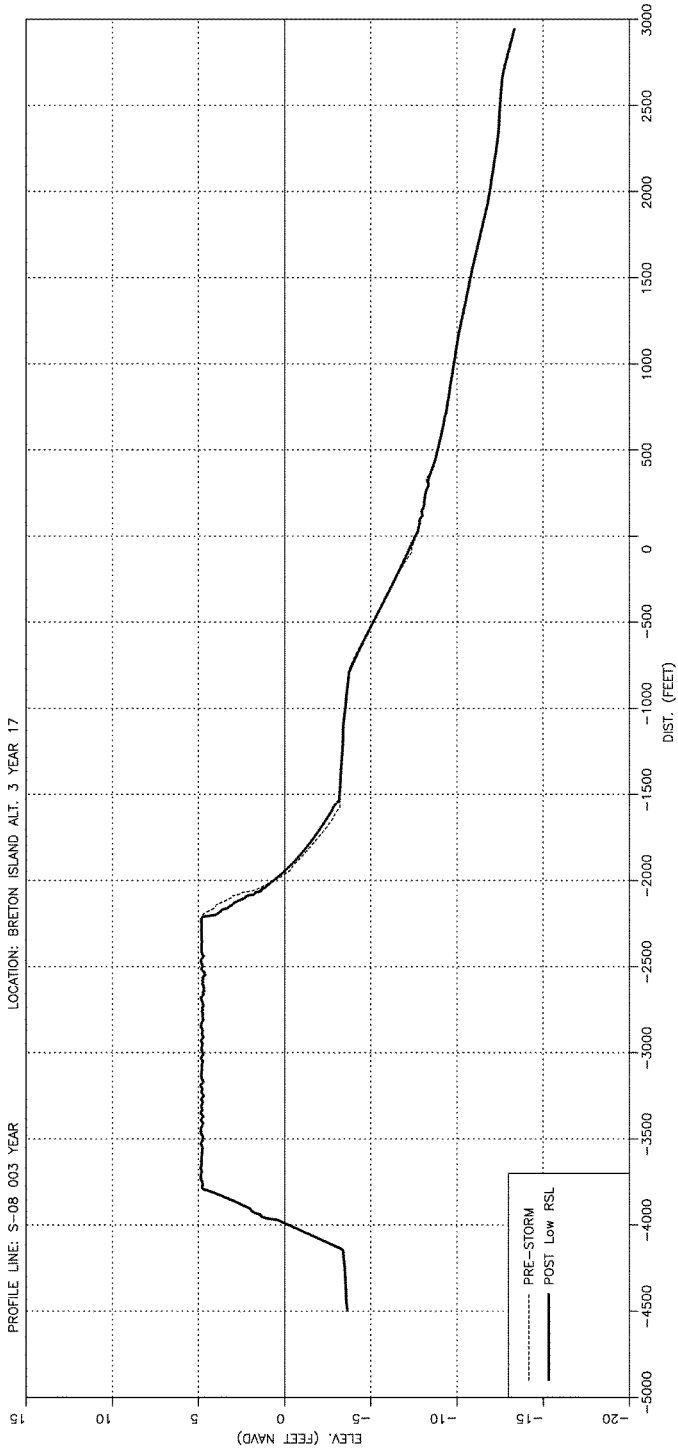

PROFILE LINE: S-07 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

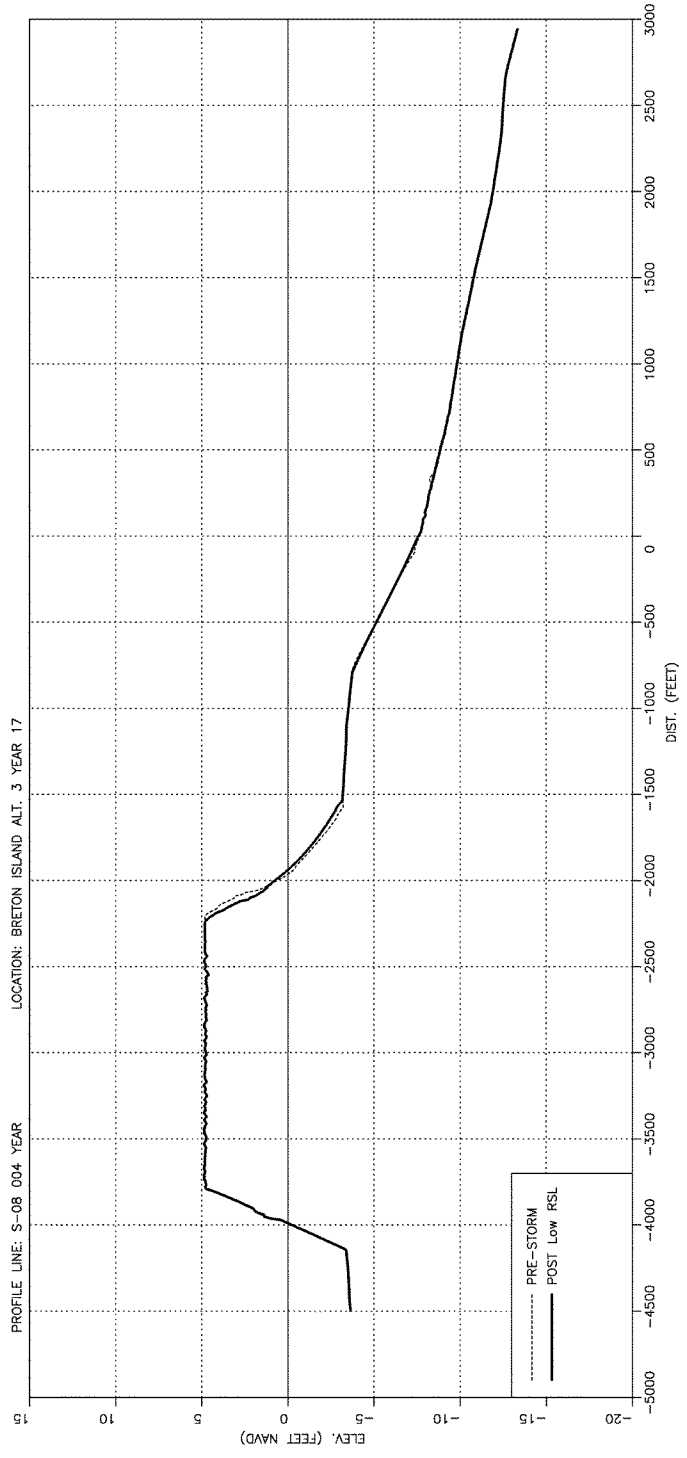

PROFILE LINE: S-07 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

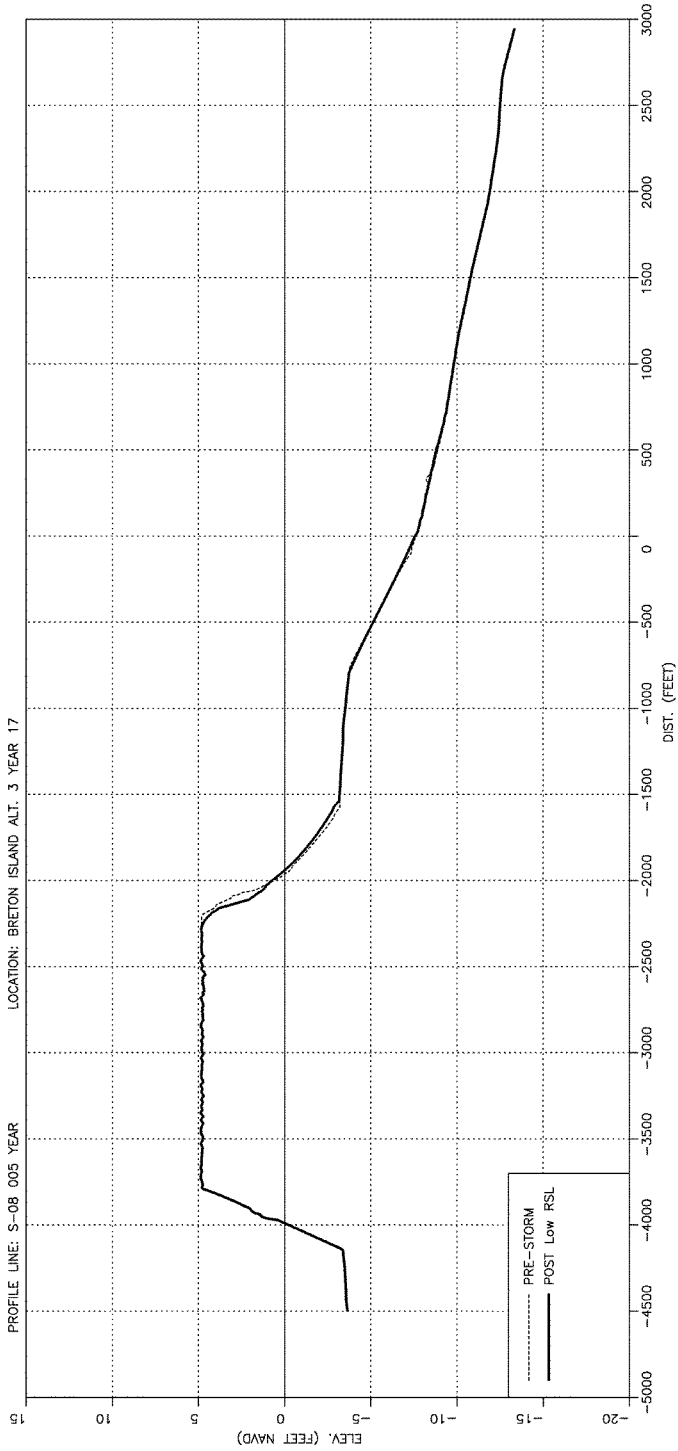

PROFILE LINE: S-08 YEAR 17
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
STORM INTENSITY = 20 YEARS.
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

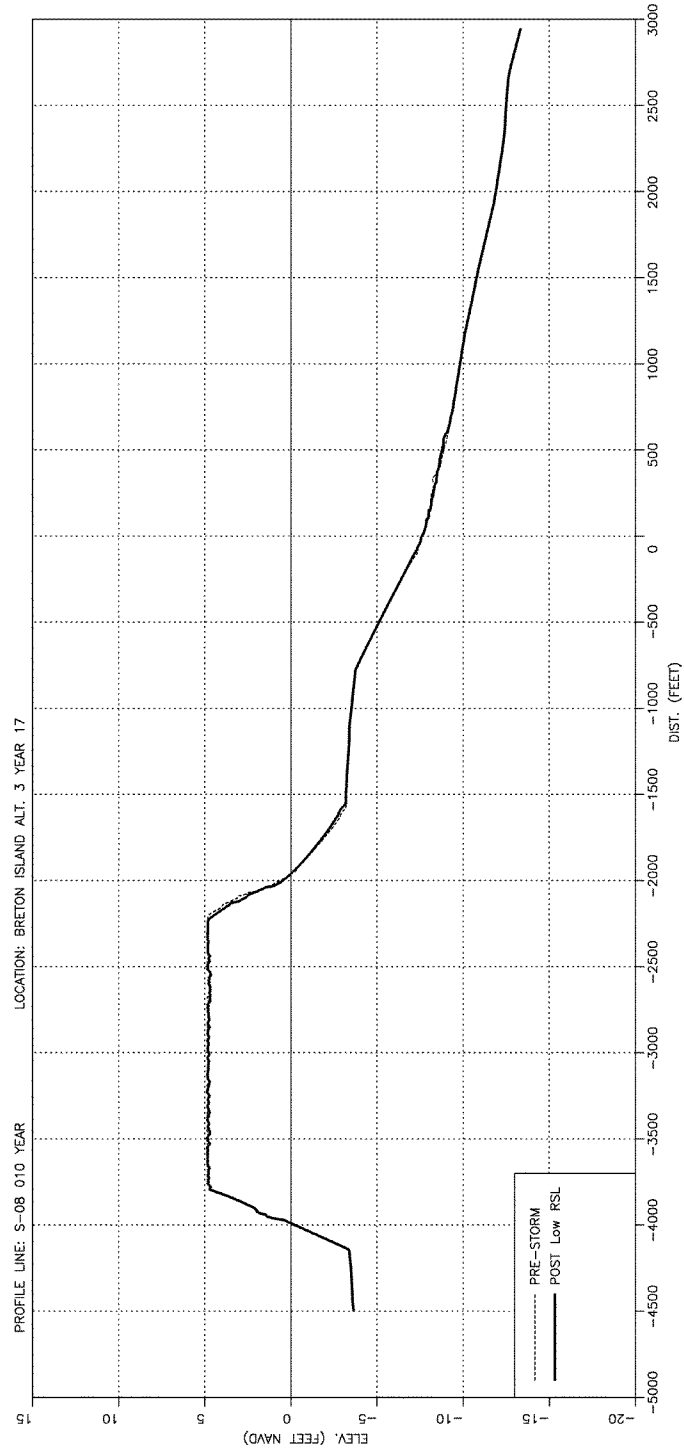

PROFILE LINE: S-08 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

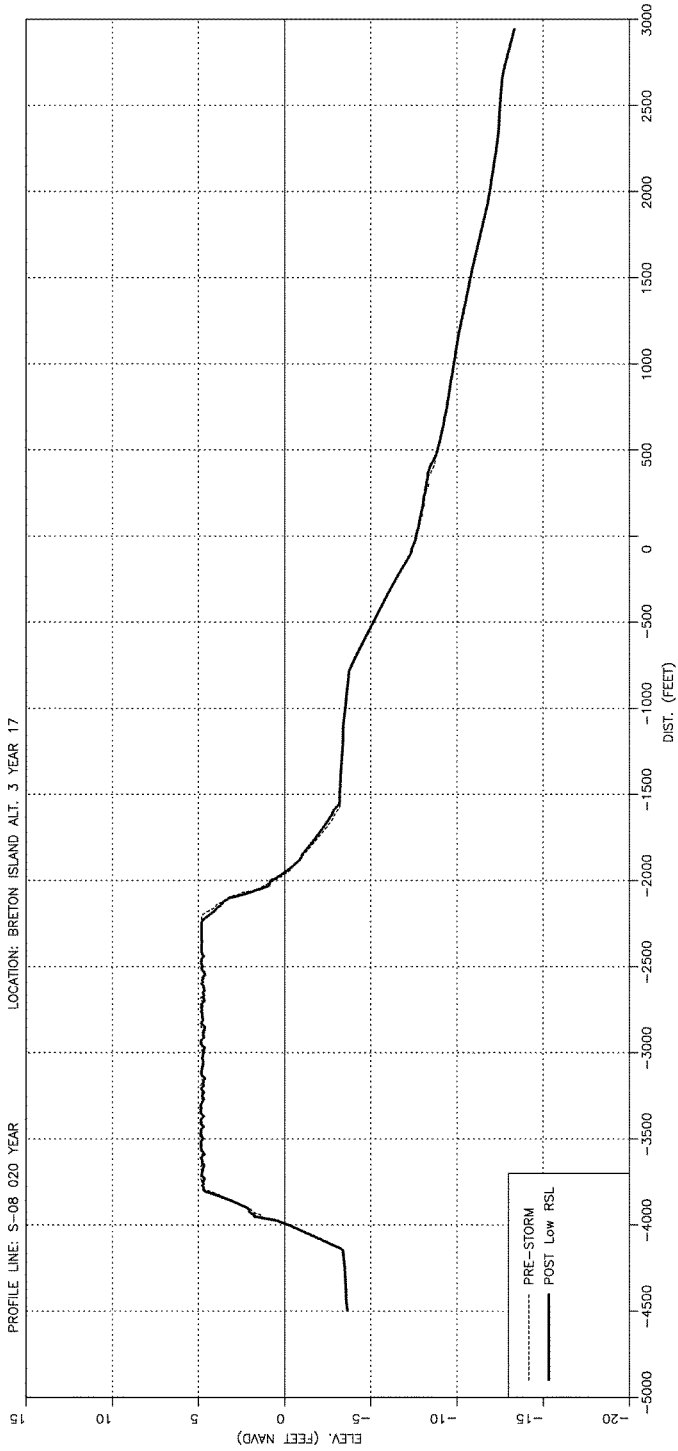

PROFILE LINE: S-08 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

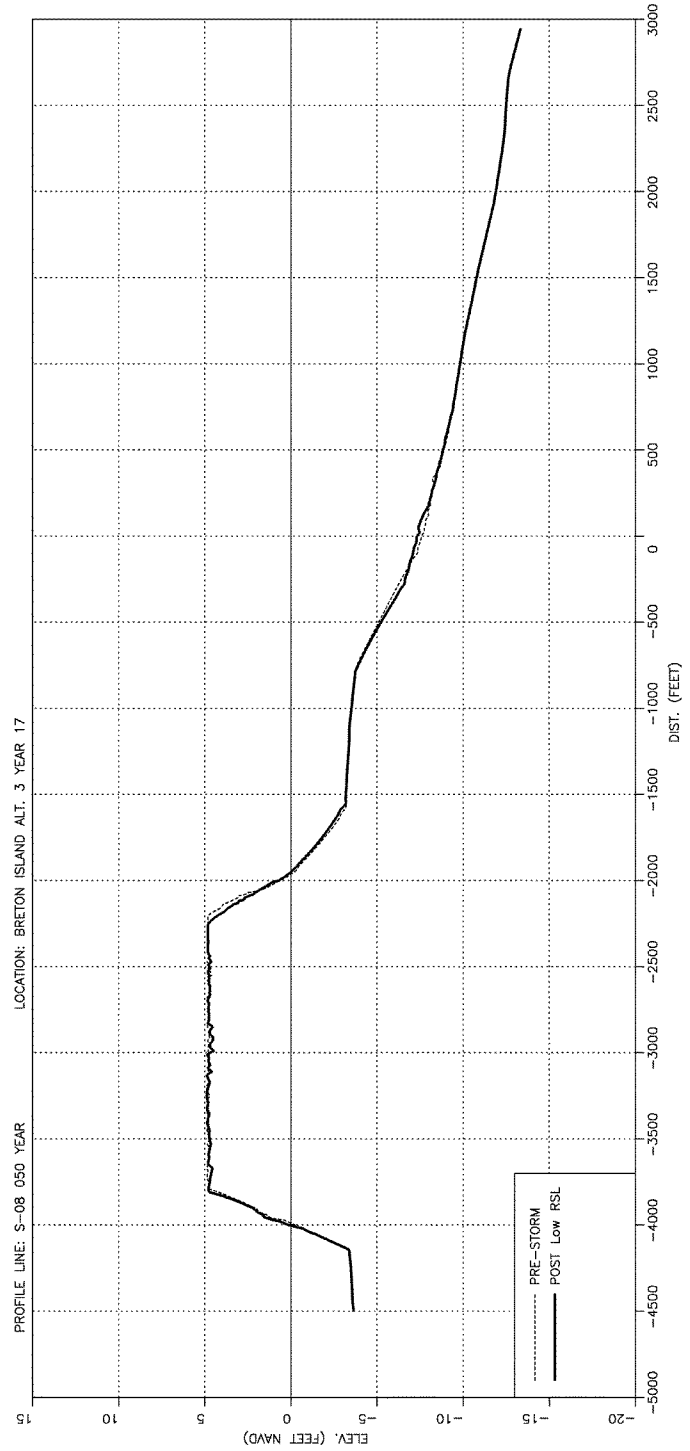

PROFILE LINE: S-08 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

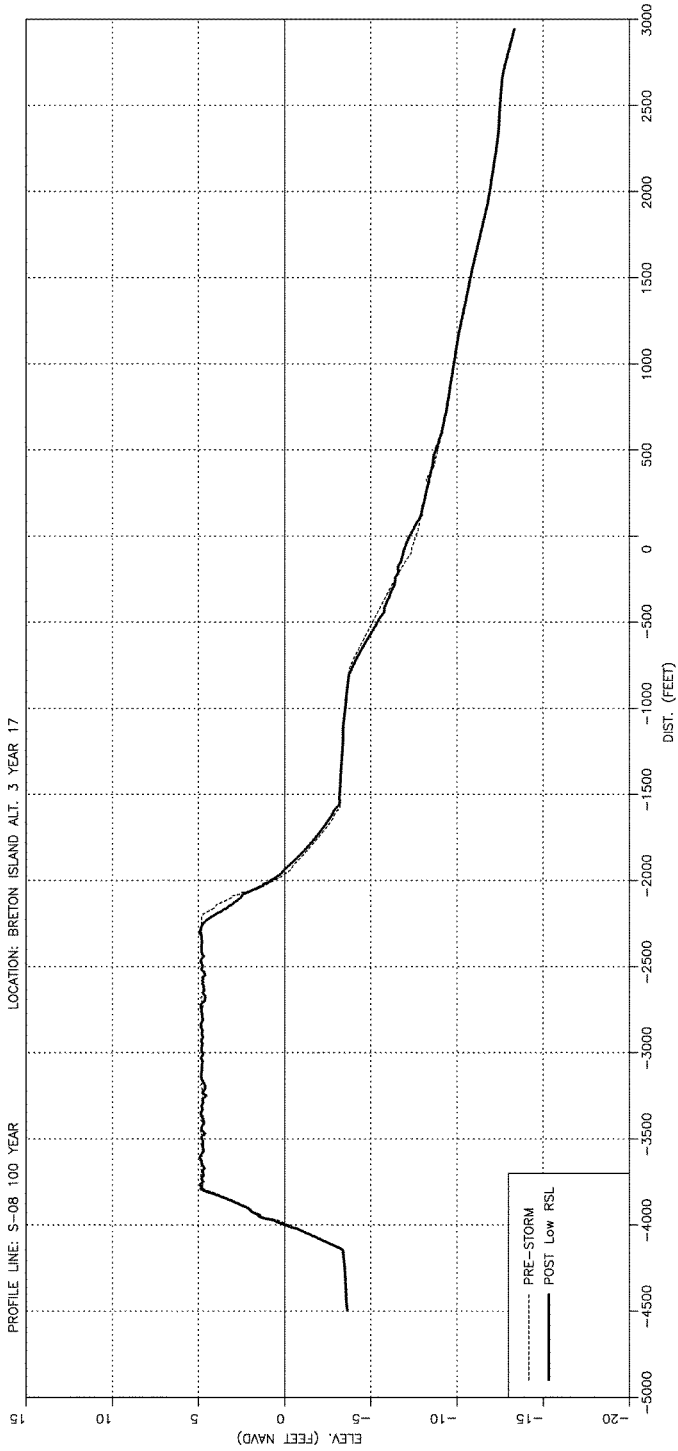

PROFILE LINE: S-08 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

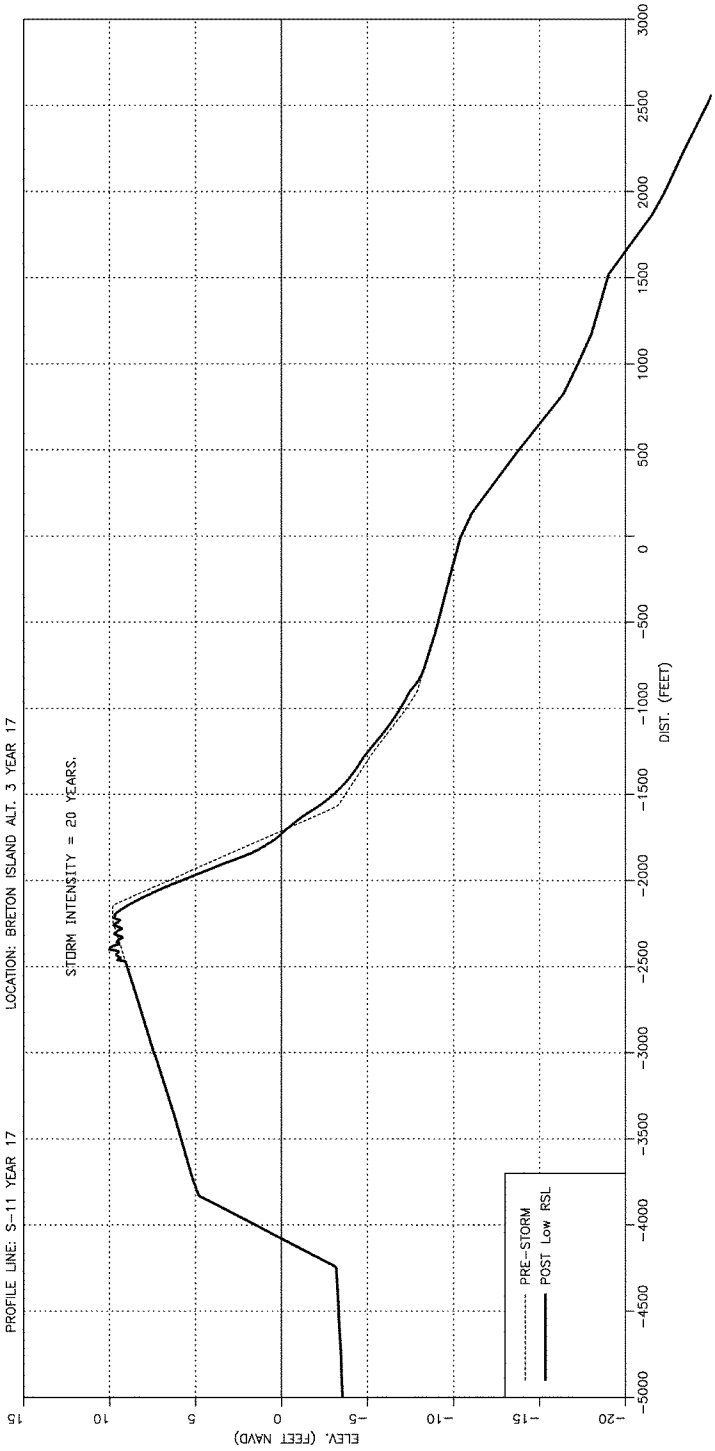

PROFILE LINE: S-08 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

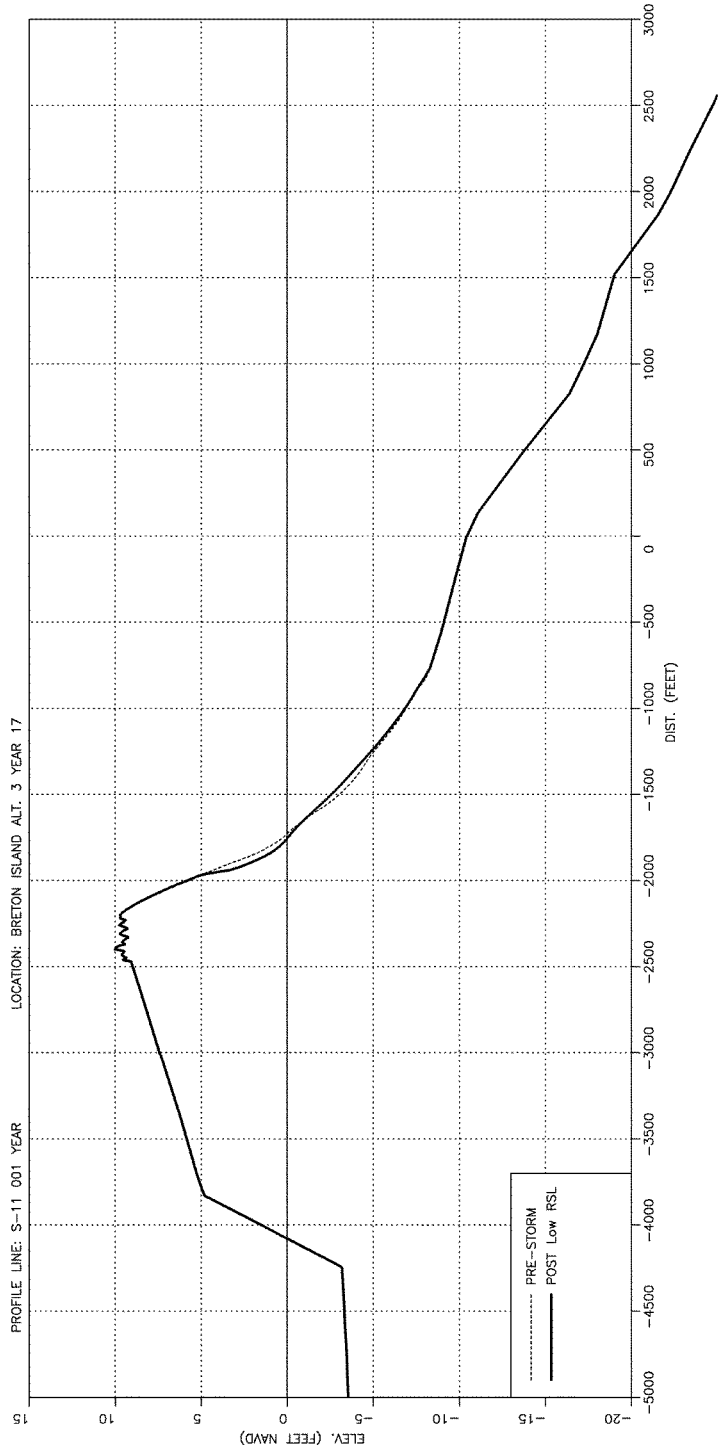

PROFILE LINE: S-08 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

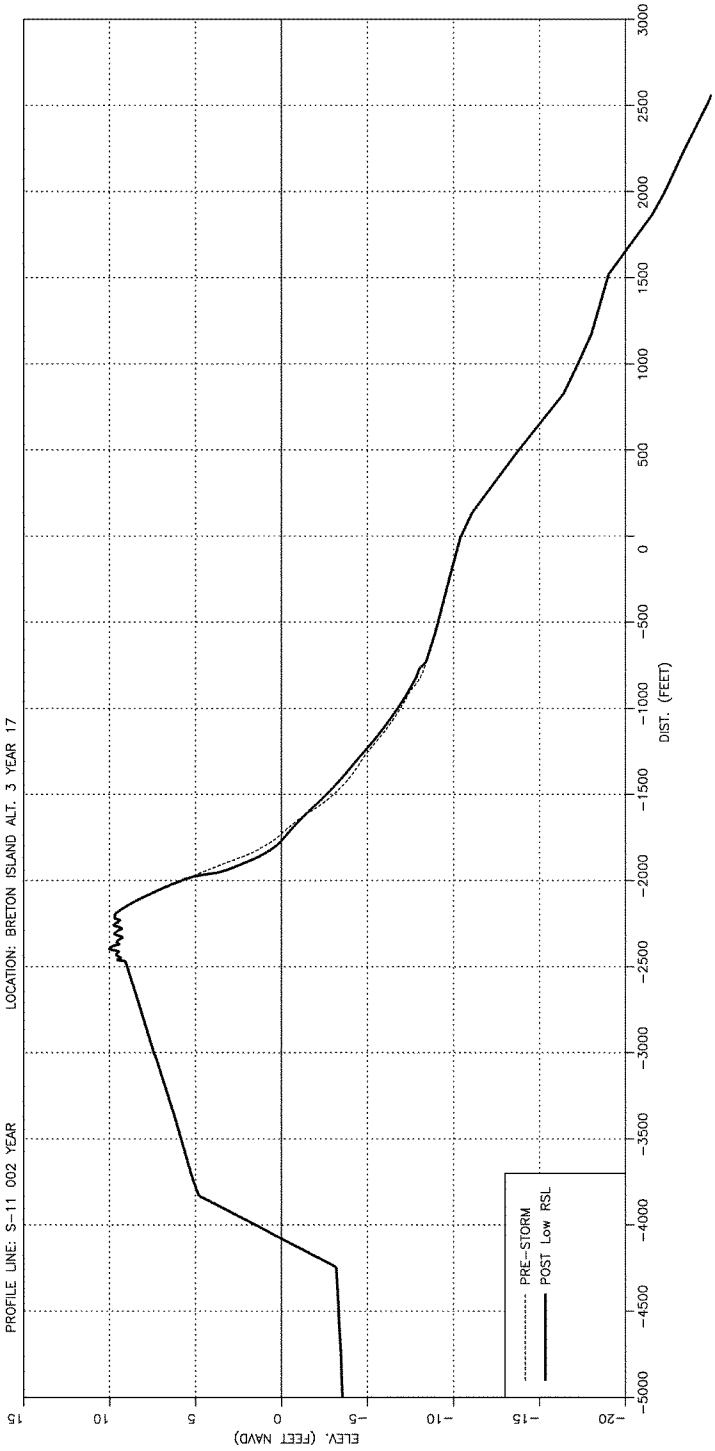

PROFILE LINE: S-08 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

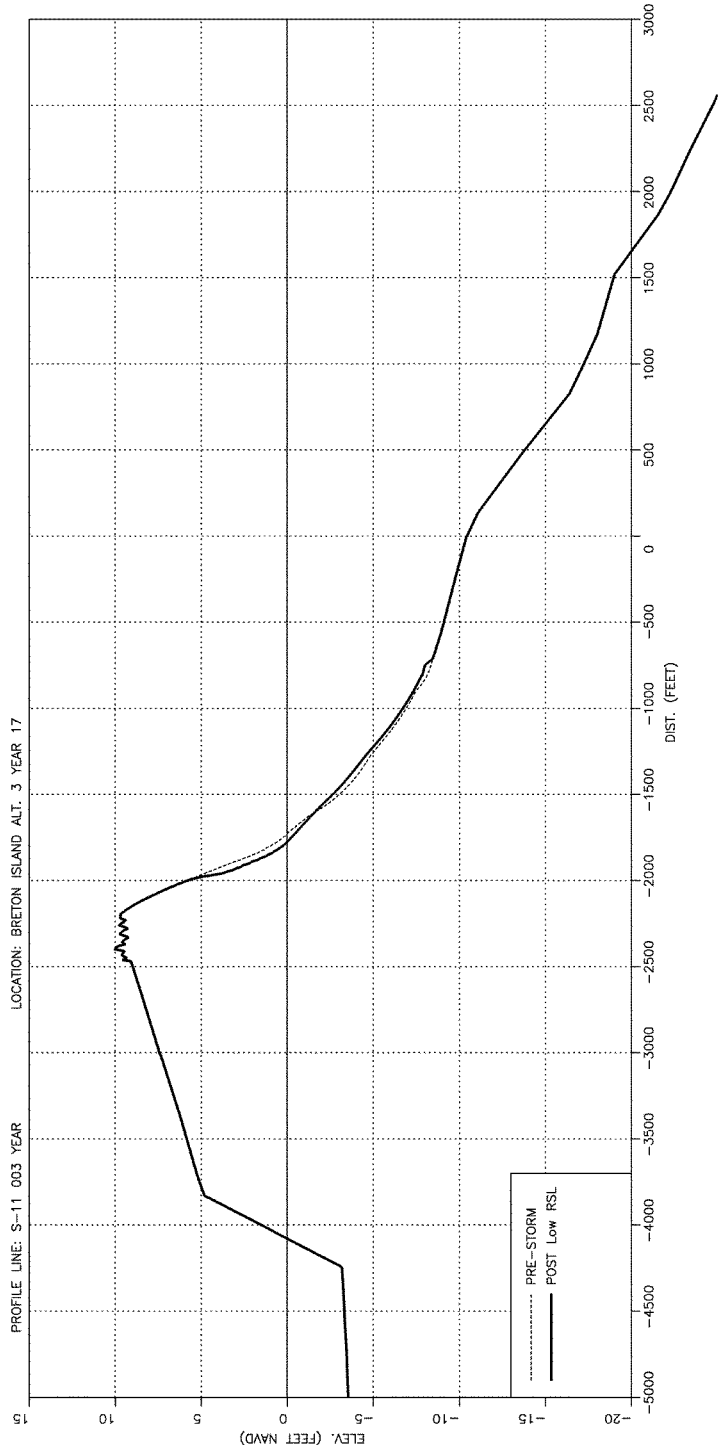

PROFILE LINE: S-08 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

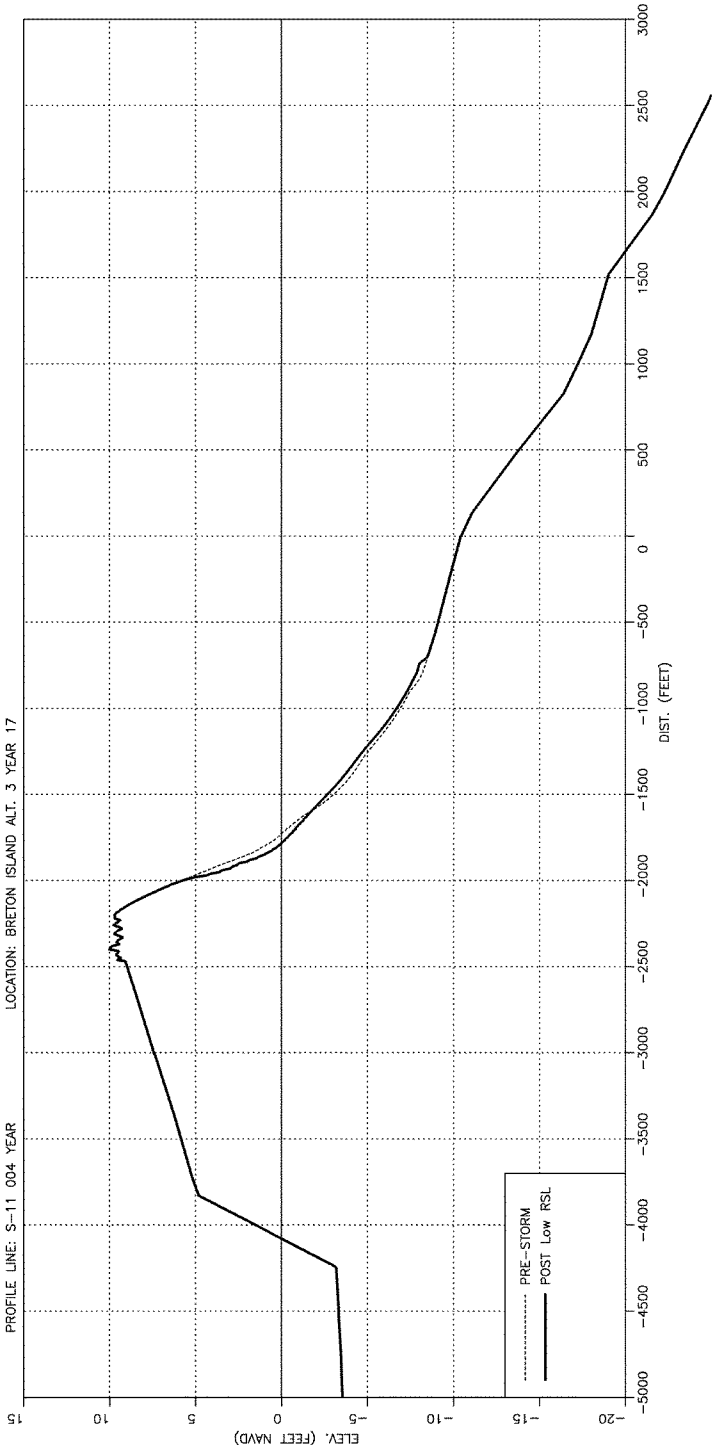

PROFILE LINE: S-08 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

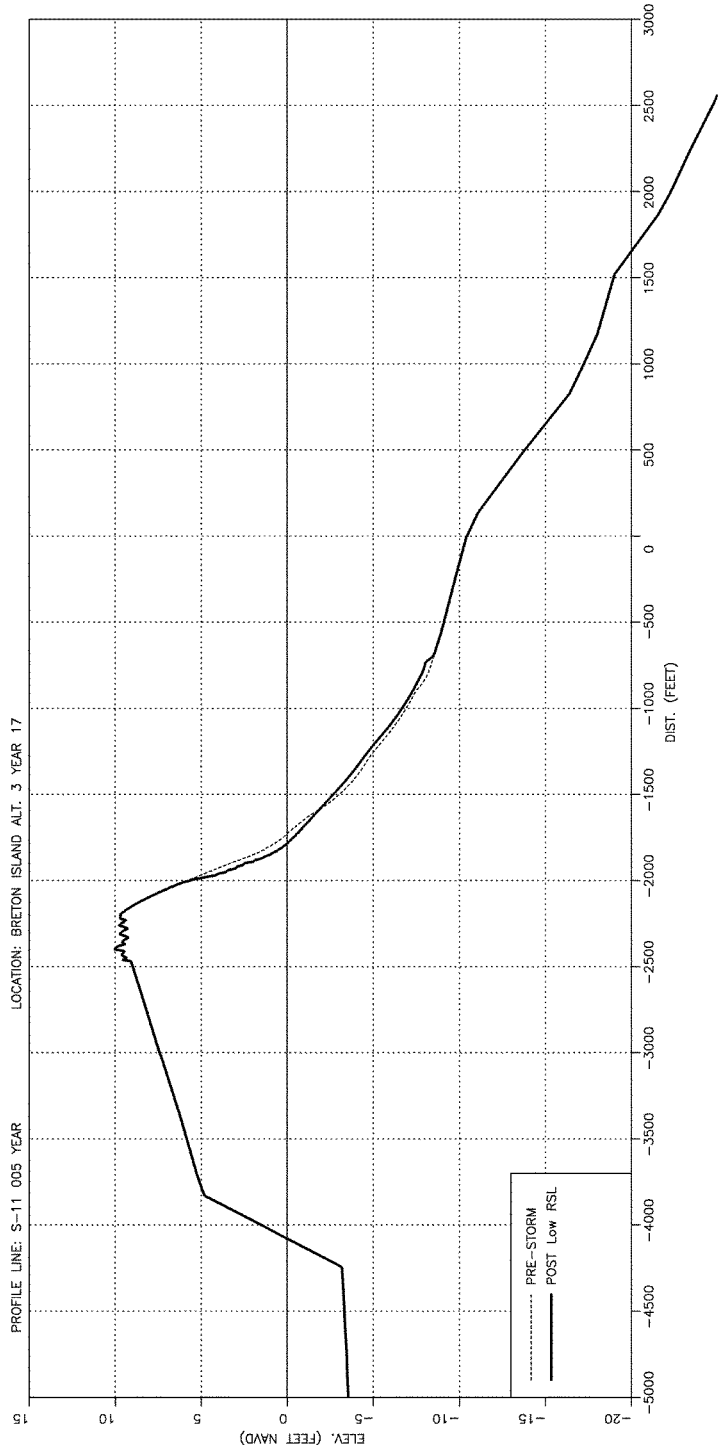

PROFILE LINE: S-11 YEAR 17
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
STORM INTENSITY = 20 YEARS.
PRE-STORM
POST Low RSL
ELEV. (FEET NAVD)
DIST. (FEET)
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

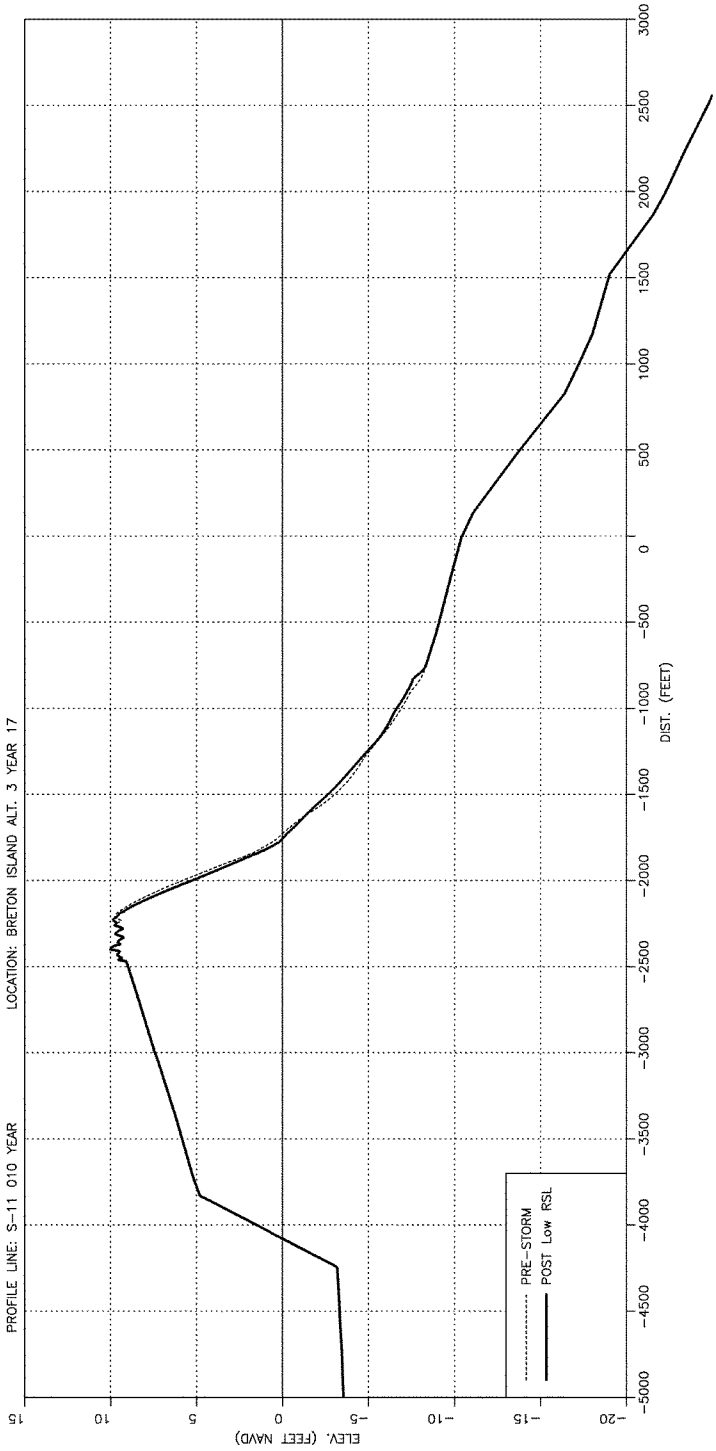

PROFILE LINE: S-11 001 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

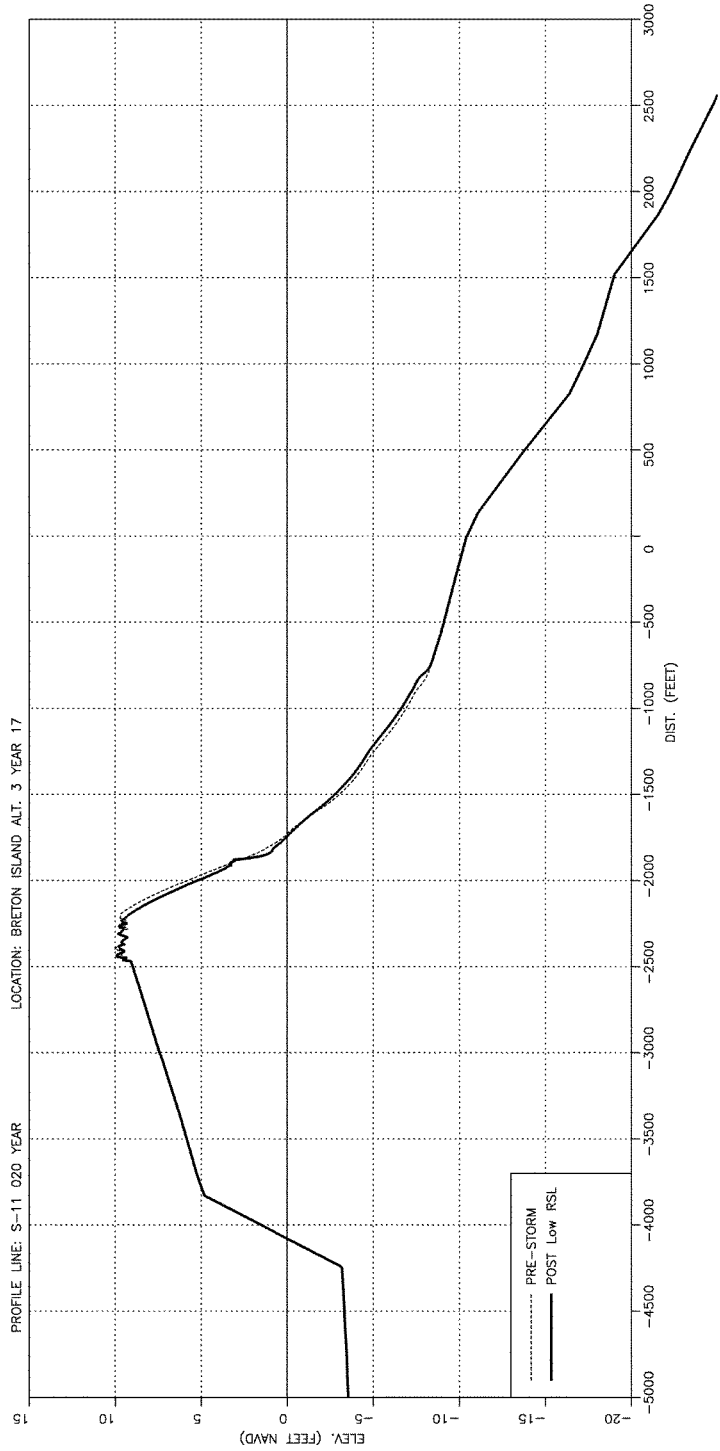

PROFILE LINE: S-11 002 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

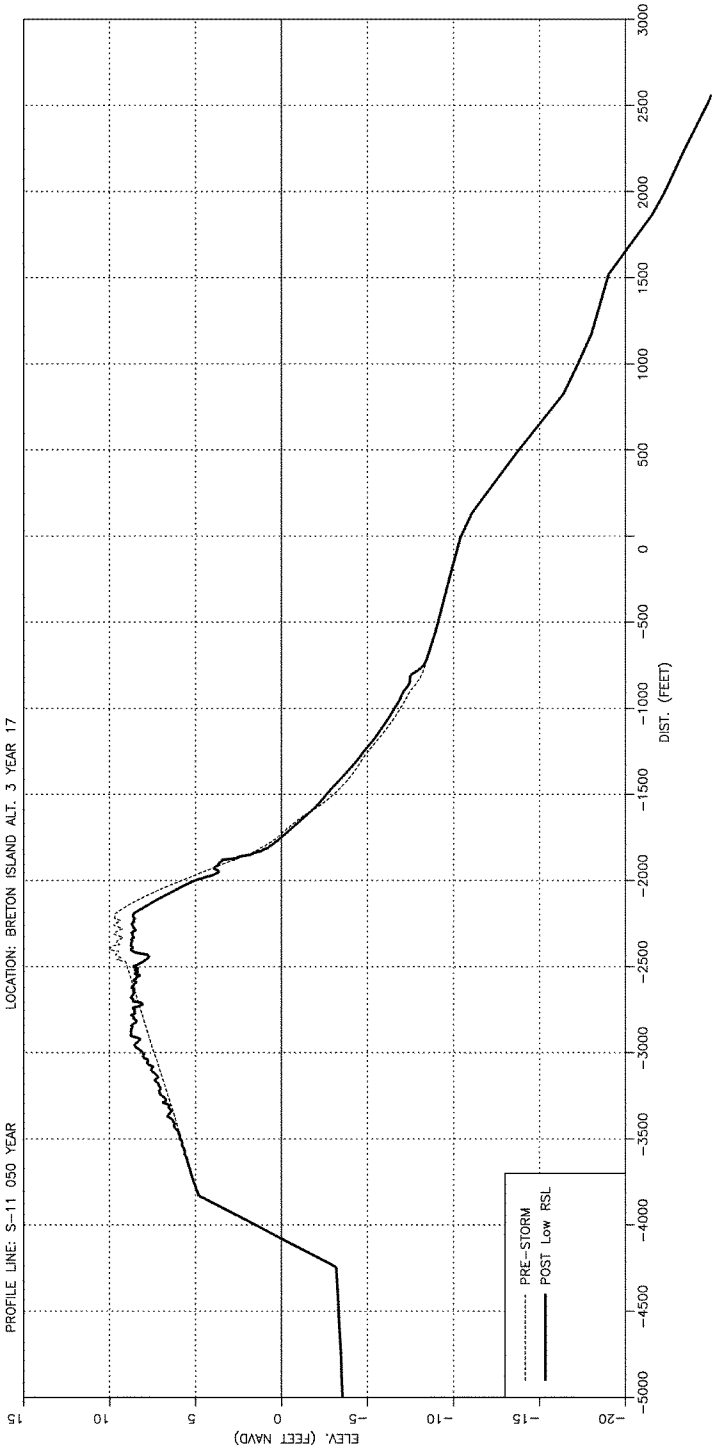

PROFILE LINE: S-11 003 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

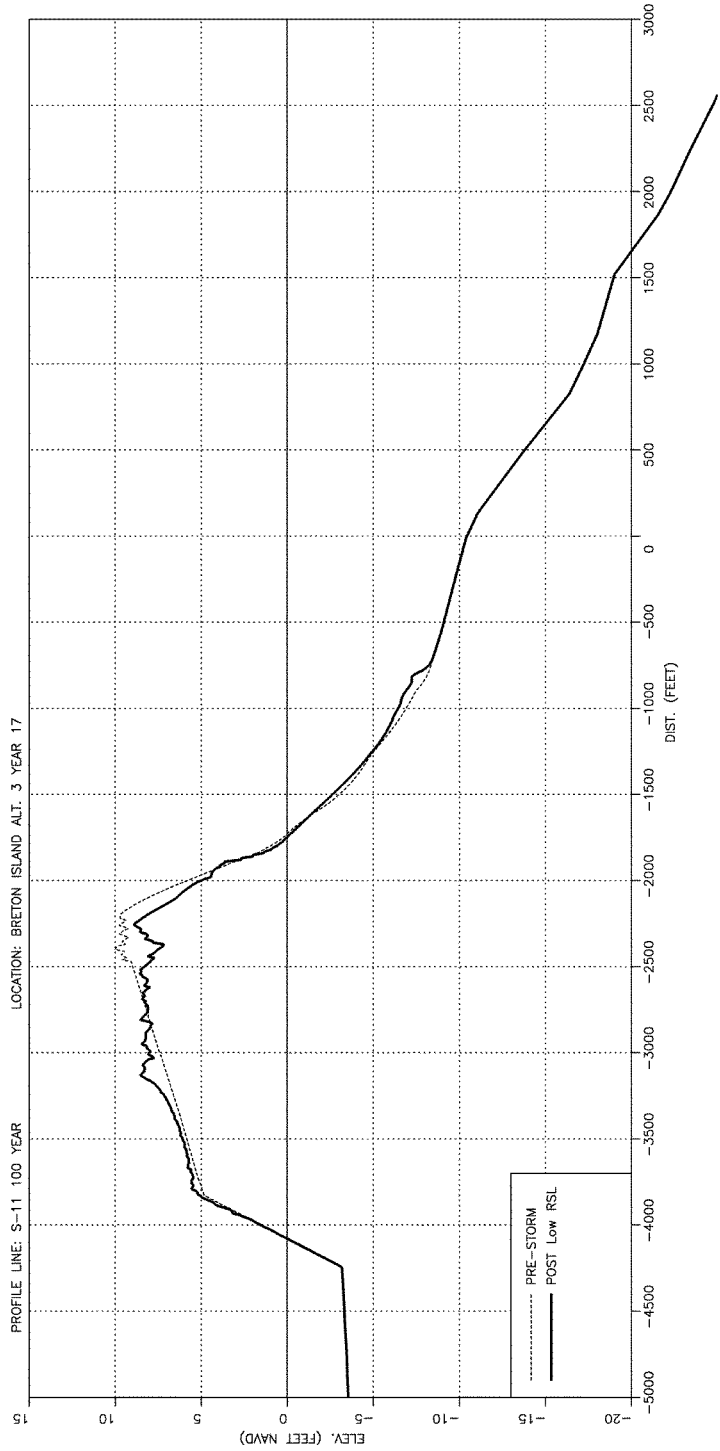

PROFILE LINE: S-11 004 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 005 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 010 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 020 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 050 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000


PROFILE LINE: S-11 100 YEAR
LOCATION: BRETON ISLAND ALT. 3 YEAR 17
ELEV. (FEET NAVD)
DIST. (FEET)
PRE-STORM
POST Low RSL
15
10
5
0
-5
-10
-15
-20
-5000
-4500
-4000
-3500
-3000
-2500
-2000
-1500
-1000
-500
0
500
1000
1500
2000
2500
3000

APPENDIX
K

N - ELWYN BOCZ
DISTRICT 1
COUNCIL MEMBER
,

N - FEDERAL AVIATION
ADMINISTRATION/DOTD
JOYCE M. PORTER
,

N - MARJOIRE KRAUS
,

N - SERGE BOURQUE
MARINE DESIGN & PLANNING
20 SAINT VENANT
STE-AGATHE, AL J6C2P1
CANADA,

N - TIM DOODY
PRESIDENT
SLFPA-E
,

N - DR. MICHAEL P EVANS
EVANS AND ASSOCIATES
CONSULTING CORPORATION
1078 SUGAR MAPLE DR.
ONEIDA, NY 13421

N - U.S. EPA-OFFICE FED. ACTIVITIES
EIS FILING SECTION
MAIL CODE 2252-A, ROOM 7241
1200 PENNSYLVANIA AVENUE, NW
WASHINGTON, DC 20004

N - U.S. ADVISORY COUNCIL ON HISTORIC
PRESERVATION
1100 PENNSYLVANIA AVENUE NW RM. 809
WASHINGTON, DC 20004

N - U.S. ADVISORY COUNCIL ON HISTORIC
PRESERVATION-EXECUTIVE DIRECTOR
SUITE 809
1100 PENNSYLVANIA AVE. NW
WASHINGTON, DC 20004

N - NATIONAL WILDLIFE FEDERATION
901 E ST NW #400
WASHINGTON, DC 20004-2037

N - AMERICAN RIVERS INC
1101 14TH ST. NW, STE. 1400
WASHINGTON, DC 20005-5637

N - U.S. DEPT OF THE INTERIOR
OFFICE OF ENV POLICY &
COMPLIANCE
1849 C STREET NW-RM. 2340
WASHINGTON, DC 20240

N - POLICY REVIEW BRANCH
US ARMY CORPS OF ENGINEERS-HQ
441 G STREET NW
WASHINGTON, DC 20314

N - HONORABLE DAVID VITTER
U.S. SENATE
HART SENATE OFFICE BLDG SUITE SH-516
WASHINGTON, DC 20510

N - U.S. DEPT OF ENERGY
OFFICE OF ENV COMPLIANCE
ROOM 3G-092 EH22
1000 INDEPENDENCE AVENUE SW
WASHINGTON, DC 20585

N - NOAA NEPA COORDINATOR
PROGRAM, PLANNING & INTEGRATION
ROUTE: PPI/SP SSMC3, RM. #15603
1315 EAST-WEST HIGHWAY
SILVER SPRING, MD 20910

N - NORFOLK SOUTHERN
1200 PEACHTREE NE
ATLANTA, GA 30309-3579

N - FORD CONSTRUCTION COMPANY CO
P.O. BOX 527
DYERBURG, TN 38024

N - MR. JOSEPH V FRANK III
218 LINTON AVENUE
NATCHEZ, MS 39120-2316

N - DUCKS UNLIMITED
DIRECTOR KEN BABCOCK
193 BUSINESS PARK DRIVE, SUITE E
RIDGELAND, MS 39157-6026

N - CEMVD-RB-T
US ARMY CORPS OF ENGINEERS
ATTN: CHIEF
P.O. BOX 80
VICKSBURG, MS 39181-0080

N - GULF STATES
MARINE FISHERIES COMMISSION
JEFF RESTER
OCEAN SPRINGS, MS 39564

N - B.W. FARRELL INC.
P.O. BOX 992
PADUCAH, KY 42002-0992

N - LUHR BROS INC
P.O. BOX 50
COLUMBIA, IL 62236-0069

N - BERNARD MCMENAMY CONT INC
DREDGING MAR & GEN CONTRACTORS
17 SUNRIDGE
FLORISSANT, MO 63031

N - DON JOHNSON
ALBERICI
8800 PAGE AVE
ST. LOUIS, MO 63114

N - MASSAMAN CONSTRUCTION COMPANY
P.O. BOX 22007
ST. LOUIS, MO 63126-0007

N - POTASHNICK-HARRISON
CONSTRUCTION COMPANY
CAPE GIRARDEAU, MO 63702-0190

N - KANSAS CITY SOUTHERN
RAILWAY COMPANY
P.O. BOX 219335
KANSAS CITY, MO 64121-9335

N - JOSEPH LOPINTO
STATE REPRESENTATIVE
80TH REPRESENTATIVE DISTRICT
2016 PERSIMMON AVE.
METAIRIE, LA 70001

N - ST BERNARD NEWS
3010 LAUSAT STREET
METAIRIE, LA 70001

N - JEFFERSON PARISH LIBRARY
4747 WEST NAPOLEON AVENUE
METAIRIE, LA 70001

N - GEOLOGICAL CONSULTANT
ROBERT P WALDRON INC
4633 TRANSCONTINENTAL DR
METAIRIE, LA 70002

N - MR. SEAN M. DUFFY, SR.
GENERAL MANAGER
GULF STATES MARITIME ASSOCIATION
3939 N. CAUSEWAY BLV. SUITE 102
METAIRIE, LA 70002

N - TIMES PICAYUNE
4013 N I-10 SERVICE ROAD W
METAIRIE, LA 70002

N - "TONY" LIGI
STATE REPRESENTATIVE
79TH REPRESENTATIVE DISTRICT
5216 SENAC DR.
METAIRIE, LA 70003

N - ENGINEERING DEVELOPMENT GROUP INC
P.O. BOX 35
METAIRIE, LA 70004-0035

N - CITY BUSINESS
EDITOR: TERRY O'CONNOR
111 VETERANS BLVD STE 750
METAIRIE, LA 70005

N - CITY BUSINESS
DEON ROBERTS
111 VETERANS BLVD SUITE 750
METAIRIE, LA 70005

N - JENNIFER SNEED
DISTRICT 5
COUNCIL MEMBER
10 FARNHAM PL.
METAIRIE, LA 70005

N - JOHN F. LABRUZZO, JR.
STATE REPRESENTATIVE
81ST REPRESENTATIVE DISTRICT
1427 CHOCTAW AVE.
METAIRIE, LA 70005

N - JOHN F. YOUNG, JR.
DIVISION A
COUNCILMEMBER AT LARGE
609 METAIRIE RD., #300
METAIRIE, LA 70005

N - JULIE QUINN
STATE SENATOR
6TH SENATORIAL DISTRICT
419 NORTHLINE
METAIRIE, LA 70005

N - AUDUBON SOCIETY, NEW ORLEANS
JENNIFER COULSON
PRESIDENT
801 RUE DAUPHINE #304
METAIRIE, LA 70005-4608

N - WILLIAMS-MCWILLIAMS CO INC
P.O. BOX 8746
METAIRIE, LA 70011

N - PAUL J. HOGAN
DISTRICT 4
COUNCIL MEMBER
P.O. BOX 250
DES ALLEMANDS, LA 70030

N - ST CHARLES GRAIN ELEVATOR
ATTN: DARRYL G. PELTIER
P.O. BOX 120
AMA, LA 70031

N - RAY LAUGA, JR.
DISTRICT A
COUNCIL MEMBER
725 LEBEAU ST.
ARABI, LA 70032

N - CRESCENT RIVER PORT PILOTS ASSOC.
MIKE BUCCOLA
8712 HWY 23
BELLE CHASSE, LA 70037

N - ERNEST DURHAM WOOTON
STATE REPRESENTATIVE
105TH REPRESENTATIVE DISTRICT
113 VERNON ST.
BELLE CHASSE, LA 70037

N - WILLIAM "BILLY" NUNGESSER
PLAQUEMINES
PARISH PRESIDENT
8056 HWY. 23, SUITE 200
BELLE CHASSE, LA 70037

N - PLAQUEMINES PARISH GOVERNMENT
PLAQ PORT HARBOR & TERM DIST
ANDREW MACINNIS-CAM
106 AVENUE G
BELLE CHASSE, LA 70037

N - CIRCLE, INC.
1204 A ENGINEERING ROAD
BELLE CHASSE, LA 70037

N - JERRY HODNETT
DISTRICT 3
COUNCIL MEMBER
413 SCHLIEF DR.
BELLE CHASSE, LA 70037

N - IRVIN JUNEAU
DISTRICT 4
COUNCIL MEMBER
118 MAGNOLIA DR.
BELLE CHASSE, LA 70037

N - MR. GEORGE PIVACH JR.
P.O. BOX 160
BELLE CHASSE, LA 70037

N - KEITH HINKLEY
DISTRICT 2
COUNCIL MEMBER
112 LIBERTY ST.
BELLE CHASSE, LA 70037

N - PLAQUEMINES NEWSPAPER
PUBLISHING INC
P.O. BOX 700
BELLE CHASSE, LA 70037

N - ANTHONY L. BURAS, JR.
DISTRICT 5
COUNCIL MEMBER
13158 HWY. 23
BELLE CHASSE, LA 70037

N - DAVID MIKE METCALF
PERMIT OFFICER
PLAQUEMINES PARISH
8056 HWY. 23, SUITE 309
PORT SULPHUR, LA 70037-2402

N - RIVER PARISHES GUIDE
P.O. BOX 1199
BOUTTE, LA 70039

N - MR. MICHAEL TRUSCLAIR
NRCS DISTRICT CONSERVATIONIST
BOUTTE FIELD OFFICE
P.O. BOX 531
BOUTTE, LA 70039

N - ST CHARLES HERALD GUIDE
DANIEL MOORE
P.O. BOX 1199
BOUTTE, LA 70039

N - TERRY AUTHEMENT
DIVISION B
COUNCILMEMBER AT LARGE
102 ANGEL DR.
BOUTTE, LA 70039

N - DON BESHEL
DISTRICT 1
COUNCIL MEMBER
8603 HWY. 39
BRAITHWAITE, LA 70040

N - JOHN "JAY" FRIEDMAN
DISTRICT 7
COUNCIL MEMBER
P.O. BOX 105
BURAS, LA 70041

N - LYNDA G. BANTA
DISTRICT 8
COUNCIL MEMBER
35588 HWY. 11
BURAS, LA 70041-5212

N - KENNETH W. "KENNY" HENDERSON
DISTRICT C
COUNCIL MEMBER
3804 PALMISANO BLVD.
CHALMETTE, LA 70043

N - PARISH PRESIDENT
ST. BERNARD PARISH GOVERNMENT
8201 W. JUDGE PEREZ DRIVE
CHALMETTE, LA 70043

N - CLERK OF COUNCIL
ST. BERNARD PARISH
ROXANNE ADAMS
8201 W. JUDGE PEREZ DRIVE
CHALMETTE, LA 70043

N - CRAIG P. TAFFARO, JR.
ST. BERNARD
PARISH PRESIDENT
8201 W. JUDGE PEREZ DRIVE
CHALMETTE, LA 70043

N - FRANK P. AUDERER, JR.
WESTERN DIVISION
COUNCILMEMBER AT LARGE
2120 GALLANT DR.
CHALMETTE, LA 70043

N - GEORGE CAVIGNAC
DISTRICT B
COUNCIL MEMBER
2825 LLOYDS AVE.
CHALMETTE, LA 70043

N - ED HINYUB
ST. BERNARD PARISH
8201 W. JUDGE PEREZ DRIVE
CHALMETTE, LA 70043

N - "NITA" HUTTER
STATE REPRESENTATIVE
104TH REPRESENTATIVE DISTRICT
P.O. BOX 275
CHALMETTE, LA 70044

N - REBECCA S. MARTIN
ST. BERNARD ECONOMIC DEVELOPMENT
COMMISSION EXECUTIVE DIRECTOR
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CHALMETTE, LA 70044

N - "V.J." ST. PIERRE, JR.
ST. CHARLES
PARISH PRESIDENT
P.O. BOX 33
DESTREHAN, LA 70047

N - JOEL T. CHAISSON, II
STATE SENATOR
19TH SENATORIAL DISTRICT
1 ORMOND TRACE
DESTREHAN, LA 70047

N - CAROLYN K. SCHEXNAYDRE
DIVISION A
COUNCILMEMBER AT LARGE
269 SCHEXNAYDRE LN.
DESTREHAN, LA 70047

N -
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118 W. EASY STREET
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N - JOHN DOUCET
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ALDERMAN
443 N. MONTZ AVE.
GRAMERCY, LA 70052

N - BETTY COOPER COLEMAN
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ALDERMAN
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GRAMERCY, LA 70052

N - ALVIN "SHARK" ST. PIERRE, JR.
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ALDERMAN
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N - HERMAN BOURGEOIS
TOWN OF GRAMERCY
MAYOR
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N - RUBENSTEIN MITCHELL CLARK
TOWN OF GRAMERCY
ALDERMAN AT LARGE
P.O. BOX 662
GRAMERCY, LA 70052

N - LYDIA Z. LOUQUE
PERMIT OFFICIAL
GRAMERCY,TOWN OF
P. O. DRAWER 340
GRAMERCY, LA 70052

N - KEYOJUAN L. GANT
DISTRICT 1B, TOWN OF LUTCHER
ALDERMAN
P.O. BOX 835
GRAMERCY, LA 70052

N - ENTERGY
1001 VIRGIL STREET
GRETNA, LA 70053

N - JEFFERSON PARISH POLICE JURY
PARISH COUNCIL
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GRETNA, LA 70053

N - RAYLYN R. BEEVERS
DISTRICT 4, CITY OF GRETNA
COUNCIL MEMBER
210 HUEY P. LONG AVE.
GRETNA, LA 70053

N - WAYNE RAU
CITY OF GRETNA
COUNCIL MEMBER AT LARGE
936 LAFAYETTE ST.
GRETNA, LA 70053

N - VINCENT E. COX, III
DISTRICT 3, CITY OF GRETNA
COUNCIL MEMBER
82 MASON AVE.
GRETNA, LA 70053

N - BELINDA CAMBRE CONSTANT
DISTRICT 2, CITY OF GRETNA
COUNCIL MEMBER
720 HUEY P. LONG AVE.
GRETNA, LA 70053

N - JONATHAN C. BOLAR
DISTRICT 1, CITY OF GRETNA
COUNCIL MEMBER
1101 KEPLER ST.
GRETNA, LA 70053

N - RICKY J. TEMPLET
STATE REPRESENTATIVE
85TH REPRESENTATIVE DISTRICT
P.O. BOX 1158
GRETNA, LA 70053

N - TIMES PICAYUNE
ANDREA SHAW
2520 BELLE CHASSE HIGHWAY
GRETNA, LA 70053

N - RONNIE C. HARRIS
CITY OF GRETNA
MAYOR
P.O. BOX 404
GRETNA, LA 70054

N - DANIKA GORRONDONA
GRETNA, CITY OF
P. O. BOX 404
GRETNA, LA 70054

N - WALLY "GATOR" LANDRY
PRESIDENT
CRUCIAL, INC.
142 ENTERPRISE DIVE
GRETNA, LA 70056

N - "JIM" TUCKER
STATE REPRESENTATIVE
86TH REPRESENTATIVE DISTRICT
732 BERHMAN HWY. STE. C-2
TERRYTOWN, LA 70056

N - ST. CHARLES PARISH COUNCIL
P.O. BOX 302
HAHNVILLE, LA 70057

N - STANLEY R DUFRENE - PUBLIC AFFAIRS
UNION CARBIDE / DOW CHEMICAL
P.O. BOX 50
HAHNVILLE, LA 70057

N - BILLY RAYMOND, SR.
DISTRICT 1
COUNCIL MEMBER
520 COURTHOUSE LN.
HAHNVILLE, LA 70057

N - EARL MATHERNE, CFM
PERMIT OFFICER
ST. CHARLES PARISH
P. O. BOX 302
HAHNVILLE, LA 70057

N - MR. JAY VINCENT
509 3RD AVENUE
HARVEY, LA 70058

N - "CHRIS" ROBERTS
DISTRICT 1
COUNCIL MEMBER
2149 HYDE PARK AVE. EAST
HARVEY, LA 70058

N - PATRICK CONNICK
STATE REPRESENTATIVE
84TH REPRESENTATIVE DISTRICT
720 FOS AVE.
HARVEY, LA 70058

N - KEITH CHIRO
PERMIT OFFICER
KENNER, CITY OF
2000 18TH ST.
KENNER, LA 70062

N - JOE STAGNI
DISTRICT 2, CITY OF KENNER
COUNCIL MEMBER
1700 TAYLOR ST.
KENNER, LA 70062

N - MICHELE P. BRANIGAN
DIVISION A, CITY OF KENNER
COUNCIL MEMBER AT LARGE
1801 WILLIAMS BOULEVARD
KENNER, LA 70062

N - "JEANNIE" M. BLACK
DIVISION B, CITY OF KENNER
COUNCIL MEMBER AT LARGE
1801 WILLIAMS BLVD.
KENNER, LA 70062

N - KENNER STAR
CANDY LOVITT-MANAGING EDITOR
P.O. BOX 641654
KENNER, LA 70064

N - E.B. "BEN" ZAHN III
DISTRICT 3, CITY OF KENNER
COUNCIL MEMBER
4328 COLORADO AVE.
KENNER, LA 70065

N - DANIEL R. "DANNY" MARTINY
STATE SENATOR
10TH SENATORIAL DISTRICT
622 CARMENERE DR.
KENNER, LA 70065

N - KENT DENAPOLIS
DISTRICT 5, CITY OF KENNER
COUNCIL MEMBER
4007 SAINT BLAISE DR.
KENNER, LA 70065

N - "TOM" WILLMOTT
STATE REPRESENTATIVE
92ND REPRESENTATIVE DISTRICT
3209 KANSAS AVE
KENNER, LA 70065

N - MARIA DEFRANCESCH
DISTRICT 4, CITY OF KENNER
COUNCIL MEMBER
20 MONTE CARLO DR.
KENNER, LA 70065

N - AARON F. BROUSSARD
JEFFERSON
PARISH PRESIDENT
3329 FLORIDA AVE.
KENNER, LA 70065

N - EDMOND J. "ED" MUNIZ
CITY OF KENNER
MAYOR
58 CHATEAU LATOUR DR.
KENNER, LA 70065

N - MARC E. JOHNSON
DISTRICT 1, CITY OF KENNER
COUNCIL MEMBER
421 FILMORE ST.
KENNER, LA 70065

N - YVETTE CRAIN
CLERK
JEAN LAFITTE, TOWN OF
2654 JEAN LAFITTE BOULEVARD
LAFITTE, LA 70067

N - TIMOTHY P. KERNER
TOWN OF JEAN LAFITTE
MAYOR
1156 JEAN LAFITTE BLVD.
LAFITTE, LA 70067

N - SLOANE KERNER
TOWN OF JEAN LAFITTE
COUNCIL MEMBER
1156 JEAN LAFITTE BLVD.
LAFITTE, LA 70067

N - SHIRLEY GUILLIE
TOWN OF JEAN LAFITTE
COUNCIL MEMBER
624 JEAN LAFITTE BLVD.
LAFITTE, LA 70067

N - C & M CONTRACTORS, INC.
ATTN: KENNY DAIGLE
P.O. BOX 70
LAFITTE, LA 70067

N - VERNA "TETA" SMITH
TOWN OF JEAN LAFITTE
COUNCIL MEMBER
2761 COUEVAS ST.
LAFITTE, LA 70067

N - CALVIN "BUTCH" LEBEAU
TOWN OF JEAN LAFITTE
COUNCIL MEMBER
2072 CAMILLE CT.
LAFITTE, LA 70067

N - NICKIE MONICA
STATE REPRESENTATIVE
57TH REPRESENTATIVE DISTRICT
298 DORAL LN.
LAPLACE, LA 70068

N - ST. JOHN THE BAPTIST PARISH LIBRARY
2920 NEW HIGHWAY 51
LAPLACE, LA 70068

N - MARCUS M. LAMBERT
DISTRICT 6
COUNCIL MEMBER
200 EDGEWOOD LN.
MONTZ, LA 70068

N - MS. LOU VAUGHN
FPA
ST. JOHN THE BAPTIST
102 EAST AIRLINE HWY.
LAPLACE, LA 70068

N - RONNIE S. SMITH
DISTRICT 6
COUNCIL MEMBER
2609 ENGLISH COLONY DR.
LAPLACE, LA 70068

N - JACLYN HOTARD
DISTRICT 4
COUNCIL MEMBER
776 MADEWOOD DRIVE
LAPLACE, LA 70068

N - DARNEL CLEMENT USRY
DISTRICT 5
COUNCIL MEMBER
500 PALM ST.
LAPLACE, LA 70068

N - STEVE LEE
DIVISION B
COUNCILMEMBER AT LARGE
38 MUIRFIELD DR.
LAPLACE, LA 70068

N - CHERYL MILLET
DISTRICT 7
COUNCIL MEMBER
1925 RIDGEFIELD DR.
LAPLACE, LA 70068

N - BILL HUBBARD
ST. JOHN THE BAPTIST
PARISH PRESIDENT
242 SOMERSET
LAPLACE, LA 70068

N - L'OBSERVATEUR
KEVIN CHIRI
P.O. BOX 1010
LAPLACE, LA 70069

N - DENNIS NUSS
DISTRICT 7
COUNCIL MEMBER
127 BRADEN DR.
LULING, LA 70070

N - SHELLEY TASTET
DISTRICT 2
COUNCIL MEMBER
11 CATHY DR.
LULING, LA 70070

N - DUSTIN "CHIP" ROUSSEL
DISTRICT 2B, TOWN OF LUTCHER
ALDERMAN
1330 THIRD ST.
LUTCHER, LA 70071

N - JASON P. AMATO
DISTRICT 2
COUNCIL MEMBER
1168 MARQUETTE DR.
LUTCHER, LA 70071

N - VANESSA ROUSSEL
CLERK
LUTCHER, TOWN OF
P. O. BOX 456
LUTCHER, LA 70071

N - PONTCHARTRAIN LEVEE DISTRICT
EXECUTIVE DIRECTOR: STEPHEN CUPIT
P.O. BOX 426
LUTCHER, LA 70071

N - NEWS EXAMINER
P.O. BOX 460
LUTCHER, LA 70071

N - FLOYD A. MARSHALL, SR.
DISTRICT 1A, TOWN OF LUTCHER
ALDERMAN
P.O. BOX 861
LUTCHER, LA 70071

N - OTIS J. SCHEXNAYDER
SEAT ONE, TOWN OF LUTCHER
ALDERMAN AT LARGE
P.O. BOX 51
LUTCHER, LA 70071

N - DALE HYMEL, JR.
ST. JAMES
PARISH PRESIDENT
P.O. BOX 3
LUTCHER, LA 70071

N - ROWDY KENNARD SCOTT
TOWN OF LUTCHER
MAYOR
1596 CABANOSE AVE.
LUTCHER, LA 70071

N - PATRICK P. ST. PIERRE
DISTRICT 2A, TOWN OF LUTCHER
ALDERMAN
P.O. BOX 1128
LUTCHER, LA 70071

N - ST. JAMES PARISH LIBRARY
1879 WEST MAIN STREET
LUTCHER, LA 70071-9704

N - DERRICK SHEPHERD
STATE SENATOR
3RD SENATORIAL DISTRICT
1113 GARDEN RD.
MARRERO, LA 70072

N - GIROD JACKSON, III
STATE REPRESENTATIVE
87TH REPRESENTATIVE DISTRICT
1528 HAYDEL ST.
MARRERO, LA 70072

N - WEST JEFFERSON LEVEE DISTRICT
EXE. DIRECTOR: GERALD SPOHRER
7001 RIVER ROAD
MARRERO, LA 70072

N - BYRON LEE
DISTRICT 3
COUNCIL MEMBER
40 GAINSWOOD DR. E.
MARRERO, LA 70072

N - JOHN PIGLIA
JEFFERSON PARISH
1887 AMES BLVD.
MARRERO, LA 70072

N - "MIKE" GINART
DISTRICT D
COUNCIL MEMBER
2104 OLIVIA ST.
MERAUX, LA 70075

N - BONNET CARRE' ROD & GUN CLUB
CHAIRMAN ENVIRONMENTAL COMMITTEE
630 SPRUCE STREET
NORCO, LA 70079

N - GARY L. SMITH, JR.
STATE REPRESENTATIVE
56TH REPRESENTATIVE DISTRICT
P.O. BOX 189
NORCO, LA 70079

N - PLAQUEMINES PARISH POLICE JURY
P.O. BOX 61
POINTE-A-LA-HACHE, LA 70082

N - BURGHART H. TURNER
DISTRICT 6
COUNCIL MEMBER
P.O. BOX 137
PORT SULPHUR, LA 70083

N - DANNY MILLET
DISTRICT 2
COUNCIL MEMBER
296 ANNEX DR.
RESERVE, LA 70084

N - CHARLES JULIEN
DISTRICT 3
COUNCIL MEMBER
P.O. BOX 2489
RESERVE, LA 70084

N - RICHARD DALE WOLFE, SR.
DIVISION A
COUNCILMEMBER AT LARGE
P.O. BOX 2289
RESERVE, LA 70084

N - "FRED" EVERHARDT, JR.
DISTRICT E
COUNCIL MEMBER
2400 GINA DR.
ST. BERNARD, LA 70085

N - "LARRY" COCHRAN
DISTRICT 5
COUNCIL MEMBER
114 OAKLAWN RDGE.
ST. ROSE, LA 70087

N - ELTON M. AUBERT
STATE REPRESENTATIVE
58TH REPRESENTATIVE DISTRICT
2740 S. BANK LN.
VACHERIE, LA 70090

N - JAMES "JIMMY" BRAZAN
DISTRICT 7
COUNCIL MEMBER
13426 REDBUD ST.
VACHERIE, LA 70090

N - "KEN" BRASS
DISTRICT 6
COUNCIL MEMBER
2381 ARMANT ST.
VACHERIE, LA 70090

N - CHARLES "I SPY" KETCHENS
DISTRICT 5
COUNCIL MEMBER
P.O. BOX 421
VACHERIE, LA 70090

N - LAFOURCHE BASIN LEVEE DISTRICT
ADMINISTRATIVE MANAGER:
RANDY TROSCLAIR
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VACHERIE, LA 70090

N - HUEY STEIN - EDITOR
THE ENTERPRISE
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VACHERIE, LA 70090-5603

N - MARLA FISHER COOPER
DISTRICT 9
COUNCIL MEMBER
42941 HWY. 23
VENICE, LA 70091

N - REED S. HENDERSON
STATE REPRESENTATIVE
103ND REPRESENTATIVE DISTRICT
3004 FARMSITE RD.
VIOLET, LA 70092

N - TONY "RICKY" MELERINE
EASTERN DIVISION
COUNCILMEMBER AT LARGE
5901 THIRD ST.
VIOLET, LA 70092

N - LAKE BORGNE BASIN LEVEE DISTRICT
ROBERT TURNER
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N - TED J. MUNCH
DISTRICT 2, CITY OF WESTWEGO
COUNCIL MEMBER
611 CHIPLEY ST.
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N - JOHN A. ALARIO, JR.
STATE SENATOR
8TH SENATORIAL DISTRICT
469 VINE DR.
WESTWEGO, LA 70094

N - LARRY WARINO, SR.
DISTRICT 5, CITY OF WESTWEGO
COUNCIL MEMBER
808 AVENUE H
WESTWEGO, LA 70094

N - MELVIN J. GUIDRY
DISTRICT 4, CITY OF WESTWEGO
COUNCIL MEMBER
1161 AVENUE C
WESTWEGO, LA 70094

N - MS. CAROL BLANCHARD
SPEC.PROJ. COORDINATOR
WESTWEGO, CITY OF
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N - JOHN I."JOHNNY" SHADDINGER, JR.
DISTRICT 1, CITY OF WESTWEGO
COUNCIL MEMBER
312 AVENUE B
WESTWEGO, LA 70094

N - DANIEL P. ALARIO, SR.
CITY OF WESTWEGO
MAYOR
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WESTWEGO, LA 70094

N - LISA VALENCE
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COUNCIL MEMBER
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WESTWEGO, LA 70094

N - ROBERT E. BILLIOT
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N - WDSU-TV
846 HOWARD AVE.
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N - DAVID HEITMEIER
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7TH SENATORIAL DISTRICT
3501 HOLIDAY DRIVE, SUITE 225
NEW ORLEANS, LA 70114

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STATE REPRESENTATIVE
98TH REPRESENTATIVE DISTRICT
906 ARABELLA ST.
NEW ORLEANS, LA 70115

N - STACY HEAD
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COUNCIL MEMBER
1675 SONIAT ST.
NEW ORLEANS, LA 70115

N - WWL / WAJY
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116

N - DENNIS WOLTERING
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - LAURA BUCHTEL
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - DAWN BROWN
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - CARL ARREDONDO
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - BILL CAPO
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - MIKEL SCHAEFER
WWL-TV, CHANNEL 4
1024 NORTH RAMPART ST.
NEW ORLEANS, LA 70116-2487

N - WALKER HINES
STATE REPRESENTATIVE
95TH REPRESENTATIVE DISTRICT
100 AUDUBON BLVD.
NEW ORLEANS, LA 70118

N - JANET PLUME
JOURNAL OF COMMERCE
826 FERN ST
NEW ORLEANS, LA 70118

N - JENNIFER ROBERTS
UNIVERSITY OF NEW ORLEANS
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NEW ORLEANS, LA 70118

N - ARNIE FIELKOW
COUNCILMEMBER AT LARGE
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NEW ORLEANS, LA 70118

N - TULANE UNIVERSITY ARMY ROTC
6823 ST CHARLES AVE
NEW ORLEANS, LA 70118-5698

N - EDWIN MURRAY
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4TH SENATORIAL DISTRICT
1540 N. BROAD ST.
NEW ORLEANS, LA 70119

N - NORA CASSERLY
1607 SAUVAGE ST.
NEW ORLEANS, LA 70119-3056

N - TIMES PICAYUNE
JEFFERSON BUREAU
DREW E. BROACH
15 JOYCE AVE
JEFFERSON, LA 70121

N - STEPHEN J. SCALISE
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9TH SENATORIAL DISTRICT
234 JEFFERSON HEIGHTS AVE.
JEFFERSON, LA 70121

N - CAMERON HENRY
STATE REPRESENTATIVE
82ND REPRESENTATIVE DISTRICT
400 CENTRAL AVE.
JEFFERSON, LA 70121

N - J. P. MORRELL
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97TH REPRESENTATIVE DISTRICT
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NEW ORLEANS, LA 70122

N - CYNTHIA HEDGE-MORRELL
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NEW ORLEANS, LA 70122

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STATE REPRESENTATIVE
96TH REPRESENTATIVE DISTRICT
6305 ELYSIAN FIELDS AVE., STE. 207A
NEW ORLEANS, LA 70122

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COUNCIL MEMBER
7212 STONELEIGH DR.
HARAHAN, LA 70123

N - TIFFANY SCOT WILKEN
CITY OF HARAHAN
COUNCIL MEMBER
812 GORDON AVE.
HARAHAN, LA 70123

N - CINDY MURRAY
CITY OF HARAHAN
COUNCIL MEMBER
125 GLENWOOD AVE
HARAHAN, LA 70123

N - MR RON BRINKMAN
US MINERALS MANAGEMENT SERVICE
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N - KIRK TALBOT
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78TH REPRESENTATIVE DISTRICT
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RIVER RIDGE, LA 70123

N - JEFFERSON PARISH LEVEE DISTRICT
EXECUTIVE DIRECTOR: BOBBY BOURGEOIS
203 PLAUCHE CT.
HARAHAN, LA 70123

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CITY OF HARAHAN
COUNCIL MEMBER
30 WEST IMPERIAL DR.
HARAHAN, LA 70123

N - ELTON MANARD LAGASSE
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RIVER RIDGE, LA 70123

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HARAHAN, LA 70123

N - PAUL D. JOHNSTON
CITY OF HARAHAN
MAYOR
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HARAHAN, LA 70123

N - LAWRENCE LANDRY
CITY OF HARAHAN
COUNCIL MEMBER
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HARAHAN, LA 70123

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JEFFERSON PARISH
COUNCIL MEMBER AT LARGE DIVISION B
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JEFFERSON, LA 70123-2337

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94TH REPRESENTATIVE DISTRICT
1133 ROBERT E. LEE BLVD.
NEW ORLEANS, LA 70124

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NEW ORLEANS, LA 70124

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7412 ONYX ST.
NEW ORLEANS, LA 70124

N - JUDY BUCKLEY
433 JEWEL ST.
NEW ORLEANS, LA 70124

N - FRANK MEYDRICH JR.
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NEW ORLEANS, LA 70124

N - KIM HOLDEN
FOX 8 LIVE
WVUE-TV
1025 SOUTH JEFFERSON DAVIS PKWY.
NEW ORLEANS, LA 70125

N - HONORABLE MARY LANDRIEU
U.S. SENATE
4301 S. PRIEUR
NEW ORLEANS, LA 70125

N - JOHN SNELL-ANCHOR
WVUE-TV
1025 SOUTH JEFFERSON DAVIS PKWY.
NEW ORLEANS, LA 70125

N - CHERYL A. GRAY
STATE SENATOR
5TH SENATORIAL DISTRICT
4219 S. CLAIBORNE AVE.
NEW ORLEANS, LA 70125

N - BOBBY BRENNAN
FOX 8 LIVE
WVUE-TV
1025 SOUTH JEFFERSON DAVIS PKWY.
NEW ORLEANS, LA 70125

N - BOB BRECK
FOX 8 LIVE
WVUE-TV
1025 SOUTH JEFFERSON DAVIS PKWY.
NEW ORLEANS, LA 70125

N - WVUE-TV
1025 SOUTH JEFFERSON DAVIS PKWY.
NEW ORLEANS, LA 70125-1218

N - CEDRIC L. RICHMOND
STATE REPRESENTATIVE
101ST REPRESENTATIVE DISTRICT
7021 COVE DR.
NEW ORLEANS, LA 70126

N - ORLEANS LEVEE DISTRICT
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SUITE 202, 6001 STARS & STRIPES BLVD.
NEW ORLEANS, LA 70126-8006

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MR. FRANK H. WALK
CHAIRMAN
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NEW ORLEANS, LA 70130

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91ST REPRESENTATIVE DISTRICT
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NEW ORLEANS, LA 70130

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HALE BOGGS FEDERAL BUILDING
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N - PONTCHARTRAIN MATERIALS CORP
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N - J H MENGE & CO.
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N - JOHN PRICE
SSA GULF TERMINALS
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N - AUX LLC
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60TH REPRESENTATIVE DISTRICT
3413 HWY. 70
PIERRE PART, LA 70339

N - BERRY BROTHERS GEN CONTRACTORS INC.
ATTN: WELDON MILLER
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BERWICK, LA 70342

N - C.J. WILLIAMS
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DONALDSONVILLE, LA 70346

N - CHIEF
P.O. BOX 309
DONALDSONVILLE, LA 70346

N - ANTHONY "TONY" HUEY
DISTRICT 1, CITY OF DONALDSONVILLE
COUNCIL MEMBER
411 W. 3RD ST.
DONALDSONVILLE, LA 70346

N - LEROY SULLIVAN
CITY OF DONALDSONVILLE
MAYOR
2219 EAST BAYOU RD.
DONALDSONVILLE, LA 70346

N - OLIVER JOSEPH
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COUNCIL MEMBER
1409 MILLIEN RD.
DONALDSONVILLE, LA 70346

N - REGINALD FRANCIS, SR.
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COUNCIL MEMBER
P.O. BOX 1582
DONALDSONVILLE, LA 70346

N - RAYMOND E. AUCOIN
DISTRICT 2, CITY OF DONALDSONVILLE
COUNCIL MEMBER
2200 EAST BAYOU RD.
DONALDSONVILLE, LA 70346

N - CHARLES R. BROWN, SR.
DISTRICT 4, CITY OF DONALDSONVILLE
COUNCIL MEMBER
106 ANNA ST.
DONALDSONVILLE, LA 70346

N - EMILE JOHN SPANO
DISTRICT 5, CITY OF DONALDSONVILLE
COUNCIL MEMBER
916 IBERVILLE ST.
DONALDSONVILLE, LA 70346

N - ASCENSION PARISH LIBRARY
500 MISSISSIPPI STREET
DONALDSONVILLE, LA 70346-2535

N - DISTRICT CONSERVATIONIST
ST. JAMES PARISH
DONALDSONVILLE SERVICE CENTER
2274 HIGHWAY 70
DONALDSONVILLE, LA 70346-8861

N - DISTRICT CONSERVATIONIST
ASCENSION PARISH
DONALDSONVILLE SERVICE CENTER
2274 HIGHWAY 70
DONALDSONVILLE, LA 70346-8861

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ROBERT PREGEANT
P.O. BOX 820
GALLIANO, LA 70354

N - MIKE PLAISANCE
PLAISANCE DRAGLINE & DREDGING CO INC
P.O. BOX 578
GOLDEN MEADOW, LA 70357

N - RAY A. SANTINY
SEAT A, TOWN OF GRAND ISLE
COUNCIL MEMBER
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GRAND ISLE, LA 70358

N - IRVIN RICHOUX, SR.
BUILDING INSPECTOR
GRAND ISLE, TOWN OF
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GRAND ISLE, LA 70358

N - CARROLL ALLEMAND
SEAT E, TOWN OF GRAND ISLE
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GRAND ISLE, LA 70358

N - GRAND ISLE INDEPENDENT LEVEE DISTRICT
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N - "ZEE" LAFONT
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GRAND ISLE, LA 70358

N - MICHAEL A. HARRIS
GRAND ISLE MATERIAL CO INC.
P.O. BOX 279
GRAND ISLE, LA 70358

N - "JAY" LAFONT
SEAT B, TOWN OF GRAND ISLE
COUNCIL MEMBER
158 PINE LN.
GRAND ISLE, LA 70358

N - "JAY" LAFONT
SEAT B, TOWN OF GRAND ISLE
COUNCIL MEMBER
P.O. BOX 27
GRAND ISLE, LA 70358

N - RAY A. SANTINY
SEAT A, TOWN OF GRAND ISLE
COUNCIL MEMBER
P.O. BOX 325
GRAND ISLE, LA 70358

N - SOUTH CENTRAL PLANNING & DEVELOPMENT
MS. MARIE FERTITTA
P.O. BOX 1870
GRAY, LA 70359

N - TENNESSEE GAS PIPELINE
SUGAR MILL POINT
1115 REGAL ROW
HOUMA, LA 70360

N - DONALD LANDRY
SOUTH LA ENVIRONMENTAL COUNCIL
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N - KATHY PITRE
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N - JERRY "TRUCK" GISCLAIR
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54TH REPRESENTATIVE DISTRICT
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N - DIAMOND SERVICES CORPORATION
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MORGAN CITY, LA 70381-1286

N - CHARLIE MELANCON
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3RD CONGRESSIONAL DISTRICT
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N - WILLIE GRANT JACKSON
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COUNCIL MEMBER
122 CAROLINA ST.
HAMMOND, LA 70401

N - JOHNNY E. BLOUNT
DISTRICT 1, CITY OF HAMMOND
COUNCIL MEMBER
102 MITCHELL DR.
HAMMOND, LA 70401

N - MAYSON H. FOSTER
CITY OF HAMMOND
MAYOR
800 W. DAKOTA
HAMMOND, LA 70401

N - "BOBBY" CORTEZ
DISTRICT 10
COUNCIL MEMBER
42102 JEFFERSON DR.
HAMMOND, LA 70403

N - LIONELL WELLS
DISTRICT 7
COUNCIL MEMBER
1700 S. MOONEY AVE.
HAMMOND, LA 70403

N - CINDY MURRAY CHATELAIN
PLANNING & ZONING CLERK
ABITA SPRINGS, TOWN OF
P. O. BOX 461
ABITA SPRINGS, LA 70420

N - LOUIS FITZMORRIS
TOWN OF ABITA SPRINGS
MAYOR
P.O. BOX 472
ABITA SPRINGS, LA 70420

N - PATRICIA EDMISTON
TOWN OF ABITA SPRINGS
ALDERMAN
72286 GORDON AVE.
ABITA SPRINGS, LA 70420-3548

N - GORDON BURGESS
TANGIPAHOA
PARISH PRESIDENT
P.O. BOX 215
AMITE, LA 70422

N - WABL
P.O. BOX 787
AMITE, LA 70422

N - NASH BONO
BUILDING OFFICIAL
CITY OF HAMMOND
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HAMMOND, LA 70401

N - JASON HOOD
DISTRICT 2, CITY OF HAMMOND
COUNCIL MEMBER
609 N. GENERAL PERSHING
HAMMOND, LA 70401

N - WFPR / WHMD
200 E THOMAS ST
HAMMOND, LA 70401-3316

N - "KATHY" MONTECINO
DISTRICT 4, CITY OF HAMMOND
COUNCIL MEMBER
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HAMMOND, LA 70403

N - CARLOS D. NOTARIANO
DISTRICT 8
COUNCIL MEMBER
43327 OLIVE BRANCH RD.
HAMMOND, LA 70403

N - "GREG" LEMONS
TOWN OF ABITA SPRINGS
ALDERMAN
71361 ST. JOSEPH ST.
ABITA SPRINGS, LA 70420

N - W. E. "PAT" PATTERSON, III
TOWN OF ABITA SPRINGS
ALDERMAN
72104 LAUREL ST.
ABITA SPRINGS, LA 70420

N - TROY DUGAS
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ALDERMAN
72099 HICKORY ST.
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N - TANGIPAHOA PARISH POLICE JURY
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N - MARY LOU LEE
CLERK
AMITE CITY, TOWN OF
212 EAST OAK STREET
AMITE CITY, LA 70422

N - MIKE WILLIAMS
DISTRICT 5, CITY OF HAMMOND
COUNCIL MEMBER
6 AUDUBON
HAMMOND, LA 70401

N - "RONNIE" BANKSTON
DISTRICT 6
COUNCIL MEMBER
43229 SWEET PEA LN.
HAMMOND, LA 70401

N - ROBERT JOSEPH MOREAU, PH.D.
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SOUTHEASTERN LOUISIANA UNIVERSITY
SLU BOX 10585
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N - ANDY CURRIER
BUILDING OFFICIAL
TANGIPAHOA PARISH
15481 W. CLUB DELUXE
HAMMOND, LA 70403

N - DAILY STAR
LILLIAN MIRANDO
P.O. BOX 1149
HAMMOND, LA 70404

N - SCOTT SIMON
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74TH REPRESENTATIVE DISTRICT
P. O. BOX 1297
ABITA SPRINGS, LA 70420

N - SHERI SABLE CAMPBELL
TOWN OF ABITA SPRINGS
ALDERMAN
72110 GUM ST.
ABITA SPRINGS, LA 70420

N - AMITE TANGI-DIGEST
120 NE CENTRAL AV-P O BOX 698
AMITE, LA 70422

N - JOHN BEL EDWARDS
STATE REPRESENTATIVE
72ND REPRESENTATIVE DISTRICT
P. O. BOX 1495
AMITE, LA 70422

N - WALTER DANIELS
DISTRICT 1, TOWN OF AMITE CITY
COUNCIL MEMBER
427 E. CHERRY ST.
AMITE, LA 70422

N - H. L. "BUDDY" TILL
DISTRICT 4, TOWN OF AMITE CITY
COUNCIL MEMBER
608 JULIE DR.
AMITE, LA 70422

N - MICHAEL A. PETITTO
DISTRICT 3
COUNCIL MEMBER
P.O. BOX 613
AMITE, LA 70422

N - TANGI-TALK
P.O. BOX 637
AMITE, LA 70422

N - CHARLES "BOO" CHRISTMAS
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COUNCIL MEMBER
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N - MARK VINING
DISTRICT 3, TOWN OF AMITE CITY
COUNCIL MEMBER
301 EAST CHESTNUT ST.
AMITE, LA 70422

N - JONATHAN FOSTER
DISTRICT 2, TOWN OF AMITE CITY
COUNCIL MEMBER
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AMITE, LA 70422

N - TANGIPAHOA PARISH LIBRARY
200 EAST MULBERRY STREET
AMITE, LA 70422-2524

N - BEN WAYNE NEVERS
STATE SENATOR
12TH SENATORIAL DISTRICT
61596 LITTLE SOUTHERN VILLAGE
BOGALUSA, LA 70427

N - GARY COOPER
DISTRICT 2
COUNCIL MEMBER
22078 SHARP CHAPEL RD.
BUSH, LA 70431

N - JOHN M. SCHRODER
STATE REPRESENTATIVE
77TH REPRESENTATIVE DISTRICT
819 W. 13TH AVE.
COVINGTON, LA 70433

N - W. T. "TREY" BLACKALL, III
CITY OF COVINGTON
COUNCIL MEMBER AT LARGE
1006 S. FILMORE ST.
COVINGTON, LA 70433

N - CLARENCE ROMAGE
DISTRICT B, CITY OF COVINGTON
COUNCIL MEMBER
706 COVINGTON POINT DR.
COVINGTON, LA 70433

N - BARBARA DODDS
LEAGUE OF WOMEN VOTERS - ST. TAMMANY
143 TCHEFUNCTE DR
COVINGTON, LA 70433

N - JOHN M. "MARTY" DEAN
DISTRICT 1
COUNCIL MEMBER
19 KATHLEEN DR.
COVINGTON, LA 70433

N - MARK SACCO
DISTRICT C, CITY OF COVINGTON
COUNCIL MEMBER
24 MICHELLE DR.
COVINGTON, LA 70433

N - "JACK" DONAHUE
STATE SENATOR
11TH SENATORIAL DISTRICT
123 MAPLE RIDGE WAY
COVINGTON, LA 70433

N - FRANCES R. DUNN
DISTRICT A, CITY OF COVINGTON
COUNCIL MEMBER
827 W. 31ST AVE.
COVINGTON, LA 70433

N - MARTIN W. "MARTY" GOULD, JR.
DISTRICT 5
COUNCIL MEMBER
300 BUCKTHORN CIR.
COVINGTON, LA 70433

N - ST. TAMMANY PARISH LIBRARY
310 WEST 21ST AVENUE
COVINGTON, LA 70433-3100

N - LEE S. ALEXIUS
DISTRICT E, CITY OF COVINGTON
COUNCIL MEMBER
400 S. NEW HAMPSHIRE ST.
COVINGTON, LA 70433-3551

N - "MATT" FAUST
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COUNCIL MEMBER AT LARGE
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N - MARSHELL BRUMFIELD
VILLAGE OF FOLSOM
MAYOR
12428 HAY HOLLOW RD.
FOLSOM, LA 70437

N - JAMES A. "RED" THOMPSON, II
DISTRICT 3
COUNCIL MEMBER
78111 J & B RD.
FOLSOM, LA 70437

N - JOYCE CORE
CLERK
FOLSOM, VILLAGE OF
P. O. BOX 609
FOLSOM, LA 70437

N - "KEN" WILT
VILLAGE OF FOLSOM
ALDERMAN
418 ACADIAN DR.
FOLSOM, LA 70437

N - PHILLIP BICKHAM
VILLAGE OF FOLSOM
ALDERMAN
P.O. BOX 914
FOLSOM, LA 70437

N - HAROLD L. RITCHIE
STATE REPRESENTATIVE
75TH REPRESENTATIVE DISTRICT
25255 HWY. 62
FRANKLINTON, LA 70438

N - DISTRICT CONSERVATIONIST
ST. TAMMANY PARISH
FRANKLINTON SERVICE CENTER
1111 WASHINGTON ST
FRANKLINTON, LA 70438-1846

N - "RICHARD" NAVARRA
TOWN OF INDEPENDENCE
ALDERMAN
P.O. BOX 857
INDEPENDENCE, LA 70443

N - LOUIS "NICK" JOSEPH
TOWN OF INDEPENDENCE
ALDERMAN
P.O. BOX 621
INDEPENDENCE, LA 70443

N - JOSEPH "JOE" GUZZARDO
TOWN OF INDEPENDENCE
ALDERMAN
P.O. BOX 545
INDEPENDENCE, LA 70443

N - ROBIN DAGRO
INDEPENDENCE, TOWN OF
P. O. BOX 35
INDEPENDENCE, LA 70443

N - CARLO S. BRUNO
DISTRICT 4
COUNCIL MEMBER
P.O. BOX 1274
INDEPENDENCE, LA 70443

N - PARNELL "BUTCH" BAHAM
TOWN OF INDEPENDENCE
ALDERMAN
135 CHARLES SINAGRA AVE.
INDEPENDENCE, LA 70443

N - STEVE "EDDIE" ANTHONY
TOWN OF INDEPENDENCE
ALDERMAN
P.O. BOX 723
INDEPENDENCE, LA 70443

N - PHILLIP F. DOMIANO
TOWN OF INDEPENDENCE
MAYOR
P.O. BOX 812
INDEPENDENCE, LA 70443

N - PARNELL "BUTCH" BAHAM
TOWN OF INDEPENDENCE
ALDERMAN
135 CHARLES SINAGRA
INDEPENDENCE, LA 70443

N - "TOM" TOLAR
DISTRICT 1
COUNCIL MEMBER
P.O. BOX 472
KENTWOOD, LA 70444

N - DAVID SELLERS
BUILDING INSPECTOR
KENTWOOD, TOWN OF
308 AVENUE G
KENTWOOD, LA 70444

N - HAROLD J. SMITH
TOWN OF KENTWOOD
MAYOR
P.O. BOX 123
KENTWOOD, LA 70444

N - IRMA THOMPSON GORDON
TOWN OF KENTWOOD
COUNCIL MEMBER
P.O. BOX 454
KENTWOOD, LA 70444

N - CARLTON S. FALLER
TOWN OF KENTWOOD
COUNCIL MEMBER
309 AVE. A
KENTWOOD, LA 70444

N - MICHAEL "MIKE" HALL
TOWN OF KENTWOOD
COUNCIL MEMBER
P.O. BOX 643
KENTWOOD, LA 70444

N - "JIMBO" SLAVEN
TOWN OF KENTWOOD
COUNCIL MEMBER
707 11TH ST
KENTWOOD, LA 70444

N - MYRTLE COOK
TOWN OF KENTWOOD
COUNCIL MEMBER
1335 THIRD ST.
KENTWOOD, LA 70444

N - U.S. DEPT OF THE INTERIOR
FISH & WILDLIFE SERVICE
61389 HWY 434
LACOMBE, LA 70445

N - "AL" HAMAUEI
DISTRICT 7
COUNCIL MEMBER
60162 OAKLAWN AVE.
LACOMBE, LA 70445

N - STEVE BENTON
FLOODPLAIN ADMINISTRATOR
MADISONVILLE, TOWN OF
P. O. BOX 160
MADISONVILLE, LA 70447

N - "TIM" BOUNDS
TOWN OF MADISONVILLE
ALDERMAN
P.O. BOX 835
MADISONVILLE, LA 70447

N - JERRY LANGE
TOWN OF MADISONVILLE
ALDERMAN
P.O. BOX 393
MADISONVILLE, LA 70447

N - MARK D. BADEAUX
TOWN OF MADISONVILLE
ALDERMAN
P.O. BOX 156
MADISONVILLE, LA 70447-0156

N - CAPT. K.C. SIVERD
218 LE CIRQUE
MADISONVILLE, LA 70447-3704

N - PETER GITZ
TOWN OF MADISONVILLE
MAYOR
P.O. BOX 160
MADISONVILLE, LA 70447-9710

N - "TIM" BOUNDS
TOWN OF MADISONVILLE
ALDERMAN
401 JOHNSON ST.
MADISONVILLE, LA 70447-9767

N - REID FALCONER
DISTRICT 4
COUNCIL MEMBER
67 MAGNOLIA RIDGE DR.
MADISONVILLE, LA 70447-9791

N - BONNIE DAVIS FRUGE
TOWN OF MADISONVILLE
ALDERMAN
301 ST. ANN ST.
MADISONVILLE, LA 70447-9804

N - (GEORGE JOSEPH) JOE FRANCE
ST. TAMMANY PARISH
21490 KOOP DRIVE
MANDEVILLE, LA 70448

N - "TIM" BURNS
STATE REPRESENTATIVE
89TH REPRESENTATIVE DISTRICT
1501 MADISON ST.
MANDEVILLE, LA 70448

N - MAYOR
CITY OF MANDEVILLE
105 LIVE OAK ST.
MANDEVILLE, LA 70448

N - CARLA BUCHHOLZ
DISTRICT B, CITY OF MANDEVILLE
COUNCIL MEMBER II
227 KIMBERLY DR.
MANDEVILLE, LA 70448

N - CHRIS BROWN
BUILDING INSPECTOR - FPA
MANDEVILLE, CITY OF
3101 E. CAUSEWAY APPROACH
MANDEVILLE, LA 70448-3592

N - DENIS P. BECHAC
CITY OF MANDEVILLE
COUNCIL MEMBER AT LARGE
661 MAGNOLIA RIDGE DR. E.
MANDEVILLE, LA 70448-4871

N - ADELAIDE J. BOETTNER
DISTRICT B, CITY OF MANDEVILLE
COUNCIL MEMBER II
2815 NORTH ST.
MANDEVILLE, LA 70448-4904

N - ZELLA WALKER
DISTRICT C, CITY OF MANDEVILLE
COUNCIL MEMBER III
326 ADAIR ST.
MANDEVILLE, LA 70448-5702

N - "JEFF" BERNARD
DISTRICT C, CITY OF MANDEVILLE
COUNCIL MEMBER III
321 MARIGNY AVE.
MANDEVILLE, LA 70448-5940

N - RUBY GAULEY
TOWN OF PEARL RIVER
ALDERMAN
39107 MCQUEEN RD.
PEARL RIVER, LA 70452

N - DAVID MCQUEEN
TOWN OF PEARL RIVER
ALDERMAN
P.O. BOX 371
PEARL RIVER, LA 70452

N - VIRGIL R. PHILLIPS
TOWN OF PEARL RIVER
ALDERMAN
39110 CRADDOCK LN.
PEARL RIVER, LA 70452

N - ELIZABETH ALLEN
CLERK
PEARL RIVER, TOWN OF
P. O. BOX 1270
PEARL RIVER, LA 70452

N - REBECCA L. "BECKY" CRAWFORD
DISTRICT 6
COUNCIL MEMBER
34441 MAX MERCER LN.
PEARL RIVER, LA 70452-2801

N - A. G. CROWE
STATE SENATOR
1ST SENATORIAL DISTRICT
201 CROWES LANDING RD.
PEARL RIVER, LA 70452-3712

N - JAY SCROGGINS
TOWN OF PEARL RIVER
ALDERMAN
65078 BANCKS ST.
PEARL RIVER, LA 70452-5100

N - JAMES LAVIGNE
TOWN OF PEARL RIVER
MAYOR
65134 HOLMES ST.
PEARL RIVER, LA 70452-5112

N - MARIE CROWE
TOWN OF PEARL RIVER
ALDERMAN
65190 HWY. 3081
PEARL RIVER, LA 70452-5142

N - DAVE HIGGENBOTHAM
DISTRICT B, CITY OF PONCHATOULA
COUNCIL MEMBER
333 N. BARONNE ST.
PONCHATOULA, LA 70454

N - JEANNEMARIE PIERSON
DISTRICT C, CITY OF PONCHATOULA
COUNCIL MEMBER
301 S. 8TH ST.
PONCHATOULA, LA 70454

N - "DEBBIE" EDWARDS
DISTRICT 9
COUNCIL MEMBER
39108 KEAGHEY RD.
PONCHATOULA, LA 70454

N - VERGIL J. SANDIFER
DISTRICT E, CITY OF PONCHATOULA
COUNCIL MEMBER
485 E. CYPRESS ST.
PONCHATOULA, LA 70454

N - VERGIL SANDIFER
DISTRICT E, CITY OF PONCHATOULA
COUNCIL MEMBER
485 E. CYPRESS ST.
PONCHATOULA, LA 70454

N - ROBERT F. "BOB" ZABBIA
CITY OF PONCHATOULA
MAYOR
211 N. 7TH ST.
PONCHATOULA, LA 70454

N - BRAVILLE J. LEBLANC
DISTRICT A, CITY OF PONCHATOULA
COUNCIL MEMBER
132 BRAVILLE ST.
PONCHATOULA, LA 70454

N - ROBERT H. ELZY, JR.
DISTRICT D, CITY OF PONCHATOULA
COUNCIL MEMBER
511 SE I55 SERVICE RD.
PONCHATOULA, LA 70454

N - PERRY GRAVES
DISTRICT D, CITY OF PONCHATOULA
COUNCIL MEMBER
208 WASHINGTON ST.
PONCHATOULA, LA 70454

N - WAYNE F. FOSTER
DISTRICT B, CITY OF PONCHATOULA
COUNCIL MEMBER
245 N. BARONNE ST.
PONCHATOULA, LA 70454

N - "STEVE" PUGH
STATE REPRESENTATIVE
73RD REPRESENTATIVE DISTRICT
P. O. BOX 2473
PONCHATOULA, LA 70454

N - RONNIE PERRIN
BUILDING INSPECTOR
PONCHATOULA, CITY OF
125 WEST HICKORY STREET
PONCHATOULA, LA 70454

N - MONROE PERRY, JR.
TOWN OF ROSELAND
MAYOR
P.O. BOX 302
ROSELAND, LA 70456

N - MARK CUTRER
TOWN OF ROSELAND
ALDERMAN
62370 WASHINGTON AVE.
ROSELAND, LA 70456

N - KIRK HENDRY
TOWN OF ROSELAND
ALDERMAN
P.O. BOX 57
ROSELAND, LA 70456

N - WANDA MCCOY
TOWN OF ROSELAND
ALDERMAN
P.O. BOX 511
ROSELAND, LA 70456

N - MONROE PERRY, JR.
TOWN OF ROSELAND
ALDERMAN
P.O. BOX 276
ROSELAND, LA 70456

N - STEPHANIE CUTRER
TOWN CLERK
ROSELAND, TOWN OF
P. O. BOX 302
ROSELAND, LA 70456

N - L. LANDON CUSIMANO
CITY OF SLIDELL
COUNCIL MEMBER AT LARGE
311 MICHIGAN AVE.
SLIDELL, LA 70458

N - KEVIN C. DAVIS
ST. TAMMANY
PARISH PRESIDENT
718 TEDDY AVE.
SLIDELL, LA 70458

N - KIM HARBISON
DISTRICT F, CITY OF SLIDELL
COUNCIL MEMBER
315 ORIOLE LN.
SLIDELL, LA 70458

N - "BILL" BORCHERT, JR.
DISTRICT G, CITY OF SLIDELL
COUNCIL MEMBER
1068 FRONT ST.
SLIDELL, LA 70458

N - IRMA L. CRY
ST. TAMMANY PARISH COUNCIL
813 MAINE AVE.
SLIDELL, LA 70458

N - SLIDELL SENTRY NEWS
3648 PONTCHARTRAIN DRIVE
SLIDELL, LA 70458

N - WARREN CROCKETT
DISTRICT C, CITY OF SLIDELL
COUNCIL MEMBER
707 MAINE AVE.
SLIDELL, LA 70458

N - RICHARD "RICKEY" HURSEY
DISTRICT B, CITY OF SLIDELL
COUNCIL MEMBER
305 CUMBERLAND DR.
SLIDELL, LA 70458

N - "JERRY" BINDER
DISTRICT 12
COUNCIL MEMBER
470 HICKORY DR.
SLIDELL, LA 70458

N - CHRISTOPHER "CHRIS" CANULETTE
DISTRICT 8
COUNCIL MEMBER
109 STRATFORD DR.
SLIDELL, LA 70458-1745

N - "RAY" CANADA
DISTRICT E, CITY OF SLIDELL
COUNCIL MEMBER
1100 RUE LATOUR
SLIDELL, LA 70458-2220

N - "BEN" MORRIS
CITY OF SLIDELL
MAYOR
P.O. BOX 828
SLIDELL, LA 70459

N - LIONEL J. HICKS
DISTRICT A, CITY OF SLIDELL
COUNCIL MEMBER
P.O. BOX 939
SLIDELL, LA 70459

N - "GREG" CROMER
STATE REPRESENTATIVE
90TH REPRESENTATIVE DISTRICT
P.O. BOX 2088
SLIDELL, LA 70459

N - DONNA O'DEL
CITY ENGINEER, FPA
SLIDELL, CITY OF
P. O. BOX 828
SLIDELL, LA 70459

N - KENNETH "KEN" BURKHALTER
DISTRICT 14
COUNCIL MEMBER
P.O. BOX 1489
SLIDELL, LA 70459

N - KEVIN KINGSTON
CITY OF SLIDELL
COUNCIL MEMBER AT LARGE
1230 ST. CHRISTOPHER DR.
SLIDELL, LA 70460

N - "STEVE" STEFANCIK
DISTRICT 11
COUNCIL MEMBER
107 ROYAL DR.
SLIDELL, LA 70460

N - "JOE" FRAUGHT
DISTRICT D, CITY OF SLIDELL
COUNCIL MEMBER
1043 ST. PETER DR.
SLIDELL, LA 70460

N - "GENE" BELLISARO
DISTRICT 9
COUNCIL MEMBER
510 BRADFORD DR.
SLIDELL, LA 70461

N - RICHARD "RICHIE" ARTIGUE
DISTRICT 13
COUNCIL MEMBER
53057 HWY. 433
SLIDELL, LA 70461

N - TIMES PICAYUNE
ST. TAMMANY BUREAU
RON THIBODEAUX
2070 E GAUSE BLVD
SLIDELL, LA 70461-5431

N - CHUCK VINCENT
PERMIT ADMINISTRATOR
KILLIAN, VILLAGE OF
P. O. BOX 546
KILLIAN, LA 70462

N - JOHN VICKNAIR
TOWN OF SPRINGFIELD
ALDERMAN
P.O. BOX 461
SPRINGFIELD, LA 70462

N - VINCE T. DELIBERTO, JR.
TOWN OF KILLIAN
ALDERMAN
20580 RIVERSIDE RD.
SPRINGFIELD, LA 70462

N - CHARLES E. MARTIN
TOWN OF SPRINGFIELD
MAYOR
P.O. BOX 421
SPRINGFIELD, LA 70462

N - J. PAUL CANIK
TOWN OF KILLIAN
ALDERMAN
31424 BARBARA DR.
SPRINGFIELD, LA 70462

N - MILDRED R. COWSAR
TOWN OF SPRINGFIELD
ALDERMAN
31466 LA HWY. 22
SPRINGFIELD, LA 70462

N - MARSHA THREETON SHERBURNE
TOWN OF SPRINGFIELD
ALDERMAN
25564 MCCARROLL RD.
SPRINGFIELD, LA 70462

N - TOMMY ABELS
TOWN OF SPRINGFIELD
ALDERMAN
P.O. BOX 436
SPRINGFIELD, LA 70462

N - MARY ANN BISSEL
TOWN OF SPRINGFIELD
ALDERMAN
P.O. BOX 336
SPRINGFIELD, LA 70462

N - DEAN A. SHARP
TOWN OF KILLIAN
ALDERMAN
P.O. BOX 1149
SPRINGFIELD, LA 70462

N - MARIE KREUTZER
CLERK
SPRINGFIELD, TOWN OF
P. O. BOX 352
SPRINGFIELD, LA 70462

N - KATHLEEN ABELS
TOWN OF KILLIAN
MAYOR
28420 RIDGE LN.
SPRINGFIELD, LA 70462

N - RONALD SHARP, SR.
DISTRICT 8
COUNCIL MEMBER
29946 HWY. 444
SPRINGFIELD, LA 70462

N - JAMES "JAY" PRATHER
TOWN OF KILLIAN
ALDERMAN
31567 JUDITH DR.
SPRINGFIELD, LA 70462

N - CHARLES E. MARTIN
TOWN OF SPRINGFIELD
P.O. BOX 352
SPRINGFIELD, LA 70462

N - BURRELL MULLETT
VILLAGE OF SUN
ALDERMAN
P.O. BOX 979
SUN, LA 70463

N - BARBARA GIBSON
VILLAGE OF SUN
30285 LOCK #3 ROAD - P.O. BOX 818
SUN, LA 70463

N - BARBARA GIBSON
VILLAGE OF SUN
MAYOR
P.O. BOX 891
SUN, LA 70463

N - FLOYD S. MIZELL
VILLAGE OF SUN
ALDERMAN
P.O. BOX 836
SUN, LA 70463

N - MINNIE HUTCHINSON
CLERK
TANGIPAHOA, VILLAGE OF
P. O. BOX 156
TANGIPAHOA, LA 70465

N - EDDIE MYERS
VILLAGE OF TANGIPAHOA
ALDERMAN
P.O. BOX 28
TANGIPAHOA, LA 70465

N - BRENDA NEVELS
VILLAGE OF TANGIPAHOA
ALDERMAN
P.O. BOX 133
TANGIPAHOA, LA 70465

N - "MONA" ALEXANDER MCLEARY
VILLAGE OF TANGIPAHOA
ALDERMAN
P.O. BOX 14
TANGIPAHOA, LA 70465

N - "JAMES" FULTZ
VILLAGE OF TANGIPAHOA
MAYOR
P.O. BOX 217
TANGIPAHOA, LA 70465

N - "RON" TANIS
VILLAGE OF TICKFAW
COUNCIL MEMBER
14087 MANINA LN.
TICKFAW, LA 70466

N - TONI JEAN ABENE BASSO
VILLAGE OF TICKFAW
COUNCIL MEMBER
P.O. BOX 576
TICKFAW, LA 70466

N - ANTHONY "TONY" LAMONTE
VILLAGE OF TICKFAW
MAYOR
14304 NUCCIO RD.
TICKFAW, LA 70466

N - H. G. "BUDDY" RIDGEL
DISTRICT 5
COUNCIL MEMBER
17037 RIDGEL RD.
TICKFAW, LA 70466

N - RUBY LETARD
MUNICIPAL CLERK
TICKFAW, VILLAGE OF
P. O. BOX 249
TICKFAW, LA 70466

N - "PRESTON" WATTS
VILLAGE OF TICKFAW
COUNCIL MEMBER
P.O. BOX 221
TICKFAW, LA 70466

N - WCKW-AM
PO BOX 683
MANDEVILLE, LA 70470-0683

N - HENRY BILLIOT
DISTRICT 10
COUNCIL MEMBER
821 ASBURY DR.
MANDEVILLE, LA 70471

N - TRILBY LENFANT
CITY OF MANDEVILLE
COUNCIL MEMBER AT LARGE
16 PRESERVE LN.
MANDEVILLE, LA 70471-2937

N - "JERRY" COOGAN
DISTRICT A, CITY OF MANDEVILLE
COUNCIL MEMBER I
525 KIMBERLY ANN DR.
MANDEVILLE, LA 70471-6712

N - CHARLES W. BOUSTANY, JR.
U. S. REPRESENTATIVE
7TH CONGRESSIONAL DISTRICT
800 LAFAYETTE ST., STE. 1400
LAFAYETTE, LA 70501

N - WHC INC
P.O. BOX 2340
LAFAYETTE, LA 70502

N - TRIGON EXPLORATION INC
P.O. BOX 52544
LAFAYETTE, LA 70505

N - CL JACK STELLY & ASSOCIATES INC
P.O. BOX 53353
LAFAYETTE, LA 70505

N - CF BEAN CORPORATION
MR. WILLIAM J. ASHY
P.O. BOX 51657
LAFAYETTE, LA 70505

N - CULTURAL & HISTORICAL/
RESEARCH & DEVELOPMENT
RESEARCH COORD MELANIE MARCOTTE
P.O. BOX 661
CHARENTON, LA 70523

N - CARR OIL COMPANY INC
P.O. BOX 318
FRANKLIN, LA 70538

N - DANIEL OAKLEY
432 NORTH TRAILWOOD
SULPHUR, LA 70663

N - JIMMIE MCCOY
DISTRICT 2
COUNCIL MEMBER
37375 LA HWY 16
DENHAM SPRINGS, LA 70706

N - ASCENSION PARISH POLICE JURY
P.O. BOX 2392
GONZALES, LA 70707

N - KENNETH P. "KENNY" MATASSA
DIVISION A, CITY OF GONZALES
COUNCIL MEMBER
P.O. BOX 426
GONZALES, LA 70707

N - EDDIE J. LAMBERT
STATE REPRESENTATIVE
59TH REPRESENTATIVE DISTRICT
P.O. BOX 88
GONZALES, LA 70707

N - GONZALES WEEKLY
PO BOX 38
GONZALES, LA 70707

N - LLOYD E. "GENE" GLASCOCK
VILLAGE OF ALBANY
ALDERMAN
P.O. BOX 89
ALBANY, LA 70711

N - EDDIE WAGNER
DISTRICT 9
COUNCIL MEMBER
32290 PEA RIDGE RD.
ALBANY, LA 70711

N - THOMAS A. STEWART
VILLAGE OF ALBANY
MAYOR
P.O. BOX 1346
ALBANY, LA 70711

N - DOROTHY KROPOG
ASSISTANT VILLAGE CLERK
ALBANY, VILLAGE OF
P. O. BOX 1000
ALBANY, LA 70711

N - LLOYD "BEE" MARTIN
VILLAGE OF ALBANY
ALDERMAN
P.O. BOX 146
ALBANY, LA 70711

N - EDMOND C. HARRIS
VILLAGE OF ALBANY
ALDERMAN
P.O. BOX 105
ALBANY, LA 70711

N - KAIL PAGE
ENVIRO CLEAN SOUTH, LLC
13073 PLANK ROAD
BAKER, LA 70714

N - ST. JAMES PARISH POLICE JURY
CONVENT COURTHOUSE
CONVENT, LA 70723

N - JODY CHENIER
DIRECTOR OF OPERATIONS
ST. JAMES PARISH
P. O. BOX 106
CONVENT, LA 70723

N - RALPH A. PATIN, JR.
DISTRICT 4
COUNCIL MEMBER
9189 SCHEXAYDER STREET
CONVENT, LA 70723

N - NEWS
P.O. BOX 1529
DENHAM SPRINGS, LA 70726

N - LIVINGSTON PARISH NEWS
688 HATCHELL LANE
DENHAM SPRINGS, LA 70726

N - ALBERT "BUDDY" MINCEY
DISTRICT 5
COUNCIL MEMBER
10961 LA. HWY 1033
DENHAM SPRINGS, LA 70726

N - DAVID D. CARTER
VILLAGE OF PORT VINCENT
ALDERMAN
19334 GOURDON LANE
PORT VINCENT, LA 70726

N - JOHN DORRIS
VILLAGE OF PORT VINCENT
ALDERMAN
18452 GUITREAU LANE
PORT VINCENT, LA 70726

N - "SCOTTY" MARTONE
VILLAGE OF PORT VINCENT
ALDERMAN
19338 GOURDON LANE
PORT VINCENT, LA 70726

N - JOHN WASCOM
CITY OF DENHAM SPRINGS
COUNCIL MEMBER
522 CENTERVILLE STREET
DENHAM SPRINGS, LA 70726

N - ARTHUR L. PERKINS, SR.
CITY OF DENHAM SPRINGS
COUNCIL MEMBER
906 HATCHELL LN.
DENHAM SPRINGS, LA 70726

N - JERRY DENTON
CITY OF DENHAM SPRINGS
COUNCIL MEMBER
930 BENTON LN.
DENHAM SPRINGS, LA 70726

N - LORI LAMM-WILLIAMS
CITY OF DENHAM SPRINGS
COUNCIL MEMBER
717 POPLAR ST.
DENHAM SPRINGS, LA 70726

N - MARSHALL H. HARRIS
DISTRICT 4
COUNCIL MEMBER
704 TOM DR.
DENHAM SPRINGS, LA 70726

N - CINDY WALE
DISTRICT 3
COUNCIL MEMBER
9417 PRINCE CHARLES
DENHAM SPRINGS, LA 70726

N - LAURA SAVOY
VILLAGE OF PORT VINCENT
MAYOR
18125 SAVOY LANE
PORT VINCENT, LA 70726

N - RENE' DELAHOUSSAYE
CITY OF DENHAM SPRINGS
COUNCIL MEMBER
211 CENTERVILLE ST. NE
DENHAM SPRINGS, LA 70726

N - JIMMY DURBIN
CITY OF DENHAM SPRINGS
MAYOR
417 CENTERVILLE ST. EAST
DENHAM SPRINGS, LA 70726

N - DISTRICT CONSERVATIONIST
LIVINGSTON PARISH
DENHAM SPRINGS SERVICE CENTER
2191 TOWER STREET
DENHAM SPRINGS, LA 70726-4918

N - J. ROGERS POPE
STATE REPRESENTATIVE
71ST REPRESENTATIVE DISTRICT
P. O. BOX 555
DENHAM SPRINGS, LA 70727

N - DENHAM SPRINGS-LIVINGSTON NEWS
P.O. BOX 1529
DENHAM SPRINGS, LA 70727

N - GEORGE TRAYLOR
BUILDING INSPECTOR
DENHAM SPRINGS, CITY OF
P. O. BOX 1629
DENHAM SPRINGS, LA 70727

N - "PAT" BELL, SR.
DISTRICT 4
COUNCIL MEMBER
P.O. BOX 81
DUPLESSIS, LA 70728

N - MONTE FERGUSON
TOWN CLERK/PERMIT ADMIN
FRENCH SETTLEMENT, VILLAGE OF
P. O. BOX 3
FRENCH SETTLEMENT, LA 70733

N - TONI GUITRAU
VILLAGE OF FRENCH SETTLEMENT
MAYOR
16619 LA. HWY. 16
FRENCH SETTLEMENT, LA 70733

N - GLEN G. NEWELL
VILLAGE OF FRENCH SETTLEMENT
ALDERMAN
14580 RUE DES CHENES
FRENCH SETTLEMENT, LA 70733

N - TERESA MILLER
VILLAGE OF FRENCH SETTLEMENT
ALDERMAN
14360 MECCA RD.
FRENCH SETTLEMENT, LA 70733

N - SEAN GUITRAU
VILLAGE OF FRENCH SETTLEMENT
ALDERMAN
16619 HWY. 16
FRENCH SETTLEMENT, LA 70733

N - GEORGE VALENTINE, JR.
DISTRICT 8
COUNCIL MEMBER
13323 HWY. 73
GEISMAR, LA 70734

N - "JODY" AMEDEE
STATE SENATOR
18TH SENATORIAL DISTRICT
42418 CLOUATRE RD.
GONZALES, LA 70737

N - ADRIAN THOMPSON
DISTRICT 3
COUNCIL MEMBER
38533 ARROWHEAD DR.
GONZALES, LA 70737

N - KENT SCHEXNAYDRE
DISTRICT 2
COUNCIL MEMBER
7140 DONALDSON DR.
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L

MISSISSIPPI RIVER – GULF OUTLET (MRGO)
ECOSYSTEM RESTORATION STUDY
LOUISIANA AND MISSISSIPPI

HYDRAULICS AND HYDROLOGY

Preliminary Hydrodynamic and Hydraulic Modeling for a Proposed Freshwater Diversion in the Vicinity of Violet, Louisiana

DRAFT MODELING REPORT

Submitted: October 9, 2009
Updated: March 15, 2010



New Orleans District

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LIST OF ACRONYMS

BOC: Basis of Comparison
cfs: cubic feet per second
CWA: Central Wetlands Area
EPA: Environmental Protection Agency
FWOP: Future Without Project
FWP: Future With Project
GIWW: Gulf Intracoastal Waterway
IHNC: Inner Harbor Navigation Canal
LACPR: Louisiana Coastal Protection and Restoration
LADEQ: Louisiana Department of Environmental Quality
LADNR: Louisiana Department of Natural Resources
LDWF: Louisiana Department of Wildlife and Fisheries
LSU: Louisiana State University
MRGO: Mississippi River-Gulf Outlet Canal
NOAA: National Oceanographic and Atmospheric Administration
NRC: National Research Council
UNO: University of New Orleans
USACE: United States Army Corps of Engineers
USGS: United States Geological Survey
WRDA: Water Resources Development Act
WWTP: Waste Water Treatment Plant

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1 EXECUTIVE SUMMARY

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2 INTRODUCTION

Section 7013 of the Water Resources Development Act (WRDA) of 2007 authorizes development of the Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan, which will be developed by the U.S. Army Corps of Engineers (USACE) as a supplement to the MRGO Deep-Draft Deauthorization Report to Congress. The USACE is currently conducting a Feasibility Study to aid in the development of this Plan, the goal of which is to restore estuarine habitat areas affected by the MRGO navigation channel.

Section 3083 of the 2007 WRDA authorizes the diversion of freshwater at or near Violet, Louisiana, for the purposes of reducing salinity in the western Mississippi Sound, enhancing oyster production, and promoting the sustainability of coastal wetlands. According to this section, the project must be designed to meet, or maximize the ability to meet, the salinity levels identified in the 1984 feasibility study of the USACE entitled "Mississippi and Louisiana Estuarine Areas: Freshwater Diversion to Lake Pontchartrain Basin and Mississippi Sound". An ad-hoc group consisting of representatives from a variety of federal and state agencies recommended that the desired salinity regime be met 40% to 50% of the time (USACE, 1982). Experience of the Louisiana Department of Wildlife and Fisheries (LDWF) marine biologists indicates that if good seed oyster production is obtained 1 out of 2 or 3 years, the oystermen will have plenty of oysters. Therefore, the diversion should be designed to allow sufficient freshwater flow to establish the proposed salinity regime 4 or 5 years in 10 or at a minimum of approximately 40% of the time.

The hydraulics and hydrology studies outlined here provide a planning level examination of the potential impacts of diversions of Mississippi River water near Violet Canal on the estuarine areas of Biloxi Marsh. An assessment of these same diversions on the Central Wetlands Area (CWA) between the River and the MRGO/Lake Borgne regions is also conducted to determine beneficial levels of flow in the CWA to meet restoration objectives.

2.1 BACKGROUND

The study area consists of approximately 3.8 million acres of land and open water within the Lake Pontchartrain basin and Lake Borgne ("MRGO Ecosystem …") (Figure 1). In Mississippi, the study area includes the Western Mississippi Sound, its bordering wetlands, and Cat Island. These areas include portions of the Pearl River and the Coastal Streams hydrologic basins.

There was once major freshwater, sediment, and nutrient input into the basin as a result of seasonal flooding of the Mississippi River. The construction of levees has confined the river between its banks and has eliminated this seasonal flooding, resulting in the elimination of sediments to these areas. The loss of freshwater has also caused saltier waters to encroach on these areas.

Manmade channels and canals that stretch from the Gulf of Mexico inland to freshwater areas allow saltwater to penetrate much farther inland, particularly during droughts and storms, which has had severe effects on freshwater wetlands (Wang 1987). Extreme salinity changes can stress fresh and intermediate marshes to the point where vegetation dies and the wetlands convert into open water (Flynn et al. 1995). By altering salinity gradients and patterns of water and sediment flow through marshes, channel and canal dredging has altered the processes essential to a healthy coastal ecosystem. Since 1932, more than 66,000 acres of marsh, or over 22 percent, has converted to open water in the Pontchartrain Basin ("Lake Pontchartrain …").

Increased salinity levels have negatively impacted the Louisiana oyster (*Crassostrea virginica*) fishery and its industry by shrinking the area within the seeding grounds that serve as ideal oyster habitat (Chatry et al., 1983). Chatry et al. (1983) developed an optimum salinity regime for oysters (see Table 1) by studying salinity, spatfall, and seed oyster production data from a 10-year time period. Meeting this established salinity regime at least 40 percent of the time has become a goal of the MRGO Ecosystem Restoration Plan.

The required salinity targets are shown in the Chatry report (reproduced in Figure 2) as monthly optimum salinity values, together with a standard error about the optimum value (+/- one standard deviation about the monthly mean). In addition, this graph depicts the range of values (denoted as range limits) analyzed to obtain the target value and standard error values (denoted as optimum limits). The graph was based on eight years of data which preceded years of good oyster production.

The optimum salinity around the mean is a very narrow range, much smaller than the daily variability in salinity due to tidal and other coastal forcing parameters such as river flow, winds, and atmospheric pressure. All of these parameters drive salinity values up or down by significant amounts, and depending on the specific conditions at a given time can have remarkable impacts on the salinity mean.

Table 1. Salinity Targets for the Biloxi Marshes (in ppt).

Month	Chatry Target	Mean Ambient Salinity	Needed Reduction (in ppt)	Needed Reduction (in %)	Chatry Optimum Limits		Chatry Range Limits	
					Low	High	Lowest	Highest
Jan	16.5	19.5	3.0	15.4%	15.5	17.5	15.0	19.0
Feb	14.5	16.5	2.0	12.1%	13.5	15.0	11.0	17.0
Mar	11.5	15.0	3.5	23.3%	10.5	12.5	7.5	15.0
Apr	8.0	14.0	6.0	42.9%	7.0	9.5	2.0	13.0
May	7.0	15.0	8.0	53.3%	6.0	8.0	4.5	11.5
Jun	12.5	17.0	4.5	26.5%	12.0	13.5	9.0	16.0
Jul	13.0	20.5	7.5	36.6%	12.5	13.0	10.5	15.0
Aug	16.0	22.0	6.0	27.3%	15.0	16.5	13.0	17.5
Sep	17.0	23.0	6.0	26.1%	16.0	18.0	15.0	24.0
Oct	17.0	24.0	7.0	29.2%	16.0	18.0	13.0	18.5
Nov	16.0	24.0	8.0	33.3%	15.0	17.0	11.5	18.5
Dec	16.0	23.0	7.0	30.4%	15.5	16.5	13.0	17.0

Note: Salinity targets were estimated to the nearest 0.5 ppt using the graphical display in Chatry et at. (1983). Ambient salinities were rounded to the nearest 0.5 ppt using Pankow et al. (1989) Equation 10a and 50

The effects of freshwater diversions at various locations in the Pontchartrain Estuary have been studied previously (Haralampides, 2000; Georgiou, 2002; McCorquodale et al., 2004; Dortch et al., 2007). Each of these efforts has involved complex hydrodynamic and water quality models that simulate relatively short time periods (on the order of one year). The modeling effort identified in this study was conducted to support the MRGO Ecosystem Feasibility Study as a planning level evaluation of the potential salinity benefits of diverting freshwater from the Mississippi River through a hydraulic diversion structure in the vicinity of the Violet Canal through the CWA and Lake Borgne and into Biloxi Marsh.

The Central Wetland Area (CWA) formerly contained an extensive cypress swamp. Re-growth has been hindered by lack of fresh water, nutrients, and sediments. Lack of the natural overbank flow of the river lowers productivity and allows salt stress (http://www.masgc.org/gmrp/plans/LACIAP.pdf). The addition of freshwater with accompanying sediments and nutrients through the near Violet Canal Diversion will ecologically benefit the CWA. The USACE plans to conduct extensive restoration throughout the CWA. Details of the restoration project include wetland, marsh, and swamp

restoration and creation to restore the CWA to cypress swamp. Preliminary plans for the restoration project are included in Appendix F.

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2.2 OBJECTIVES

The goal of the hydrodynamic modeling described here is to determine if salinity targets in the Biloxi Marsh can be met by diverting freshwater from the Mississippi River through a hydraulic structure and conveyance system near the Violet Canal. The resultant flow regime would then be the basis of design for a new, or modification to an existing, hydraulic structure that would deliver fresh water to benefit the Biloxi Marsh. A secondary objective is the use of the proposed hydraulic modifications to introduce freshwater to the CWA in order to enhance cypress swamp and freshwater marsh restoration.

A final design will balance the efficiency of delivery of freshwater to the Biloxi Marsh region, and ecological restoration goals to the CWA. Considerations in the design are the available head in the Mississippi River and the potential negative impacts to the CWA that could result from inundations due to increased water levels.

2.3 METHODOLOGY

To meet the objectives, a modeling initiative was developed to establish details of a near Violet Canal diversion (Figure 3). This was undertaken as follows:

1. Collecting and collating data on flows, salinity, nutrients and future projects and evaluating their impact on the study area.
2. Modifying and re-calibrating the existing Pontchartrain Basin UNO Mass Balance model.
3. Undertaking a series of model runs to establish the feasibility of a diversion in the vicinity of the Violet Canal to meet Biloxi Marsh salinity targets and to determine flows and generalized flow regime details.
4. Developing a 2D detailed model of the CWA area using Mike21 to characterize the impacts of different alternative diversion locations on the area in terms of salinity, stage and flow.
5. Using UNO's FVCOM to consider the sensitivity of the UNO Mass Balance model results to wind shear and, if necessary, refine the error bands on selected alternatives from the model to reflect these results.
6. Run the UNO Mass Balance model with the final preferred alternative based on flow characterized in the detailed modeling to evaluate the effect on salinity in the Biloxi Marsh.

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7. Providing detail on any hydraulic structures or flood defenses which may be required to implement the final preferred alternative.

2.4 REGIONAL HYDROGRAPHIC SETTING

2.4.1 CLIMATOLOGY

The study area climate is warm and humid subtropical due to its latitude and proximity to the Gulf of Mexico. The area has mild winters, hot summers, heavy precipitation, and generally high humidity. Prevailing winds are southeasterly during the spring, southwesterly in the summer, and northeasterly in the fall and winter. In the coastal area, winds have a strong impact on coastal water levels. Winds from a southerly direction may push water into the bays and lakes, frequently raising water levels in the upper part of the estuarine zone. This also forces more saltwater into the upper reaches of the system, making the region saltier for the time period associated with the frontal activity. On the other hand, winds from a northerly direction may depress water levels and make some areas fresher.

Generally, the winds in the southern Louisiana estuaries are calm to light. However, there are occasional strong winds from two important sources: 1) tropical storms in the summer and fall and 2) the passage of frontal systems in the winter months.

Tropical storms, when approaching the region from the south, will have very strong winds from the east and southeast. These winds will push the shelf waters inland, piling up the water in a significant rise of water level, commonly called storm surge. These winds will push the more saline water from further out in the estuary, increasing the local salinity. However, this increase in salinity is temporary. Following the storm, water will flow out and salinity levels will return to roughly the same values as before the storm. The strong winds stack up the water but there is very little mixing of the water.

The effects of a frontal passage, on the other hand, are more permanent. The north wind preceding a frontal passage causes a set down on the continental shelf and this allows for gravity drainage of the estuary. The waters of the marshes flow out into the Gulf where there is mixing with the Gulf waters. When the north winds subside after the frontal passage, it is the more saline water of the Gulf that returns into the estuary. This increase in salinity is for a longer duration and will last until local rainfall and runoff reduce the salinity.

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Hurricanes or tropical storms originating in the North Atlantic and Caribbean Sea occasionally come into the study area during the hurricane season, June through October. These weather systems can cause considerable property and environmental damage and loss of human life. Historical data from 1899 to 2007 indicate that 30 hurricanes and 41 tropical storms made landfall along the Louisiana coastline ("NHC Archive..." and "NOAA Technical...").

Winds and waves generated by these storms have caused substantial damage to the marshes and have contributed to erosion and land loss. Table 2 presents a chronology of major hurricanes that have influenced the study area. Figure 4 presents the hurricane tracks.

Table 2. Major Hurricanes.

Storm	Date	Lowest Pressure	Sustained Winds
Hilda	10/3/1964	950 mb	115 mph
Betsy	9/19/1965	948 mb	125 mph
Camille	8/17/1969	909 mb	190 mph
Andrew	8/26/1992	956 mb	115 mph
Georges	9/28/1998	964 mb	104 mph
Katrina	8/29/2005	920 mb	125 mph

2.4.2 GEOGRAPHY

The Lake Pontchartrain Basin consists of Lake Maurepas, Lake Pontchartrain, Lake Borgne, the Biloxi Marshes, Chandeleur Sound, plus associated marshlands and waterways. Lakes Maurepas, Pontchartrain, and Borgne cover 55 percent of the basin. Lakes Maurepas and Pontchartrain are hydrologically connected by Pass Manchac, separated only by land bridges of cypress swamp and fresh/intermediate marsh. Lake Borgne is hydrologically connected to Lake Pontchartrain through Chef Menteur and Rigolets. They are separated by a brackish marsh land bridge. Lake Borgne is also hydrologically connected to Lake Pontchartrain via the MRGO and the Inner Harbor Navigation Canal (IHNC). This connection is the smallest of the three between Lakes Borgne and Pontchartrain and will be reduced once hurricane barrier structures currently being constructed are operational.

2.4.3 FRESHWATER INFLUENCES

The basin has several freshwater tributaries. The Blind, Amite, and Tickfaw Rivers flow into Lake Maurepas. The Tangipahoa and Tchefuncte Rivers and Bayous LaCombe and Bonfouca enter from the north shore of Lake Pontchartrain. The IHNC (making a connection between the Mississippi River and the Basin), the Bonnet Carré Spillway, and several stormwater drainage canals discharge

into Lake Pontchartrain from the south shore. The annual freshwater flow into Lake Pontchartrain and Lake Maurepas averages about 3,800 cfs and 6,400 cfs respectively. This includes ungaged areas but excludes diversions at the Bonnet Carré Spillway.

The largest tributary to the basin, the Pearl River discharges about 13,200 cfs into Lake Borgne near the mouth of the Rigolets. Flow in the Pearl River is highly variable by season and meteorological events. Flows have been as low as 1,000 cfs and as high as 180,000 cfs.

2.4.4 TIDES

Tides in the basin are principally diurnal, with mean ranges of 0.3 ft (Lake Maurepas), 0.5 ft (Lake Pontchartrain) and 1.4 ft (Chandeleur Sound). Mean water levels are affected by winds, freshwater runoff, and seasonal trends in the Gulf of Mexico. Sustained winds can raise or lower peak astronomical tide levels by several feet for short periods of time. The mean water levels are lower in winter and midsummer while higher in spring and fall.

2.4.5 HYDRODYNAMICS AND THE MRGO, GIWW, AND IHNC

To facilitate navigation, three man-made waterways were constructed which may have modified the hydrologic regime of Biloxi Marsh (Sikora, 1985). These are the IHNC, Gulf Intracoastal Waterway (GIWW), and MRGO. The IHNC, connecting the Mississippi River and Lake Pontchartrain, was completed in 1923 with the construction of the IHNC lock at the Mississippi River. The lock allowed for navigation by preventing high stages in the Mississippi River from producing strong currents in the channel. In the 1930's the GIWW was constructed from the mid-point of the IHNC going east and later routed through the IHNC lock. The construction of the GIWW east of the IHNC allowed for additional tidal exchange with Lake Pontchartrain, in addition to the larger channels of the Rigolets and Chef Menteur Pass.

Of the three channels, the MRGO had the greatest impact upon the Biloxi Marsh, Lake Borgne, and adjacent areas. Beginning in 1958 construction of the MRGO took until 1968. From 1968 until its deauthorization the MRGO provided a deep draft shipping channel connecting the Gulf of Mexico to the GIWW. This channel allowed for a density flow of salt water to travel up the MRGO, changing the salinity regime in Lake Borgne and the CWA. As deep draft ships navigated the channel, salt water in the lower part of the water column would be disturbed in the water column by the ship propeller. This brought saltwater to the surface which had an impact on the freshwater vegetation. Concurrently, the ship's wake would erode the banks of the channel. In places the channel shoreline

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has receded over a thousand feet. The receding MRGO shoreline eventually met a receding Lake Borgne shoreline allowing for salt water exchange from MRGO into Lake Borgne and thus impacting salinities in the Biloxi Marsh area.

After Hurricane Katrina, the USACE recommended de-authorization of the MRGO. Congress appropriated funds and a closure structure consisting of a rock dike was constructed across the MRGO at the La Loutre ridge. The closure structure effectively closes the pathway for saltwater to travel up MRGO with the expected action of reducing salinity in Lake Borgne and the surrounding areas.

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3 DATA

3.1 AGENCY RESOURCES

An early task in this effort was to undertake a review of available water quality data. This review considered data collection/identification exercises undertaken by the USACE and the State of Louisiana together with data collected by the U.S. Environmental Protection Agency (EPA), the State of Louisiana, the State of Mississippi, the U.S. Geological Survey (USGS), and other agencies. A summary of the data is located in Appendix A.

3.2 RIVER/FRESHWATER DATA

Freshwater flow data was extracted from existing data sets as daily flow rates for rivers and diversions discharging into Lakes Maurepas and Pontchartrain, Mississippi Sound, Mobile Bay and the passes of the Mississippi River. Flow data for diversion structures such as Caernarvon, Blind River and Hope Canal, and flood control structures such as the Bonnet Carré Spillway are also available. Where gaged data were not available, the flow was established by considering the flow from a neighboring gaged area and assigning a flow based on the proportion of the two drainage areas, assuming similar rainfalls in the ungaged and gaged areas.

For the Lake Pontchartrain basin area, daily flow values from the USGS for the Amite, Tchefuncte, Tickfaw, Tangipahoa and Pearl Rivers were used. The ungaged areas around Lake Maurepas and Lake Pontchartrain were grouped into the following areas: ungaged South Lake Maurepas, ungaged Southwest Lake Pontchartrain, ungaged South Central Lake Pontchartrain (Jefferson Parish), ungaged Southeast Lake Pontchartrain (Orleans Parish), ungaged Northeast Lake Pontchartrain (Bayous Lacombe and Bonfouca), and ungaged South Lake Borgne.

For the Mississippi coast, daily flow values from the USGS were used for the Wolf, Biloxi and Pascagoula Rivers. Flow for the Jourdan River was apportioned according to its drainage area. Daily freshwater flows into Mobile Bay were also obtained from the USGS.

Daily flows for the Mississippi River were obtained from the USACE and were distributed into the various passes according to the average percentage of flow determined from more than two dozen surveys of discharges in the passes from 1970 through 2004.

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Flow data for the Bonnet Carré Spillway is also available for periods when the structure was being operated for flood control in 1997 and 2008. For other high Mississippi River conditions when the structure was not being operated for flood control, leakage through the needles of the structure is significant enough to be considered a freshwater input. Leakage was calculated using a slot flow equation and was checked against USGS flow measurements and a leakage curve supplied by the USACE.

The Pearl River has the largest freshwater flow and is the closest freshwater discharge to the Biloxi Marsh area. This flow regime is the largest contributor to salinity changes in the Biloxi Marsh region. Daily flows from 1990 through 2008 were used for input into the model; the entire record from 1938 through 2008 was analyzed to obtain monthly averages and statistics for the monthly averages. Figure 5 shows the monthly average, minimum and maximum flows of the Pearl River.

3.3 ANALYSIS OF HISTORIC SALINITY DATA

There are few data sets in the Lake Pontchartrain/Lake Borgne areas that have significant high frequency salinity data over long time periods. There are, however, many independent point measurements taken for single purpose applications by many different people and agencies. As a result, there are large numbers of these salinity data points collected over the period of interest at different depths, times and places.

The UNO Mass Balance model only provides valid information at monthly time scales and thus requires comparing datasets on a similar time scale. The USACE has collected the point data and provided the associated spatial descriptions (Figure 6). The data was set up in a sorted data base by latitude, longitude and date.

To generate data sets appropriate for comparison with model results, the data was aggregated together based on their locations relative to the grids that were generated for the UNO Mass Balance model. The aggregated cells were then averaged together over each month to generate monthly "mean" values in each year data was collected. If enough data is collected over each one month period then the average of all these data points over each aggregated grouping provides the best estimate of the average salinity for that month and year. A high number of data points will effectively filter out high frequency variability in the salinity data caused by winds and tides. Figure 7 is a depiction of the average horizontal salinity variation across the system from Manchac to the Chandeleur Islands.

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Salinity in the Biloxi Marsh can be represented by the aggregation of zones J and L (Figure 8) which represent the grouping of several monitoring stations that are in the vicinity of the Biloxi Marsh. Figure 9 shows the monthly average salinity for aggregated zones J and L against the Chatry limits. The historic salinity falls within or below Chatry's optimum upper limits during January, February, March, August, September, November and December. The average salinity falls just above Chatry's limits in June, July and October. In April and May, historic salinity levels are significantly higher than the target.

An analysis of the relationship between the freshwater discharges from the Pearl River system and salinity values in Biloxi Marsh can be developed (Figures 10 and 11). If there is a direct relationship, higher river flows would correlate with lower salinity values. To test this hypothesis, salinity data from the Biloxi Marsh area was aggregated together as described above from zones J and L. The monthly salinity values were plotted directly against the monthly river flows. The results illustrate that prior to the mid 1980s there seems to be a poor relationship between the river and salinity as demonstrated by lack of the expected inverse correlation (Figure 12). This poor relationship is probably due to lack of enough salinity data being available prior to 1989 which will create a bias in the data sets. For the data set from 1989 to the present which is consistent with the data set used in the modeling effort, the anticipated inverse relationship is present (Figure 13).

A multiple linear regression model was developed to describe the relationship between salinity in the Biloxi Marsh and 3 independent variables related to flow in the Pearl River. The equation of the fitted model is:

Monthly Mean Salinity = 53.0764 - 1.69051*logflow - 1.33071*loglf1 - 1.66414*loglf2

Where: logflow = log transformed mean flow for predicted month
loglf1= log transformed mean flow for month prior to predicted month
loglf2= log transformed mean flow for month two months prior to predicted month

The P-value from the analysis of variance (ANOVA) analysis is less than 0.05, indicating a statistically significant relationship between the variables at the 95.0% confidence level. The R-Squared statistic indicates that the model, as fitted, explains 69.09% of the variability in the salinity. The adjusted R-squared statistic, which is more suitable for comparing models with different numbers of independent variables, is 68.61%. The standard error of the estimate shows the standard deviation

of the residuals to be 2.50. The mean absolute error of 1.98 is the average value of the residuals. The Durbin-Watson statistic tests the residuals to determine if there is any significant correlation based on the order in which they occur in the data file. Since the P-value is less than 0.05, there is an indication of possible serial correlation at the 95.0% confidence level.

In determining whether the model can be simplified, the highest P-value on the independent variables is 0.0001, belonging to loglf1. Since the P-value is less than 0.05, that term is statistically significant at the 95.0% confidence level. Consequently, all variables should remain in the equation of the fitted model.

The analysis demonstrates that gage data in the Pearl River can, within the errors demonstrated, predict salinity in the Biloxi Marsh. With this relationship operational models may be developed to help managers predict those times when diversions of Mississippi River water may be needed. The analysis only touches on the functional scheme framework that would be required for a diversion. The result provides an initial piece of the overall data requirements and methodology necessary to create this management framework.

3.4 RELATIVE SEA LEVEL RISE DUE TO EUSTATIC SEA LEVEL RISE AND SUBSIDENCE

Sea level rise in southern Louisiana is a combination of eustatic rise (due to global factors), general land settlement and other local factors which have an impact on sea level and is significantly higher than either the global or regional average sea level rise changes.

Historic rates of relative sea level rise vary across Louisiana and can also vary depending on the methods used to estimate those rates. The two most commonly cited methods of estimating historic relative sea level rise rates in Louisiana are radiometric dating of organic deposits (mostly peat) and analysis of long-term tide gage data. Relative sea level rise rates are determined from tide gage data that are based on more recent (20th century) data than radiometric dating. The relative sea level rise rate determined from gage data is generally greater than the rates determined from radiometric dating.

Data from two local gages together with work from an earlier Louisiana Coastal Protection and Restoration (LACPR) technical report were reviewed as part of this study. The historic trend in sea level rise from the Shell Beach gage was adopted for this study. The historic trend was established as 10.2mm/year using a dataset of 42 years from 1961 to 2002.

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The future rates of sea level rise were established in accordance with EC 1165-2-211 and produced three estimates into the future as detailed in Appendix B. The three estimates (low intermediate and high) are based on the following:

1. Low - continuation of the historic rate
2. Intermediate - accelerating rate of eustatic rise based on the National Research Council (NRC) Sea Level Curve I
3. High - accelerating rate of eustatic rise based on the NRC Sea Level Curve III

For the purpose of extracting the non-global eustatic sea level rise rates from the historic rate, a value of 1.7mm/year was used in accordance with the guidance.

When considering a study period from 2011 to 2065, the increases in sea level over this period were estimated as:

1. Low rate (based on a historic trend of 10.24 mm/yr) = 1.8ft (0.55m)
2. Intermediate rate (based on a NRC Curve I and 1.7mm/yr baseline eustatic) = 2.2ft (0.69 m)
3. High rate (based on a NRC Curve III and 1.7mm/yr baseline eustatic) = 3.7ft (1.12 m)

A plot of the sea level rise over the period is shown in Figure 14.

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4 LARGE AREA MODELING – UNO Mass Balance Model

The UNO Mass Balance model is a mathematical tool that performs first-order approximations of mass transfer due to physical inputs like water level, flow, and salinity. The modeling approach is valid if the results are interpreted in the appropriate manner and at the appropriate temporal and spatial scale. The UNO Mass Balance model is ideally used early in feasibility studies in order to look at large numbers of alternatives over long time frames. The model was selected for this planning study because it has been demonstrated to accurately characterize salinity variability on monthly time scales in the Lake Pontchartrain/Lake Borgne regions (McCorquodale, et. al., 2008). For this study, the model domain was modified to better represent the Biloxi Marsh and the Chandeleur Islands in order to characterize the effects of Mississippi River diversions near Violet Canal on salinity in the Biloxi Marsh/Lake Borgne area.

The UNO Mass Balance model has a coarse resolution with grid cells sized on the order of 10 x 10km. The model makes volume and salinity calculations for each box. There is no vertical gradient defined and the model is only capable of predicting large-scale (>> 10km) gradients in the salinity pattern because of its resolution. The model provides a reasonable representation of the spatial distribution of salinity over large areas at these low frequencies (monthly) of interest. The facility of this model is that it is readily available for use, has the ability to make a significant number of operational runs over long time scales, and is easy to modify to include new changes to the system such as the MRGO barrier. For the purposes of this study, the results of the model will be used to define discharge rates at the diversion necessary to meet the salinity targets in the Biloxi Marsh/Lake Borgne regions. The results will be expressed by a range with consideration of the model uncertainties. The model will not provide detailed flow diagrams, residual velocity fields or detailed constituent gradient information. A description of the details and mathematics of the UNO Mass Balance model is included in Appendix C.

Assumptions in the UNO Mass Balance model include:

- Study area is composed of well mixed cells
- Flow in the channels depends on difference in water levels between cells and friction
- Tides are diurnal (one maximum per day) with a lunar cycle
- Short-term wind effects are not included; seasonal Gulf water level is included
- Coriolis force (earth's rotation) is neglected

4.1 MODEL STRENGTHS AND LIMITATIONS

4.1.1 STRENGTHS

The UNO Mass Balance model is mass conservative and can simulate decadal periods in a few minutes. This permits the user to consider the long term impacts of many options and meteorological scenarios.

The UNO Mass Balance model, within the limitation of the cell and link resolution can simulate the water flux and the salinities on an hourly basis for several decades. The use here is to define low frequency variation such as months, which is consistent with the time frames identified in the Chatry salinity targets.

4.1.2 LIMITATIONS

The UNO Mass Balance model lacks spatial resolution and can not represent stratified flows. Stratified flows have been observed in a few locations in the model domain, e.g. in the MRGO channel, in Lake Pontchartrain at the outlet of the IHNC and seaward of the Chandeleur Islands. To partially overcome this disadvantage, the cells were designed to represent distinctive hydrologic and/or habitat areas. Additionaly, the model was calibrated to reproduce the depth-averaged salinities where data were available, such as the MRGO and Lake Pontchartrain. This model assumes that the constituent in each cell is completely mixed with the computed value of the state variable assigned to the centroid of the cell.

Wind shear is not included in UNO Mass Balance model calculations. The model assumes that the advective fluxes are primarily driven by gravity (pressure gradients) and resisted by friction that form drag.

The UNO Mass Balance model will have little or no value in providing hydraulic or salinity information pertinent to understanding the ecology in the CWA. A cell has been added to the model to capture the CWA, but the results will only be valid as a first order of magnitude because of the coarse resolution.

The model should not be used to examine the effects of relative sea level rise. The model geometry remains constant throughout the various runs and is unable to adapt to account for changes that would occur as a result of sea level rise.

4.1.3 UNCERTAINTIES

Modeling efforts have uncertainties. The quantification, understanding, and minimization of these uncertainties are critical for the correct interpretation of model results. Uncertainty may arise in the input data, in the geometry of the model grid, and/or in the data used to verify and calibrate the model.

Uncertainty in the input data results from having to define freshwater flows from the rivers and streams in the Pontchartrain basin and along the Mississippi Coast. Input flows for the numerous ungaged areas were assumed to be similar to the input in the gaged areas. While this is a valid assumption, it adds some uncertainty to the model.

Uncertainties in the model geometry can be more significant than those in the input data. Large areas are approximated with an average depth and the boxes have an area for runoff and a contributing area for evaporation. All of these areas and depths are estimated based on the best available data.

Field data for calibration and validation can contribute the highest uncertainty to the modeling effort as data are critical in interpreting model results. Much of the data are spot data, and the exact time with respect to the tide and meteorological forcing is unknown. The ensemble of measurements was assumed to indicate average conditions. The UNO Mass Balance model had previously been validated for Lake Pontchartrain and Lake Maurepas, but was not validated for the Lake Borgne and Biloxi Marsh. The data was utilized to ascertain if the model reproduces seasonal trends.

The calibration and validation process for the expanded model was not thoroughly undertaken due to the limited data; therefore, uncertainty in the model results exists. Based on the model calibration error of 17%, a standard error in the prediction of the salinity in any cell can be +/-17%. Despite the uncertainties, the UNO Mass Balance model is a good, efficient tool to investigate the impact of proposed diversions.

4.2 MODEL INPUT PARAMETERS

The UNO Mass Balance tidal, salinity and water quality model requires extensive input datasets. The hydrologic and ambient data were obtained from the LADEQ, UNO, USGS, NOAA, LADNR, USACE and EPA. The inputs listed below and described further in the text are dominant in determining the salinity distribution in the cells:

- The freshwater budget (rainfall, evaporation, tributary flow and diversions)

- The open boundary conditions (tides and salinities)
- The cell and link bathymetry
- The link friction factors (Manning's n and eddy loss coefficients)
- The diffusivities for the links

4.2.1 MODEL GEOMETRY

The model consists of boxes (cells) and links. Figures indicating the cells and cell-link configuration are included in Appendix D. The dimensions of each cell and link as well as other preliminary data assignments are included in Appendix D. Appendix D also includes a table with the attributes of each cell including surface area, depth, hydraulically connected area, percent open area, initial salinity, and fetch length.

4.2.2 BOUNDARY CONDITIONS

The open boundary was located in the Gulf of Mexico in order to minimize its influence on the area of interest. Diurnal tides were imposed with a spring range of 0.66 m. The salinities at the Gulf boundary vary from 34 to 36 ppt with surface values on average less than deeper values. The model used 34 ppt which is more representative of mean surface salinities.

4.2.3 FRESHWATER INPUT

Freshwater flows were input into the UNO Mass Balance model as boundary conditions. The freshwater input data was comprised of daily flow data for rivers discharging into Lakes Maurepas and Pontchartrain, Mississippi Sound, Mobile Bay and the passes of the Mississippi River. Flow data for diversion structures such as Caernarvon and flood control structures such as Bonnet Carré were also inputs into the model. Salinity of the freshwater inputs was set at 0.2 ppt.

The USGS gage near Bogalusa, Louisiana has a continuous discharge record from October 1, 1938 to present. The USGS had a gage near the mouth of the Pearl River from October 1, 1963 through September 30, 1970. This gage was discontinued because the tidal flow made for difficulties in accurately determining the flow. Comparison of the two records where they coincided showed the Pearl River flow to be, on average, about 32 percent greater than the Bogalusa flow. The ratio of total basin surface area to basin area above the gage location is approximately 1.32. Thus, for the modeling period, the Bogalusa flows were increased by 32 percent and used as the Pearl River discharge in the model.

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Table 3 gives a summary of all the freshwater input flows for the UNO Mass Balance model and Figure 15 shows the location of input flows in relation to the cells.

Table 3. Freshwater Input Flows.

Location	Average Flow (cfs)	Min Flow (cfs)	Max Flow (cfs)
Amite River	2,005	132	79,600
Tangipahoa River	1,072	73	36,400
Tchefuncte River	137	25	4,667
Tickfaw River	493	55	20,760
Pearl River	10,277	1,140	97,400
South Lake Maurepas	1,042	69	35,980
Southwest Lake Pontchartrain	261	17	8,995
South Central Lake Pontchartrain (Jefferson Parish)	265	24	8,995
Southeast Lake Pontchartrain (Orleans Parish)	353	28	12,593
Northeast Lake Pontchartrain (Bayou LaCombe)	384	24	13,493
Northeast Lake Pontchartrain Bayou Bonfouca	385	26	13,493
Lake Borgne (Violet wetlands)	82	6	841
Wolf River	542	12	19,448
Jourdan River	667	15	23,936
Biloxi River	156	4	5610
Pascagoula River	8,474	898	103,000
Mobile Bay	17,533	128	157,788
Southwest Mississippi River (Southwest Pass, Grand Pass and West Bay Diversion)	179,728	45,115	433,500
Central Passes Mississippi River (Pass a Loutre and South Pass)	250,302	62,831	603,723
East Passes Mississippi River (includes Main Pass to Bayou Lamoque and Bohemia Spillway)	107,124	26,890	258,380
Caernarvon Diversion	1,300	0	9,267
Violet Siphon	100		
Bonnet Carré Diversion			240,000
Diversions at Maurepas Swamp (Convent, Blind River/Hope Canal, and Maurepas Swamp River Reintroduction)		0	4,500

4.2.4 BATHYMETRY

Bathymetry used for the UNO Mass Balance model was obtained from NOAA navigation charts, a previously compiled bathymetry mesh for ADCIRC model runs, and Barrett (1970).

4.2.5 METEOROLOGICAL INPUTS

Daily precipitation, evapotranspiration, air temperature, water temperature and daily wind speed were all input into the model as described. Figures 16 to 18 show the values input into the model.

4.3 MODEL CALIBRATION AND VALIDATION

The base model was originally developed, calibrated, and validated for Lake Pontchartrain/Lake Borgne area (McCorquodale, et. al., 2008). For this study, the model domain was extended to examine the Biloxi Marsh area.

4.3.1 SALINITY CALIBRATION

The extended model was calibrated using flow and salinity data for the period 1990 through 2008. This is the period for which the best, most comprehensive data sets are available. This base condition is not the same as the existing conditions, as existing conditions have changed with the closure of the MRGO at the La Loutre Ridge. Since the collected salinity data is from the period prior to the construction of the MRGO closure structure, the calibration effort was conducted using the conditions existing prior to the construction of the closure structure. Calibration values are included in Appendix D. Tidal fluxes were compared with data from the UNO/USGS Synoptic Survey, which uses an Acoustic Doppler Current Profiler at Rigolets, Chef, IHNC and Pass Manchac. Salinities from LDWF and MS Division of Wildlife, Fisheries and Parks were supplemented with salinities from NOAA, USACE, USGS, LADEQ, LADNR, UNO and LSU.

The freshwater inflows described previously were included as input into the calibration. Additionally, inflows from the Caernarvon and Bonnet Carré diversions which were present at the time of the calibration period were used for calibration. The Caernarvon diversion was modeled using an average flow of 1,300 cfs, maximum flow of 9,267 cfs, and minimum flow of 0 cfs. The Bonnet Carré Spillway Diversion was modeled using a maximum flow of 240,000 cfs, which occurred during the 1997 operation of the structure.

Figure 19 shows the tidal fluxes through the passes into Lake Pontchartrain and Lake Maurepas. Table 4 compares the spring ebb tidal fluxes in the model with measured values. The values for Pass Manchac into Lake Maurepas are within one percent. The values for the IHNC through Seabrook are within five percent. The model under-computes the peak spring tide flow in the Chef Menteur Pass by 23 percent and over-computes the Rigolets by eight percent (8%). However, the combined ebb flux into Lake Pontchartrain through the IHNC, Chef Pass and the Rigolets in the model is within 2.3

percent of the observed value. The spring tidal range in Lake Pontchartrain is predicted within 4% of the observed range.

Table 4. Tidal fluxes during spring flood and ebb tide.

	Pass Manchac into Lake Maurepas	IHNC through Seabrook	Chef Menteur Pass	Rigolets	IHNC, Chef Menteur, and Rigolets
Observed	13,000	13,000	85,000	180,000	278,000
Modeled	35,300	12,400	65,000	194,000	271,400

Figure 20 is a plot of modeled data compared to collected data at Grand Pass, in the Biloxi Marsh area. This data represents the output from Box 14, which is in the western Mississippi Sound just north of the Biloxi Marsh area, over the time period shown. Box 14 is a "deeper" water region where a significant transfer of flow occurs along the Mississippi coast where water mixes with saltier gulf waters. The data sets show good agreement though the model does not agree with the extreme high and low salinity points probably due to the depth-averaged feature of the model and its weakness in calculating the higher frequency variability. The 14-day moving average provides a trendline of the measured data, which correlates well to the results.

Figure 21 is a plot of the modeled data compared to the measured data at Rigolets over the time period shown. The data is the output from cell 3, which is the area in east Lake Pontchartrain. Similar to the Grand Pass data, the model does not capture the high and low salinity values but is able to follow the trend of the data well.

Figure 22 graphs the maximum and minimum salinity values for the areas shown in Figure 23 versus the mean salinity value of the nearest cell in the model. Linear curves are given for the maximum, minimum, and calculated mean of the salinity points. The equation for the line in the middle indicating the mean values is Y=0.9975X. This line has a R^2 value of 0.9533 and an error of 0.17 percent (0.17%). Both of these numbers give confidence in the ability of the model to provide accurate estimates of average salinity values and thus to predict average salinity values due to proposed diversions.

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4.3.2 SALINITY VALIDATION

No formal validation of the results has been completed. Lack of enough salinity data taken after the closure of the MRGO did not allow for validation of model results. The construction of the MRGO closure has significantly changed (lowered) the salinity patterns in Lake Borgne that existed since the 1950s dredging of the MRGO. Therefore, validation of this condition is not possible until a reliable long-term data set is generated. The existing UNO Mass Balance model previously validated for Lake Pontchartrain was calibrated to analyze the effects in the Biloxi Marsh. Comparison of model output with existing data provides confidence in the model results.

4.4 SALINITY TARGET LOCATION AND CALCULATION

As discussed, the diversion of freshwater near the Violet Canal structure would be beneficial if salinity in Biloxi Marsh can be modified to meet the salinity targets of Chatry. The measure is defined as meeting these targets along a specified line (contour) in the Biloxi Marsh. The Salinity Target Line, is defined in the "Flood Control of the Mississippi River and Tributaries Mississippi and Louisiana Estuarine Areas, Design Memorandum No 1, Bonnet Carré Freshwater Diversion Structure, Appendix C, Salinity Study Results" and is the designated "point" in Biloxi Marsh where salinity from the model can be aggregated to compare against the Chatry limits.

This line passes through computational boxes 14, 13, 78, 74, and 28 in the salinity model. Box 14 has been excluded from the analysis as the majority of this box is deeper water and not marshland and is subject to higher salt gradients and skews the depth averaged value to the saltier side. Box 28 within the model represents the MRGO seaward of the Bayou la Loutre and is not thought to represent the salinity within the Biloxi Marsh. Although the line does not pass through Box 73 this has been included in the weighting as this is a significant part of the marshland. From the salinity values of the remaining four boxes, salinity along the Salinity Target Line was determined by dividing the line into twelve points and using an inverse distance weighted process to establish the average salinity along the line. Each salinity value is weighted inversely to the square of the distance of the centroid of each box from the line. All points weighting gives a single set of weights that can be used to represent the average value along the whole line. A distance weighting factor of 1 has been used. The line and points used are given in Figure 24 and Table 5.

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Table 5. Weighting Factors for Determining Salinity along Target Salinity Line.

Box	0	1	2	3	4	5	6	7	8	9	10	11	12	All points
13	0.41	0.45	0.49	0.43	0.33	0.27	0.20	0.13	0.10	0.10	0.13	0.15	0.17	27%
73	0.17	0.14	0.11	0.11	0.15	0.20	0.21	0.18	0.15	0.15	0.21	0.25	0.26	18%
74	0.14	0.12	0.10	0.10	0.15	0.24	0.37	0.56	0.66	0.66	0.54	0.45	0.40	32%
78	0.28	0.29	0.30	0.36	0.37	0.29	0.21	0.13	0.10	0.10	0.13	0.15	0.17	23%
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100%

4.5 METHODOLOGY FOR ESTABLISHING COMPLIANCE WITH SALINITY TARGET VALUES

The UNO Mass Balance model has been developed to demonstrate the effectiveness of different scenarios in achieving the salinity target. Neither the target nor results from the UNO Mass Balance model represent a single number but a range or averaging of values over spatial and temporal scales.

For the target values, the ranges have occurred due to the variability of the data analyzed to produce the results. The salinity values vary from year to year and the target ranges were statistical ranges about the mean value of selected years correlated to high oyster production. The optimum limits (which are the target of this exercise) are based on one standard deviation about this mean, whereas the range is the maximum and minimum values recorded in those months which were seen to contribute to optimize oyster production.

For the modeling results, there is a range in the values as a result of uncertainties within the model and also as a result of the averaging process to establish salinity values to compare against the target value. The model uncertainties were established as being around ±17% of the modeled salinity (e.g. a modeled value of 10ppt would have a model uncertainty of ±1.7ppt). In addition, a standard deviation associated with the averaging process defined in section 4.4 was established. These two values were combined as a vector sum to give a standard error for the modeled results.

Having established these standard deviations for both the target and modeled result it is then possible to plot the frequency distributions (based on a t-distribution) of the modeled salinity and the target value (an example of which is shown in Figure 25). This figure shows that for some percentage of the time the modeled distribution overlaps the target distribution. Significantly, most values are demonstrated to be lower in salinity than the upper optimum limit identified by Chatry. The results of

the distributions were plotted as cumulative, as shown in Figure 26. From Figure 26 it can be seen that the percentage time that the modeled results intersect with the Chatry limits is the models prediction against the target for that month. For this example the model generated salinity values in May along the target line below the Chatry Optimum uppper value 30% of the time and above the Chatry optimum upper value 7% of the time, therefore the overlap within the optimum range is 23%.

For compliance with the 40% criteria, freshening of the system is examined. Therefore, all values lower than the upper Chatry limit are considered. In this example, the UNO Mass Balance model has generated salinity values lower than the upper target for 30% of the Mays (over 19 years). Therefore, this scenario does not meet the 40% target.

4.6 MODEL RESULTS

The UNO Mass Balance model was run for a number of scenarios during the development of the diversion alternatives. All the model simulations used the same base bathymetry and links, together with the majority of the same fluvial inputs as the historic model developed and used for calibration. Table 6 provides the scenarios performed and the key differences. The historic scenario is the calibration run. The recently constructed MRGO closure and other structures recently built are expected to have a substantial impact on salinity in Lake Borgne and surrounding areas but no data have been collected since construction to date to evaluate this impact. To demonstrate the reliability of the model, the alternatives and their detail are discussed further in the following sections.

Table 6. Table of Elements for Model Runs.

Run	MRGO Closed	Seabrook Gate	IHNC Barrier	Modified and Future Diversion Flows	Near Violet Canal Diversion Flow
Historic					
Baseline (Closures)	X	X	X		
Future Without Project	X	X	X	X	
Future With Project	X	X	X	X	X

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4.6.1 PRE MRGO CLOSURE (HISTORIC)

The calibration effort proved that the model is capable of predicting salinity within an identified error. The analysis of historic data from areas J and L in section 3.3 indicates that salinity falls within or below Chatry's optimum limits during January, February, March, August, September, November and December and the average salinity falls just above Chatry's limits in June, July and October. In April and May, historic salinity levels are significantly higher than the target. The historic condition model results indicate the same trend and show that the target has only been met 4% of the time in the critical month of May and only 24% in Aprils. The results for the historic condition run are seen in Table 7. July is slightly under the Chatry criteria. Figure 27 and 28 graphically compare the J and L data with the historic condition model run. The model agrees well with the physical data, especially in the months of April and May. These model runs point to the impact the MRGO had in the salinity character of Lake Borgne resulting in higher salinities in critical months (April, May) in the Biloxi Marsh.

Table 7. Historic Condition Model Results.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	13.3	3.72	2.55	94%
February	10.6	3.92	2.10	98%
March	9.9	3.80	1.99	90%
April	10.8	2.94	2.05	24%
May	12.5	4.12	2.44	4%
June	13.5	3.78	2.58	47%
July	14.2	3.67	2.69	37%
August	15.8	2.94	2.93	59%
September	16.7	3.14	3.08	67%
October	17.8	2.68	3.26	48%
November	17.7	2.85	3.25	41%
December	16.2	3.33	3.01	50%

4.6.2 POST MRGO CLOSURE (BASELINE CONDITIONS)

Baseline conditions include the MRGO closure structure at the La Loutre Ridge, the Seabrook Gate and the IHNC Barrier (with openings for Bayou Bienvenue and the GIWW) all in place. During the Baseline model run, the salinity goal is now met for all months except May where the goal is met

only 6% of the time. The results for the baseline run are seen in Table 8. This model scenario indicates that the existing closures and other structural changes to the physical system will not be enough on their own to reduce salinities to the recommended target in May in the Biloxi Marsh and that additional freshwater will need to be input into the system via diversions. This alternative does tell us that May is the critical month and that diversions need to occur in that timeframe to meet the monthly salinity target identified.

April barely meets the criteria with salinity calculated below the upper limit 41% of the time. All other months are fresher than this upper limit over 50% of the time over the 19 year modeled record.

Table 8. Baseline Condition Model Results.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	12.3	3.69	2.37	98%
February	9.4	3.85	1.91	99%
March	8.8	3.74	1.81	98%
April	9.7	2.86	1.86	41%
May	11.6	4.02	2.29	6%
June	12.7	3.77	2.45	59%
July	13.5	3.66	2.56	47%
August	15.2	2.85	2.80	68%
September	15.9	3.10	2.96	76%
October	17.1	2.63	3.14	57%
November	16.9	2.80	3.12	50%
December	15.2	3.35	2.85	63%

4.6.3 FUTURE WITHOUT PROJECT (FWOP)

Two FWOP conditions are examined based on the final disposition of future diverions. The FWOP and FWOPD scenarios include the baseline conditions, existing diversions at Violet Siphon, Bonnet Carré and Caernarvon, and planned diversions at Maurepas Swamp (Convent, Blind River/Hope Canal, and Maurepas Swamp River Reintroduction), Caernarvon, and the CWA Waste Water Treatment Program.

Planned diversions from the lower Mississippi River located below the Caernarvon Diversion were not included in the model. The Bertrandville Siphon, Bohemia Mississippi River Reintroduction, Delta Building Diversion (North of Ft. St. Phillip), White Ditch, Bayou LaMoque and the Benney's Bay Diversion were deemed to be sufficiently far from the study area to not have a significant influence on salinity conditions in the study area and there is little available information as to the proposed operational scheme for these diversions. The inflow due to existing cuts, overflows and diversions in the River reach from Baptiste Collette to Bohemia was approximated as 12% of the River flow.

The diversion value for the Violet Siphon is 100 cfs which is assumed to be the average. Bonnet Carré is the same as the calibration/historic run with a maximum flow of 240,000 cfs. The combined diversions into the Maurepas swamp area (Convent Diversion: 500 cfs, Blind River/Hope Canal: 1,500 cfs and Maurepas Swamp River Reintroduction: 1,000 cfs) have a potential capacity of 3,000 cfs in the FWOP scenario. These diversions are regulated to keep the Lake Maurepas salinity below 1 ppt. The model was operated in the FWOP scenario to open the diversion when salinity in Maurepas was greater than 1 ppt; if the salinity was less than 1 ppt, they are closed. This results in a condition where Lake Maurepas was always less than 1 ppt. The FWOPD condition is identical to the FWOP condition except that in the FWOPD scenario, the diversions at Maurepas Swamp total 4,500 cfs due to an increase in the Blind River/Hope Canal diversion to 3,000 cfs. The CWA Waste Water Treatment Program flow totals approximately 30 cfs.

Input flows for the Caernarvon diversion were increased by roughly 25 percent in line with the projected increase in the capacity of the structure. The increase is calculated by increasing the actual flows for 2007 and 2008, in which the structure was operated to pulse large flows, by 25 percent. The resulting flows were then smoothed so as to eliminate rapid changes that might induce numerical instabilities in the model. The resulting smoothed flow maintained the same volume of flow. Figure 29 shows the actual flows for 2007 and 2008 and the resulting smoothed flow curve. This resulting smoothed flow was then repeated on that two year cycle over 19 years to examine salinity variability due to the Caernarvon input flows for the 19 year period.

The model results indicate that the planned Caernarvon diversion and salinity constraint does modify the salinity regime in the Biloxi Marsh. For the month of April, salinity decreases over the baseline condition and the amount of time that the salinity is under the upper target increases from 41% to

86.9% in the FWOP condition and 91.3 in the FWOPD condition. This reduction in salinity from the diversions infers that additional diversions may not be necessary during Aprils.

Salinities in the month of May were also lowered and the target salinity is now met 27.4% of the time in the FWOP condition and 33.7% of the time in the FWOPD condition with these planned diversions. This is a significant increase of 21% to 27% of the time that the goal is met over this new baseline conditions. This is a significant improvement, indicating that additional management changes may help meet the targeted goals. This scenario also verifies that additional freshwater diversions will be necessary in freshening the Biloxi Marsh to meet the 40% Chatry goal. The FWOP model results are seen in Table 9.

Table 9. Future Without Project Condition Model Results – FWOP.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	11.04	3.50	2.14	99.6%
February	8.06	3.78	1.70	100.0%
March	7.29	3.59	1.55	99.9%
April	7.54	2.67	1.49	86.9%
May	9.04	3.63	1.83	27.4%
June	10.08	3.54	1.99	93.8%
July	11.15	3.36	2.15	83.1%
August	13.32	2.57	2.47	89.3%
September	14.60	2.88	2.71	89.1%
October	15.98	2.47	2.93	71.5%
November	15.91	2.65	2.93	63.3%
December	14.16	3.13	2.65	77.7%

The FWOPD condition adds in the diversions at Maurepas Swamp that is anticipated to be approximately 4,500 cfs year round. It has conditional approval as an authorized project. The result is a small change in the average salinity but boosts the before project to a fresher initial condition at Biloxi Marsh (Table 10).

Table 10. Future Without Project Condition Model Results - FWOPD.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Error (ppt)	Sigma (ppt)	
January	10.47	3.31	2.03	99.8%
February	7.77	3.54	1.62	100.0%
March	6.99	3.36	1.48	99.9%
April	7.25	2.49	1.42	91.3%
May	8.67	3.42	1.75	33.7%
June	9.64	3.33	1.90	96.5%
July	10.64	3.15	2.05	89.2%
August	12.69	2.41	2.35	93.9%
September	13.86	2.76	2.57	94.0%
October	15.14	2.37	2.78	81.2%
November	15.05	2.50	2.77	74.6%
December	13.38	3.00	2.50	86.5%

4.6.4 FUTURE WITH PROJECTS/PROJECT ALTERNATIVES (FWP)

The FWP scenario includes the closures and diversions outlined in the FWOP/FWOPD conditions and with the addition of near Violet Canal diversion scenarios. The UNO Mass Balance model is not resolved enough to differentiate between the specific diversion locations and scenarios are not defined as such. All results figures for the FWP scenarios are in Appendix E.

Initially, diversions between 7,000 and 30,000 cfs were discharged to Lake Borgne over the entire year to investigate the sensitivity to salinity reductions and the ability of a diversion in this area to affect salinity and meet the salinity target. To discharge this amount of water through the CWA it was physically necessary to anticipate a direct channel through the CWA and through a new structure in the Chalmette levee into the MRGO and Lake Borgne. These higher flows could not be released inside the CWA due to the potential of severe flooding. Alternatives of 7,000, 10,000, 15,000, 20,000 and 30,000 cfs were modeled in this fashion.

To facilitate environmental enhancement of the CWA, a second condition was established where discharges of between 1,000 and 10,000 cfs are diverted into the CWA, inundating this area prior to discharging through the Bayou Bienvenue and Bayou Dupre control structures (and potentially a third structure). For these scenarios a base flow of 1,000 was run for all months except April and May. In April and May, the flow was increased to 5000, 7,000, and 10,000 cfs. The 1,000 cfs base flow

provides hydration and is expected to create freshwater conditions in the CWA year round. Increased flows in April were included to account for the hydraulic residence time (approximately two weeks) in Lake Borgne to establish the freshest conditions possible to help meet the Chatry target in May.

To improve the flow dispersion to the Biloxi Marsh region these modeling scenarios were also run to include a closure of the MRGO/Lake Borgne connection, forcing additional freshwater south and out through Bayou La Loutre rather than discharging directly through Lake Borgne. The Lake Borgne channel has recently been structurally altered to reduce the opening to a 200m wide channel. In the Lake Borgne closed scenario this opening is now completely blocked. This closure does not completely block water from moving into Lake Borgne since there are several other smaller channels connecting the MRGO and Lake Borgne.

Table 11 lists the FWP model runs where the following denotes the type of run:

- A1 – Base flow is 1,000 and flow is increased in April and May. Lake Borgne is open.
- A2 – Base flow is 1,000 and flow is increased in April and May. Lake Borgne is closed.
- A3 – Flow is steady for all months. Lake Borgne is open.
- A4 – Flow is steady for all months. Lake Borgne is closed
- D – Includes diversions at Maurepas Swamp totaling 4,500 cfs (Blind River, Convent, and Hope Canal); otherwise, the diversions at Maurepas Swamp are regulated to maintain a salinity in Lake Maurepas below 1ppt.

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Table 11. Future With Project Alternatives.

Alternative	Base Flow (cfs)	April/May Flow (cfs)	Gap between MRGO and Lake Borgne - Open or Closed	Diversion at Maurepas Swamp
1A1	1,000	1,000	Open	< 1ppt
7A1	1,000	7,000	Open	< 1ppt
5A2	1,000	5,000	Closed	< 1ppt
7A2	1,000	7,000	Closed	< 1ppt
10A2	1000	10,000	Closed	<1ppt
10A3	10,000	10,000	Open	< 1ppt
15A3	15,000	15,000	Open	< 1ppt
20A3	20,000	20,000	Open	< 1ppt
30A3	30,000	30,000	Open	< 1ppt
7A4	7,000	7,000	Closed	< 1ppt
7A2D	1,000	7,000	Closed	4500 cfs
7A4D	7,000	7,000	Closed	4500 cfs

Operationally, there is an expectation that flows above the base levels of 1,000 cfs through the CWA would require construction of a structure in the levee south of the IHNC structure. The mass balance model does not need this level of specificity and flows were designated through the links represented in the box model as the Bienvenue and Dupre gates. All of the flows that would be directed through this third structure are included in the flow out of the Dupre gate. Based on the MIKE 21 results that are provided later; the distribution of flow exiting the CWA and included as the fresh water input in the FWP model runs is shown in Table 13.

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Table 12. Flow Distributions through the Central Wetlands.

Flow scenario (cfs)	Bayou Bienvenue (cfs)	Bayou Dupre (cfs)
1,000	500	500
5,000	450	4550
7,000	630	6,370
10,000	900	9,100

The flow distribution exiting the CWA through links in the model to other cells within the model is shown in Table 13 and provides an estimate of how much freshwater from the CWA is entering each geographic location. For Alternatives A1 and A2, water exits via the Bayou Dupre and Bayou Bienvenue control structures.

Table 13. Flow Distribution.

	% of Violet Flow Delivered		*% of Violet Flow Delivered*	
	Diversions up to 1,000 cfs		*Diversion of 7,000 cfs*	
System Compartment	*Lake Borgne Gap Open*	*Lake Borgne Gap Closed*	*Lake Borgne Gap Open*	*Lake Borgne Gap Closed*
Bayou Dupre	**50%**	**50%**	**91%**	**91%**
Biloxi Marsh	20%	25%	6%	46%
Lake Borgne	30%	25%	62%	46%
Bayou Bienvenue	**50%**	**50%**	**9%**	**9%**
Lake Pontchartrain via IHNC	14%	14%	2%	2%
Golden Triangle	6%	6%	1%	1%
Lake Borgne	30%	30%	5%	5%

The impacts of the 1,000 cfs diversion are examined in detail in the MIKE 21 section. The UNO Mass Balance model only examinesimpacts on the overall system including Biloxi Marsh. When compared to FWOP, the base level of flow will show a slight (<1ppt) reduction in the average salinity in Biloxi Marsh for April and May. Table 14 provides the results of the 19-year monthly averages over the period of simulations and associated statistics for that specific scenario. A similar table for every diversion scenario is provided in Appendix E as well as associated graphs and spatial plots of salinity results. Table 15 provides a summary of the results that are found in this appendix.

Table 14. FWP 1,000 cfs Condition Model Results – 1A1.

	Model Results		Model Uncertainty	
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	Below Chatry Target
January	10.73	3.27	2.07	99.8%
February	8.05	3.51	1.66	100.0%
March	7.32	3.36	1.53	99.9%
April	7.66	2.46	1.49	85.3%
May	9.07	3.40	1.81	26.7%
June	10.03	3.27	1.95	94.4%
July	11.04	3.10	2.11	84.7%
August	13.09	2.37	2.42	91.2%
September	14.24	2.74	2.64	91.7%
October	15.50	2.32	2.84	77.3%
November	15.35	2.45	2.82	70.9%
December	13.61	2.93	2.54	84.2%

The results demonstrate how the different conditions change the salinity character of Lake Borgne which each affects the salinity structure in Biloxi Marsh. The results also highlight the difficulty of translating a range of values over a spatial area of 600 square miles and using a transect line of over 30 miles long in an area that has relatively large salinity variability over tidal, synoptic, monthly and annual cycles.

The results are described in terms of how an alternative is able to modify the salinity structure at the Salinity Target Line to meet the Chatry Limits. To put the analysis in perspective, the upper Chatry Limit target for May is 8 ppt. All of the diversion scenarios (1,000 to 30,000 cfs) that will be discussed will decrease the salinity in Biloxi Marsh on the order of 3 to 4 ppt from the FWOP conditions.

Generally the results indicate that the full freshwater diversion over the entire year has a greater impact (approximately 3% increase) on meeting salinity targets in May than just applying a diversion in April and May. A closure of Lake Borgne can affect salinity in the Biloxi Marsh a significant amount. At 7,000 cfs the Lake Borgne closure is correlated to a 3% to 4% increase in time that the salinity target is met. As hypothesized, more flow does move south in the MRGO channel with the gap closed, discharging to Biloxi Marsh in a more efficient manner than through Lake Borgne alone.

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Year round flows via the diversions at Maurepas Swamp (set at 4,500 cfs) also impact salinity in Biloxi Marsh by an order of 4% increase.

Table 15. Results of diversion scenarios in terms of % of time salinity meets the upper Chatry Salinity Limit in May.

Flow (cfs)	Historic	Baseline	FWOP Scenarios		FWP Scenarios					
			FWOP	FWOPD	A1	A2	A3	A4	A2D	A4D
0	3.9%	6.1%	27.4%	33.7%						
1,000					26.7%					
5,000						33.7%				
7,000					31.7%	36.7%		43.6%	43.0%	48.1%
10,000						41.6%	46.2%			
15,000							55.2%			
20,000							63.3%			
30,000							75.4%			

The variety of diversion alternatives between 5,000 and 10,000 cfs will alter salinity in Biloxi Marsh relative to the 40% target goal. At 5,000 cfs, the target is met in the range of 32% to 36%. At 7,000 cfs we see alternatives range between 32% and 48%. At 10,000 cfs the range in meeting the Chatry targets is from 38% to over 50%. The operation of the diversion at 1,000 cfs year round and 7,000 cfs in April and May with Lake Borgne open, not considering an increased diversion at Maurepas Swamp, only meets the Chatry target 32% of the time. With Lake Borgne closed the 7,000 cfs diversion lowers salinity to meet the target 37%. By either increasing the diversion at Maurepas Swamp or allowing 7,000 cfs flow year round, the salinity meets the Chatry target 43% of the time. By increasing the diversion at Maurepas Swamp and allowing 7,000 cfs flow year round, the target is met 48% of the time. These relationships and a graphic representation of Table 15 are provided in Figure 30.

4.6.5 SALINITY TIME SERIES ANALYSIS OF FWP RESULTS

The primary objective of the UNO Mass Balance model is to analyze salinity at the Salinity Target Line, a specific location in the Biloxi Marsh. It can also be helpful to look at the salinity results surrounding the region encompassing the Salinity Target Line and compare them also to the salinity conditions derived by Chatry. Figures E2 to E27 in Appendix E provide time series of salinity generated at monthly time steps over the 19 year model runs of the FWP 7A2D scenario for those boxes in Lake Borgne (cell 1 and 2), the Biloxi Marsh (cells 13, 73, 74, 78) and along the Mississippi Coast (cells 80 and 14). The figures include the salinity time series, the Chatry Optimum upper limit,

and the delta or difference between the Chatry limit and the salinity value calculated for that month. These monthly time series demonstrate an annual cycle, much like the cycle represented by Chatry.

Examination of the salinity results should be reviewed in context to conditions during that timeframe. The drought monitoring program did not begin until the mid 1990's but rainfall/flow data from the Pearl River basin indicate that the area was in drought conditions in October to November of 1990 and again in the same months of 2000. The 2000 event is documented in the National Drought Monitor and occurs on drought maps. The data indicates that flows from the Pearl River leading up to this declaration were very low. Both the salinity data available for this area in this time frame and the model runs show the 2000 event. In addition to droughts hurricane Katrina struck the coast in August 2005 and had significant impact to the salinity regime.

4.6.5.1 LAKE BORGNE

Salinity in Lake Borgne (boxes 1 and 2) as modeled over the 19 years is substantially lower than the optimum Chatry values for all months. Even in drought periods, the system remains relatively fresh. Box 1 has a slightly higher level of annual variability through the period of record due to the proximity of freshwater flows from Lake Pontchartrain and is, on average, slightly more saline than box 2. Both boxes and therefore Lake Borgne is almost completely fresh every spring with salinity values between 0 and 2 ppt.

4.6.5.2 BILOXI MARSH

Biloxi Marsh is divided into four compartments as represented by box 13, box 73, box 74, and box 78. Box 73 is the closest to the near Violet diversion outfall and the freshwater in Lake Borgne. Box 73, as expected, becomes the freshest zone in this region with salinities generally between 3 and 10 ppt. The drought periods during 1990 and 2000, and the effect of Katrina appear clearly in the results. Box 13 is the next freshest and slightly saltier than box 73 by a couple of ppt. Boxes 74 and 78 are significantly saltier than the northern boxes with salinities ranging from 7 to 17 ppt with box 74 slightly saltier than 78. These relationships are reasonable considering the proximity of the northern boxes to the fresh Lake Borgne and the southern boxes to the open Gulf.

Boxes 74 and 78 demonstrate a monthly salinity signal that very closely matches the optimum signal of Chatry. The variability in salinity over a year is on the same order as Chatry with a salty component in the 16 to 17 ppt range with the freshwater component in 5 to 7 ppt range in the spring.

The shape and the order of magnitude of the salinity signal is comparable between the boxes and the Chatry limit; however, the freshwater signal is often present earlier in the spring than shown by Chatry. This causes the month against month results to indicate that April is fresher than "needed" while May barely meets the Chatry requirement. It is only the fresher fractions contributed by boxes 73 and 13 in the calculation of the salinity along the Salinity Target Line that allow the composite of the entire region to meet the minimum criteria.

4.6.5.3 MISSISSIPPI COASTLINE

Box 14 of the original computational domain was segmented into 2 boxes for the 7A2D scenario. Box 80 follows the Mississippi coastline along the barrier islands, which is coincidently near the Mississippi state boundary. Box 14 represents the deeper water between the barrier islands and Biloxi Marsh. The plot of the salinity time series for each box is similar with box 80 generally running a few ppt fresher than box 14. This trend is expected due to the shallower waters and proximity to freshwater inflow. Box 80 ranges from around 10 ppt each spring to around 20 ppt in the fall with monthly averaged highs at 25 ppt during the 2000 drought event and elevated values after Katrina. The signal closely follows the defined Chatry values with a similar lag in the freshwater component by a month or so earlier in the system. The box 80 values are higher than those of boxes 74 and 78, an indication that the proposed diversion has a greater impact in the Biloxi Marsh area.

4.6.6 AREA OF INFLUENCE AND IMPACTS TO SALINITY

The area of influence where the reduction in salinity is due to diversions is shown in Appendix E in Figures E28 through E39. These maps are generated based on the 19 years of records so demonstrate the long-term impacts of the diversion. In any given year there is more or less impact. The calculations demonstrate that there is an influence of the diversion in the Lake Borgne/Biloxi Marsh region in all months of the year demonstrating that even the 1,000 cfs maintenance flows are felt. In April the change in salinity, as compared to FWOP, is in the northwest sector or box13 which is adjacent to freshest compartment of Lake Borgne. Boxes 73, 74 and 78 have relatively no change (<0.4 ppt) which may be a function of the freshening of this area in Aprils of many of the years of record. Box 73 is the region of greatest impact from the diversion alone and is the primary contributor to changes in the salinity target measured at the Chatry Line.

As seen in Figure 31, in Mays we can see that the near Violet Canal diversion most influences box 73 which is the closest to the CWA and benefits due to the influence of the fresher adjacent regions

depicted by box 8 (Carnarvon) and box 1 in Lake Borgne. This influence region extends along the northern boxes of Biloxi Marsh (73 and 13) and into boxes 14 and 80 along the Mississippi coasts barrier islands. Lake Borgne is significantly impacted by the diversions and is able to trap fresh water behind the raised Biloxi Marsh plateau which protects this region from the heavier salt water of the Gulf.

Box 13 in the Biloxi Marsh is less changed due to the near Violet Canal diversion. While this region benefits from the freshening of Lake Borgne, the deeper waters of Box 14 along the Mississippi Coast may result in saltier water influencing the depth averaged salinity generated by the model. This area is one that would probably be better represented by a 3-d hydrodynamic model due to the perceived stratification that is expected to occur from the influences of the fresher waters of Lake Borgne to the west and the Gulf to the south. The Biloxi Marsh stands as a barrier to some of the salt water exchange between the Gulf and Lake Borgne whereas box 14 provides the only "deep" water access for saltier gulf water to penetrate into Lake Borgne. In Junes there appears to be a residual effect of the diversion. Additional areas of influence in the months following June are associated with the 1,000 cfs maintenance flows.

Influence of the diversion along the Mississippi Coastline and territorial waters is shown to be limited in April (on average less than 0.5ppt) but is impacted in May with a lowering of the average salinity by up to 1 ppt with the near Violet Canal diversion.

4.7 DISCUSSION

Results from the planning level mass balance model developed for this study tell resource managers a number of things that are useful in understanding the salinity regime in the Biloxi Marsh., Data and model results demonstrate that the Biloxi Marsh region is at or fresher than salinities required for oyster seed production as recommended by Chatry for the winter months. The spring and months of April, May and June have historically been saltier than the optimum salinity ranges.

The MRGO closure, the construction of the IHNC barrier, and the Seabrook gate will have an immediate positive (lower salinity) impact in Biloxi Marsh relative to these three key months. This scenario, the baseline condition representing current conditions, appears to mitigate the long-term impact of salinity intrusion by freshening the system over historic conditions in all months on the order of 1 to 2 ppt. In May, the month of the year the fishery requires the greatest freshwater

enrichment, the baseline condition, which includes the major modifications of the system, now only meets the Chatry target 6% of the time, which is up from the historic 4%.

The USACE, the State of Louisiana, and others have studied and are implementing a number of planned freshwater diversions. The FWOP condition builds upon the baseline condition by acknowledging these new inputs to the system. These diversions, represented in the model as the FWOP conditions have a significant effect on the year round salinity in Biloxi Marsh with additional reductions in salinity on the order of 2 ppt. More importantly there is a considerable reduction in the salinity in May and the data now indicates that salinity will be reduced below the upper Chatry limit 26% of the time. This is a significant change in the conditions of this area. If we consider the Blind/Convent River diversion as a FWOP the salinity target is now met 31% of the time.

It should be noted that with these diversions most months now exhibit lower salinities (is significantly fresher) in the Biloxi Marsh and that these salinities are below the upper optimum Chatry limit. This study did not look at ways to alter (reduce) diversions in those months when there is an over-freshening. This needs to be refined once operational strategies are considered. The mass balance model predicts an overall freshening of the system as a result of the additional structures included in the baseline scenario. That freshening continues with the diversions discussed in FWOP scenarios. This condition (present today) along with the potential near Violet Canal diversion and the Blind/Convent River diversion becomes the condition from which managers could manipulate salinity to better address salinity (fishery) goals in the Biloxi Marsh area.

May continues to be the chronic month, even after accounting for the planned diversions, cited in the FWOP condition. Additional diversions near Violet Canal have been tested to see if supplementary freshwater will continue to drive salinity down in the Biloxi Marsh. A number of alternatives were modeled beginning at 1,000 cfs up to 30,000 cfs. The 1,000 cfs, 5,000 cfs, and 7,000 cfs diversions looked at a 1,000 cfs base flow condition year round with a planned pulse in April and May as well as the full diversion year round. The increased rate was added to the base flow on April 1st and turned off May 31st. These scenarios were examined in a Lake Borge open and closed condition. Diversions of 10,000 cfs, 15,000 cfs, 20,000 cfs and 30,000 cfs were also tested as a constant flow through the system during all months of the year. The 7000 cfs diversions were also tested in combination with a diversion from Blind/Convent River. Because of the monthly time scale of the model results and the global salinity targets there was little effort in fine tuning the results of the various diversion alternatives.

A new freshwater diversion near Violet Canal in May is shown to freshen the system. As the level of freshwater is introduced into the system through this diversion, the percent of time the salinity target was met in the Biloxi Marsh is increased. This relationship is near linear above 1,000 cfs with an increase of time the Chatry limit is met of approximately 1.5% for every 1,000 cfs added to the system for those diversions scenarios that are considered with the Lake Borgne connection cut off or for those scenarios where the diversion is provided year round. The 1000/7000 cfs diversion scenario without the coincident Blind/Convent River diversion only meets the upper target in May 37% of the time and it would talk about 9000 cfs to meet the 40% criteria under this condition.

Adding the Blind/Convent River diversion the 1000/7000 cfs scenario meets the limit in May 43% and if we run the 7000 cfs diversion all year with the Blind/Convent River condition the salinity condition in Biloxi Marsh meets the Chatry criteria 48% of the time. Application of much higher diversions (on the order of 20,000 cfs) through the CWA without the benefit of the Blind/Convent River diversion will generate even lower salinities and will meet the May target on the order of 60% as modeled over the 19 years of record. Adding Blind River will further lower salinities.

To improve the efficiency of delivery of freshwater another set of diversion alternatives was modeled with the channel between the MRGO and Lake Borgne closed by incorporating a barrier. This forced the freshwater north and south through existing natural channels but more importantly it forced additional water south through the Bayou La Loutre. This created a more direct connection with the Biloxi Marsh than when flows are directed through Lake Borgne and then to Biloxi Marsh.

Flows in the Pearl control the ambient salinity in the Biloxi Marsh system. In 1989 and 2000, lower than normal flows correspond to high salinities (20 ppt and 17 ppt respectively) in May of those years. The existing and proposed diversions will modify (lower) this salinity condition but not enough to bring the salinity in May, and probably other months of those years, into compliance with the Chatry limits. If the Pearl River flow is low enough the diversions discussed here are relatively ineffectual in lowering salinity in the Biloxi Marsh.

Results of the timeseries analysis demonstrate that the diversion defined as FWP conditions contributes to a salinity regime that very closely mimics' the optimum signal as defined by Chatry. The northern portions of the marsh are fresher than required while the southern compartments have the same order of magnitude and annual cycle necessary for the oyster fishery. The timing of the

freshwater signal is often early by a month or so, coming in March or April where salinity in Biloxi Marsh is lowered to values required by Chatry. Even in drought years there is an appreciable reduction in salinity (even if not to the Chatry values). Care should be taken when interpreting monthly averaged timescales as variability in the data can skew averages toward one month or another. If the timing of the minimum salinity period is flexible, on the order of a month prior to the time Chatry designates, there an expectation that, if properly timed, an earlier diversion coincident with the freshwater event could have the potential of lowering salinity to or near to the Chatry low. The UNO Mass Balance model is very coarse in its definition of the flow regime through the CWA and another modeling effort is required to determine the specifics of flows in the CWA, MRGO, and to establish the value of a Lake Borgne closure. The flow distributions outlined in this report are an estimate of the distribution through the system and into the Lake Borgne/Biloxi Marsh basin.

A 1,000 cfs base flow was run as a management condition throughout the year. The 1,000 cfs was a condition that appears to provide the CWA sufficient freshwater to maintain the system as a cypress swamp. The salinity goal to meet proposed ecological conditions in the CWA is to maintain the salinity at all times below 2.6 ppt. The mass balance model is not of the resolution to describe the dynamics and other fine details of flow through the CWA but is sufficient to demonstrate that the 1,000 cfs base flow is an appropriate order of magnitude estimate to meet the salinity goals in the CWA. Higher resolution modeling using MIKE21 examines the effect of a 1,000 cfs diversion.

4.8 SENSITIVITY IMPACTS TO SEA LEVEL RISE

The UNO box model was run for two SLR scenarios: 1) a rise of 0.8 m over 100 years, and; a rise of 1 m over 100 years. The model was not modified to consider the effects of progressive land loss over the period of sea level change. The Gulf of Mexico mean stage was raised by 0.8 and 1 m respectively to represent the two SLR scenarios. The main changes that the model responded to were: a) an increase in the depth of the hydraulic links between the boxes and b) an increase in the mean storage in each box. No change in the rainfall-evaporation time series was made.

The example presented here is for the case with the near Violet Canal diversion in place at a peak flow of 7,000 cfs in April and May (FWP condition). The model was run for a hydrologic record of 19 years with diurnal lunar tides. The no SLR case was run as a basis of comparison [BOC]. Figure 34 shows the change [SLR-BOC] in salinity in the computated domain.

Figure 34 shows that the inner boxes of Biloxi Marsh experience little change while the ocean side demonstrates a small increase in salinity. The box that showed the greatest increase was the intermediate marsh in the Caernarvon area. This may be due the width of the direct hydraulic link between the open water and the intermediate marsh. The model showed that the Upper Pontchartrain Estuary with SLR has a mean salinity slightly less than that for the case of zero sea level rise. Small changes in salinity due to SLR, as depicted by the UNO Mass Balance model, are probably due to the geometry of the system as modified by the condition if it is considered that the Biloxi Marsh will continue to act as a sill, cutting of the salt water flux into the Lake Borgne region. Concurrently, there is a larger reservoir of freshwater because of the increased hydraulic detention times that result from the 0.8 to 1 m increase in depth.

The UNO Mass Balance model has serious limitations when applying it to predict changes in salinity 100 years into the future. First of all, the model does not take into account the changes in the landform during this period. For example, the increase in the hydraulic conveyance due to erosion is not considered. Secondly, no changes in the hydrologic and meteorological inputs that could significantly impact the Upper Estuary have been considered. The possible increases in wind and wave energies that are often predicted to accompany climate change have been neglected.

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5.0 DETAILED MODELING OF THE CWA USING MIKE 21

5.1 INTRODUCTION

The UNO Mass Balance Model provided generalized hydrodynamic results in the CWA and coarse approximation of the effects of the diversion. To assess the effects and flow characteristics inside the CWA in more detail, the development of a detailed 2-dimensional hydrodynamic model was needed. The MIKE21-HD (MIKE21) model by the Danish Hydraulic Institute (DHI) is specifically for the purposes of investigating the hydrodynamic effect of the inflow of fresh water into the CWA for existing conditions and a restored scenario. The hydrodynamic module solves the shallow water equations, depth-averaged, over a 2-dimensional plane, which implies that the salinity is calculated as a depth averaged concentration. This approach is justified if vertical mixing occurs within short distances of the source and no significant stratification occurs, which is what is expected to happen with the introduction of the near Violet Canal diversion.

The impact of the flow through the diversion and how this affects the salinity and circulation in the channels are investigated using MIKE21. The model is used to examine two scenarios, a 1,000 cfs maintenance flow for the purpose of freshening the CWA in support of ecological enhancement of the area by transforming the 48 square miles into freshwater marsh and cypress swamp; and a 7,000 cfs diversion scenario that is the benchmark for freshening the Biloxi Marsh region.

A 1,000 cfs diversion from the Mississippi River was estimated by calculating the inflow from a typical tide through the two navigation gates into the CWA. This order of magnitude of flow generally outlined the magnitude that could be added to the CWA without vastly changing the hydraulic character of the gate. That flow magnitude was carried through and tested as part of the UNO mass balance modeling where FWP scenarios that included the 1,000 cfs diversion indicated that the CWA "box" was adequately freshened by this level of flow.

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5.2 OBJECTIVE

The results from the MIKE21 simulation runs address the following questions relating to the diversion of flows through the CWA.

1. What is the impact of the base flow through the diversion? How does it affect salinity in the CWA?
2. Does the proposed change in topography for the restored marsh impact the base flows, levels and discharges?
3. What happens during periods of peak diversion flows? Where does the water go? What is the flow split through the existing structures? Is a new outfall structure needed? How extensive is flooding (frequency, levels, etc) inside the CWA. Are new channels needed within the wetlands?
4. What are the impacts of localized flooding due to the new diversions?
5. What are the impacts of sea level rise on the marsh?

5.3 MODELING SCENARIOS

5.3.1 BASELINE - MB

This scenario (MB) reflects existing conditions by including the existing bathymetry, vegetation, control structures at Bayou Dupre and Bayou Bienvenue, and normal tidal flows through the inlets at Bayou Dupre and Bayou Bienvenue. The best available bathymetry was used for this scenario supplemented by specific information on channels and other features that were specifically collected for this effort. Calibration and validation of the model was completed for this scenario and is discussed further in Appendix G. The model domain includes the CWA and extends only as far into the MRGO to enable the flows within the gates to be established.

5.3.2 BASELINE WITH 1,000 cfs – MB1

The baseline condition with 1,000 cfs (MB1) is the baseline scenario with the existing bathymetry and the addition of a 1,000 cfs base flow from the Mississippi River through the new diversion channel. This scenario investigates the impacts of adding flows to the existing conditions in the CWA. This scenario introduces a new diversion channel that transfers flow into an open water areas of the CWA. This scenario investigates punching the new diversion channel through a new control structure in the Chalmette levee into the MRGO.

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For the MB1 run, the flow is split is as shown in Table 16.

Table 16. Location and Value of Flow for MB1

Location	Flow
New Diversion Channel	870 cfs
Existing Violet Siphon Diversion	100 cfs
WWTPs	30 cft

5.3.3 RESTORED WITH 1000 cfs – MR1

The restored condition with 1,000 cfs (MR1) is the baseline scenario with a restored bathymetry/topography and the addition of a 1,000 cfs base flow from the Mississippi River through the new diversion channel. This scenario investigates the impacts of increasing diversion flows with the restoration of the CWA. The restoration increased the bed levels in local areas and modifies the vegetation according the proposed plans developed by the USACE. The split in flow and configuration of channels and structures is identical to that of the MB1 run.

5.3.4 RESTORED WITH 7000 cfs – MR7

The restored condition with 7,000 cfs (MR7) uses the baseline scenario with the restored bathymetry/topography and the addition of a 7,000 cfs flow in April and May from the Mississippi River through a new diversion channel. This scenario includes a ramping up of flows from the baseline flow condition (1,000 cfs) to the peak over a timeframe of 14 days. It also includes a third control structure into the MRGO with controls to restrict outflow into the MRGO if required. The initial scenario will be established to divert approximately 6,000 cfs through the new control structure. This will force a similar amount of water to exit the Dupre and Bienvenue gates as in the maintenance case.

For the MR7 run, the flow into the CWA is as shown in Table 17.

Table 17. Location and Value of Flow for MR7

Location	Flow
New Diversion Channel	6870 cfs
Existing Violet Siphon Diversion	100 cfs
WWTPs	30 cft

5.3.5 SEA LEVEL RISE CONDITION – MR1S

The sea level rise condition (MR1S) is the baseline scenario with the restored bathymetry, the addition of a 1,000 cfs base flow from the Mississippi River through the new diversion channel, and

accounts for the impact of potential sea level rise on the stage and salinity within the CWA. A mid range Sea Level Rise value of 2.2ft (0.69m) was considered.

5.4 RESULTS

5.4.1 MODEL RUN MB

5.4.1.1 FLOW DISTRIBUTION

The discharges through the Bayou Dupre and Bayou Bienvenue control structures openings fluctuate with the tide as seen in Figure 38. The maximum discharge through the Bayou Bienvenue structure is much larger (about 1,500 to 3,000 cfs) than through the Bayou Dupre structure (300 -700 cfs).

The average discharges are low, about 9.3 cfs at Bayou Dupre and -19.2 cfs at Bayou Bienvenue. Positive discharge is defined as flowing into the MRGO. Negative discharge is defined as flowing into the CWA. Although the values appear to show a small net inflow into the CWA, this is within the tolerances of the model and is effectively balanced.

5.4.1.2 WATER LEVELS

The results indicate a small water level gradient from north to south exists with water levels higher near Bayou Bienvenue (maximum at 1 to 1.05 feet) than at Bayou Dupre (maximum at 0.95 to 1.0 feet).

Inside the CWA there is not much variability in water level, except the western part. In that area the maximum water levels are limited to 0.6 to 0.8 feet. These lower water levels are probably due to the effect that Paris Road has on blocking flow into and out of this area.

5.4.1.3 CURRENT VELOCITIES

The maximum current velocities are generally low. The maximum velocities in the channels are low ranging from approximately 0.3 ft/sec to 0.6 ft/s. In the small channels, as well as the open water areas, the current velocities drop to almost 0 ft/s.

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5.4.1.4 SALINITY

Figure 39 shows the average salinity during the simulation period for the baseline scenario. Within the central wetlands, the mean salinity is typically about 4 ppt. In the Violet Canal the mean salinity drops to 2 ppt in the most western part.

5.4.2 MODEL RUN MB1

5.4.2.1 FLOW DISTRIBUTION

Figure 40 shows the temporal variation and the average discharge distribution over the Bayou Dupre and Bayou Bienvenue control structures. The maximum discharge through Bayou Bienvenue is larger (1,800 to 3,400 cfs) than through the Bayou Dupre (300 to 1,000 cfs). On average about 385 cfs flows through the Bayou Dupre structure and 596 cfs through Bayou Bienvenue. The discharge distribution is roughly 40 % through the Bayou Dupre structure and 60 % through the Bayou Bienvenue structure.

The total outflow into MRGO is approximately 1,000 cfs. This flow is the same as the total discharge input on the model boundaries. This concludes that the water that flows into the CWA also flows out to the MRGO and that no storage occurs during the simulation period.

5.4.2.2 WATER LEVELS

At the end of the new diversion channel, the water level increases significantly. In the actual situation only during high waters is the area flooded. In the baseline scenario with 1,000 cfs, the water levels increase 0.3 to 1.1 feet and the tidal range is about 0.1 to 0.5 feet at that location.

At Paris Road and at the Bayou Bienvenue structure there is little change in water levels. However, at the Bayou Dupre structure, the water level increases by approximately 0.1 to 0.5 feet and, during high waters, the tidal range decreases by almost 0.3 feet.

The maximum water levels are found in the new diversion channel (above 1.2 feet) and in the adjacent wetlands (1 to 1.1 feet). The mean water level increases in the wetlands by approximately 0.6 feet.

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5.4.2.3 CURRENT VELOCITIES

The current velocity inside the new diversion channel is approximately 2.5 ft/s. At Paris Road no changes in velocities were observed. At the Bayou Dupre and Bayou Bienvenue structures there are some changes. At Bienvenue the maximum velocity increases by 0.1 ft/s during ebb flow (flow going towards the MRGO). Overall the velocities during ebb flow are larger than during flood flow (flow going towards the CWA). During flood flow the current velocities decrease by almost 0.2 – 0.3 ft/s at the Bienvenue structure. This can be explained by the extra freshwater outflow from the CWA into the MRGO which increases the ebb flow and decreases the flood flow. At the Bayou Dupre structure flood flow is not easily distinguished due to this freshwater outflow.

Maximum velocities observed in the new diversion channel are on the order of 1.5 ft/s to 2.5 ft/s. In the adjacent wetlands, the maximum velocities are approximately 0.5 ft/s.

5.4.2.4 SALINITY

The salinity in the new diversion channel is 0 ppt, whereas in the baseline scenario during high water peaks of 2 – 5 ppt were computed. At Paris Road the salinity fluctuates around 1 to 3 ppt as compared to 4 to 7 ppt in the baseline scenario.

At the Bayou Bienvenue structure, the salinity drops to 1 to 2 ppt during ebb flow (due to fresh water outflow), but does not change (with respect too the baseline situation) at flood flow. In the baseline scenario, values of 6 to 8 ppt were found.

At the Bayou Dupre structure, the salinity drops to almost 0 ppt. Only at high water inflow do the salinity levels increase locally, but do not reach the baseline values of 6 to 8 ppt.

Mean salinity can be seen in Figure 41. Compared to the baseline scenario, the wetland area in the center of the CWA almost becomes fresh with salinity values of 0 to 0.5 ppt. Also, the main channels in the systems become fresh with a mean salinity of 0.5 ppt. Near the Bayou Bienvenue structure, the mean salinity is around 4 – 5 ppt.

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5.4.3 MODEL RUN MR1

5.4.3.1 FLOW DISTRIBUTION

Figure 42 shows the discharge distribution over the Bayou Dupre and Bayou Bienvenue including the mean discharges. The restored scenario slightly modifies the discharge distribution over the two control structures with 377 cfs (38 %) flowing through the Bayou Dupre structure and 626 cfs (62 %) through the Bayou Bienvenue structure. In the baseline scenario, the ratio was 40 % - 60 %. The discharge through the opening to the MRGO from the new diversion is 0 cfs.

5.4.3.2 WATER LEVELS

The results of the water levels are similar to the MB1 scenario. At the end of the new diversion channel the water levels increase to 0.2 to 1.1 feet. The tidal range increases slightly by 0.1 to 0.6 feet.

At Paris Road the tidal range slightly increases by approximately 0.1 to 0.3 over the MB1 results to 0.5 to 1.6 feet. At the Bayou Bienvenue structure, there is little change in water levels. At the Bayou Dupre structure, the water level increases by approximately 0.1 to 0.5 feet and the tidal range decreases by almost 0.3 feet during high waters.

The maximum water levels are found in the new diversion channel (1.1 feet) and in the adjacent wetlands (1.1 feet). Compared to the MB1 scenario, a larger area is affected by the fresh water outflow, but the maximum level in the new channel is lowered by 0.1 feet. The maximum water level in the Violet Canal is 1.0 to 1.05 feet. The mean water level increases in the channel to 0.55 to 0.60 feet and in the wetlands to 0.40 to 0.60 feet.

The higher water levels in the northwestern part of the CWA can the explained by the wastewater outflow, which flows onto a piece of land at a higher elevation and roughness coefficient used in the model. This results in less flow to the neighboring channels and the water is stored in the area.

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5.4.3.3 CURRENT VELOCITIES

The mean velocity is about 0.3 to 0.35 ft/s at the end of the new diversion channel. Due to the restoration of the wetlands, the velocity also decreases at Paris Road to about half that seen in the baseline scenario.

At the Bayou Bienvenue structure, the same pattern is observed as in the MB1 scenario. The maximum velocity slightly increases by 0.1 ft/s during ebb flow and decreases by almost 0.2 to 0.3 ft/s during flood flow. The velocities during ebb flow are larger than during flood flow.

Compared to the MB1 scenario, the most significant changes are found in the new diversion channel. The maximum velocity is limited to approximately 0.3 ft/s, whereas in the MB1 scenario the maximum velocities were about 1.5 to 2.5 ft/s.

5.4.3.4 SALINITY

The water in the new diversion channel is completely fresh, 0 ppt. At Paris Road the salinity fluctuates around 1 to 2 ppt, which is slightly lower than in the MB1 scenario. At the Bayou Bienvenue structure, the salinity drops to 1 to 2 ppt during ebb flow (due to fresh water outflow), but does not change at flood flow. In the baseline scenario values of 6 to 8 ppt were found. At the Bayou Dupre structure, the salinity drops to almost 1 ppt. Only at high water does the salinity increase, but does not reach the value of the baseline scenario of around 6 to 8 ppt.

Figure 43 shows the monthly averaged salinity for the whole area. The overall picture is the same as in the MB1 scenario. The fresh water discharge from the Mississippi River causes a decrease in salinity, not only in the wetland area in the center of the CWA, but also in the main channels like the Violet canal.

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5.4.4 MODEL RUN MR7

5.4.4.1 FLOW DISTRIBUTION

Figure 44 shows the discharge distribution over the Bayou Dupre, Bayou Bienvenue and the new diversion for this scenario, as well as the mean discharges. Due to the opening of the new diversion channel 5,660 cfs flows through the new channel. Approximately 1,260 cfs flows through the other two openings (479 cfs through the Dupre structure and 781 through the Bienvenue structure).

Including a structure at the end of the new channel will potentially result in lower discharges through the channel and will increase the discharge through the Bayou Dupre and Bayou Bienvenue.

5.4.4.2 WATER LEVELS

Near Paris Road the water levels increase during high water by about 0.2 to 0.3 feet but decrease during low water (about 0.2 feet) when compared to the baseline scenario. At the Bayou Bienvenue structure a small increase of 0.1 feet was found. At the Bayou Dupre structure, the effect appears to be larger.

The maximum water levels are higher in the new diversion channel (above 1.2 feet) and in the adjacent wetlands (also above 1.2 feet). The extent of the area affected by the freshwater inflow is the greatest in this scenario. Mean water levels in the channel and the surrounding wetlands are above 0.7 feet.

Although the water levels in and near the new channel increase significantly, no flooding of the higher wetlands areas occur. This means that the water levels do not reach the level of the banks of the channel.

5.4.4.3 CURRENT VELOCITIES

The current velocity in the new channel fluctuates around 2.5 feet/second, which is almost the same as the velocity in the smaller channel in the MB1 scenario. Although there is a larger discharge, the channel also has larger dimensions which limit the velocities. The current velocities at the other

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locations show the same results as in the other scenarios with additional fresh water inflow. Inside the new diversion channel, the flow velocities increase to above 2.1 ft/s, which is significantly larger than in the other channels within the CWA.

5.4.4.4 SALINITY

The large fresh water diversion turns the CWA area almost completely becomes fresh. The mean salinity in all major channels and wetland areas is 1 ppt or below. At the MRGO a plume of fresher water is found at the outflow of the new diversion. Only at the main channel near the Bayou Bienvenue structure do higher salinity values penetrate slightly into the area.

At the point in the new channel and near the Bayou Dupre structure, the salinity drops to 0 ppt. At Paris Road the salinity drops to an equilibrium value of 0.2 to 0.3 ppt. At the Bayou Bienvenue structure, the salinity fluctuates with the tide and drops to 1 to 2 ppt during ebb flow (due to fresh water outflow). Salinity does not change noticeably at flood flow. Mean salinities are seen in Figure 45.

5.4.5 MODEL RUN MR1S

5.4.5.1 FLOW DISTRIBUTION

Figure 46 shows the discharge distribution over the Bayou Dupre, Bayou Bienvenue and the new diversion for this scenario, as well as the mean discharges.

Sea level rise affects the maximum discharges through the Bayou Dupre and Bayou Bienvenue structures significantly. Through the Dupre structure, the maximum discharge is to 3,000 to 5,000 cfs or about five times greater than the MR1 results of 600 to 1000 cfs. The maximum discharge through the Bienvenue structure is 5,000 to 9,000cfs when sea level rise is considered. Without the consideration of sea level rise, the maximum discharge is about three times less or 1,500 to 3,500 cfs in the MR1 scenario.

The mean discharges are on the same order as the MR1 scenario regarding no change in total fresh water outflow. However, the flow split over the Dupre and Bienvenue structures changes. When considering sea level rise, 680 cfs flows through Dupre (57.5 %) and 502 cfs flows through

Bienvenue (42.5 %). The ratio is 38 % Dupre and 62 % Bienvenue with the MR1 scenario. Sea level rise causes a shift in discharge distribution such that the majority of the discharge is through the Bayou Dupre structure.

The discharge through the opening in the new diversion channel is 0 cfs, as the channel is closed by a weir structure.

5.4.5.2 WATER LEVELS

The water levels increase significantly in this scenario. A large part of the CWA area is flooded due to the 3.7 feet increase of sea level. At all locations the water levels increase by almost 3.7 feet. The tidal range inside the CWA decreases. In the new diversion channel, the tidal range becomes 0.1 to 0.5 feet. In the MR1 scenario, the tidal range was 0.1 to 0.6 feet.

At Paris Road, the tidal range is completely dampened. It becomes 0.1 to 0.5, whereas it was 0.5 to 1.6 feet in the MR1. This is also the case at Bienvenue where the tidal range in this scenario is 0.2 to 0.8 feet. In the MR1 scenario it was 0.4 to 1.7 feet. The same holds for the Bayou Dupre outflow.

Peak water levels are found at 4.3 - 4.4 feet for all locations.

5.4.5.3 CURRENT VELOCITIES

The current velocities increase at both Bayou Dupre and Bayou Bienvenue. Peak velocities inside the Bienvenue structure are approximately 2.7 ft/s, at Dupre it is 2.1 ft/s. In the MR1 scenario this is respectively 1.5 ft/s and 0.5 ft/s. Inside the Dupre structure outflow the velocities increase significantly. This is also due to the increased discharge through that opening.

Velocities of 0.8 – 1.0 ft/s are found in the channels which run to Bayou Dupre and Bayou Bienvenue. In the remaining portions of the CWA, velocity does not exceed 0.5 ft/s.

5.4.5.4 SALINITY

Salinity is able to penetrate more easily into the CWA due to sea level rise.

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Figure 47 shows the mean salinity in the CWA. Near Bayou Dupre and Bayou Bienvenue, the mean salinity becomes 4 to 6 ppt. The central CWA is influenced by the fresh water inflow from the new diversion channel and the salinity is 0 to 2 ppt). In the area west of Paris Road, the water becomes saltier with a mean salinity of 3 to 4 ppt.

Near Paris Road the salinity fluctuates with the tide. At peak flood the salinity is 6 to 7 ppt and during ebb the salinity drops to 3 to 4 ppt.At both the Bayou Dupre and Bayou Bienvenue structures, the salinity during flood matches the values of the MB scenario at 6.5 to 8 ppt. During low tide the salinity drops at Bayou Dupre to 3 to 4 ppt and Bayou Bienvenue to 4 to 5 ppt.

The salinity inside the CWA fluctuates with the tide. Figures 48 and 49 show the salinity during high water and low water. During high water salinity values of above 7 ppt are found west of the Paris Road. During low water the maximum salinity is approximately 4 ppt. Also notice the number of white cells during low water (Figure 49), which indicates that these cells have become dry.

5.5 SUMMARY OF RESULTS

The following tables summarize the MIKE21 results for all scenarios.

Table 18. Discharge distribution summary.

	MB	MB1	MR1	MR7	MR1S
Discharge (cfs)					
Dupre	9.3	385	377	479	681
Bienvenue	-19.2	596	626	781	502
Diversion	-	-	-	5660	-
Discharge %:					
Dupre	-	39.2 %	37.6 %	3.9 %	57.5 %
Bienvenue	-	60.8 %	62.4 %	11.3 %	42.5 %
Diversion	-	-	-	81.8 %	-

Table 19. Water levels, current velocities and salinity results summary.

	MB	MB1	MR1	MR7	MR1S
Water levels (ft)					
Dupre	-0.55 – 0.9	-0.1 – 0.9	-0.1 – 0.9	-0.2 – 1.1	3.3 – 4.4
Bienvenue	-1.1 – 1	-1 – 1.1	-1 – 1	-1 – 1.1	3.1 – 4.4
Diversion	Dry – 0.9	0.1 – 1.1	-0.15 – 1.1	0.7 – 1.4	3.4 – 4.4
Paris Road	-0.9 – 0.9	-0.7 – 0.95	-1 – 1.1	-1 – 1.1	3.4 – 4.4
Currents (ft/s)					

Dupre	Max 0.5	Max 0.45	Max 0.45	Max 0.55	Max 2.2
Bienvenue	Max 1.4	Max 1.5	Max 1.5	Max 1.5	Max 2.8
Diversion	Max 0	Max 2.7	Max 0.35	Max 2.7	Max 0.3
Paris Road	Max 0.8	Max 0.8	Max 0.55	Max 0.55	Max 0.85
Salinity (ppt)					
Dupre	6 – 8	0 – 7	1 – 7	0	2 – 8
Bienvenue	6 – 8	0.5 – 8	0.5 – 8	0 - 8	3.5 – 8
Diversion	Peaks 2 – 5	0	0	0	0 – 0.5
Paris Road	4 – 7	1 – 3	1 – 2	0.3	3 – 7.5

5.6 *CONCLUSIONS*

The following provides responses to the five objectives formulated above relating to the MIKE21 modeling effort.

1. **What is the impact of the base flow through the diversion? How does it affect salinity in the CWA?**

The base flow (1,000 cfs) generally lowers salinity levels within the CWA but raises levels and flow rates to some degree. The increase in water levels is generally less than 0.25ft across the wetlands. See Figure 50.

2. **Does the proposed change in topography for the restored marsh impact the base flows, levels and discharges?**

The change in topography due to marsh and swamp recreation has little impact on the flows, levels and salinity values within the CWA, particularly with the increased channel designed to transfer the higher flows from the Mississippi River to the MRGO.

The water level increase is greatest to the west of Paris Road where the impact of the sewage treatment works discharge is felt together with the increase in marsh and wetland. See Figure 51.

3. **What happens during periods of peak diversion flows? Where does the water go? What is the flow split through the existing structures? Is a new outfall structure needed? How extensive is flooding (frequency, levels, etc) inside the CWA. Are new channels needed within the wetlands?**

Initial screening before developing the Mike21 model suggested that a third structure would be needed to prevent excessive flows in the existing channels and extensive flooding.

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Therefore during periods of peak flow the water was directed to the MRGO via the new channel. The flow split through the existing structure followed the same proportions as with the 1000cfs background flow. There is some increase in water levels with the 7,000cfs flow in the area immediately adjacent to the new and existing channels when the majority of the flow was passed directly to the MRGO. See Figure 52. Even at high tide the water levels are below the proposed marsh elevation and will generally in the channels.

Reducing the discharge through the new structure would force water to the Dupre and Bienvenue gates and raise water levels but would increase the velocity through these gates with the increased flows. A variety of scenarios can be generated with the MIKE 21 model to examine impacts to the system by modifying the discharge through the third opening. Water levels would need to be raised on the order of a foot to flood the swamp areas at high tides only. To totally inundate the system the water levels would need to be increased by over 2.5 feet to keep the system we during low tide.

4. What are the impacts of localized flooding due to the new diversions?

The new diversions have little influence on the water levels outside of the channels. For the 1000cfs scenario, in the central area the effect is less than 0.5ft, for the 7000cfs scenario, the effect is less than 1ft. Flow velocities increase within the channels.

5. What are the impacts of sea level rise on the marsh?

About 80% (rough estimate) of the area will flood during high waters for the SLR scenario. This will change drastically the hydrodynamic behavior for the whole area and will likely indirectly induce morphological changes to the area. More areas will experience larger salinity levels.

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6 DETAILED MODELING – FVCOM

The study objectives of the FVCOM modeling effort where to:

1. Better understand and quantify high frequency variability of the salinity field in open water using a numerical model, and
2. To understand the transient salinity field during a transition from low to high hypothetical flow magnitude and distribution between sites at Bayou Bienvenue and Bayou Dupre in the Central Wetlands Area (CWA).

The Finite Volume Coastal Ocean Model (FVCOM) was selected for this study because it is a prognostic, unstructured-grid, finite-volume, free-surface, 3-D primitive equation coastal ocean circulation model developed by CHEN ET AL., (2003). The model consists of momentum, continuity, temperature, salinity, and density equations and is closed physically and mathematically using turbulence closure sub-models. FVCOM is solved numerically by a second-order accurate, discrete flux calculation in the integral form of the governing equations over an unstructured triangular grid. This approach combines the best features of finite-element methods (grid flexibility) and finite-difference methods (numerical efficiency and code simplicity) and provides a much better numerical representation of both local and global momentum, mass, salt, heat, and tracer conservation.

For a more detailed description of model development and other capabilities the reader is directed to CHEN ET AL. (2003). The model was used in three-dimensional mode due to the episodic and seasonal stratification that the estuary experiences (ABADIE AND POIRRIER, 2000; GEORGIOU, 2002; LI ET AL., 2008) and to capture additional stratification potentially induced near freshwater input sources. Finally, the freely available source code for FVCOM does not readily offer salinity transport under the two-dimensional mode without code modifications.

A detailed report including the background, model inputs, calibration, verification, and results can be found in Appendix H.

6.1 SIMULATION MATRIX

The following simulation matrix was considered to address the objectives of this study. First, two simulations, one with wind and one without wind were conducted to compare the high frequency variability in the open water areas of the basin (Lake Borgne and Mississippi Sound in the vicinity of the Biloxi marshes). These simulations were conducted with realistic winds, did not include a closure

at the connection between Lake Borgne and the MRGO, and without a new diversion. The second set of simulations, were performed using reconstructed winds, an no closure at the connection between Lake Borgne and the MRGO, and a 7,000 cfs diversion. Lastly, a longer simulation of 45 days was performed to investigate the time-dependent evolution of the salinity field resulting from a diversion of 1,000 cfs (split at 50/50 between Bayou Bienvenue and Bayou Dupre) to 7,000 cfs (with a split of 10/90 respectively). During this simulation, the MRGO closure structures were includes and connection between MRGO and Lake Borgne was closed. Table 20 shows a summary of the FVCOM simulations performed.

Table 20. Case name and initial and boundary conditions for each simulation performed.

Case name	simulation time (days)	MRGO closure @ La Loutre	MRGO closure @ Bienvenue	Gap @ MRGO and Lake Borgne	Wind stress	Diversion flow
OPT1	5	yes	No	open	Yes, realistic	no
OPT2	5	yes	No	open	No wind	no
OPT3	5	yes	yes	open	Yes, realistic	yes
OPT5	10	yes	yes	closed	Yes, constructed	yes/7,000
OPT6	10	yes	yes	closed	No wind	yes/7,000
OPT7	45	yes	yes	closed	No wind	yes/(1,000-7,000)
OPTF	45	yes	yes	closed	No wind	yes/(1,000-7,000)

6.2 MODEL RESULTS AND DISCUSSION

6.2.1 SIMULATED SALINITY DISTRIBUTION UNDER WIND STRESS

Initially the model was used to investigate the short term high frequency variability in open water (in Lake Borgne and the Mississippi Sound). This was accomplished using realistic wind fields. Two simulations were performed, one with wind and one without wind. Figure 50 shows the depth-integrated distribution of salinity averaged over the 5 day simulation period for the case with wind. Figure 51 shows the same solution without wind. By comparison these two simulations look very similar. An initial conclusion would be to infer that there are negligible changes between the two simulations. When comparing the variance or dispersion in the system, however, by means of calculating the standard deviation of each node (in time) and plotting the results in two dimensions, a different pattern emerges. Figure 52 shows that wind induced circulation within Lake Pontchartrain will cause variation in the salinity near the coastlines where currents are larger. Similarly, higher variability, although small, is observed in the Mississippi Sound near Half Moon Island , at the location of interaction of the Pearl River freshwater plume in that vicinity, and within the Biloxi Marsh area.

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In an attempt to investigate intermittent or transient conditions, the closure of the MRGO at Bayou Bienvenue was not included in simulations opt1 and opt2. Another simulation was performed (opt3), which was similar to opt1 (i.e., with frontal actual winds, and other boundary conditions), but included the closure of the MRGO near Bienvenue gates. Figure 54 shows that the average depth-integrated salinity for this simulation looks identical to that of opt1. Moreover, the distribution of the standard deviation for scenario opt3, shown in Figure 55, very closely compares to that of the simulation without the closure. Some obvious and expected differences exist between the two simulations and are largely in the MRGO itself, and as a result additional rather small difference in Breton Sound, and within the Biloxi Marshes. The differences however outside the navigation complex are rather small.

A second set of simulations with and without winds were conducted with constructed and more persistent west and northwest winds during the post frontal phase of the storm. This wind pattern would have the tendency to push or force water seaward of the Basin, and in the process help spread and disperse the salinity. As a subsequent result, salinity targets in Mississippi Sound, Biloxi Marshes and other areas of interest could be met faster than anticipated. These simulations, namely opt5 and opt6, have the same initial and boundary conditions as opt1 through opt3, with the exception of the winds which are constructed. An additional difference between these simulations is that there is a diversion at Violet with a constant flow of 7,000 cfs throughout the simulation. These simulations are slightly longer and last for 10 days. Comparatively, Figures 56 and 57 look again very similar, with average depth-integrated salinities fairly similar through the computational domain. When inspected closely, there is a small wind induced variability that shows in the averaged salinity field. This can be seen in Lake Pontchartrain, where the wind induced currents produce more mixing and hence more variability near the coast. Additional differences include small deviations in the Mississippi and Chandeleur sounds; however, when looking at the average salinity field these differences do not appear to be large.

When we examine the variance by looking at the standard deviation in time for every node (Figure 58 and 59), the variability due to wind stress is great. Up-estuary, in Lake Pontchartrain, there appears to be very small variability due to tidal forcing alone (Figure 59). Moreover, in the Mississippi Sound standard deviations are of the order of 3 ppt, and are largely in areas where tidal range is high. In the area of interest, and within the Biloxi Marsh area, there is evident change, although most of this change can de attributed to freshwater input at Violet, which naturally flows seaward through Bayou

La Loutre. When we compare Figure 58 to Figure 59 (frontal constructed wind stress), we notice that there is additional variability explained only by high frequency response to wind stress. Wind induced currents within Lake Pontchartrain cause, as previously observed, salinity to respond along the coastline. Furthermore, within the Biloxi Marsh area, the standard deviations appear to rise to 6 ppt or more. Similarly, Figure 15 also shows that open water bodies such as Breton, Chandeleur, and Mississippi Sound respond to wind stress rapidly. The areas, when compared to no wind simulations, showed double the variability in the presence of wind stress.

6.2.2 TRANSIENT SALINITY RESPONSE TO A DIVERSION

The second objective of the study was to investigate the transient response of the salinity field from 1,000 cfs to 7,000 cfs during spring, with three closures implemented: (1) MRGO at Bayou La Loutre; (2) MRGO at Bayou Bienvenue; and (3) the connection between Lake Borgne and the MRGO. Two simulations were conducted. The first included the same boundary condition for salinity as in all previous simulations. The second included an open boundary obtained and forced from the UNO Mass Balance model simulations during spring. No wind was considered for this longer 45 day simulation.

Figure 60 and Figure 61 show the average depth-integrated distribution of salinity over the period of the simulation (45 days). The average value for every node (in time) is computed based on the hourly output. It is evident from the average salinity field that up-estuary (such as within Lake Pontchartrain) lower salinities in Breton Sound as a result of diversions in the Caernarvon Basin have little or no impact. This is the same for Lake Borgne and for parts of Biloxi Marsh and the Mississippi Sound. Average salinities however start to be considerably different within Breton Sound, the Chandeleur Sound, and the eastern part of Mississippi Sound. Within the Biloxi Marsh however, the change is rather small, perhaps due to the short simulation period.

Looking at Figures 62 and 63, on the other hand, large differences in the standard deviation can be seen, which can explain areas that are more dynamic. For instance, the small and rather insignificant change up-estuary as a result of a diversion in Breton sound directly can be explained easily by direct comparison of Figures 62 and 63, where we see that these two images are very similar. Similarly, the freshwater diversion at Violet (through Bayou Dupre) is unaffected by additional input into Breton Sound. This is explained by the similar standard deviation within the Biloxi Marsh area between Figures 62 and 63. Finally, as expected and as shown to some extend in the average salinity field from Figures 60 and 61, the eastern portion of the Mississippi Sound, Breton Sound, Chandeleur

Sound, and the eastern portion of the Biloxi Marsh can be affected by lower salinity in Breton Sound as shown in Figure 63.

Most of this change and variability can be explained by either tidally induced circulation or freshwater induced circulation as a result of diversions. The large variation seen in Figure 63 can also be explained relative to the initial condition. Since the initial condition is somewhat saltier than the future and imposed boundary condition, this part of the domain responds to the forcing by rapidly mixing the forced salinity inside the domain. This may be somewhat unrealistic, and will be largely a function of the initial condition. However, the model predicts that this area will respond to a lower salinity in Breton sound, and would in fact, given sufficient time, reach within the area of interest.

Time-series results of the evolution of the salinity field during the longer simulation of 45 days, starting from 1,000 cfs and going through 7,000 cfs are shown in sequential plots in Appendix H as Figure 22 through Figure 27. The figures show the evolution of the salinity field as a function of time. Figure 64, on the other hand, shows the evolution of an instantaneous surface salinity at two locations, one in the MRGO channel upstream of Bayou La Loutre, and the other in the center of the Biloxi Marsh. The figure shows that initially, when the diversion in the system is of the order of 1,000 cfs using a 50/50 split between Bayou Bienvenue and Bayou Dupre, the instantaneous salinity at both locations is dominated by tidal induced circulation. Both signals respond to tidal forcing by showing diurnal oscillations. The salinity within the MRGO (green solid line), although small, shows some response to diurnal oscillation. This is so small and cannot be seen with the salinity time-series but is seen in the gradient term. The gradient term responds to diurnal oscillations during the low diversion flow but they are rather negligible. However, once the flow starts to rise to 7,000 cfs there is a rather rapid response. The absence of the diurnal oscillation in this term also deems this area now dominated by river-water rather than tides.

In the Biloxi Marsh, despite the obvious decline in instantaneous salinity as a result of the diversion (black trend line, Figure 64), there seems to be a slightly different response. There is an obvious phase or lag in the system. For example, during the early part of the simulation, the area responds only to tidal forcing, as the local average or trend is a horizontal line up to hour 240 and above. By this time, the diversion has already been operating and is fully ramped to 7,000 cfs, but has not produced a measurable change in this area. Subsequently, and coinciding with a neap cycle, the system responds with a sudden reduction in the salinity, verifying the small dominance of river-

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induced circulation in the absence of strong tidal induced flow. By this time, the diversion flow is fully developed and the declining trend in the salinity appears to be linear in time.

6.3 Conclusions to FVCOM Modeling

The model simulations showed that wind stress resulting from frontal weather can produce high frequency variability in the Pontchartrain Basin within just three days of the application of the wind. In 5 day simulations with half a day of spin up time, the model predicted double the variability. The model also predicted that when only using the averaged salinity field, one would tend to underestimate this variability and high frequency response, primarily because the response is rapid. The model also predicted that in longer simulations, the high frequency response would tend to be smaller due to the natural tendency of wind to cancel this response. This is largely a function of wind climate, basin geometry, duration and intensity of each event, and the relaxation scale of the basin.

Finally, a longer simulation of a diversion from 1,000 cfs to 7,000 cfs showed that the MRGO-La Loutre pathway is largely dominated by tidal currents when the flow is near the low 1,000 cfs magnitude. When the flow is near 7,000 cfs, the basin in this area is dominated by the diversion flow. Furthermore, the model predicted a lag time of the order 4-7 days for this flow to reach the Biloxi Marsh area through this direct route. It is emphasized that for this simulation, the Lake Borgne connection to the MRGO was closed, which further ensures that the conveyance is maximum through this pathway. The model also showed that the Biloxi Marsh area is largely tidally influenced when the flow at Violet is near 1,000 cfs. Although tidal flows continue to cause strong diurnal oscillations in the salinity, when the flow reaches 7,000 cfs and dynamic equilibrium after the lag period, there is a steady decline in the salinity.

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7 HYDRAULIC DESIGN

In terms of channel configuration, diversions into and through the CWA will require four components. First, there must be a structure through the Mississippi River Levee; second, a sediment basin will trap particulates from the water; third, there must be sufficient conveyance through the CWA; and fourth, exit structures in the Chalmette levee must be capable of passing the diversion to the MRGO within acceptable impacts to the CWA and infrastructure. These four components will be addressed from the downstream end of the system.

There are numerous ways to route the design flow of 7,000 cfs through the Central Wetlands. As a first approximation, a straight channel with confined flow was investigated using the following assumptions: culverts at the river would be 500 feet in length (i.e. long enough so that the Mississippi River levee as well as the river road and the railroad could pass over them); the culverts under the back levee would be 200 feet in length (i.e. long enough to allow them to pass under the levee); and the length of the direct channel between the two culverts is 21,300 feet. It is further assumed that the velocity head (energy) through the culverts is lost due to using a settling basin downstream of the culvert at the Mississippi River and again with the deep water of the MRGO downstream of the second set of culverts. The channel size was manipulated so as to maintain a velocity of two feet per second with a 7,000 cfs flow. The channel design is a twelve foot deep channel with one on three side slopes; a 250 foot bottom width; and an almost imperceptible gradient of one foot over the 21,300 foot length of the channel. The five culverts at the River are sized as 13 feet by 13 feet gated concrete box culverts. The culverts at the east end of the channel will be five 13 feet by 12 feet gated culverts. The head loss through the MRGO culvert would be 1.58 feet. This configuration will satisfy the need to route the proposed amount of water through the Central Wetlands. The channel dredging for this proposed configuration will involve the removal of an estimated 2.7 million cubic yards of material.

The design configuration given above uses a relatively small width channel so that the velocity for the 7,000 cfs would be slightly greater than 2 feet per second, thus reducing the potential for sedimentation. The calculations also assume a sedimentation basin at the head of the channel (i.e. the velocity head through the River culverts is entirely lost in the sedimentation basin). This channel could be constructed so that the 12 foot depth is below the marsh elevation and thus dikes confining the flow would not be required. By slightly throttling the exit culverts the water elevation in the channel could be adjusted to where it overflowed onto the marsh.

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For the background flow of 1,000 cfs, the gates at the back would be adjusted (or totally closed) so that flow is forced to go overland toward the Bayou Dupre and Bayou Bienvenue structures. If all of the flow were forced to exit through these two structures there would be an average seaward flow of slightly less than one foot per second in the structures (56 feet wide by 10 foot deep).

Appendix I provides additional design including an analysis of the design configuration considering sea level rise. Figures and cross-sections of the proposed design are provided in Appendix I. The future CWA restoration efforts are considered.

4.7 DESIGN CONSIDERATIONS

The following points should be considered during design of the channel and structures. Appendix J provides details on the potential impact to navigation and shoaling.

- The diversion goal will need to be met under significantly different Mississippi River head conditions.
- Diverting a flow greater than 10,000 cfs can be accomplished via a direct hydraulic connection (canal w/ berms and gate) to Lake Borgne. If the flow is less than 10,000 cfs, the connection is into the CWA.
- Freshwater could be diverted into CWA from the channel if needed for ecological restoration of the CWA.
- Depending upon the duration of the diversion, flooding may be detrimental to the marsh plant communities. If this is the case, this leaves two equally unappealing alternatives – either 1) segregate the channel flow from the marsh with side dikes so as to prevent flooding of the marsh or 2) tolerate flooding the surrounding marsh.
- Waters discharging from the Bayou Bienvenue structure will be released north of the IHNC structure and may affect the lock.
- Head of a few feet will likely be necessary to increase the water elevation of the marsh to flood levels which would therefore increase the volume of water discharging through the Bayou Bienvenue and Dupre control structures. Thus the velocities through these structures could be quite high. Consideration must be given to navigation through the structures.
- Higher flows may require an additional opening in the MRGO levee which would decrease velocities through the Bayou Bienvenue and Dupre control structures. This would also decrease the detention time for water in the marsh and reduce period of inundation.

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7.2 OPERATIONAL ISSUES

By demonstrating that the Chatry salinity targets can be met or exceeded through diversions, an operations scheme can be developed to control discharges. Operationally, two indicators can be evaluated: 1) the gaged river flows in the Pearl River; and 2) a real time salinity gage strategically placed in the Biloxi Marsh area.

Operational schemes can be developed because of the good relationship found between the Pearl River flow and salinity variability in the Biloxi Marsh. Caution must be exercised however, because the relationship as defined in this report will change now that the MRGO structure is in place and other structures coming on line.

A salinity gage should be placed in the Biloxi Marsh to capture real time salinity, temperature, water levels, and potentially nutrients and sediment concentrations. This gage should be continually monitored and compared to the Pearl River gage. Estimates can be made over the same time frame for each.

Other potential issues that need to be investigated include:

- Localized flooding
- Drastic changes in volume of water on a month to month time frame
- Ecological impacts (good or bad)
- Effect of location on shoaling and navigation
- Impact on surge with increase of water levels in marsh and adaptive management schemes ahead of surge producing weather events to lessen the impact from surge

7.3 OPERATIONAL GUIDELINES

This numerical modeling effort did not include any management of the diversion flows. For the large scale diversions, there were continuous flows at a set rate; for the smaller diversions, where the gap between Lake Borgne and the MRGO was closed, there were diversions of 5,000 cfs, 7,000 cfs, or 10,000 cfs in the months of April and May and a maintenance diversion of 1,000 cfs in the other months to maintain a freshwater system in the CWA. These diversion flows were not adjusted in terms of the measured salinity in the target area or the anticipated freshening from flood events in the Pearl River. The modeled diversion flows were not managed because of the time frame and scope limitations of the modeling effort.

In reality, the diversion flows will be managed. When measured salinities are at or below target levels, the flow amounts can reduced accordingly; when salinities are high, the diversion flow will be increased. Likewise, diversion flows can be adjusted in terms of flood flows in the Pearl River. When a major meteorological system produces copious rainfall in the Pearl basin, the diversion flow may need to be adjusted, particularly if the salinities are near the target levels.

An analysis of the monthly average Pearl River flow and the average monthly salinity showed a statistical relationship with a moderate correlation. An equation was obtained that gives the average monthly salinity in terms of the average monthly average Pearl River flow for the present month and the two preceding months with an R^2 value of 69 percent. This relationship was determined using the data for the 19 year period from 1990 through 2008 in which there was data for salinities in the target area. The same analysis will be done using modeled salinities for the future without project conditions. This new analysis is necessary because the previous analysis was conducted with the conditions prior to the MRGO closure at the La Loutre ridge and the IHNC barriers at the GIWW, Bayou Bienvenue and Seabrook.

Although there is a good correlation ($R^2 = 0.69$) between the Pearl River flow and salinities in the target area, there are other important contributors to the salinities as well. One of these factors is wind, which can be a dominant mechanism for inducing circulation patterns in shallow water. Generally, the winds in the southern Louisiana estuaries are calm to light. However, there are occasional strong winds from two important sources; these are tropical storms in the summer and fall and the passage of frontal systems in the winter.

Tropical storms, when approaching the region from the south, have very strong winds from the east and south east. These winds push the shelf waters inland, causing a significant rise in water level commonly called storm surge. These winds will push the more saline water further into the estuary, increasing the local salinity. However, this increase in salinity is temporary because as soon as the storm subsides the water will flow out and salinity levels will return to roughly the same values as before the storm.

The effects of a major frontal passage, on the other hand, can last longer. The north wind preceding a frontal passage causes a set down on the continental shelf and this allows for gravity drainage of the estuary. The waters of the marshes flow out into the Gulf where there is mixing with the saltier Gulf

waters. When the north winds subside, it is the more saline water of the Gulf that returns into the estuary. This increase in salinity is for a longer duration and will last until local rainfall and runoff reduce the salinity.

The influence of wind on salinity is mentioned here because it is a mechanism that could explain some of the variability not captured in the correlation between the Pearl River flows and the salinities in the Biloxi Marsh. It is also mentioned because when the diversion study is implemented, there may be real-time gages in the target area that will reflect the increases of salinity resulting from a frontal passage. The manager of the diversion could accordingly increase diversion flows to counter this affect. Similarly, when the diversion has been flowing and a system produces large rainfall in the Pearl basin, the operator may reduce diversions if salinities are already near target levels.

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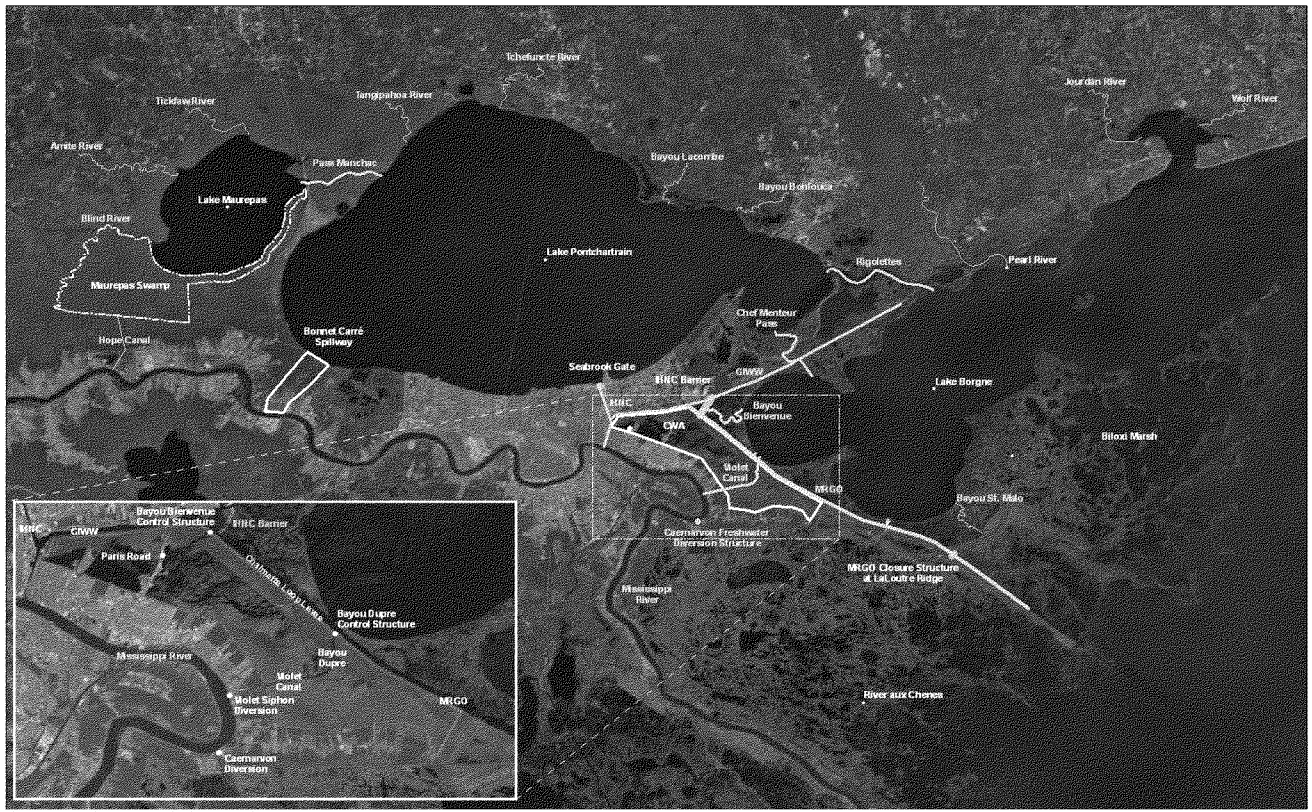


Figure 1. Map of study area with important features.

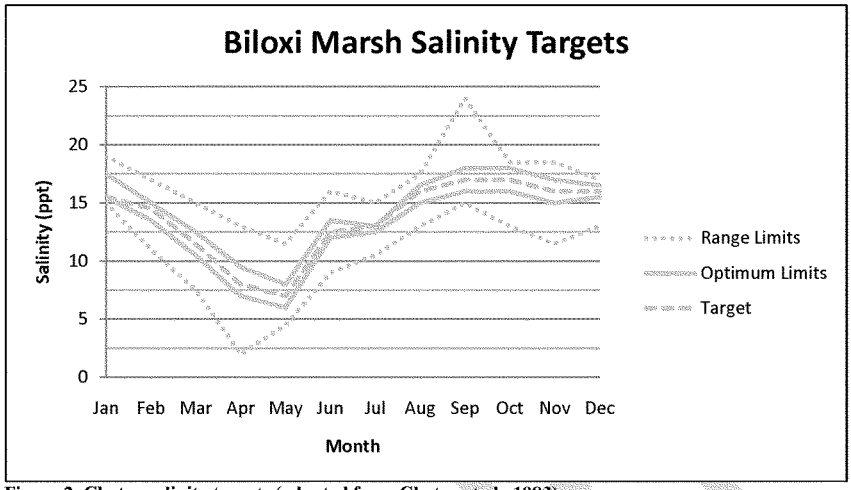


Figure 2. Chatry salinity targets (adapted from Chatry et al., 1983).

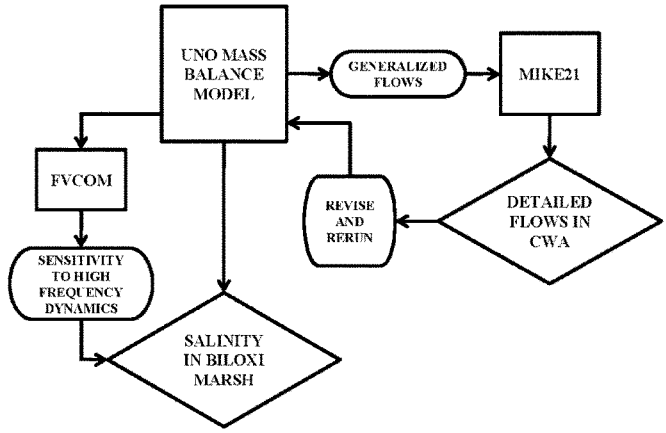


Figure 3. Methodology flowchart.

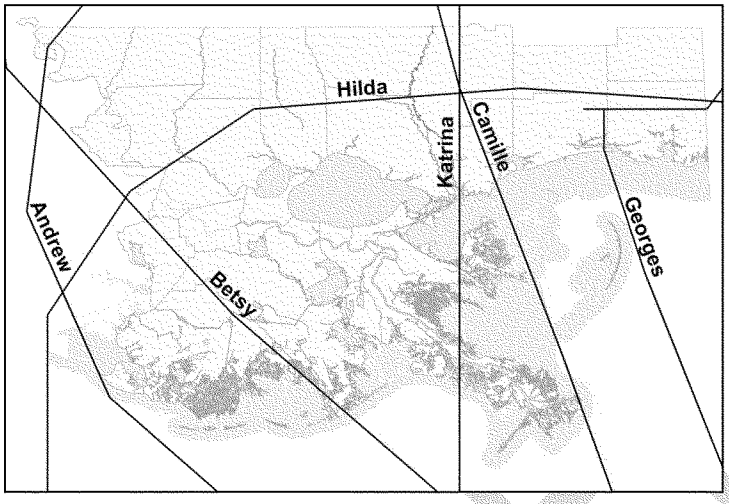


Figure 4. Major hurricane tracks.

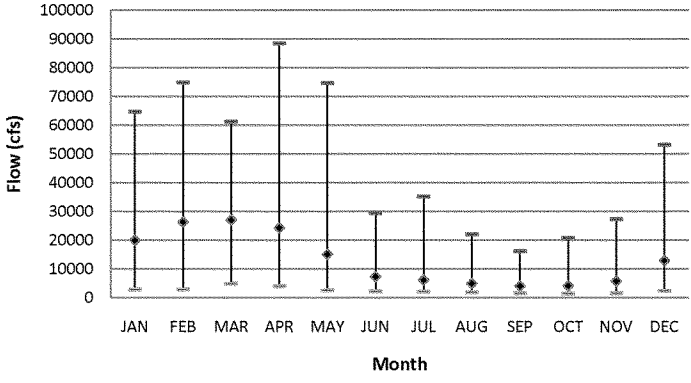


Figure 5. Monthly flow values (average, minimum, and maximum) for the Pearl River data set.

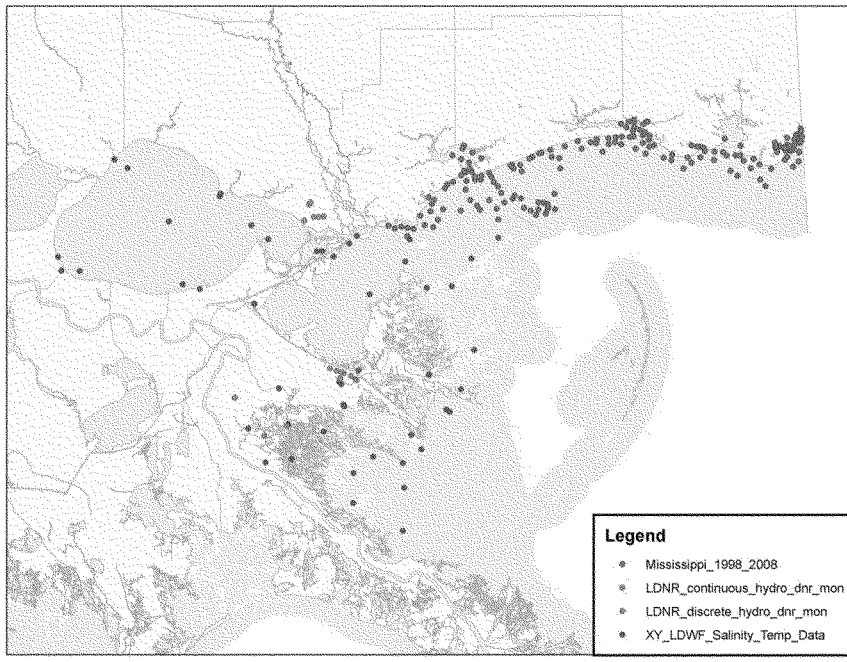


Figure 6. Water quality data collection points in study area.

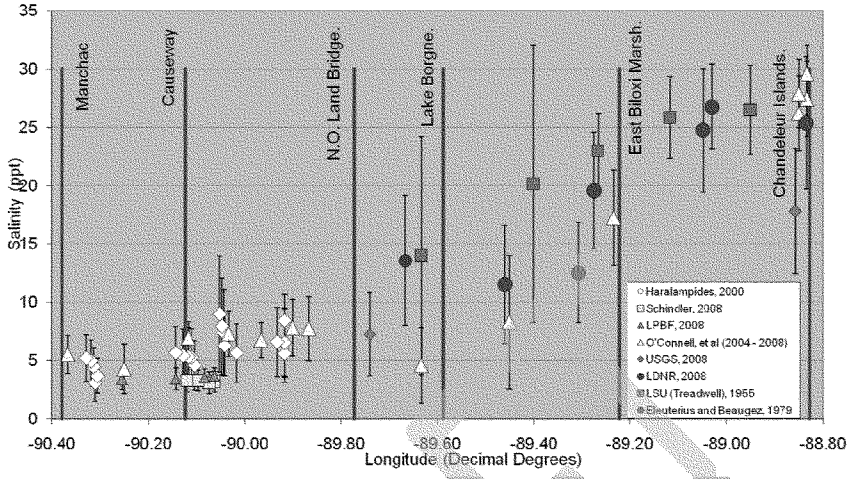


Figure 7. Salinity level and location of historic data.

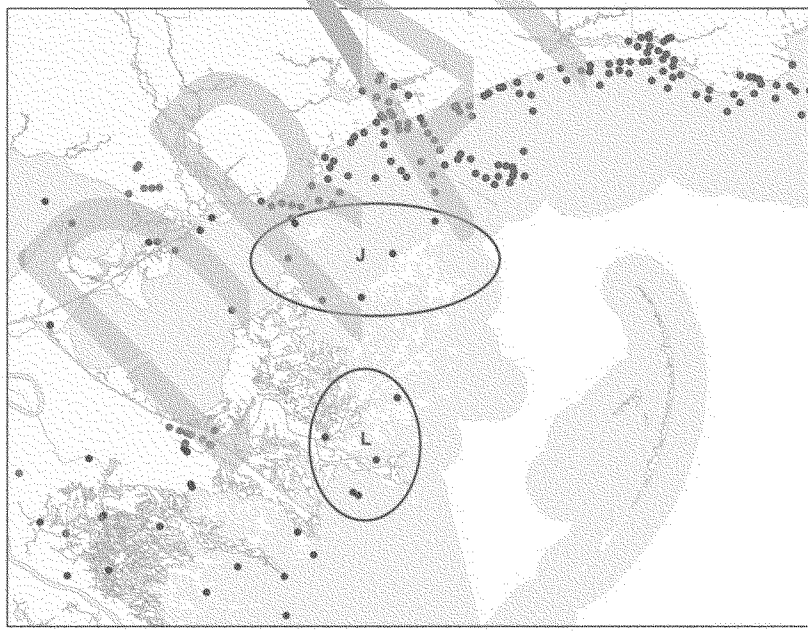


Figure 8. Location of J and L data points.

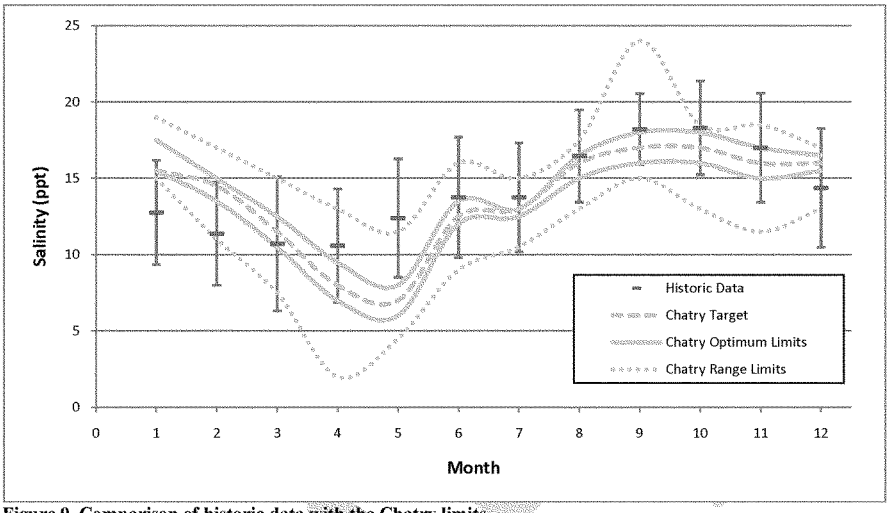


Figure 9. Comparison of historic data with the Chatry limits.

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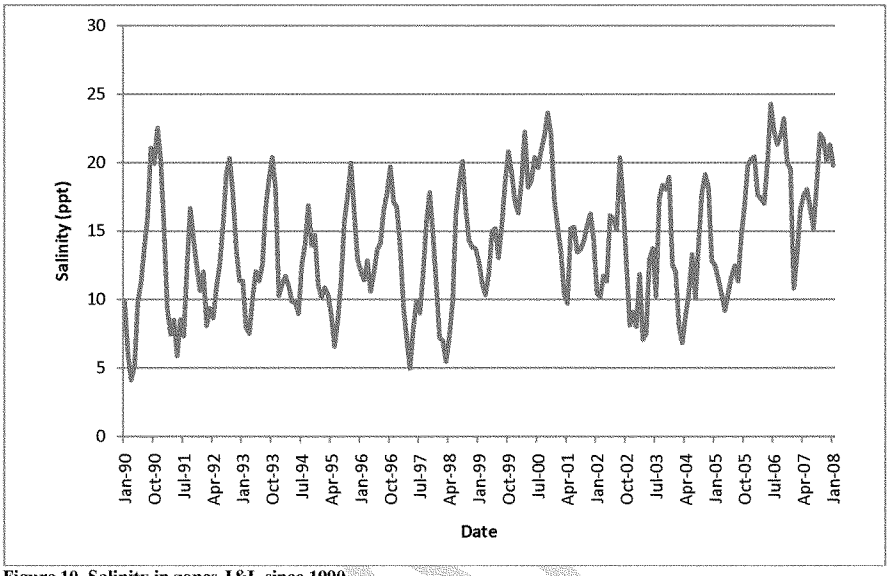


Figure 10. Salinity in zones J&L since 1990.

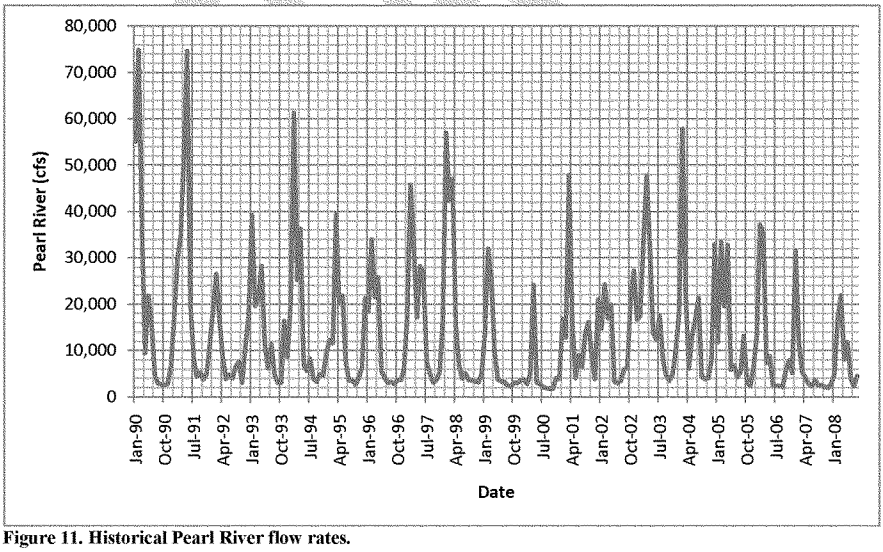


Figure 11. Historical Pearl River flow rates.

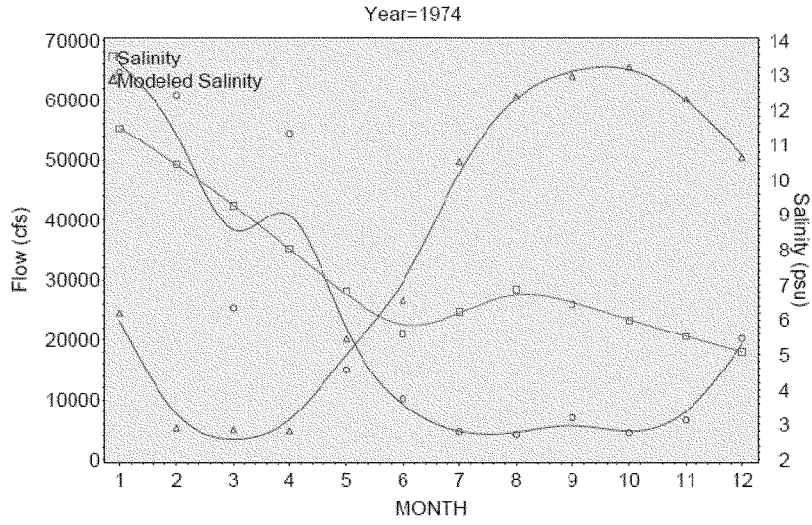


Figure 12. Example of poorly correlated data (1974).

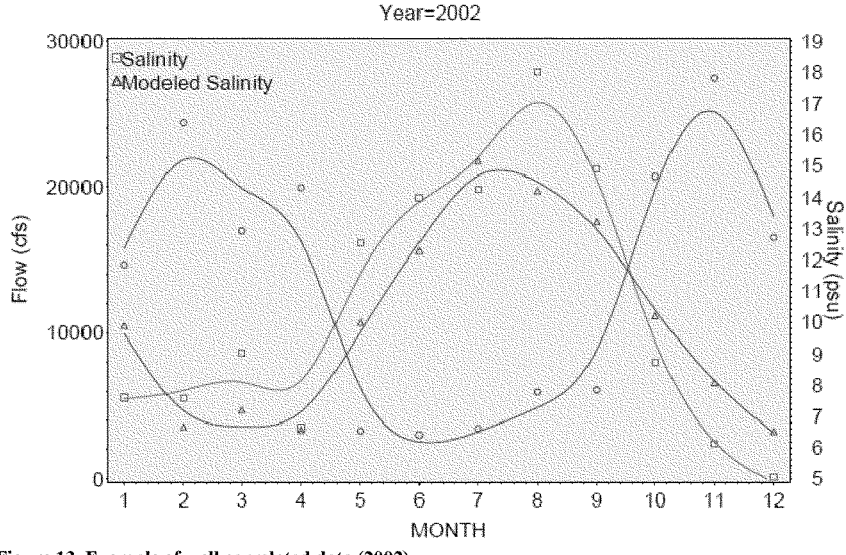


Figure 13. Example of well correlated data (2002).

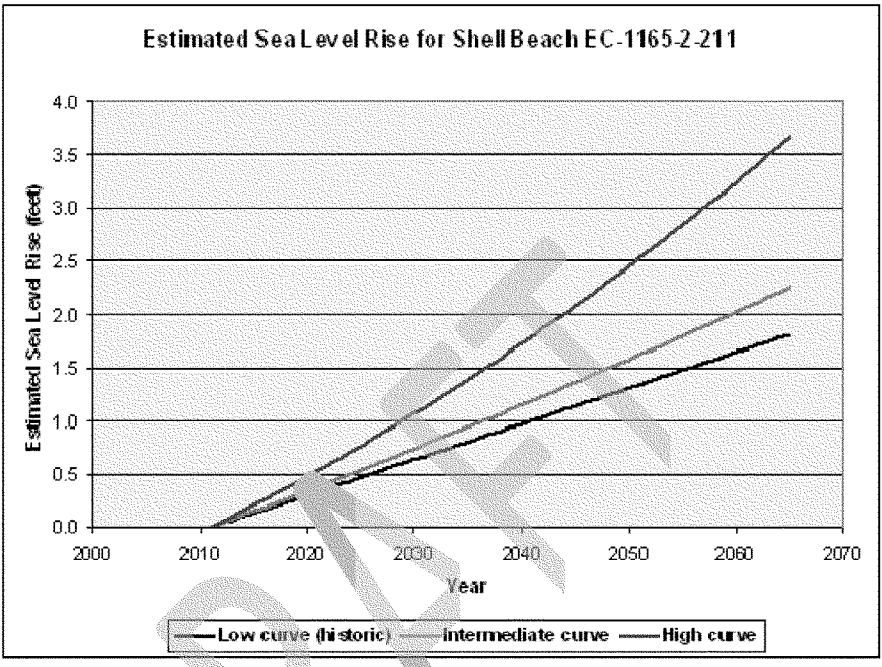


Figure 14. Estimated sea level rise curves.

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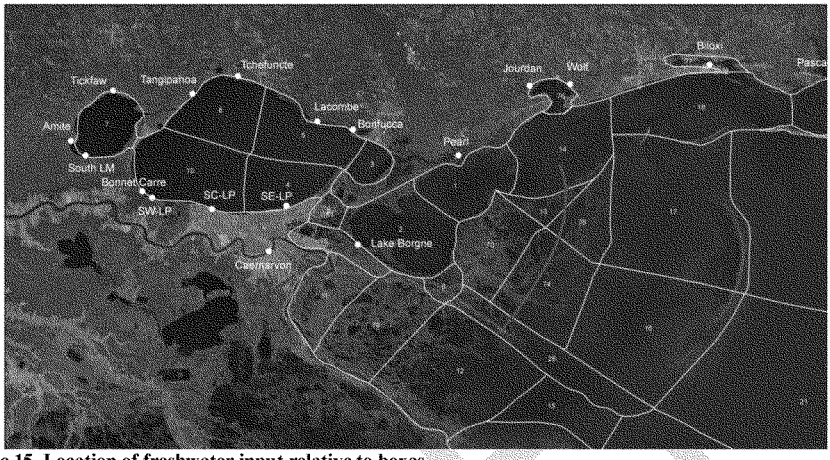


Figure 15. Location of freshwater input relative to boxes.

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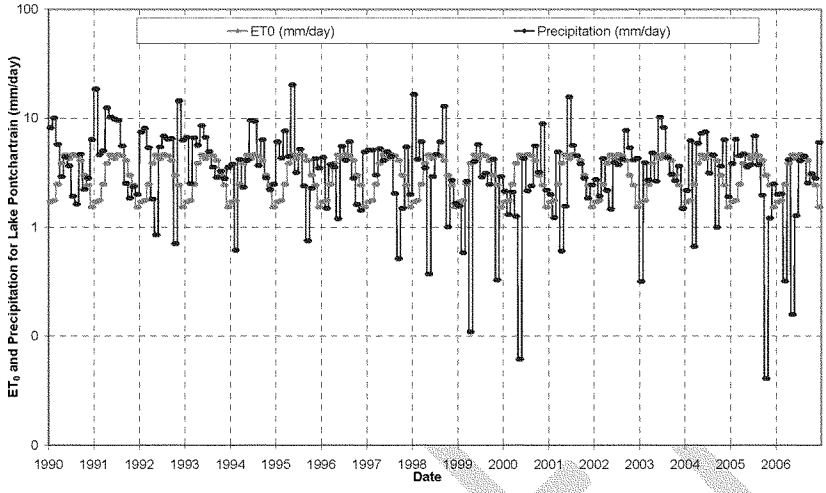


Figure 16. Daily precipitation and evapotranspiration rates input into the UNO Mass Balance model.

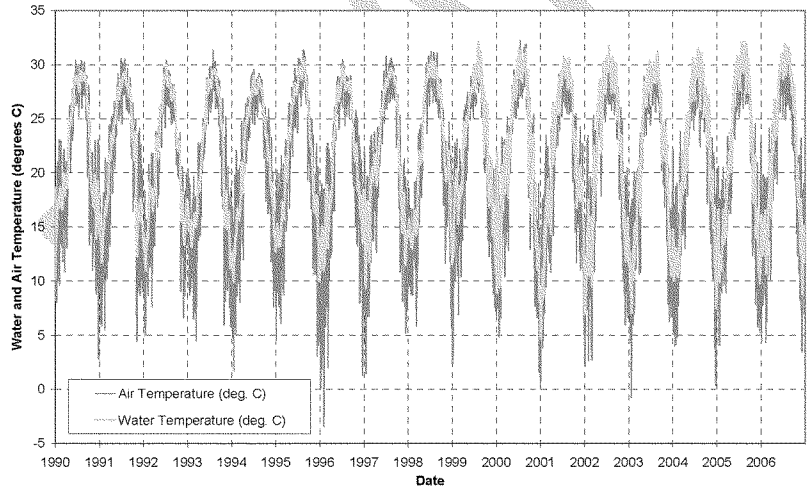


Figure 17. Daily air and water temperatures input into the UNO Mass Balance model.

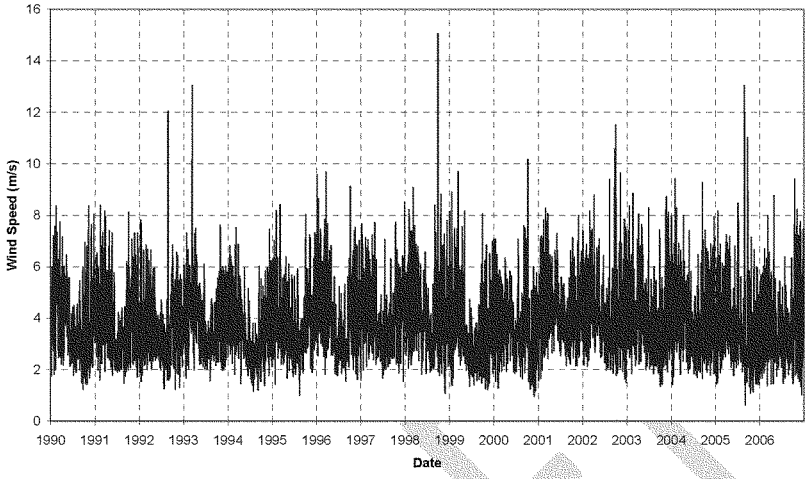


Figure 18. Average daily wind speed input into the UNO Mass Balance model.

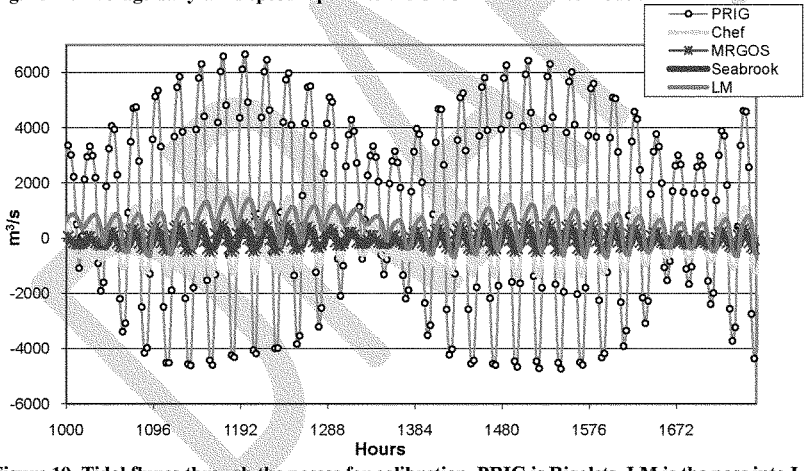


Figure 19. Tidal fluxes through the passes for calibration. PRIG is Rigolets, LM is the pass into Lake Maurepas.

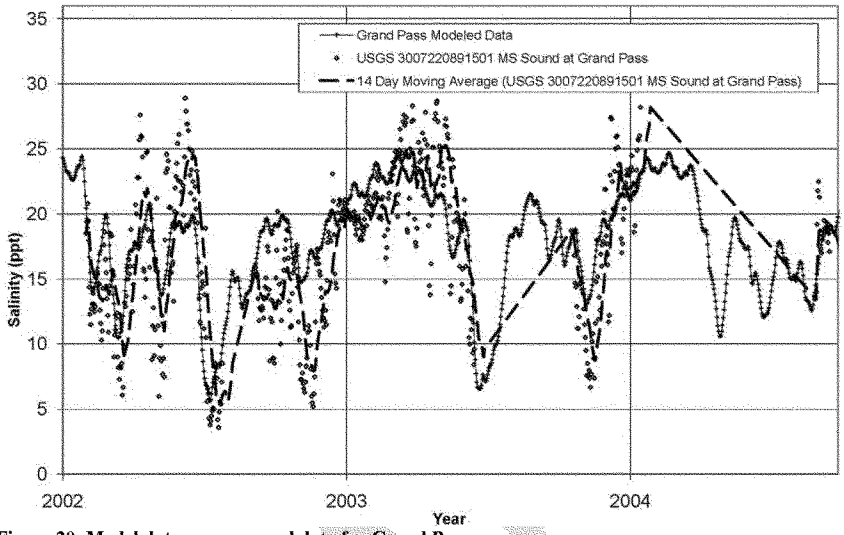


Figure 20. Model data vs. measured data for Grand Pass.

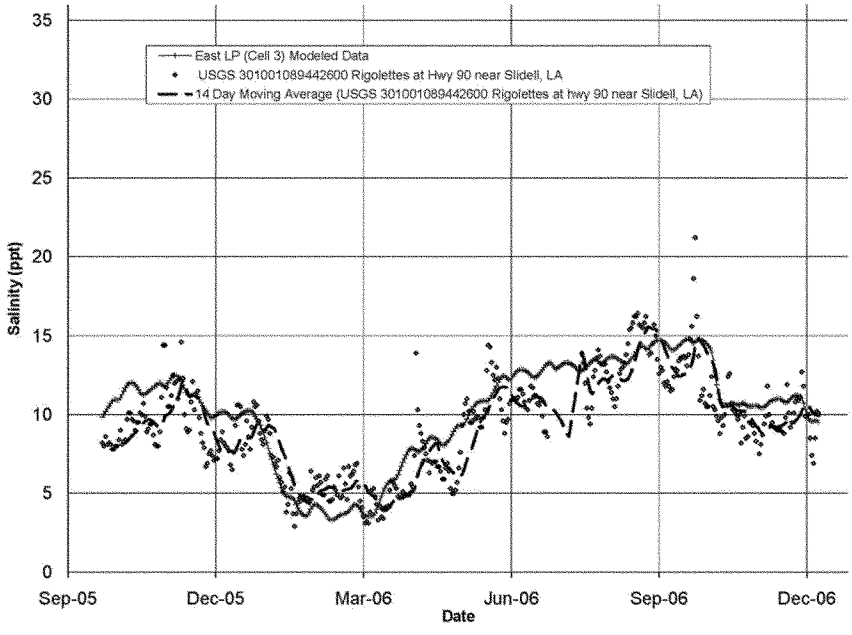


Figure 21. Modeled data vs. measured data at the Rigolets.

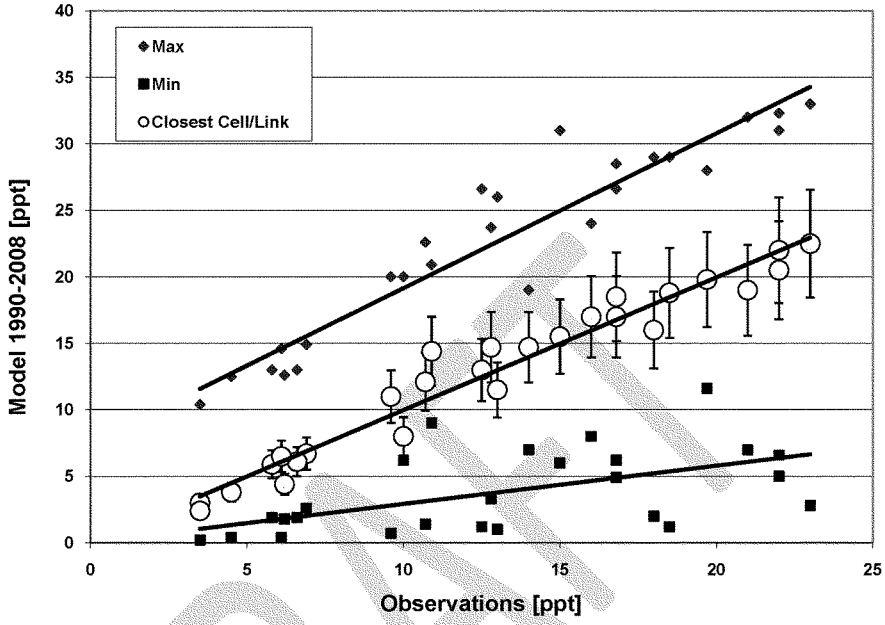


Figure 22. Plot of modeled data versus observed data.

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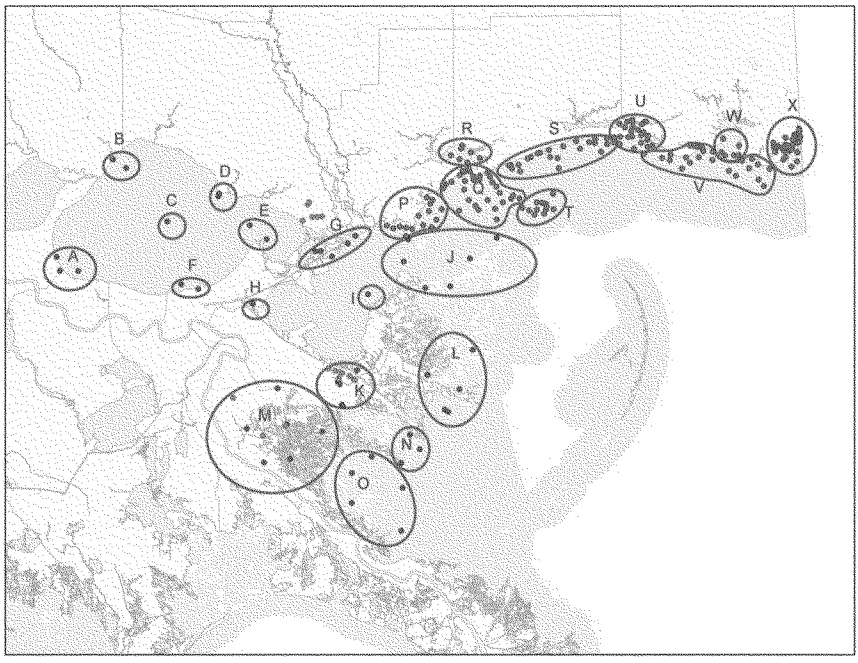


Figure 23. Locations of salinity data.

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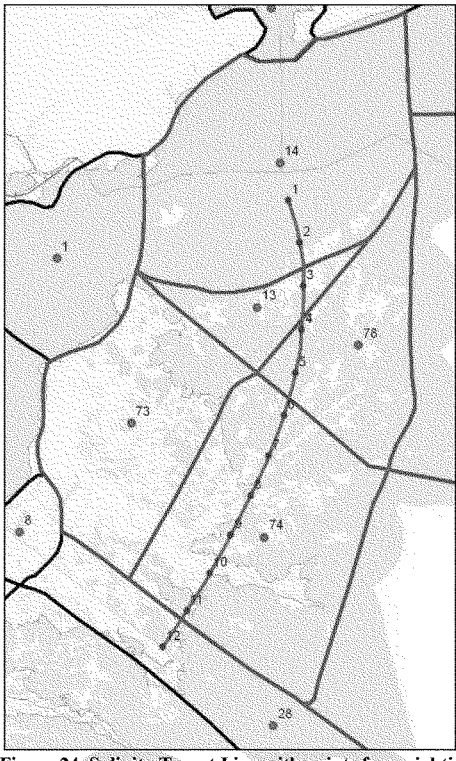


Figure 24. Salinity Target Line with points for weighting salinity.

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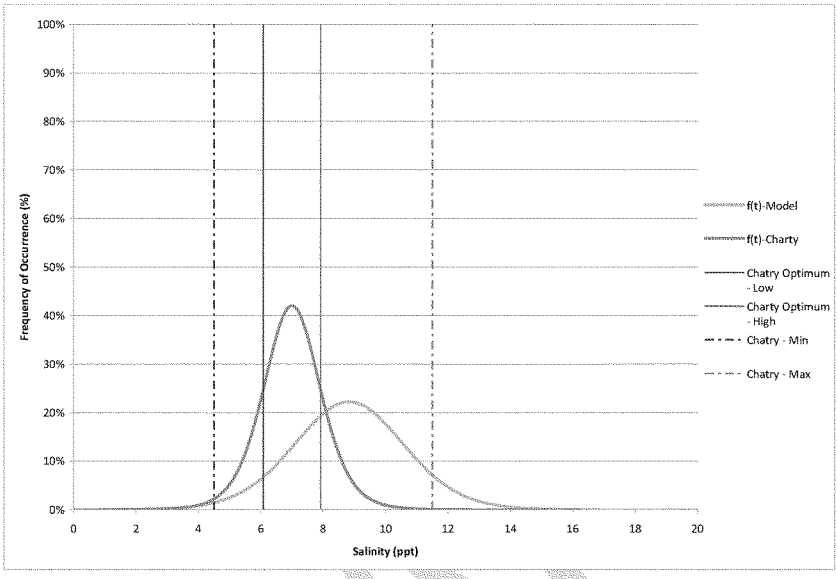


Figure 25. Salinity targets and modeled results plotted as t-distributed about the mean values.

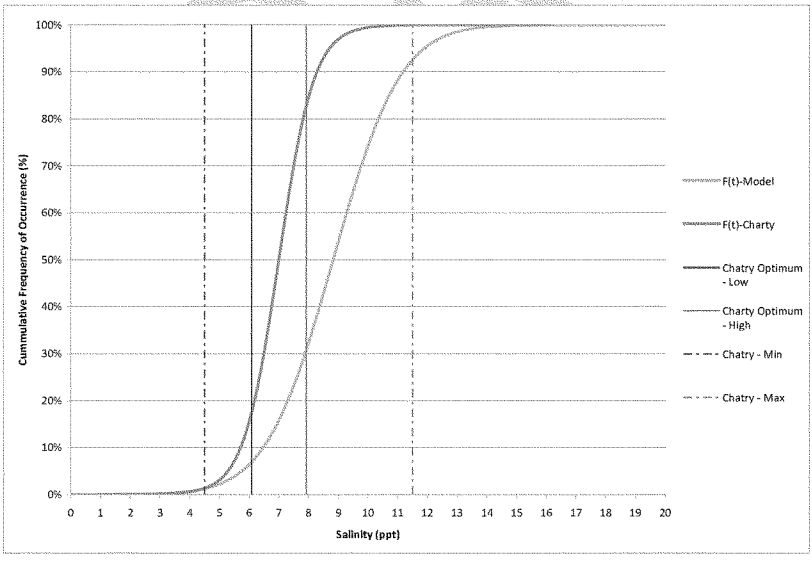


Figure 26. Salinity targets and modeled results taken as cumulative frequencies about the mean values.

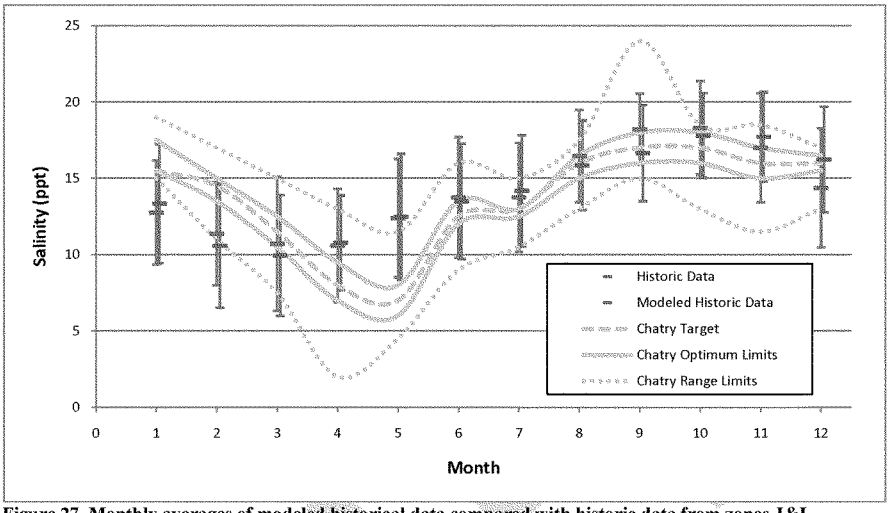


Figure 27. Monthly averages of modeled historical data compared with historic data from zones J&L.

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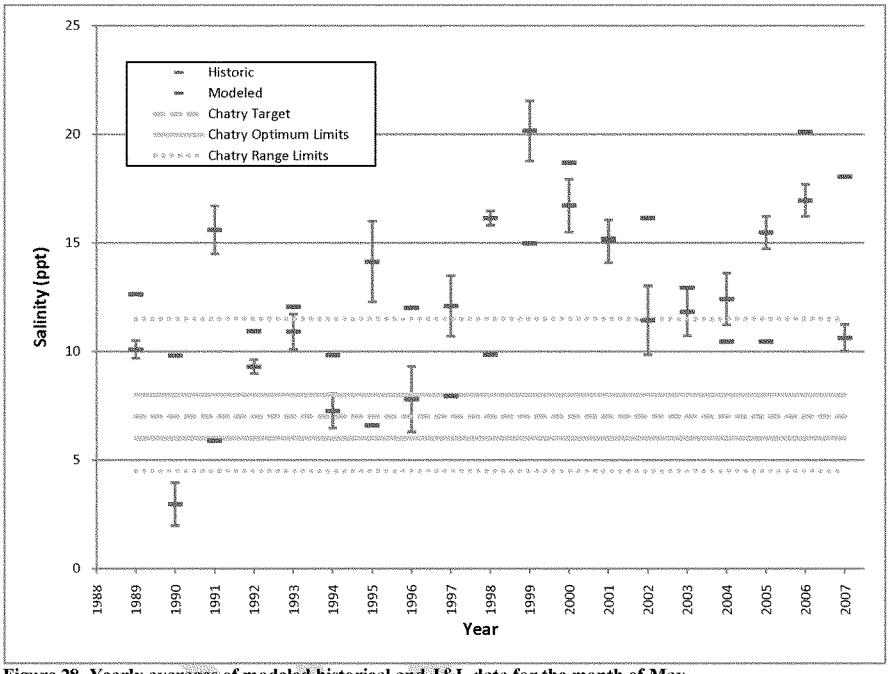


Figure 28. Yearly averages of modeled historical and J&L data for the month of May.

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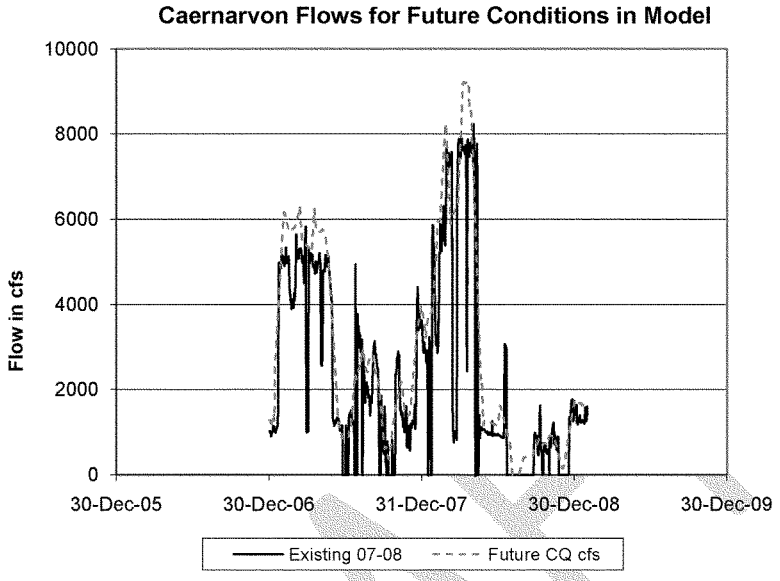


Figure 29. Caernarvon input flows based on increase of 2007 – 2008 pulsing.

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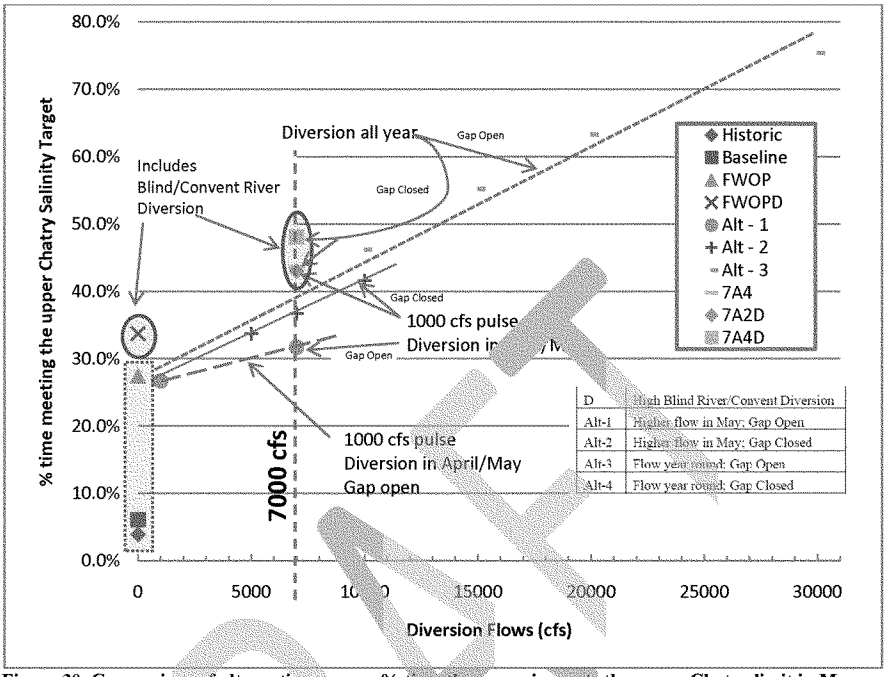


Figure 30. Comparison of alternatives versus % time the scenario meets the upper Chatry limit in Mays.

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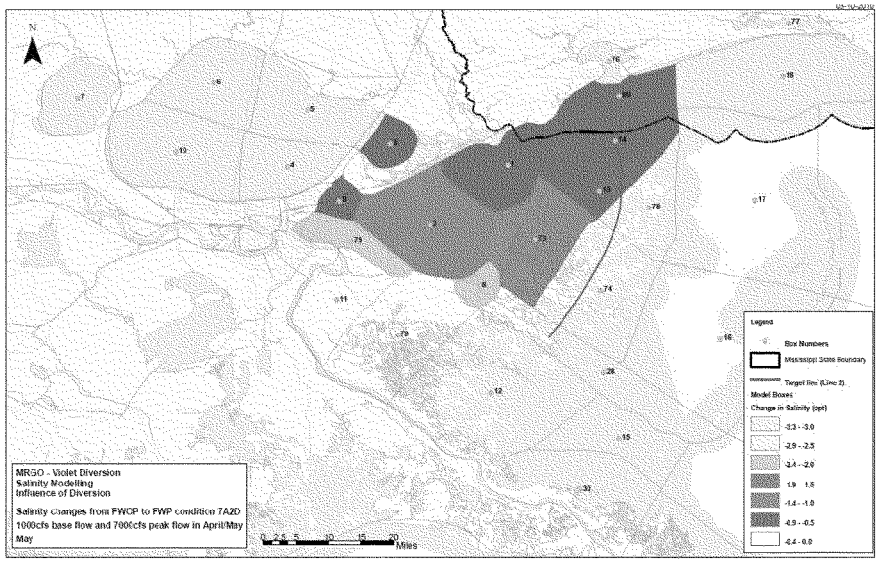


Figure 31. Area of influence of the 7A2D diversion in May (7,000 cfs in April and May with the Gap at Lake Borgne closed and the 4500 cfs diversion at Blind/Convent River).

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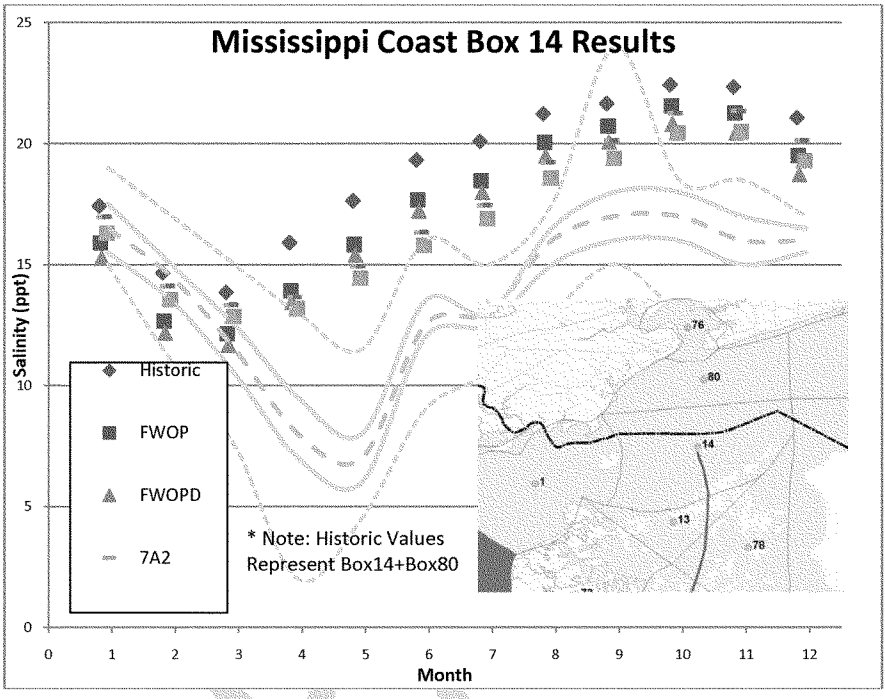


Figure 32. Changes in salinity along the Mississippi Coastal related to diversions near Violet Canal with an inset of the location of box 80 and box 14.

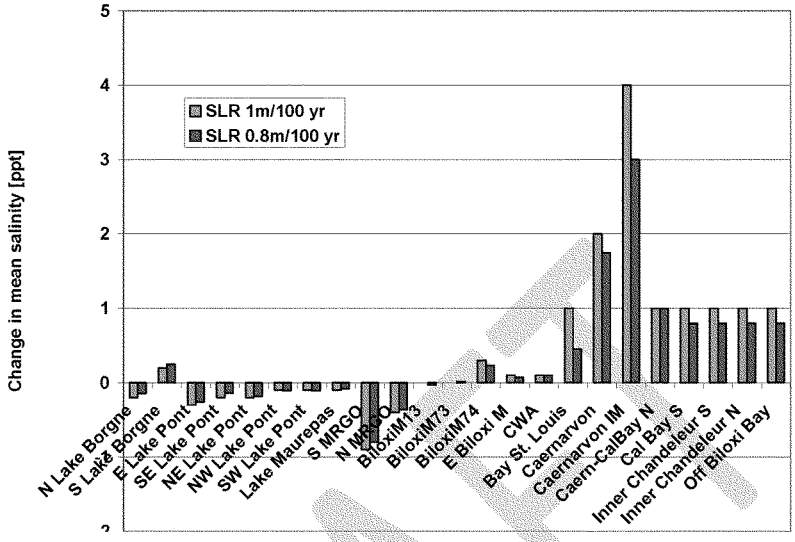


Figure 33. Preliminary Salinity Responses to Relative Sea Level Rise.

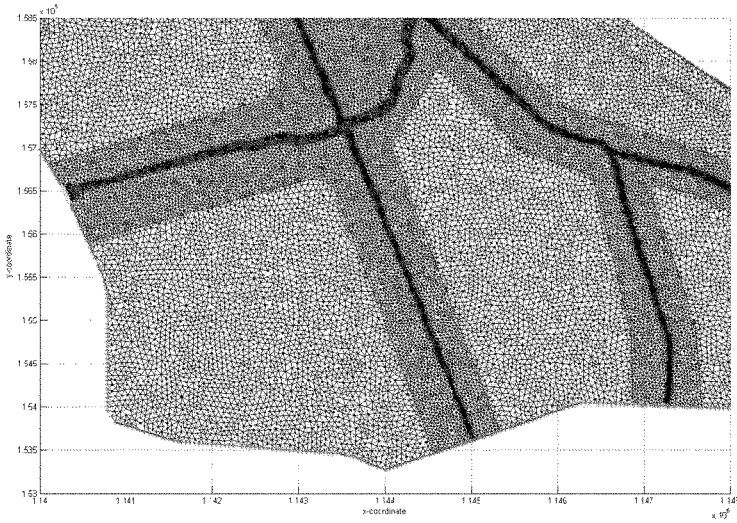


Figure 34. Part of the computational grid and the open boundaries.

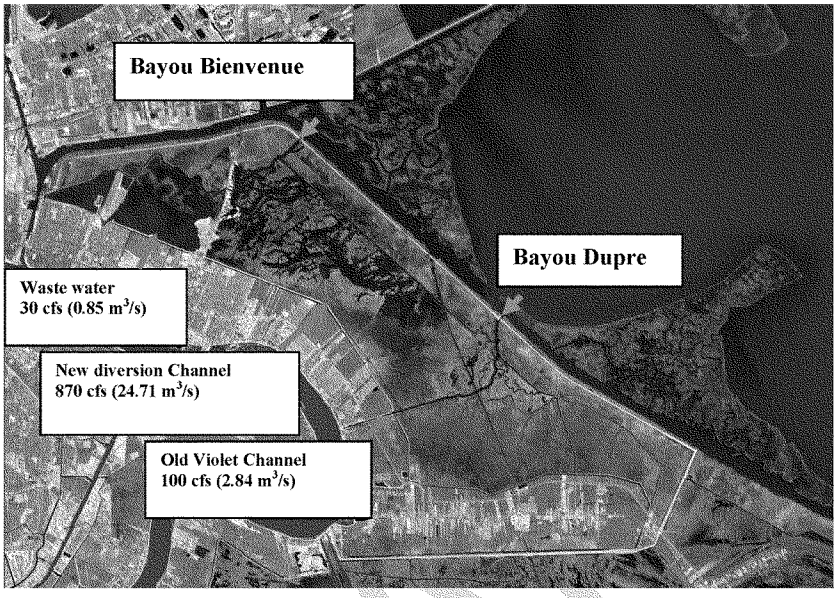


Figure 35. Flow stations in the CWA for this baseline scenario with 1000 cfs.

DRAFT

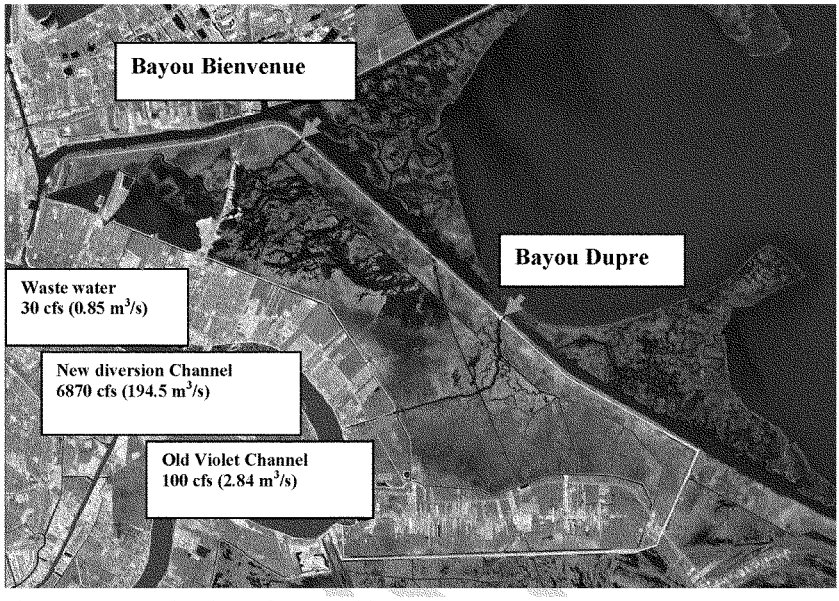


Figure 36. Flow stations in the CWA condition MR7.

DRAFT

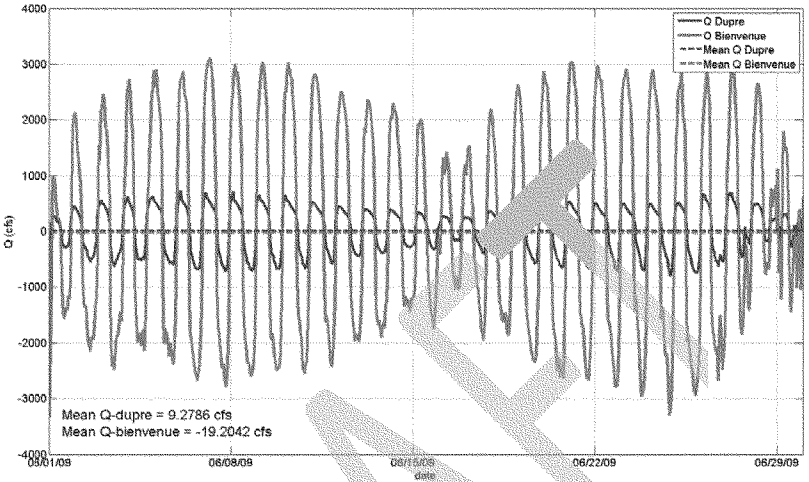


Figure 37. Discharge distribution over the Bayou Dupre and Bayou Bienvenue for the MB scenario.

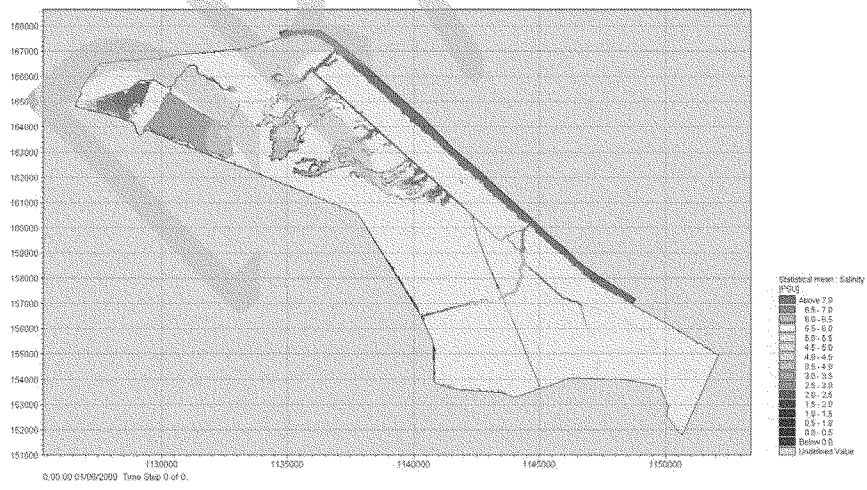


Figure 38. Average salinity in the MB scenario.

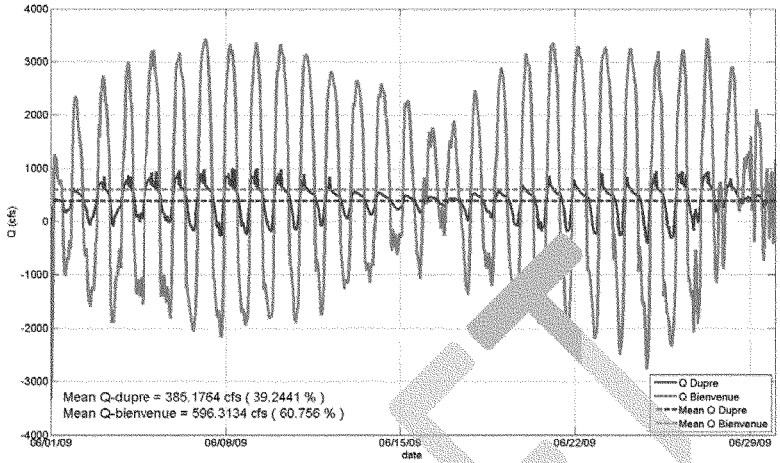


Figure 39. Discharge (cfs) through the Bayou Dupre (Blue) and Bayou Bienvenue (red) gates for the MB1 scenario. Dashed line indicates the mean discharge through the gates.

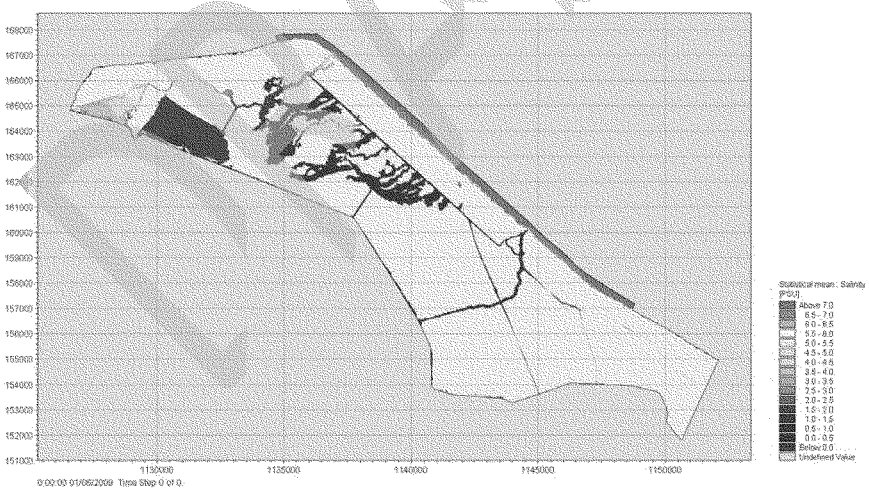


Figure 40. Mean salinity during June 2009 for the MB1 scenario.

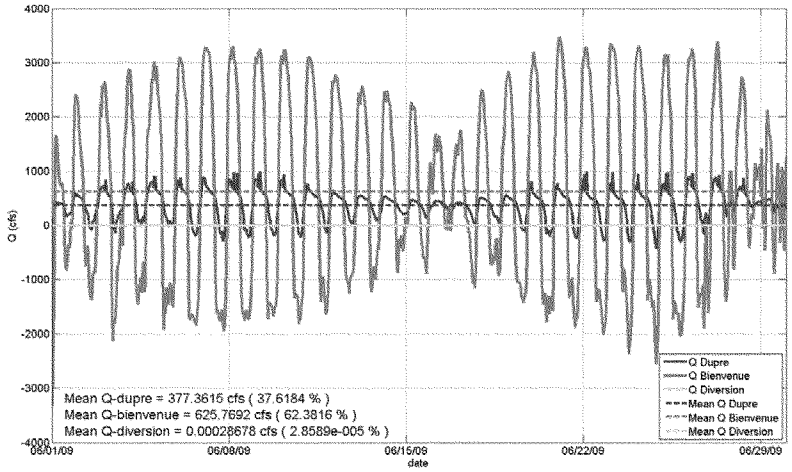


Figure 41. Discharge (cfs) through the Bayou Dupre (Blue), Bayou Bienvenue (red) and new Diversion (green) gates for the MR1 scenario. Dashed line indicate the mean discharge through the gates.

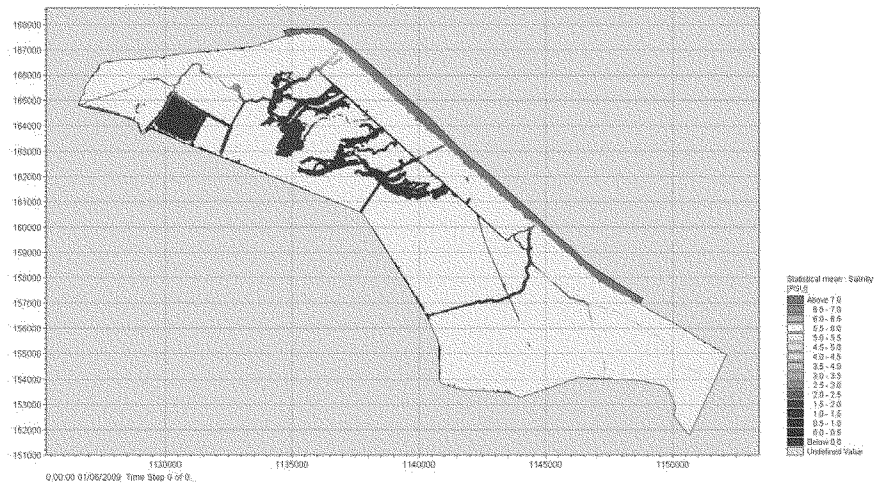


Figure 42. Mean salinity during June 2009 for the MR1 scenario.

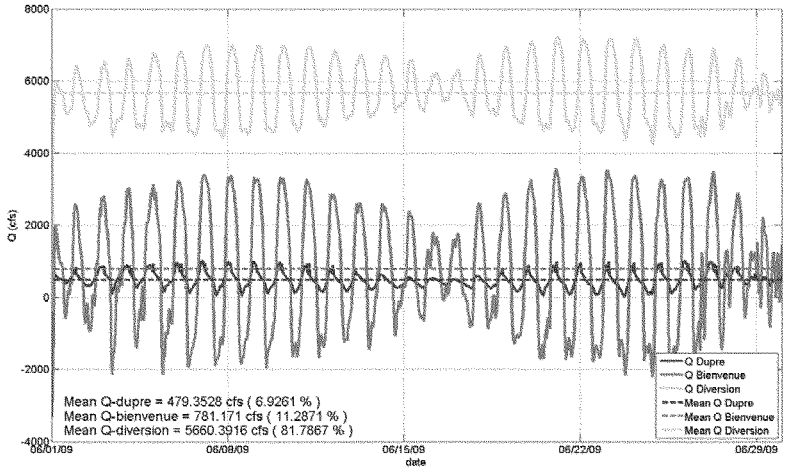


Figure 43. Discharge (cfs) through the Bayou Dupre (Blue), Bayou Bienvenue (red) and new Diversion (green) gates for the MR7 scenario. Dashed line indicate the mean discharge through the gates.



Figure 44. Mean salinity during June 2009 for the MR7 scenario.

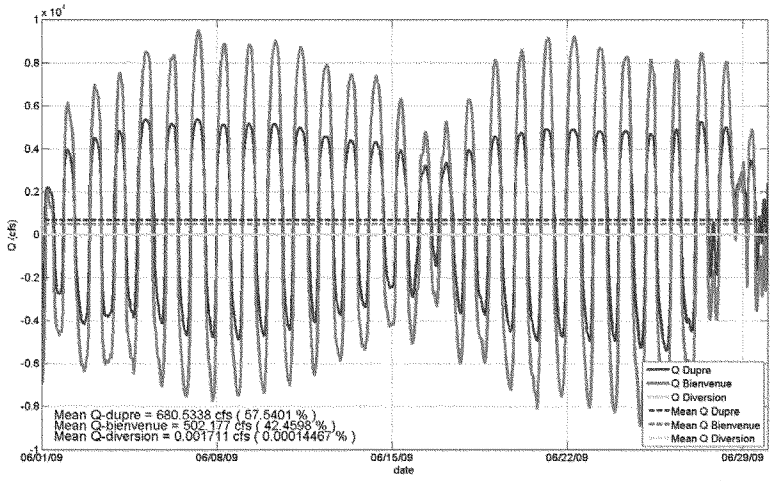


Figure 45. Discharge (cfs) through the Bayou Dupre Structure (Blue), Bayou Bienvenue Structure (red) and new Diversion (green) gates for the MRS1 condition. Dashed line indicate the mean discharge through the gates.

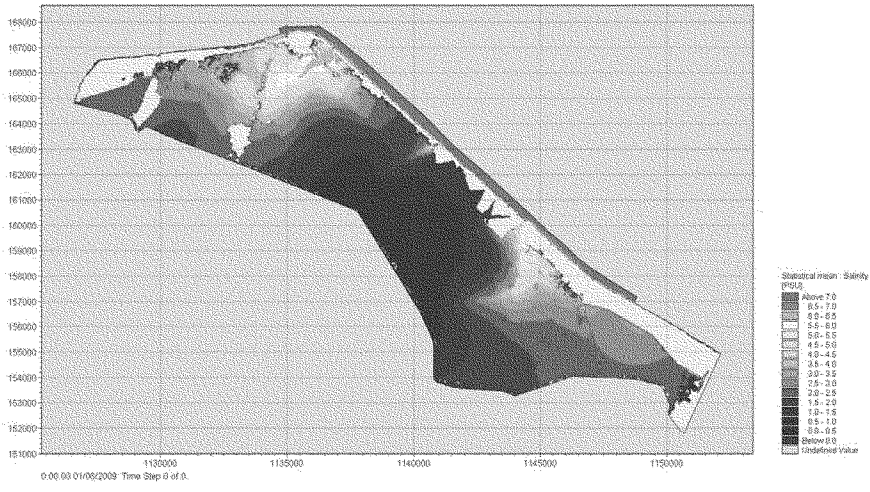


Figure 46. Mean salinity during June 2009, restored scenario with 1000 cfs including Sea level rise.

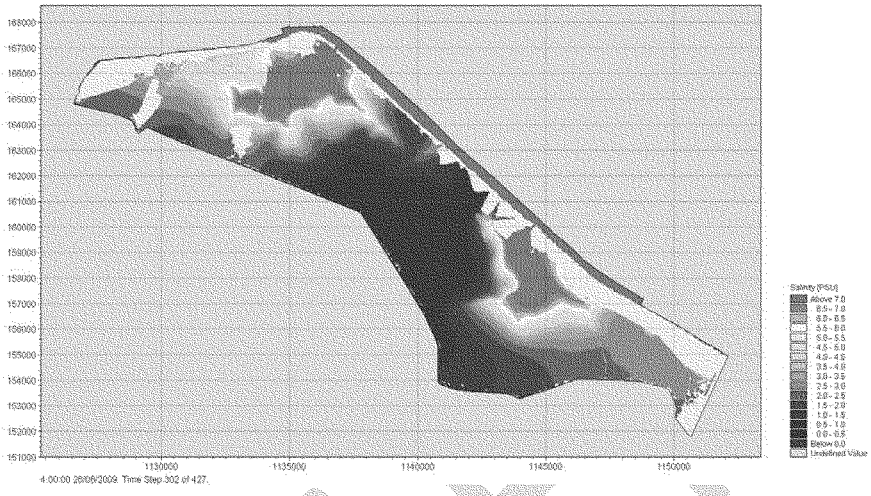


Figure 47. Salinity during high water, 26th June 2009, 4h00.

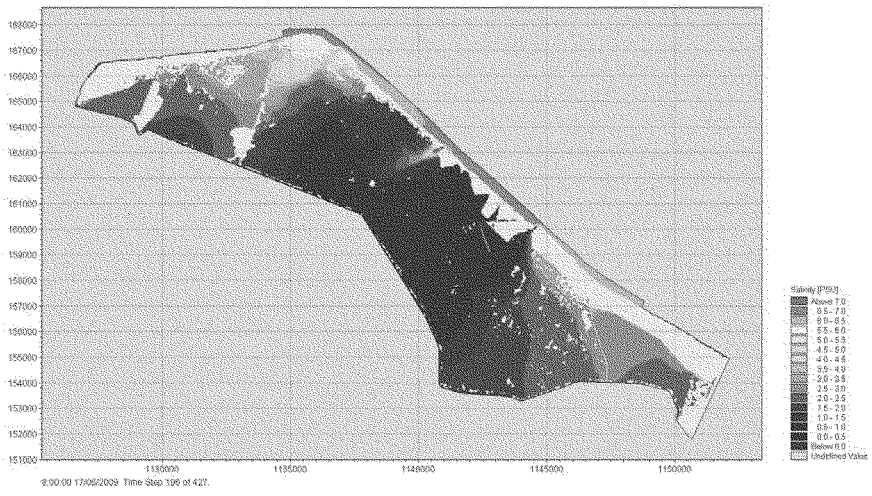


Figure 48. Salinity during low water, 17th June 2009, 8h00.

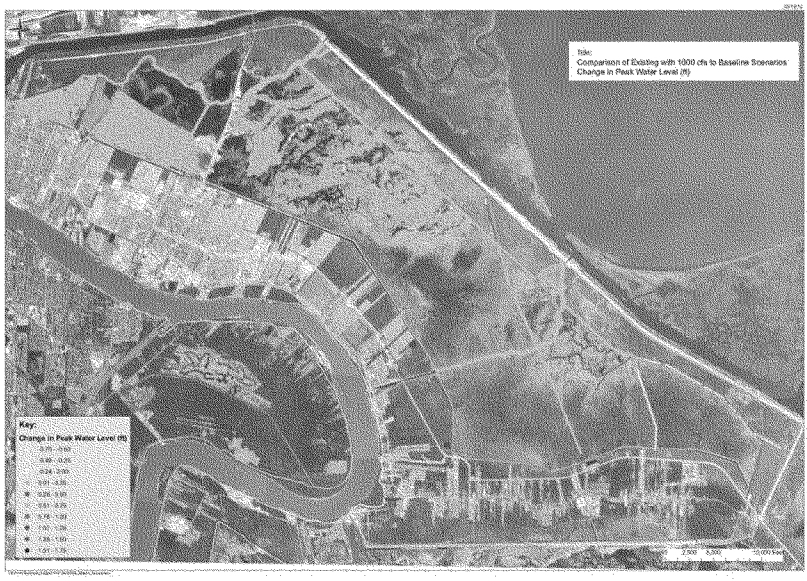


Figure 50. Comparison of the MB1 and MB Scenarios for Peak Water Level.



Figure 51. Comparison of MR1 with MB Scenarios for Peak Water Level.

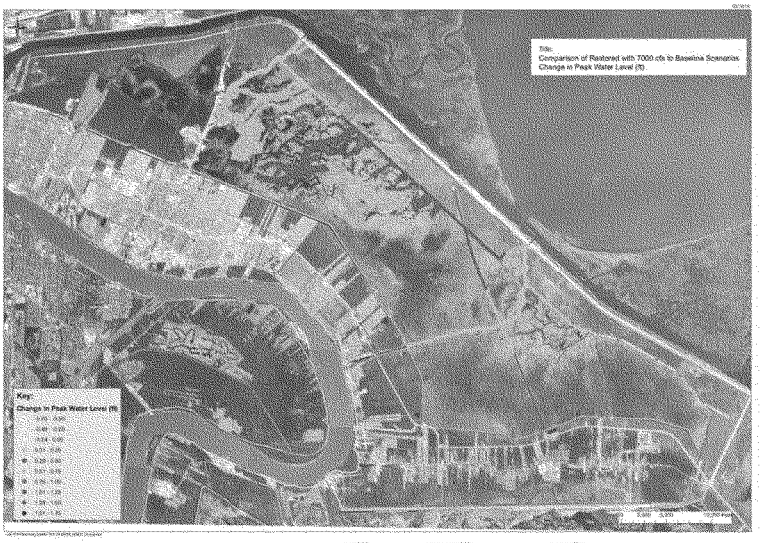


Figure 49. Comparison of MR7 with MB Scenarios for Peak Water Level.

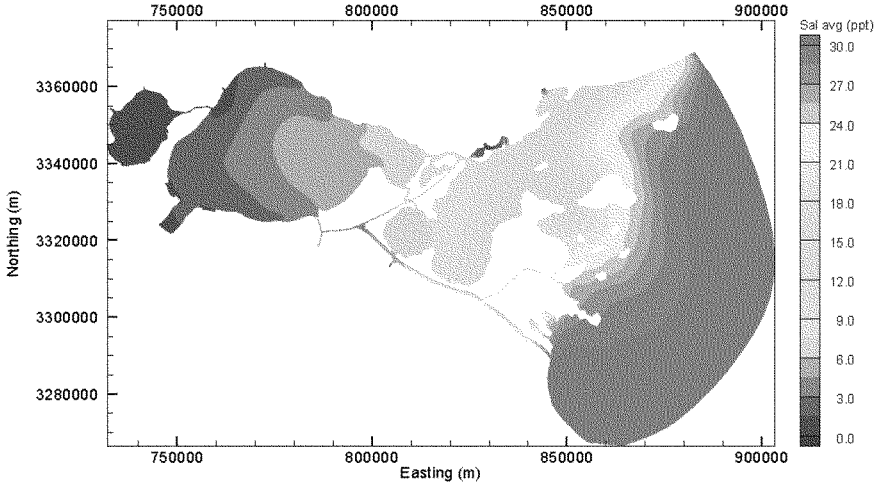


Figure 50. Model simulated depth-integrated salinity distribution averaged over 5 days (case opt1; frontal wind).

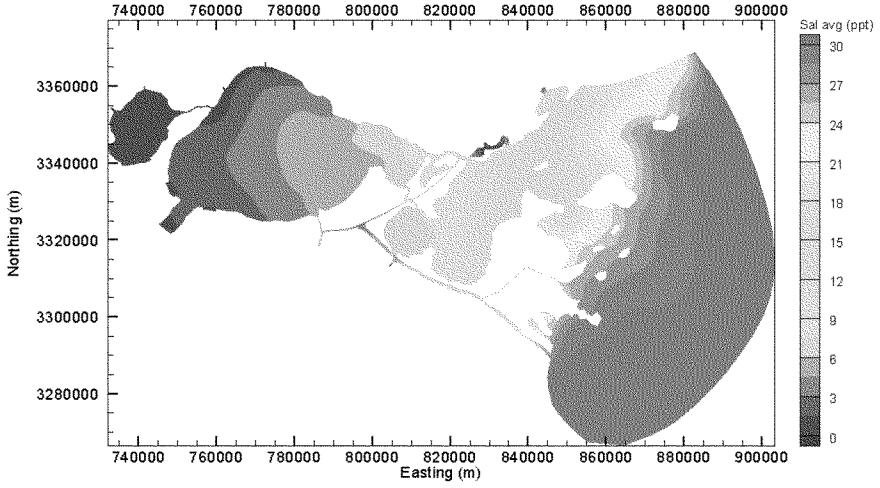


Figure 51. Model simulated depth-integrated salinity distribution averaged over 5 days (case opt2; no wind).

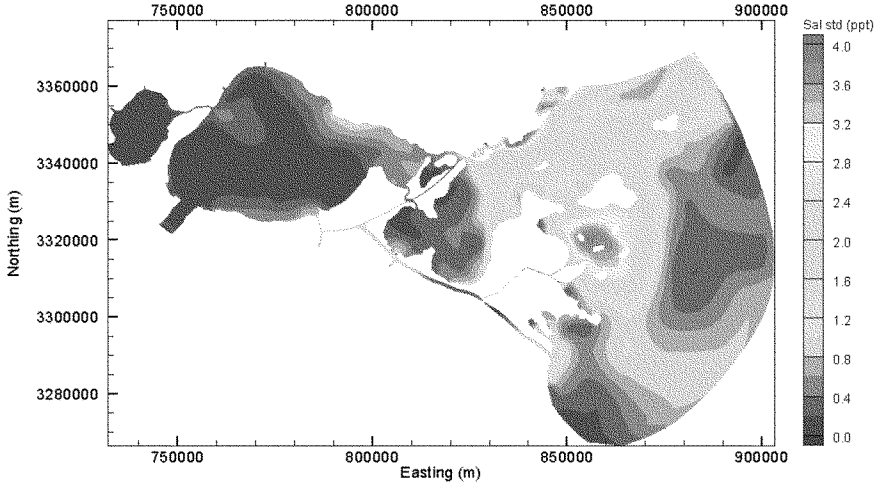


Figure 52. Model simulated depth-integrated standard deviation distribution for 5 days (case opt1; frontal wind).

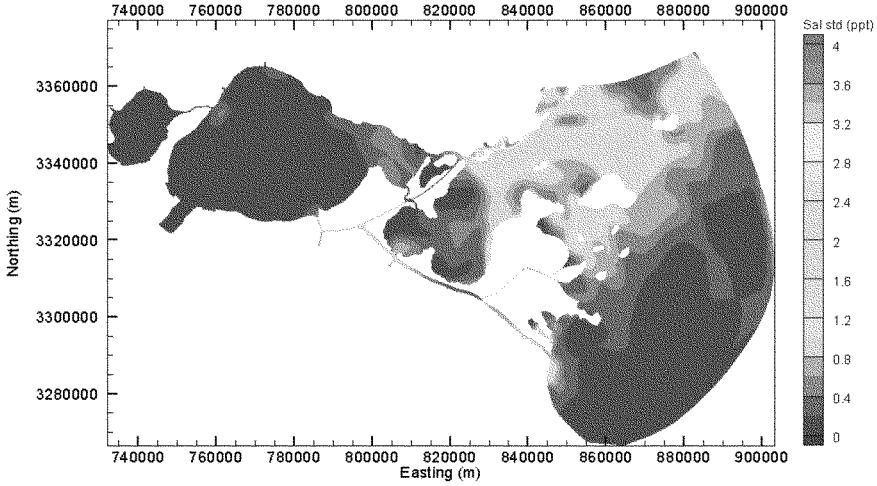


Figure 53. Model simulated depth-integrated standard deviation distribution for 5 days (case opt2; no wind).

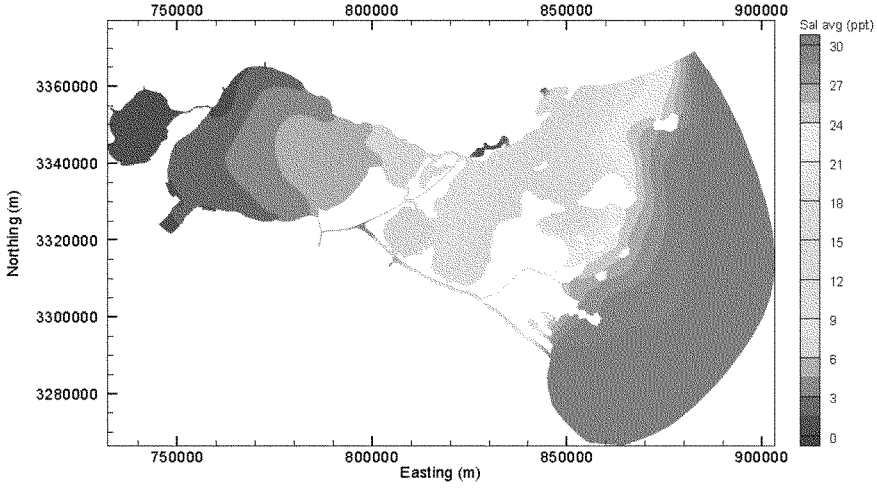


Figure 54. Model simulated depth-integrated salinity distribution averaged over 5 days (case opt1; frontal wind).

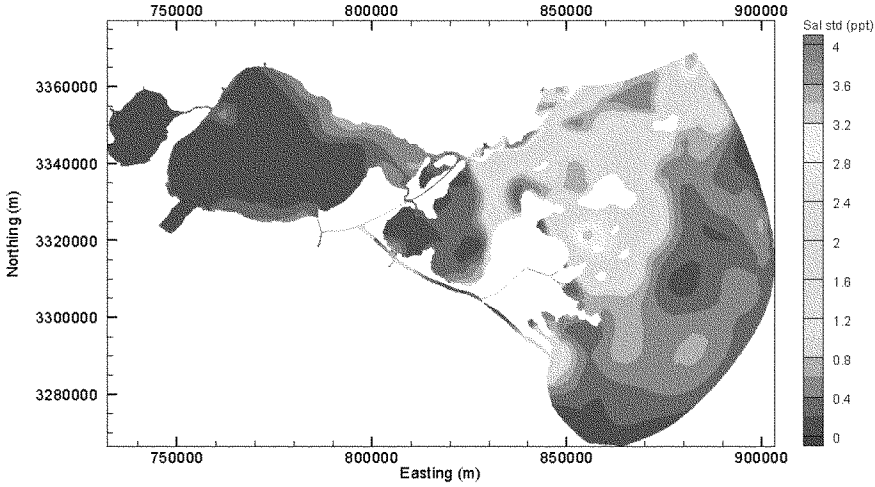


Figure 55. Model simulated depth-integrated standard deviation distribution for 5 days (case opt3; frontal wind).

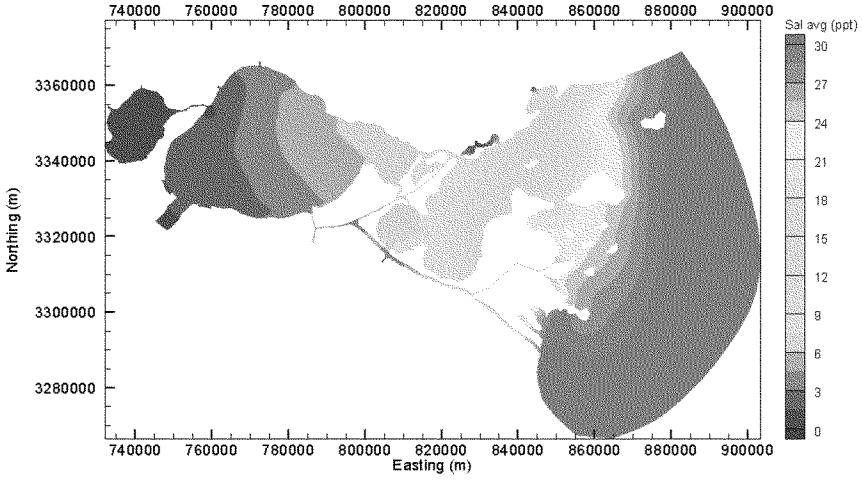


Figure 56. Model simulated depth-integrated salinity distribution averaged over 5 days (case opt5; frontal wind).

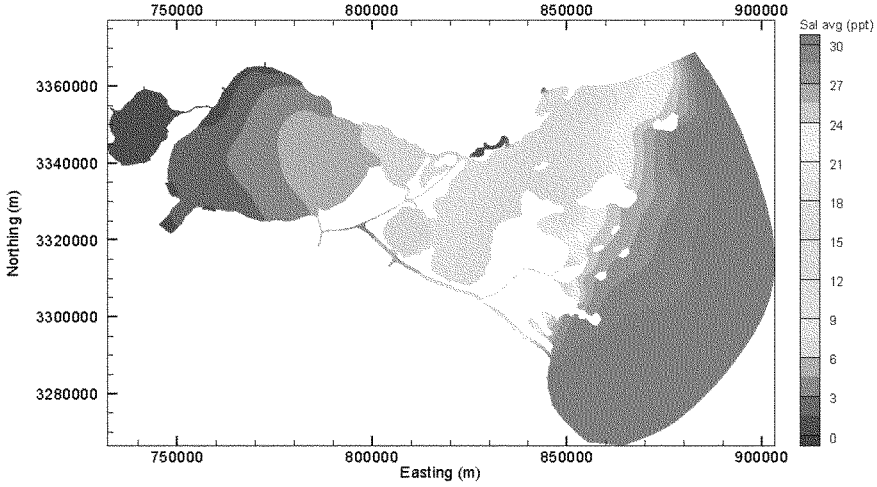


Figure 57. Model simulated depth-integrated salinity distribution averaged over 5 days (case opt6; no wind).

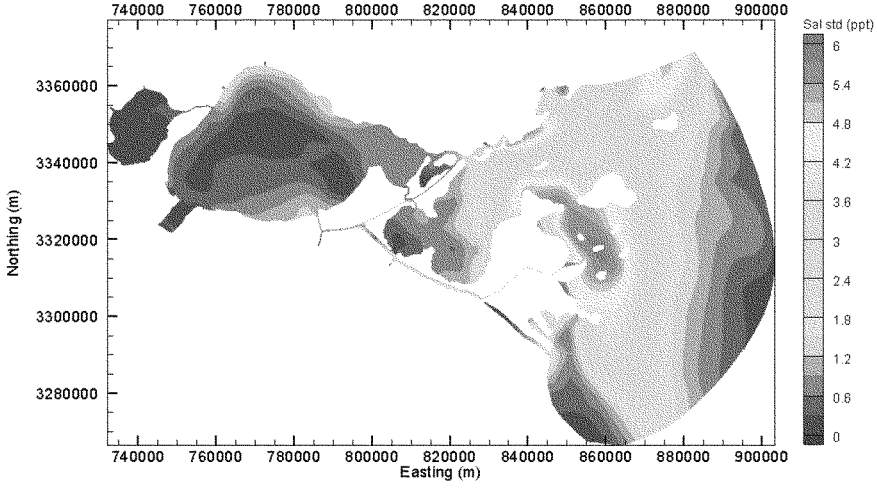


Figure 58. Model simulated depth-integrated standard deviation distribution for 5 days (case opt6; frontal wind).

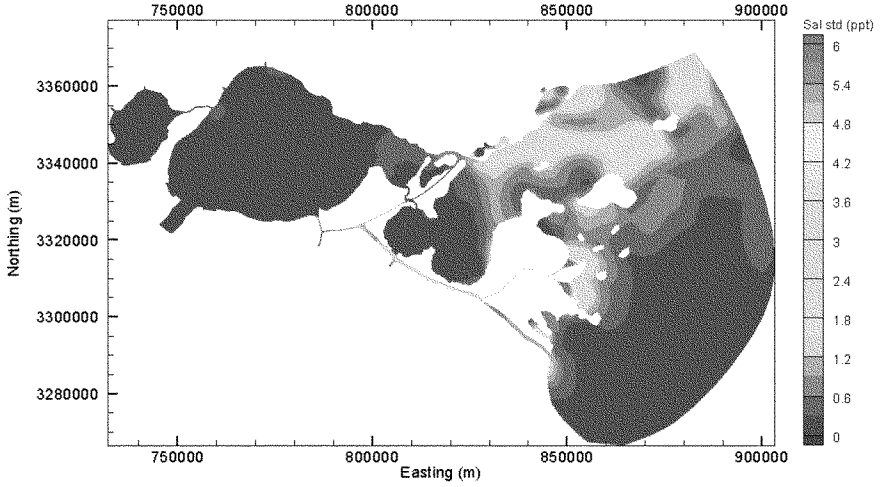


Figure 59. Model simulated depth-integrated standard deviation distribution for 5 days (case opt6; no wind).

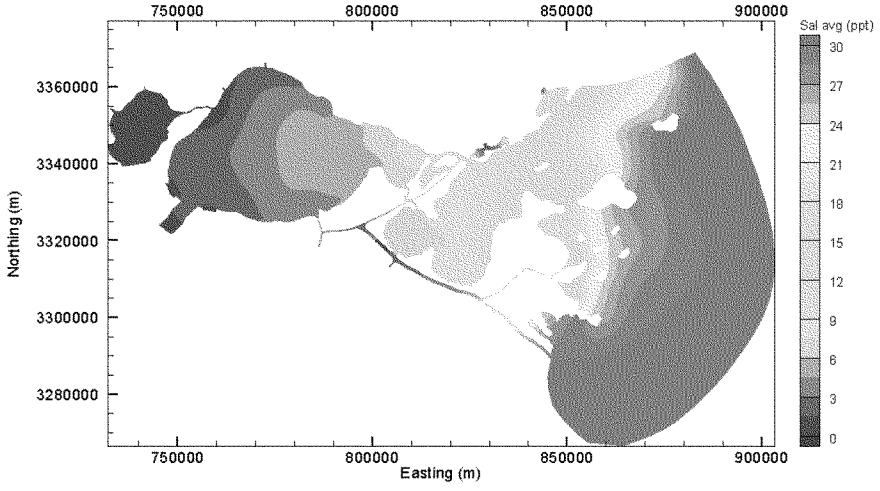


Figure 60. Model simulated depth-integrated standard deviation distribution for 45 days (case opt7; no wind)

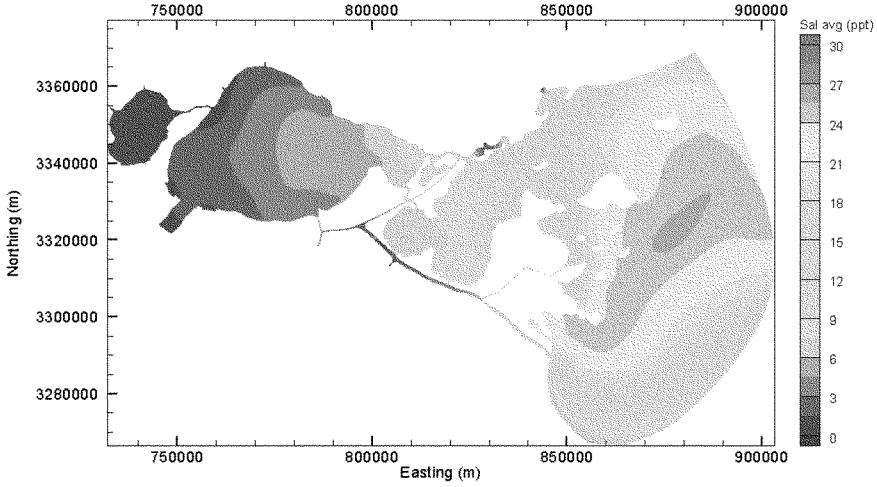


Figure 61. Model simulated depth-integrated standard deviation distribution for 45 days (case optf; no wind)

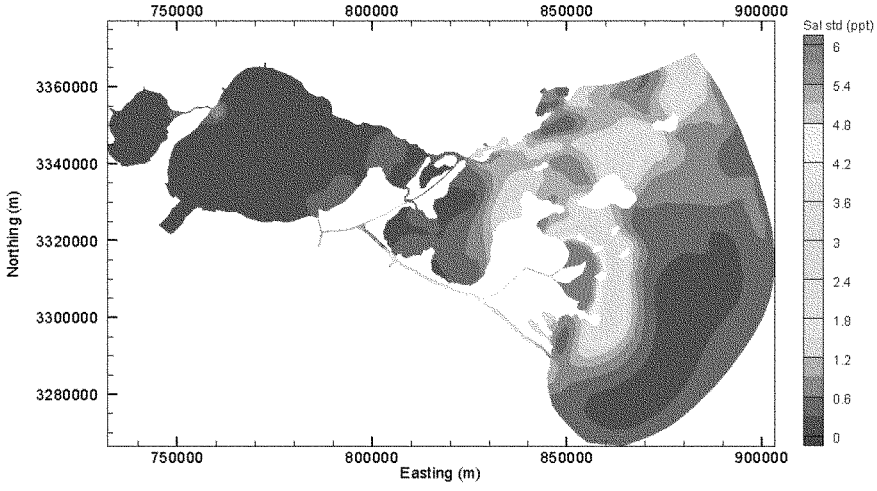


Figure 62. Model simulated depth-integrated standard deviation distribution for 45 days (case opt7; no wind).

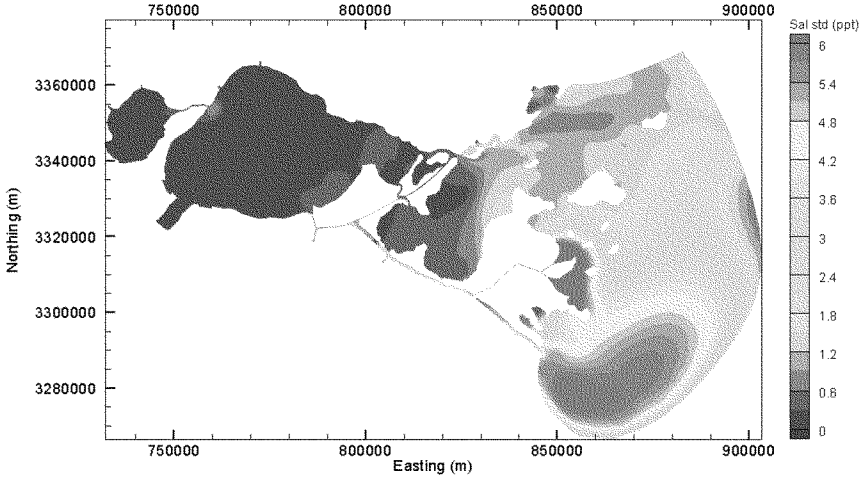


Figure 63. Model simulated depth-integrated standard deviation distribution for 45 days (case optf; no wind)

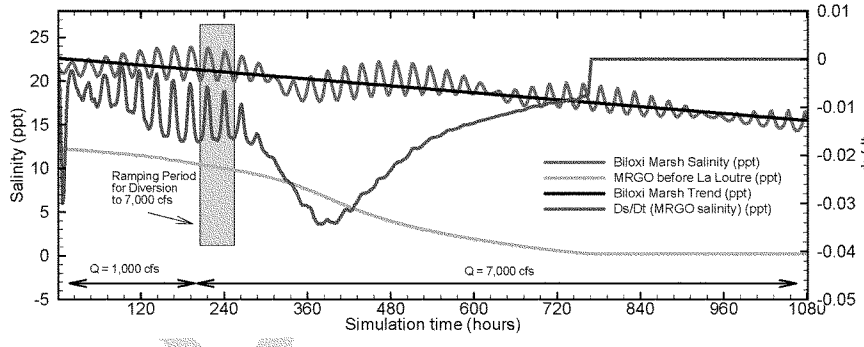


Figure 64. Instantaneous surface salinity for simulation optf, showing the salinity in the central Biloxi Marsh)red line) and within the MRGO channel upstream of Bayou La Loutre (green solid line).

APPENDIX A
REVIEW OF EXISTING DATA STUDIES

REVIEW OF EXISTING DATA STUDIES

A Reference Guide for Available Data in Eastern Louisiana and Mississippi Coastal Waters is the USACE guide of available data in Eastern Louisiana which provided indication of resources where data could be obtained, extent of records and parameters available at each station. The USACE document lists the following resources:

1. United States Geological Survey (USGS)

The USGS stations are located over a large portion of the study area both inland and in the coastal region. Most the stations, however, are within freshwater rivers rather than the tidal environment and do not measure salinity. Five sites are identified as measuring salinity. Of these, two have only 3 records, whilst the other three have extensive records. Data is recorded daily although the data is not necessarily complete. The data available from these stations includes station name, location (latitude/longitude), description of site, gage datum and water variables.

2. Louisiana Department of Natural Resources (LA DNR)

The data collected from the LA DNR database provides information describing the station name, location and water variables. These monitoring stations are distributed more densely over the study area but only provide data from 1996 to 2008. The data collection frequency varies from site to site from multiple times daily to monthly.

3. Environmental Protection Agency (EPA)

The Environmental Protection Agency database provides data for stations within each of the Parishes bordering Lake Pontchartrain, Lake Borgne and the Gulf. The extent of data varies from Parish to Parish in terms of both number of stations monitored and length of records. The data is split into two parts, legacy and modernized. The modernized data appears to be only available for a short period with monthly records. Information on the location, variable, number of samples and beginning and end dates of the samples are available from this database.

The legacy data is less well described in the document with only summaries for each Parish, showing the number of stations observing salinity and the total number of records over a period.

This suggests monthly recording of data at the sites. A few stations have data dating back to 1957. There are limited sites in St. Bernard Parish and Orleans Parish, but many in Plaquemines.

4. Louisiana Department of Environmental Quality (LA DEQ)

The Louisiana Department of Environmental Quality database has numerous water quality monitoring stations all over the study area and provides various data from 1963 to 2008. The data available to use for this model includes project number, assessment subsegment ID, site number, site name, latitude and longitude, variable name, number of samples and sample begin and end dates.

The majority of these sites have short data records and data appears to be collected monthly or less frequently.

5. Batelle Gulf Nutrient Data Management Platform (GNDMP)

The GNDMP data are mostly located in the Mississippi sound from Lake Borgne to Gulfport and east to the Pascagoula area. This database can be downloaded from their website and provides information such as the station ID, station name, location, variable, number of samples and the first and last dates of the samples taken, from 1965 to 1998.

6. Mississippi Data

The Mississippi data was sampled by the Mississippi Department of Environmental Quality. Most of the stations are located along the Mississippi coastline, in the Mississippi Sound with a few stations in the Sound and inland. There are few sites with long term data sets, and the frequency of samples on these longer sets appears to be monthly or less frequent.

7. Louisiana State Data Collection Draft Report (Moffat & Nichol Engineers)

This is a working draft by Moffat & Nichol Engineers (Baton Rouge) containing a data collection summary with information on salinity measurements for the study area. Section 2 of the report lists stations measuring salinity from DNR, USGS, NOAA, and Dauphin Island Sea Lab. It splits the data into hourly or less time steps and daily or longer time steps. A total of 120 stations are available with hourly time steps. The majority of these sites were also listed in the

USACE report as part of the LA DNR and USGS datasets, but not necessarily with the same time step or data intervals. The included stations recorded measurements in an hourly or 15-minute time steps. The gages measure salinity in parts per thousand and the period of available data varies for each location.

8. Other Data

A further 55 sites were identified in the daily or greater time step, and these were all listed as inactive stations with no data range. Some of these sites are the same as those in the USACE report.

DATA SOURCES SUPPLIED

1. Louisiana Department of Wildlife and Fisheries (LDWF)

Data from the Louisiana Department of Wildlife and Fisheries (LDWF) was received from the USACE as an ArcView shapefile with salinity data attached. This covered 59 stations across the Lake Pontchartrain, Lake Borgne and Biloxi Marsh area. The data is available as random sample dates (i.e. not true monthly or daily).

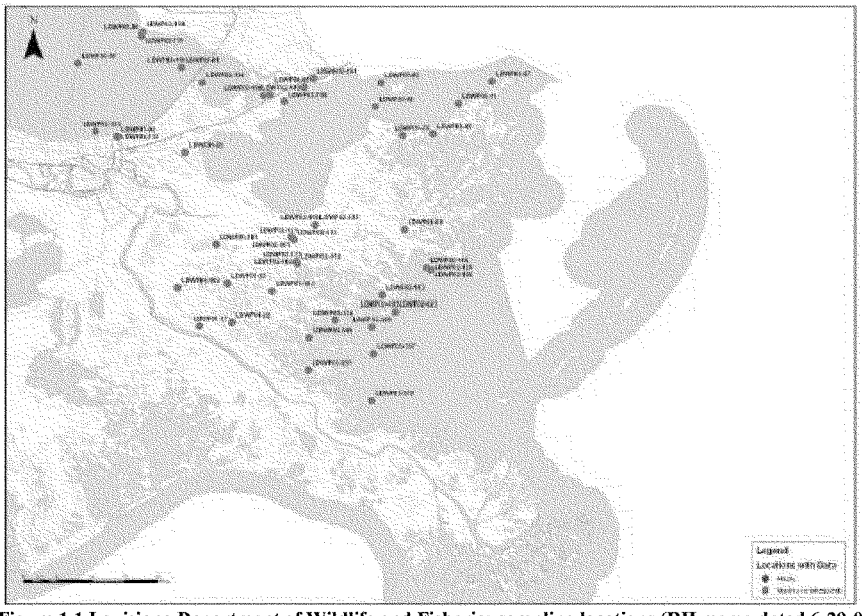


Figure 1.1 Louisiana Department of Wildlife and Fisheries sampling locations (RH memo dated 6-29-09).

2. Mississippi Department of Marine Resources (MDMR)

Data from the Mississippi Department of Marine Resources (MDMR) is available for 270 stations along the Mississippi coastline; however, only 147 stations have been selected as being potentially useful. The stations were selected based on the number of records available at the station (generally less than 50 readings). Data records are available from 1998 to 2008 with some gaps. The data is available as random sample dates (i.e. not true monthly or daily).

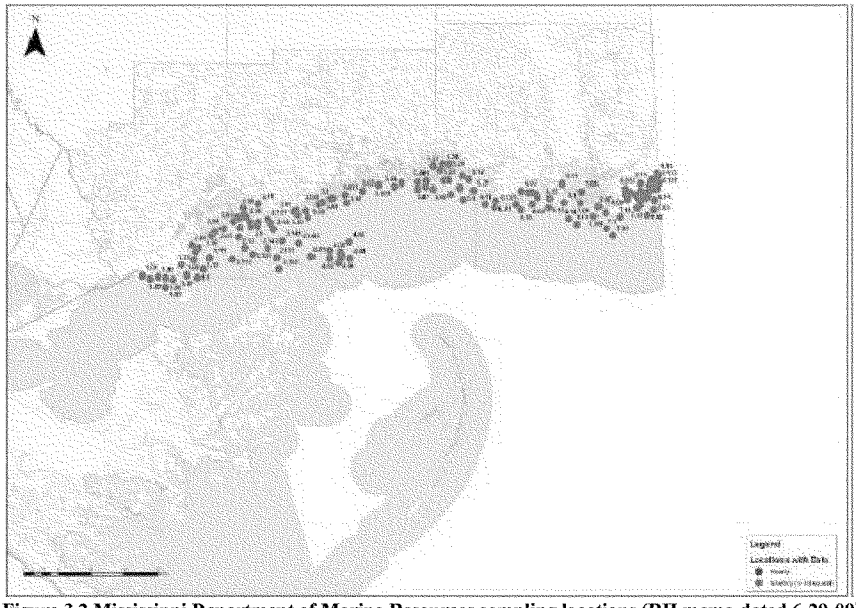


Figure 3.2 Mississippi Department of Marine Resources sampling locations (RH memo dated 6-29-09).

3. Louisiana Department of Natural Resources (LA DNR).

A geodatabase was supplied with data for some sites from the Louisiana Department of Natural Resources (LA DNR).

DATA EXTRACTED AS PART OF THIS INITIATIVE

1. USGS Stations

Three daily water quality data sets have been obtained from USGS stations. The locations of the stations are: Caernarvon Outfall Channel at Caernarvon, Mississippi Sound at Grand Pass, and Rigolettes at Hwy 90 near Slidell.

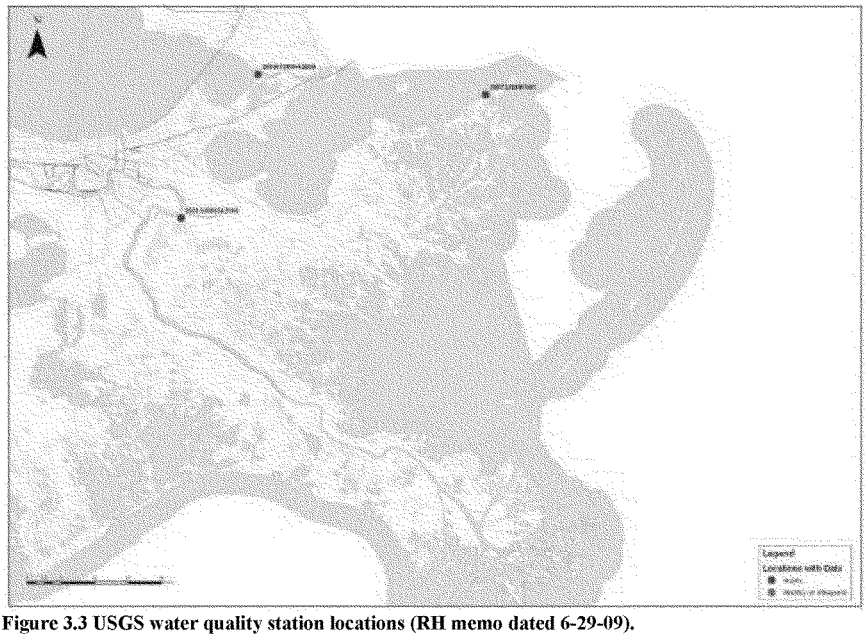


Figure 3.3 USGS water quality station locations (RH memo dated 6-29-09).

2. Coastwide Reference Monitoring System (CRMS)

Data from the Coastwide Reference Monitoring System (CRMS) sites encompass multiple ecological parameters for wetland ecosystem evaluation. The 24 most suitable stations are operated by Coastal Estuaries Services LLC. Data for the stations are available as hourly records with some gaps.

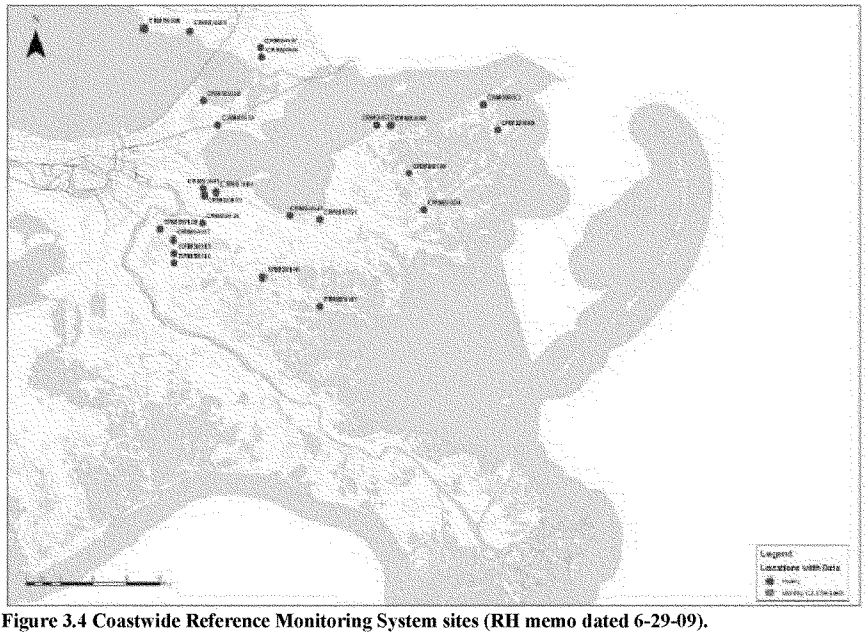


Figure 3.4 Coastwide Reference Monitoring System sites (RH memo dated 6-29-09).

3. Louisiana Department of Natural Resources (LA DNR).

Further examination on the location, lengths and quality of records determined that a further 44 stations from the DNR dataset were suitable for potential use in the analysis. These specific salinity stations were selected due to their location and the continuity of data available. The stations are located within an area to the northeast of the Mississippi in about a 40 mile radius of the MRGO.

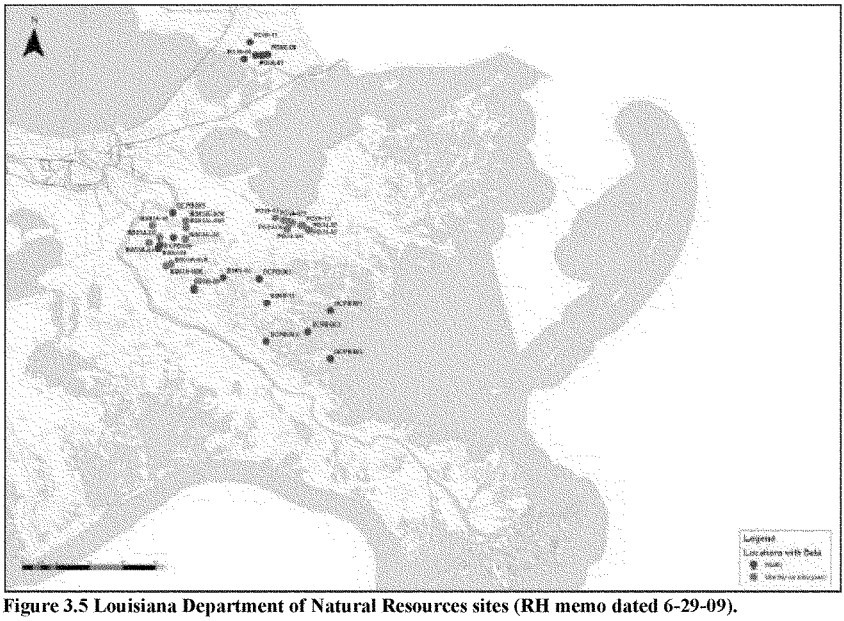


Figure 3.5 Louisiana Department of Natural Resources sites (RH memo dated 6-29-09).

4. Environmental Protection Agency's (EPA) STORET site

Data for the whole of Louisiana was downloaded from the Environmental Protection Agency's (EPA) STORET site. The data is ordered by Parish and only three Parishes have been considered. These are Orleans, St. Bernard and Plaquemines. These three Parishes have 135 sampling locations for salinity, some of which fall outside the area of interest. The data was generally collected in the 1970's and 1980's and has gaps so that it is not a consistent monthly data source.

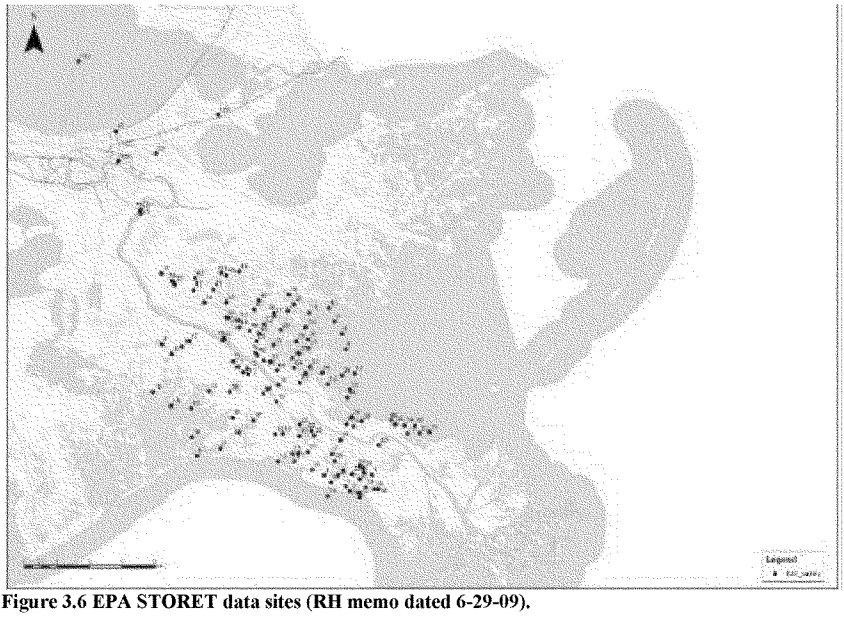


Figure 3.6 EPA STORET data sites (RH memo dated 6-29-09).

APPENDIX B

SEA LEVEL RISE
CENTRAL WETLANDS AND BILOXI MARSH

The topic of Sea Level Rise in southern Louisiana is pertinent and any modeling of salinity and levels within the Biloxi Marsh and the Central Wetlands areas needs to take into consideration the latest thoughts on this process.

Sea Level Rise in southern Louisiana is a combination of eustatic rise (due to global factors), general land settlement and other local factors which have an impact on sea level.

The USACE Circular EC 1165-2-211 Water Resource Policies and Authorities, Incorporating Sea-Level Change Considerations in Civil Works Programs, July 2009, proposes a current eustatic sea level rise of 1.7mm/yr ±0.5mm/yr. The work flow for determining SLR refers to the Gulf of Mexico and Louisiana particularly as being an area that may have a regional sea level rise value different from the regional trend.

To investigate the values of sea level rise in this area two studies have been considered. These are:

- The work carried out for the LACPR technical report in 2007
- Recent analysis of two long term gage data sets by the USACE, New Orleans District.

LACPR

For the LACPR technical report, work was carried out on SLR by Kevin Knuuti of ERDC. His report is attached to the end of this note.

This report divided the coasts of Louisiana into three sections, the Chenier Plain, the Delta Plain and the Pontchartrain Basin. The area of interest for this project falls within both areas 6 and 7 in his figure A.1, which are the St Bernard Delta Plain and the Pontchartrain Basin. These areas overlap in Lake Borgne which makes the selection of specific numbers from the report difficult as area 6 is within the results for the Delta Plain and area 7 in the Pontchartrain Basin, with each of the areas having significantly different rates of relative sea level rise.

The following table provides the range of values suggested for the two different areas:

	Relative Sea-Level Rise Values between 2010 and 2060 (meters/ft)	
Basis for Value	Delta Plain	Pontchartrain Basin
Historic Rate	0.4/1.3'	0.2/0.7'
Future Scenario 1	0.6/2.0'	0.4/1.3'
Future Scenario 2	1.0/3.3'	0.8/2.6'

These rates suggest non eustatic changes (subsidence and other local factors) of around 6mm/year in Delta and 2mm/year in the Pontchartrain Basin (using 2mm/yr for regional eustatic rise). This is a significant change between the two overlapping regions.

This analysis used the historic rates for the low rate, the NRC Curve I for the Future Scenario 1 (or mid range) and the NRC Curve III for the future scenario 2 (or high range).

Comments on the LACPR technical report

Firstly the rates were developed as global numbers for large areas of the Louisiana coastline rather than for the more specific areas being considered at this time. There is no evidence within the report as to which (if any) gages were used within the assessment or whether these results were averaged over spatial areas.

Gage Data Analysis

Data from two gages, Shell Beach and West End, has been analyzed and the results are presented.

Shell Beach

This gage was within Shell Beach on the bayou running through the community. Records were available from 1961 to 2002 when the gage was discontinued. Daily data for this site was readily available although it is thought that hourly data may also be available.

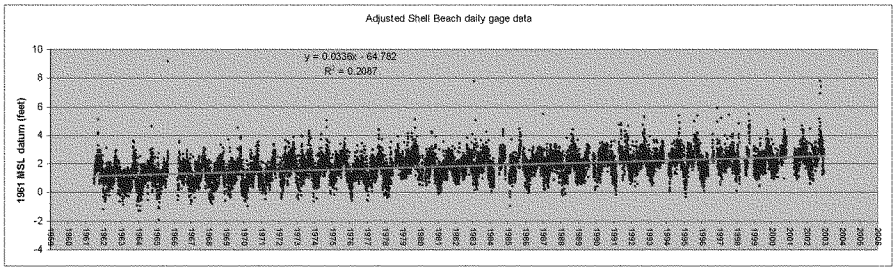
The location of the site is shown in the following figure, together with the location of the current NOAA gage which sits within Lake Borgne.



The analysis generally follows the methodology outlined in the USACE Circular EC1165-2-211 but is based on trends in the daily values rather than MSL values calculated from hourly values. There are 42

years of records which places this within the acceptable range for a single site. The data set is 82% complete over that period.

The datum of the gage appears to have changed in 1978 and so data after July 1978 has been increased by 1' to accommodate this change. The time series from the analysis is shown in the graph below.



There is an apparent trend in the data across the whole period of around 10.2mm/yr. This value include local settlement, local water level changes and global eustatic change i.e. this is the relative sea level rise (RSLR) at this point.

The analysis has then projected this historic rise from 2011 to 2061 (50 years initially to be comparable with the LACPR values), together with using the NRC sea level curves I and III with a eustatic component of 1.7mm/yr to provide intermediate and high estimates of sea level rise into the future. Over this 50 year period the increases are:

- 0.5m/1.7ft for the Historic/low estimate
- 0.6m/2.1ft for the Intermediate estimate
- 1.0m/3.3ft for the High estimate.

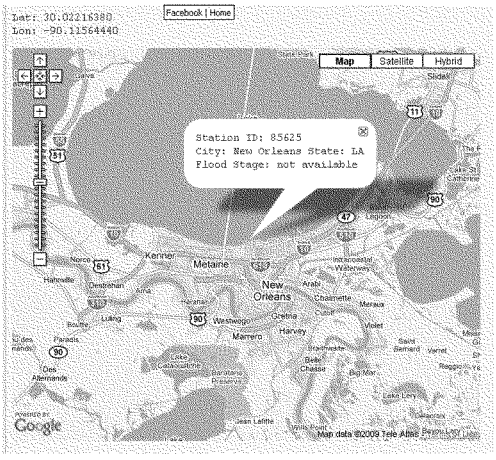
Comments on the Shell Beach Analysis

- The NOAA method for establishing MSL trends uses either annual or monthly MSL's based on analyzing hourly data. The Shell Beach analysis has used trends associated with a single daily value taken at the same time each day. With the length of data available (nearly 13,000 records) it is unlikely that changing to monthly MSL values based on hourly data will change the overall trend within the dataset, but it would help to establish realistic error bands on the trend.
- There is some evidence that subsidence rates may be peaking in the 1970's (possibly as a result of oil and gas extraction within the area). There is a possible suggestion of this within the Shell Beach gage data as the trend before 1978 and after 1978 show a reduction (11.5mm/yr before and 8mm/yr afterwards). However the length of record (≈ 20 years) is realistically too short to draw reasonable conclusions on trends and the USACE Circular advises the use of extreme caution with datasets less than 40 years.

- The use of the global 1.7mm/yr eustatic sea level rise for this region may be incorrect. Analysis of the stable land mass along the western side of Florida has shown a local sea level rise in excess of the 1.7mm/yr (in the range of 2 to 2.4mm/yr) and so the use of a higher number in Louisiana may be appropriate in establishing the intermediate and high values using the NRC curves. However the adoption of say 2.3mm/yr only reduces the 2061 value by 0.15' over the 50 years, and the adoption of these numbers would need further investigation.

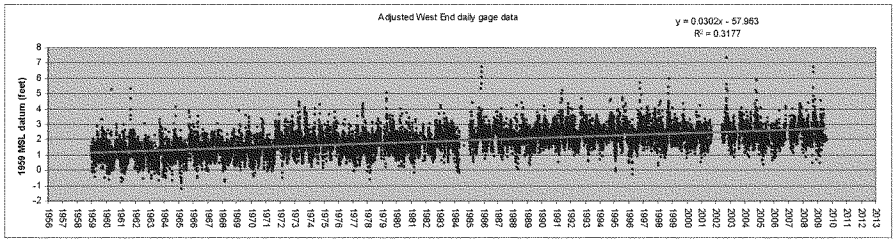
West End

The gage is located in the marina on the lake front in West End. Records were available from 1937 to 2008, but however before 1959 the records were intermittent and not usable for analysis. Daily data for this site was available. The location of the site is shown in the following figure.



The analysis generally follows the methodology outlined in the USACE Circular EC1165-2-211 but is based on trends in the daily values rather than MSL values calculated from hourly values. There are 50 years of records which places this within the acceptable range for a single site. The data set is 91% complete over that period.

The datum of the gage appears to have changed at several points in the period and the data was adjusted so that it all referred to the same datum used in 1959. This resulted in a change of up to +0.81'. The time series from the analysis is shown in the graph below.



There is an apparent trend in the data across the whole period of around 9.2mm/yr. This value includes local settlement, local water level changes and global eustatic change i.e. this is the relative sea level rise (RSLR) at this point.

The analysis has then projected this historic rise from 2011 to 2061 (50 years initially to be comparable with the LACPR values), together with using the NRC sea level curves I and III with a eustatic component of 1.7mm/yr to provide intermediate and high estimates of sea level rise into the future. Over this 50 year period the increases are:

- 0.5m/1.5ft for the Historic/low estimate
- 0.6m/2.1ft for the Intermediate estimate
- 1.0m/3.3ft for the High estimate.

The comments on the West End gage are the same as those for Shell Beach

Comment on Analysis

Both of the two gages resulted in very similar total values of SLR over 50 years which are comparable with the Delta Plain numbers from LACPR

Source	LACPR (Delta) 2010-2060	Shell Beach 2011-2061	West End 2011-2061
Low (Historic)	0.4m/1.3'	0.5m/1.7'	0.5m/1.5'
Intermediate	0.6m/2.0'	0.6m/2.1'	0.6m/2.1'
High	1.0m/3.3'	1.0m/3.3'	1.0m/3.3'

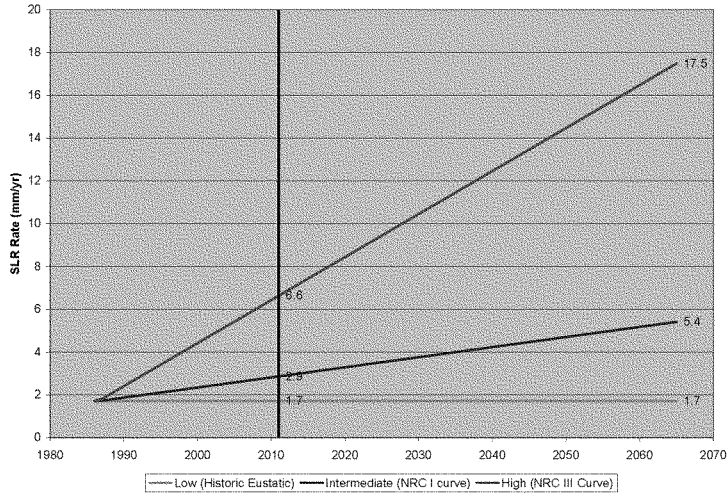
(Note variations in conversions due to rounding errors)

There is no justification at this stage for adopting lower rates of local water level change due to potential slackening of subsidence. The length of record available for analysis is insufficient to draw conclusion and significant trends, and the error in the trend increases with a reduction in record length.

There is also no justification or data to adjust the rate of eustatic SLR used in establishing the higher rates of rise in this area. Further studies may challenge the 1.7mm/yr eustatic rise for this area, but a small change in this value will have little impact on the values in 50 years.

Consideration should be given to the error in the trend. The USACE circular 1165-2-211 suggests an error band of around ±0.5mm/yr for a data set of 40 years and around ±0.4mm/yr for 50 years of data. These would equate to ±25mm in 50 years for Shell Beach and ±20mm in 50 years for West End (i.e. around 1' additional) which is insignificant in comparison with the total increases (<5% on the low case).

One further comment should be made with regard to the accelerated growth curves. These curves start from 1986 with an estimated eustatic rise of 1.7mm/yr and then increase this rate over time. By 2011, the the intermediate rate is 2.9mm/yr and the high rate 6.6mm/yr. This is illustrated in the graph below - this shows the rates of annual eustatic sea level rise in the three scenarios from 1986 to 2065. The thick line represents 2011.



There is no evidence to suggest that either this increased rate has or has not occurred over the past few years, and until further analysis is undertaken over a reasonable time period the methodology used to establish the growth curves should be taken as providing an indication of how sea level rise may accelerate over time.

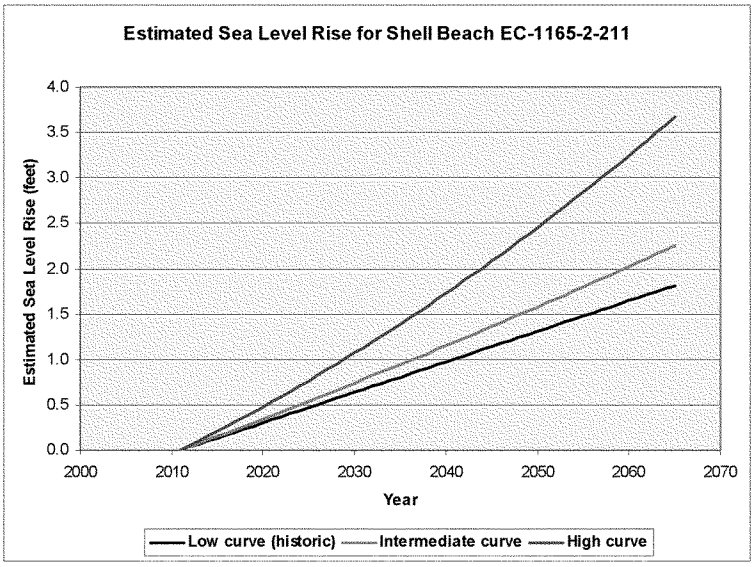
Conclusions

As there is little to choose between the three data sets we would propose using the results from Shell Beach as being the site nearest to the area of interest, and which follows a defined methodology in line with EC-11652-211.

Considering a longer project period than 50 years i.e. from 2011 to 2065 gives the following figures:

Low rate (based on historic trend of 10.24mm/yr)	1.8ft (0.55m)
Med rate (based on NRC Curve I and 1.7mm/yr baseline eustatic)	2.2ft (0.69m)
High rate (based on NRC Curve III and 1.7mm/yr baseline eustatic)	3.7ft (1.12m)

A plot of the sea level rise over the period is shown below.



LACPR Extract - LACPR Final Report Vol II, Hydraulics and Hydrology Appendix, Annex A, June 2009

Author: Kevin Knuuti, ERDC-CHL

Variations and trends in the relationship between local mean sea level (LMSL) and land elevations are important considerations in the planning and design of structures in areas that are currently tidally influenced or that could become tidally influenced in the future. In areas where the LMSL is rising relative to land elevation, the relative sea-level rise (RSLR) is often divided into a global increase in water mass (eustatic rise), a rise in local water level due to density changes in the water (steric rise), and a drop in local land elevation (subsidence). Throughout the 20th century, the global average SLR due to eustatic and steric effects has been approximately 1.8 mm/year (Meehl, 2007). Examination of tide gauges on geologically stable platforms in the northern Gulf of Mexico indicates a regional average SLR of approximately 1.8-2.0 mm/year during that same time period. Throughout coastal Louisiana, rates of subsidence exceed the rate of SLR by varying amounts. The resulting rates of RSLR throughout coastal Louisiana are significantly higher than the global average and regional average SLR rates.

Though the causes of climate change and future projections of climate change are somewhat controversial, it is well accepted that RSL has been rising across coastal Louisiana and will continue to do so in the future. Because of the difficulty associated with quantifying the rates of SLR that will occur in different areas of Louisiana, a sensitivity analysis is performed to determine how different project designs would respond to a range of SLR rates. For this sensitivity analysis, an extrapolation of the historic rates of RSLR is used as the low level for future sea-level rise and accelerated rates of rise based on National Research Council (NRC, 1987) and Intergovernmental Panel on Climate Change(IPCC) (Meehl, 2007) projections are used for higher rates of rise. Historic rates of RSLR vary across Louisiana and also vary depending on the methods used to estimate those rates. The two most commonly cited methods of estimating historic RSLR rates in Louisiana are radiometric dating of organic deposits (mostly peat) and analysis of long-term tide-gauge data. Because the RSLR rates determined from tide gauge data are based on more recent (20th century) data and because these rates are generally greater than the rates determined from radiometric dating, tide gauge RSLR rates are used for the low rate of RSLR in the sensitivity analysis.

Both the National Ocean Service and the U.S. Army Corps of Engineers have maintained long-term water-level gauges that can be used to calculate historic RSLR rates across coastal Louisiana. Because of the distance between these gauges, and the engineering difficulty associated with using numerous historic RSLR rates for analysis, coastal Louisiana was divided into different geomorphic regions for RSLR analysis. Within each geomorphic region, subsidence rates were thought to be relatively uniform due to relatively homogeneous geologic conditions. The geomorphic regions considered were based on the historic shifting of the Mississippi River's main stem and the associated delta lobes the river created, as shown in figure A.1 and as described by Penland (1990). Based on similarities in historic RSLR rates, alternative screening further grouped the regions into three primary geomorphic regions: the Chenier Plain (region 1 in figure A.1), the Delta Plain (regions 2-6 in figure A.1), and the Pontchartrain Basin (region 7 in figure A.1).

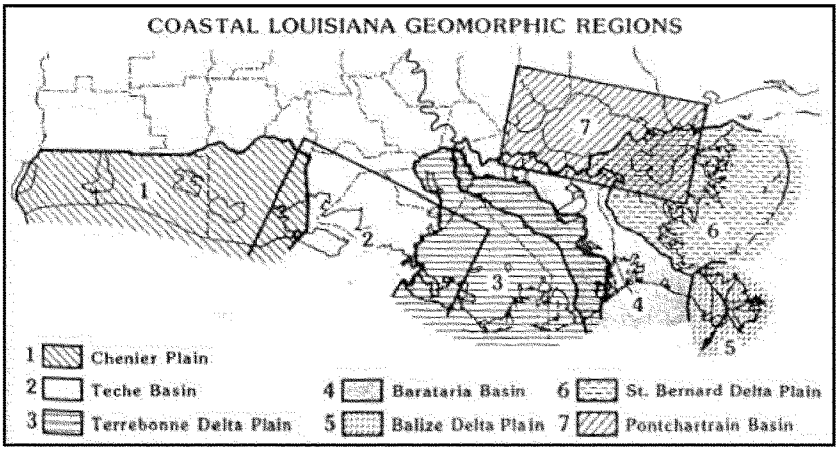


Figure A.1, from Penland, 1990

Future rates of RSLR were determined by considering both the 1987 NRC global mean SLR projections and the 2007 IPCC global mean SLR projections, along with estimates for local and regional subsidence rates across coastal Louisiana. While the 2007 IPCC projections are considered the most current and rigorous effort to estimate future global mean SLR rates there has been some criticism that these projections do not adequately consider the potential for extreme scenarios such as massive ice loss and melting from Antarctica. The 2007 IPCC mean central value estimate for global mean SLR by 2100 is 0.343 meters and the upper limit value is 0.59 meters. Due to the uncertainties associated with the IPCC estimate methods, a conservative value of 0.5 meters of rise by 2100 is used for rigorous sensitivity analysis, with the acceleration.

$$E(t_2) - E(t_1) = 0.0012(t_2 - t_1) + b(t_2^2 - t_1^2)$$

(see Knuuti, 2002, for description of variables and derivation of equation).

To account for possible extreme scenarios of global mean SLR and the associated RSLR across Louisiana, the sensitivity analysis also considered the "Curve III" value from the 1987 NRC report, which estimates a global mean SLR of 1.5 meters by 2100.

Estimates of local and regional subsidence rates were calculated by subtracting the regional historic SLR rate (2.0 mm/year) from the local and regional RSLR rates described earlier. These subsidence rates were combined with the future projections described in the previous two paragraphs to determine local and regional projections for future rates of RSLR. Table A.1 summarizes the RSLR values developed for the sensitivity analysis scenarios.

Table A.1: Relative Sea-Level Rise Values, 50-year project life

	Relative Sea-Level Rise Values between 2010 and 2060 (meters)		
Basis for value	Chenier Plain	Delta Plain	Pontchartrain Basin
Historic rate	0.2	0.4	0.2
Future scenario 1	0.4	0.6	0.4
Future scenario 2	0.8	1.0	0.8

References:

National Research Council (NRC), 1987. Responding to Changes in Sea Level: Engineering Implications.

Corps of Engineers Policy, as described in ER 1105-2-100 (dated 22 April 2000), Knuuti, K. (2002).

"Planning for Sea-Level Rise: U.S. Army Corps of Engineers Policy" in Solutions to Coastal Disasters '02. ASCE, Alexandria, VA.

Meehl, G. (Intergovernmental Panel on Climate Change), 2007. The Scientific Basis.

APPENDIX C

DESCRIPTION OF THE UNO MASS BALANCE MODEL

DESCRIPTION OF THE UNO MASS BALANCE MODEL

The UNO Mass Balance Model for hydrology, hydraulic, salinity and water quality that was applied in this study was adapted from the model developed by McCorquodale et al. (2007b).

The hydrodynamic module of the 1-D model uses a similar link-cell structure and connectivity matrix to that used in the EPA EXTRAN model (the hydrodynamic part of the U.S. EPA Storm Water Management Model (SWMM) 5.0) for urban hydraulics. The main difference is that the UNO model considers the effect of salinity on the pressure gradient. The procedures in the EPA WASP model were adapted for the mass balance modeling of salinity, suspended solids and nutrients
(http://www.epa.gov/athens/wwqtsc/WASP.pdf).

The study area is divided into storage elements (cells) and conveyance channels (links) between the cells. The stage in each cell is computed by the continuity equation (Eq. 1). The advective flow in the model is determined by the differential pressure gradient between the cells subtending the connecting links (Eq. 2). Wetland areas are incorporated into the model by assigning a hydraulically connected area (drainage area to each cell). The atmospheric open water area and the runoff contribution from the adjacent wetlands are also considered (Eq. 1).

$$\frac{d\eta_j}{dt} = n_j' = \left(\frac{\sum Q_{ji,trib,div} + P_j - ET_j}{As_j} \right) + \frac{Run_j}{As_j} \qquad \text{(Eq. 1)}$$

$$Q_i = A_i \left\{ \frac{2g\left|(\eta_j + \frac{d_i S_j}{1000}) - (\eta_{j+1} + \frac{d_i S_{j+1}}{1000})\right|}{\left(\sum k_{im} + 2gn_i^{\,2} \frac{L_i}{R_i^{\frac{2}{3}}} \right)} \right\}^{\frac{1}{2}} sign[(\eta_j + \frac{d_i S_j}{1000}) - (\eta_{j+1} + \frac{d_i S_{j+1}}{1000})]$$

(Eq. 2)

$$Run_j = A_{dj} \left\{ P_j - k_{ow} \times ET_j - (1 - k_{ow}) k_{crop} \times ET_j \right\} \geq 0 \qquad \text{(Eq. 3)}$$

where j = cell reference number; i = link reference number; η_j = stage in each cell; $Q_{ji,trib,div}$ = inflow to each storage cell (j) from links (i) and/or tributaries (trib) and/or diversions (div); P_j =

precipitation rate on each cell; d_i = water depth in link (i); ET_j = evapotranspiration rate on each cell; As_j = surface area of each storage cell; Run_j = runoff contribution for each cell; A_i = cross-sectional area of each link; k_{im} = eddy loss coefficients in each link (internal energy losses due to generation of turbulence); n_i = Manning's roughness coefficient for each link; L_i = length of each link; R_i = hydraulic radius of each link; the function *sign* assigns a negative or positive value to 1 depending on the value in the brackets; A_{dj} = hydraulically connected area for each cell; k_{ow}= fraction of open water in A_{dj}; and k_{crop} = crop factor (0.1 to 1).

The mass balance equations for salinity and suspended solids are given in Eqs. 4 and 5, respectively.

$$\frac{dCS_j}{dt} + \frac{CS_j \eta_j'}{y_j} = \frac{\sum CS_{i,trib} Q_{i,trib}}{y_j As_j} - k_{dis}\left(\frac{A_i}{L_i}\right)\left(\frac{CS_j - CS_{j,nb}}{y_j As_j}\right) \quad \text{(Eq. 4)}$$

$$\frac{dCSS_j}{dt} + \frac{CSS_j \eta_j'}{y_j} = \frac{\sum CSS_{i,trib,div} Q_{i,trib,div}}{y_j A_j} - \frac{k_{set} Vs CSS_j}{y_j} + \frac{k_{rs} k_{rsc} d_{ref} Vw^2 - k_{ls} CSS_j y_j}{2 y_j{}^2 T_{res}} - k_{dis}\left(\frac{A_i}{L_i}\right)\left(\frac{CSS_j - CSS_{j,nb}}{y_j As_j}\right) + G_s \quad \text{(Eq. 5)}$$

where CS_j = salinity concentration in each cell; $CS_{i,trib}$ = salinity concentration from each link and tributary; y_j = depth in each storage cell; k_{dis} = dispersion coefficient; A_i = area of each link; L_i = length of each link; $CS_{j,nb}$ = salinity concentration in neighboring cells; η_j' = rate of rise of stage in each cell; CSS_j = suspended sediment concentration in each cell; $CSS_{i,trib,div}$ = suspended sediment concentration from each link, tributary and diversion; k_{set} =settling velocity calibration factor; Vs = settling velocity; k_{rs} = wind resuspension coefficient; k_{rsc} = wind resuspension calibration factor; d_{ref} = reference depth; Vw = wind speed; k_{ls} = suspended sediments boundary calibration factor; T_{res} = residence time; $CSS_{j,nb}$ = suspended sediment concentration in neighboring cells; and G_s = area based internal source generation rate such as shell fish production with units of mass per unit volume per unit time. The sedimentation general parameters were: the reference depth (d_{ref}) = 4.0 m; settling velocity (Vs) = 8 m/d (Miller et al.,

2005); and the area based internal source generation rate (G_s) is about 30 g/m^3/year (USACE, 1984).

All numerical integrations were made using the Euler method with a time step on the order of 60 seconds. A hybrid upwinding and central differencing numerical integration solution scheme was used to solve the advective transport of salinity, suspended sediment and chemical constituents. A central difference/upwinding calibration factor was used to determine the weighting between each solution method where 1 = pure upwinding and 0.5 = central differencing. A pure central difference scheme produced oscillations that were unrealistic while pure upwinding resulted in so much numerical dispersion that the model became insensitive to realistic eddy dispersivities. Based on a sensitivity study it was found that a weighting factor of 0.5009 introduced sufficient upwinding to prevent instability but still retain most of the second order accuracy of the central differencing method without introducing excessive numerical dispersion. Since the weighting factor is very close to 0.5, the model can be considered to be a central difference scheme and as such it is second order accurate. The control volume approach ensures conservation of mass, such that any quantity leaving through a face of one cell is the same as that entering the adjoining cell. The scheme was applied to internal links and seaward open boundaries but not to the inflow boundaries. The diffusive fluxes were computed using central differencing.

MASS BALANCE OF FLOW, NUTRIENTS AND SUSPENDED SEDIMENTS

Alternatives

Two Alternative diversion scenarios have been considered:

1. A diversion of an average of 1000 cfs at or near the existing Violet Syphon during all months except April and May when the Diversion would be in the range 5000 to 7000 cfs; the large gap between MRGO and Lake Borgne is left open in this Alternative.
2. A diversion of an average of 1000 cfs at or near the existing Violet Syphon during all months except April and May when the Diversion would be in the range 5000 to 7000 cfs; the large gap between MRGO and Lake Borgne is blocked in this Alternative.

Figure 1 shows a schematic organization chart for the flow distribution from the Violet diversion. It is assumed that the nutrients can be represented by dissolved inorganic nitrogen (DIN) as a surrogate. It is also assumed that the suspended solids are of two types: sand and fines (silt and clay), The sand load is assumed to be deposited near the diversion; only the fines are included in the following computations.

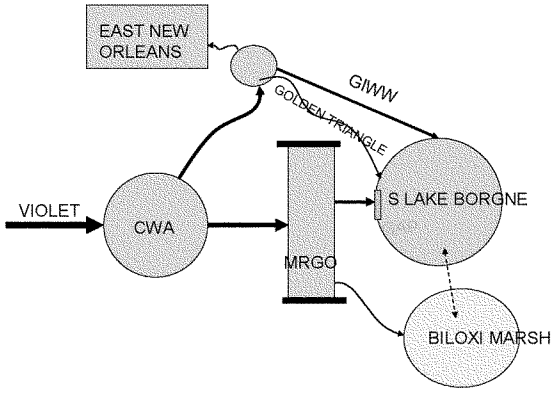


Figure 1. System Compartments

Distribution of Violet Diversion Water

The calibrated link-node model was used to estimate the flow distribution for Alternatives 1 and 2.

Alternative 1: The second column of the first half of Table 1 shows the percentage of the Violet flow that reaches the various compartments for flows up to 2000 cfs for Alternative 1.Table 1

indicates that about 68% of the flow that enters the CWA leaves via the Bayou Dupre structure and 32% leaves by Bayou Bienvenue. The flow from Bayou Bienvenue is split three ways in terms of the original Violet flow, 9% goes to East New Orleans toward Lake Pontchartrain, 4% goes to the Golden Triangle and 19% travels eastward to Lake Borgne. Of the water that leaves through Bayou Dupre approximately 6% of the Violet flow goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (62%). A total of about 85% of the Violet flow eventually enters South Lake Borgne. Table 2 presents similar information for a diversion of about 6000 cfs; the flow distribution is not too sensitive to the magnitude of the diversion up to about 6000 cfs. Figure 2 shows the distribution of the Violet diversion water for Alternative 1.

Alternative 2: The second column of the second half of Table 1 shows the percentage of the Violet flow that reaches the various compartments for flows up to 2000 cfs for Alternative 2. Table 1 indicates that about 68% of the flow that enters the CWA leaves via the Bayou Dupre structure and 32% leaves by Bayou Bienvenue. The flow from Bayou Bienvenue is split three ways in very similar distribution to Alternative 1. Of the water that leaves through Bayou Dupre approximately 34% of the Violet flow goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (34%). A total of about 57% of the Violet flow eventually enters South Lake Borgne. Table 2 presents similar information for a diversion of about 6000 cfs. Figure 3 shows the distribution of the Violet diversion water for Alternative 2.

Distribution of DIN in the Violet Diversion

It is assumed that the nutrients are transported by the net flow as calculated by the link-node model which was used to estimate the flow distribution for Alternatives 1 and 2. The delivery of Dissolved Inorganic Nitrogen (DIN) depends on the flow distribution and the uptake or conversion of DIN along the pathway. Based on our modelling of Lake Pontchartrain we made two assumptions: a) flow through wetlands can remove about 50% of the DIN at low flows (Roblin 2008 based on work by Day et al on the 1994 Bonnet Carré experimental opening) and b) the DIN update is reduced as the flow increases above some limit (1000-2000 cfs in this analysis).

Alternative 1: The third column of the first half of Table 1 shows the percentage of the Violet DIN load that reaches the various compartments for flows up to 2000 cfs for Alternative 1. Column 4 shows that estimate percentage loss or update of DIN in a particular compartment in terms of DIN load entering the CWA. Table 1 indicates that about 34% of the DIN that enters the CWA leaves via the Bayou Dupre structure and 16% leaves by Bayou Bienvenue. The flow from Bayou Bienvenue is split three ways and in terms of the original Violet DIN load:

4.5% goes to East New Orleans toward Lake Pontchartrain
2% goes to the Golden Triangle and
9.5% travels eastward along the GIWW to Lake Borgne.

Of the DIN that leaves through Bayou Dupre approximately 3% of the Violet DIN load goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (31%). A total of about 41% of the Violet DIN load eventually enters South Lake Borgne. Table 2 shows the estimates for DIN for a diversion of the order of 6000 cfs from Violet. The uptakes are considerably less because the detention times are reduced. Above 2000 cfs, it is assumed that the uptake rates are proportional to the diversion flow divided by the 2000 cfs.

Alternative 2: The third column of the second half of Table 1 shows the percentage of the Violet DIN load that reaches the various compartments for flows up to 2000 cfs for Alternative 2. Column 4 shows that the estimated percentage loss or uptake of DIN in a particular compartment in terms of DIN load entering the CWA. Table 1 indicates that about 34% of the DIN that enters the CWA leaves via the Bayou Dupre structure and 16% leaves by Bayou Bienvenue.

As in Alternative 1, the flow from Bayou Bienvenue is split three ways and in terms of the original Violet DIN load:

4.5% goes to East New Orleans toward Lake Pontchartrain
2% goes to the Golden Triangle and
9.5% travels eastward along the GIWW to Lake Borgne.

Of the DIN that leaves through Bayou Dupre approximately 17% of the Violet DIN load goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (~17%). A total of about 27% of the Violet DIN load eventually enters South Lake Borgne through the Bayou Dupre route and the Bayou Bienvenue route. Table 2 shows the estimates for DIN for a diversion of the order of 6000 cfs from Violet.

Distribution of Fine SS in the Violet Diversion

The delivery of SS depends on the flow distribution and the deposition rates along the pathway. Based on our modelling of Lake Pontchartrain, we have estimated that at low flows about 30% of the fine sediment will be deposited in the wetland compartments and at high flows this will be proportional to the diversion flow divided by the 2000 cfs. It is assumed that the deposition in the channels is very small O(1%) or less.

Alternative 1: The fifth column of the first half of Table 1 shows the percentage of the Violet fine suspended sediment (SS) load that reaches the various compartments for flows up to 2000 cfs for Alternative 1. The last column (6) shows the estimated percentage deposition of SS in a particular compartment in terms of SS load entering the CWA. Table 1 indicates that about 48% of the SS that enters the CWA leaves via the Bayou Dupre structure and 22% leaves by Bayou Bienvenue. The flow from Bayou Bienvenue is split three ways and in terms of the original Violet SS load:

6% goes to East New Orleans toward Lake Pontchartrain,

3% goes to the Golden Triangle and

13% travels eastward in the GIWW to Lake Borgne.

Of the water that leaves through Bayou Dupre approximately 3% of the Violet flow goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (~45%). A total of about 58% of the Violet SS load eventually enters South Lake Borgne. Table 2 shows that same estimates for SS for a diversion of the order of 6000 cfs from Violet.

Alternative 2: The fifth column of the second half of Table 1 shows the percentage of the Violet fine suspended sediment (SS) load that reaches the various compartments for flows up to 2000 cfs for Alternative 2. The last column (6) shows the estimated percentage deposition of SS in a particular

compartment in terms of SS load entering the CWA. Table 1 indicates that about 48% of the SS that enters the CWA leaves via the Bayou Dupre structure and 22% leaves by Bayou Bienvenue. The SS from Bayou Bienvenue is split three ways and in terms of the original Violet SS load:

~6% goes to East New Orleans toward Lake Pontchartrain,

~3% goes to the Golden Triangle and

~13% travels eastward in the GIWW to Lake Borgne.

Of the SS that leaves through Bayou Dupre approximately 23% of the Violet SS load goes directly to the Biloxi Marsh while the rest goes directly to Lake Borgne (~23%). A total of about 38% of the Violet SS load eventually enters South Lake Borgne. Table 2 shows that similar estimates for SS for a diversion of the order of 6000 cfs from Violet.

Alex McCorquodale September 2, 2009

Table 1. Mass Balance of Water, DIN and Fine Suspended Sediments from Violet Diversion for a Diversion of up to 2000 cfs for Alternatives 1 and 2

Alternative	1	Flows <= 2000 cfs			
System Compartment	*% of Violet Flow Delivered*	*% of Violet DIN Delivered*	*DIN Uptake %*	*TSS % Delivered*	*TSS deposited %*
CWA	100	100	50.0	100	30
Bayou Dupre	68.0	34.0	0.0	47.6	0.0
Bayou Bienvenue	32.0	16.0	0.0	22.4	0.0
GIWW E. New Orleans	9.0	4.5	4.5	6.3	6.3
Golden Triangle	4.0	2.0	1.0	2.8	0.8
GIWW East	19.0	9.5	0.2	13.3	1.0
MRGO	68.0	34.0	0.2	47.6	1.0
S. Lake Borgne	85.0	41.1	41.1	57.9	57.9
Biloxi Marsh Direct	6.0	3.0	3.0	2.9	2.9
Uptake %			100.0		100

Alternative	2	Flows <= 2000 cfs			
System Compartment	*% of Violet Flow Delivered*	*% of Violet DIN Delivered*	*DIN Uptake %*	*TSS % Delivered*	*TSS deposited %*
CWA	100	100	50.0	100	30
Bayou Dupre	68.0	34.0	0.0	47.6	0.0
Bayou Bienvenue	32.0	16.0	0.0	22.4	0.0
GIWW E. New Orleans	9.0	4.5	4.5	6.3	6.3
Golden Triangle	4.0	2.0	1.0	2.8	0.8
GIWW East	19.0	9.5	0.2	13.3	1.0
MRGO	68.0	34.0	0.2	47.6	1.0
S. Lake Borgne	57.0	27.1	27.1	37.6	37.6
Biloxi Marsh Direct	34.0	17.0	17.0	23.3	23.3
			100		100
		fDIN	50%	fTSS	30%

Table 2. Mass Balance of Water, DIN and Fine Suspended Sediments from Violet Diversion for a Diversion of approximately 6000 cfs for Alternatives 1 and 2.

Alternative	1	Flows ~ 6000 cfs

System Compartment	*% of Violet Flow Delivered*	*% of Violet DIN Delivered*	*DIN Uptake %*	*TSS % Delivered*	*TSS deposited %*
CWA	100	100	17	100	10
Bayou Dupre	68.0	56.4	0.0	61.2	0.0
Bayou Bienvenue	32.0	26.6	0.0	28.8	0.0
GIWW E. New Orleans	9.0	7.5	7.5	8.1	8.1
Golden Triangle	4.0	3.3	0.6	3.6	0.4
GIWW East	19.0	15.8	0.5	17.1	0.5
MRGO	68.0	56.4	0.5	61.2	0.5
S. Lake Borgne	85.0	69.0	69.0	75.4	75.4
Biloxi Marsh Direct	6.0	5.0	5.0	5.2	5.2
Uptake %			100		100

Alternative 2 Flows ~ 6000 cfs

System Compartment	*% of Violet Flow Delivered*	*% of Violet DIN Delivered*	*DIN Uptake %*	*TSS % Delivered*	*TSS deposited %*
CWA	100	100	17	100	10
Bayou Dupre	68.0	56.4	0.0	61.2	0.0
Bayou Bienvenue	32.0	26.6	0.0	28.8	0.0
GIWW E. New Orleans	9.0	7.5	7.5	8.1	8.1
Golden Triangle	4.0	3.3	1.7	3.6	0.4
GIWW East	19.0	15.8	0.5	17.1	0.5
MRGO	68.0	56.4	0.5	61.2	0.5
S. Lake Borgne	57.0	44.7	44.7	50.2	50.2
Biloxi Marsh Direct	34.0	28.2	28.2	30.4	30.4
			100		100
		fDIN	17%	fTSS	10.0%

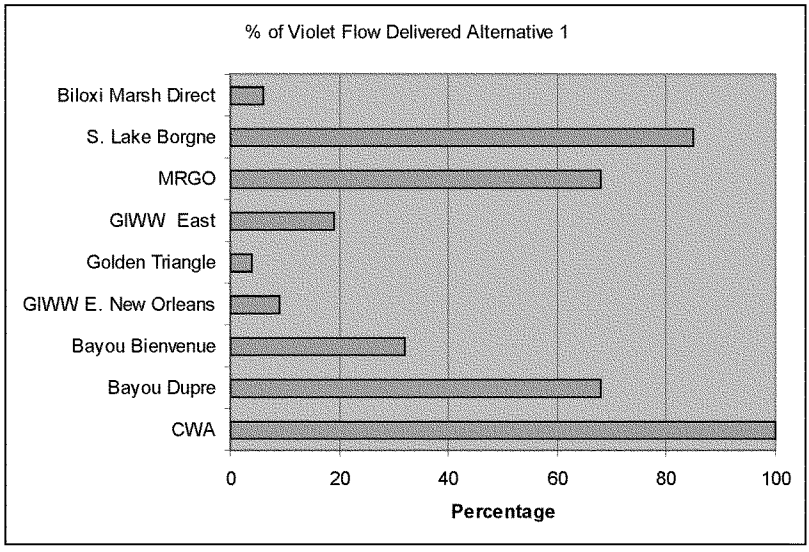


Figure 2 Percent of Flow Delivered in Alternative 1

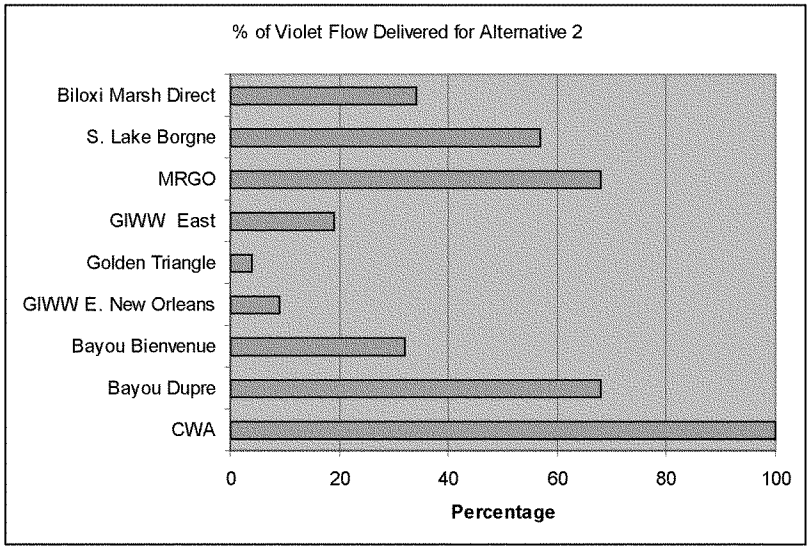


Figure 3 Percent of Flow Delivered in Alternative 2

APPENDIX D

UNO MASS BALANCE
MODEL GEOMETRY DETAILS

The constants k_m, k_{en} and k_{ex} represent the minor loss coefficient due to structures, the entrance loss coefficient and the exit loss coefficient in each link respectively. The constant E represents a dispersion factor.

This appendix includes a table of cell input attributes and the calibration factors. Graphic representations of the cell-link for the alternatives are included.

Table of Cell Attributes

Cell No.	Cell Name	Surface Area (As_j in km^2)	Depth (m)	Hydraulically Connected Area (A_{dj} in km^2)	Percent Open Water	Initial Salinity (CS_j in ppt)	Fetch (km)
1	LB N	325	2.8	50	15	0	18
2	LB S	340	2.7	50	15	0	18
3	LP E	200	2.6	150	15	0	14
4	LP SE	350	3.8	10	10	0	19
5	LP NE	350	4	15	20	0	19
6	LP NW	350	3.5	15	20	0	19
7	LM	350	3.5	25	20	0	19
8	MRGO BM	55	6.5	50	20	0	1
9	MRGO N	50	6.5	50	20	0	1
10	LP SW	350	3.2	2.5	20	0	19
11	Caern E	190	1	520	15	0	14
12	Caern BS	525	1.7	195	50	0	23
13	BM N	85	1.1	55	45	0	9
14	B. St. L	575	3.5	5	50	0	24
15	BS nr MR	640	2	50	15	0	25
16	SE of BM	1120	1.5	50	15	0	33
17	NE of BM	1340	2	50	15	0	37
18	Biloxi R	700	2.6	2.5	75	0	26
19	Off Bara	2500	8	520	40	0	50
20	Off P a Loutre	3015	15	50	15	0	55
21	Off HOP E	2880	20	550	20	0	54
22	Off Pasc R	3850	20	50	15	0	62
23	Off Delta S	3075	100	50	15	0	55
24	Deep Gulf	2900	100	50	15	0	54
25	Off Mobile R	2990	100	50	15	0	55
26	Mobile R	1030	4	50	15	0	32
27	Pascag R	800	3.1	50	25	0	28
28	MRGO S	500	4.2	10	50	0	22
29	Off Bara	3000	100	1	50	0	55
30	Above HOP E	400	1	500	20	0	20
31	MR Delta W	1200	5	1220	20	0	35
32	Deep Gulf	3000	50	1	50	0	55
33	E MR Delta	420	1	400	10	0	20
34	Bara B	68.9	3.4	140.9	33	0	8
35	Bara B	94.9	1.3	16.3	85	0	10
36	Bara B	102.1	1.9	18.4	85	0	10
37	Bara B	46.7	1.4	3	94	0	7

Cell No.	Cell Name	Surface Area (As_j in km^2)	Depth (m)	Hydraulically Connected Area (A_{dj} in km^2)	Percent Open Water	Initial Salinity (CS_j in ppt)	Fetch (km)
38	BARA Est	118.1	1	16.7	88	0	5
39	BARA Est	222.7	1.4	144	20	0	7
40	BARA Est	174.8	0.8	91.8	66	0	6
41	BARA Est	133.2	1.6	43	76	0	6
42	BARA Est	30	1.2	18.8	61	0	5
43	BARA Est	65.8	0.9	85.1	44	0	8
44	BARA Est	86.2	1.7	38.7	69	0	9
45	BARA Est	57.6	1.5	4.4	93	0	8
46	BARA Est	88.4	1.5	42.8	67	0	9
47	BARA Est	39.5	0.8	101.4	28	0	6
48	BARA Est	211.1	1.4	254.3	45	0	8
49	BARA Est	11.7	2	9.3	56	0	3
50	BARA Est	15.7	1.1	10.7	60	0	4
51	BARA Est	40.9	1.2	76.1	35	0	6
52	BARA Est	10.25	1.3	13	16	0	3
53	BARA Est	16	1.3	23.2	41	0	4
54	BARA Est	6.8	2	65.7	9	0	3
55	BARA Est	65.6	1.8	91.7	42	0	8
56	BARA Est	37.1	1.1	63.1	37	0	6
57	BARA Est	52.6	0.7	85.7	38	0	7
58	BARA Est	120	1.8	160	10	0	8
59	BARA Est	68.5	1.8	56.4	10	0	8
60	BARA Est	10.31	4	27.5	10	0	3
61	BARA Est	11.2	4	101	10	0	3
62	BARA Est	7.3	0.5	128	10	0	3
63	BARA Est	10.8	0.7	246.6	10	0	3
64	BARA Est	17.6	0.7	342.3	10	0	4
65	BARA Est	5.1	4	46.2	10	0	2
66	BARA Est	9.4	4	84.5	10	0	3
67	BARA Est	71.7	2	1212	10	0	8
68	BARA Est	7.9	1.3	43.7	10	0	3
69	BARA Est	7.8	4	70	10	0	3
70	Terreb Est	1400	1	500	20.9	0	30
71	Terreb Est	200	2	4220	10.9	0	7
72	BARA Est	1200	6	1220	1	0	20
73	BM LB	124	1	373	15	0	2
74	BM BS	240	1	260	40	0	5
75	CWA	20	1.5	175	15	0	4

Table of Cell Attributes

Cell No.	Cell Name	Surface Area (As_j in km^2)	Depth (m)	Hydraulically Connected Area (A_{dj} in km^2)	Percent Open Water	Initial Salinity (CS_j in ppt)	Fetch (km)
76	B St L	50	2.5	20	25	0	7
77	Biloxi R	50	2	50	25	0	7
78	BM E	110	1.5	160	50	0	5
79	INTER Caern	250	1	300	30	0	5

Table of Cell Attributes

Calibration Values for Historic

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex}	E
1	1	14	5.5	3000	15000	0.016	0.007	0.25	1	9
2	3	1	10.5	10500	985	0.024	0.075	0.5	2	2500
3	2	1	4.0	15000	15000	0.021	0.007	0.1	1	50
4	3	2	8	7850	360	0.025	0.075	0.5	2	30
5	8	28	6.5	60420	320	0.023	0	0.5	1	100
6	9	8	6.5	20000	300	0.023	0	0.5	1	100
7	9	2	4.05	12000	150	0.03	0	0.5	2	55
8	4	9	8.5	15000	150	0.025	0.1	0.5	19	350
9	5	3	3	20000	20000	0.023	0	0.025	0.25	155
10	5	4	4.3	40000	40000	0.02	0	0.02	0.25	195
11	6	5	3.9	40000	20000	0.02	0	0.5	1	46
12	7	6	8.1	8800	395	0.024	0	0.5	1	200
13	8	2	3	2000	50	0.03	0	0.5	1	2
14	10	6	3.7	20000	20000	0.025	0	0.02	0.25	56
15	10	4	3.9	40009	20000	0.025	0	0.02	0.25	56
16	1	13	2.1	14500	1000	0.04	0	0.02	1.25	651
17	14	18	5	10000	20000	0.015	0	0.02	0.25	56
18	18	27	5	15000	20000	0.02	0	0.02	0.25	26
19	27	26	5	20000	20000	0.032	0	0.02	0.25	16
20	26	25	5	5000	4000	0.032	0	0.02	0.25	116
21	2	73	1	5000	650	0.075	0	0.02	0.25	271
22	14	13	1	5000	400	0.08	0	0.02	0.25	201
23	14	17	6	3000	7500	0.02	0	0.08	0.25	150
24	78	17	2	3500	5000	0.058	0	0.12	0.25	200
25	17	22	11.	10000	10000	0.018	0	0.02	0.25	201
26	27	22	5	5000	10000	0.023	0	0.02	0.25	16
27	22	25	19	30000	55000	0.02	0	0.02	0.25	151
28	74	16	1	4000	500	0.045	0	0.038	0.25	20
29	16	17	4.6	20000	15000	0.022	0	0.02	0.25	251
30	16	21	11.5	3000	18000	0.02	0	0.02	0.25	101
31	21	22	8	20000	15000	0.02	0	0.02	0.25	251
32	21	24	21	30000	60000	0.02	0	0.02	0.25	501
33	24	25	11	30000	20000	0.02	0	0.02	0.25	501
34	28	20	5	20000	4000	0.02	0	0.02	0.25	16
35	28	16	5	20000	10000	0.02	0	0.02	0.25	500
36	15	28	5	20000	10000	0.018	0	0.02	0.25	500
37	28	74	2	20000	10000	0.08	0	0.02	0.25	200
38	20	21	8	20000	15000	0.018	0	0.02	0.25	506
39	20	23	21	30000	50000	0.018	0	0.02	0.25	501
40	23	24	15	30000	20000	0.02	0	0.02	0.25	501

Calibration Values for Historic

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex}	E
41	11	79	1	10000	6400	0.04	0	0.02	0.25	126
42	12	15	2.7	20000	25000	0.022	0	0.02	0.25	501
43	15	20	4	10000	5000	0.032	0	0.02	0.25	501
44	20	31	6	10000	5000	0.032	0	0.02	0.25	501
45	23	32	25	45000	25000	0.032	0	0.02	0.25	151
46	19	29	16	20000	20000	0.03	0	0.02	0.25	151
47	73	74	1	5000	1000	0.1	0	0.12	0.25	200
48	18	17	2	15000	15000	0.023	0	0.02	0.25	151
49	30	15	2	8000	2000	0.023	0	0.032	0.25	251
50	33	20	3	10000	20000	0.023	0	0.02	0.25	201
51	12	30	5	20000	300	0.02	0	0.02	0.25	351
52	32	29	5	20000	20000	0.032	0	0.02	0.25	1501
53	31	19	5	20000	20000	0.032	0	0.02	0.25	1501
54	31	32	4	20000	45000	0.033	0	0.02	0.25	201
55	25	101	30	30000	20000	0.028	0	0.02	0.25	1001
56	24	102	30	30000	20000	0.03	0	0.02	0.25	1001
57	23	103	30	30000	20000	0.03	0	0.02	0.25	1001
58	29	104	28	30000	20000	0.03	0	0.02	0.25	1501
59	32	105	27	30000	20000	0.03	0	0.02	0.25	1501
60	9	2	1.5	15000	50	0.041	0	0.12	1	175
61	34	19	2	5000	100	0.035	0	0.12	1	51
62	35	19	4	2000	800	0.025	0	0.12	1	51
63	36	19	18	1000	700	0.025	0	0.12	1	51
64	37	19	6	2000	2300	0.035	0	0.12	1	51
65	38	19	8.5	2000	1900	0.025	0	0.12	1	51
66	35	19	7	2000	870	0.035	0	0.12	1	51
67	36	31	6	2000	500	0.05	0	0.12	1	51
68	37	31	6	2000	500	0.05	0	0.12	1	51
69	38	31	6	2000	500	0.05	0	0.12	1	51
70	34	35	1.5	10638	15723	0.025	0	0.12	0.5	60
71	35	36	2	9222	11877	0.025	0	0.12	0.5	84
72	37	36	2	9366	8884	0.025	0	0.12	0.5	87
73	38	37	2	9157	9189	0.025	0	0.12	0.5	83
74	39	38	2	15047	13679	0.025	0	0.12	0.5	201
75	39	40	2	21372	12022	0.025	0	0.12	0.5	327
76	70	72	2	54374	8280	0.025	0	0.12	0.5	1288
77	71	70	1.5	38280	643	0.025	0	0.12	0.5	524
78	40	41	1	15659	3218	0.025	0	0.12	0.5	157
79	41	42	1	10573	9350	0.025	0	0.12	0.5	106
80	43	34	1	16238	11072	0.025	0	0.12	0.5	162
81	43	35	1	10815	6936	0.025	0	0.12	0.5	108
82	44	36	1	11169	10911	0.025	0	0.12	0.5	112

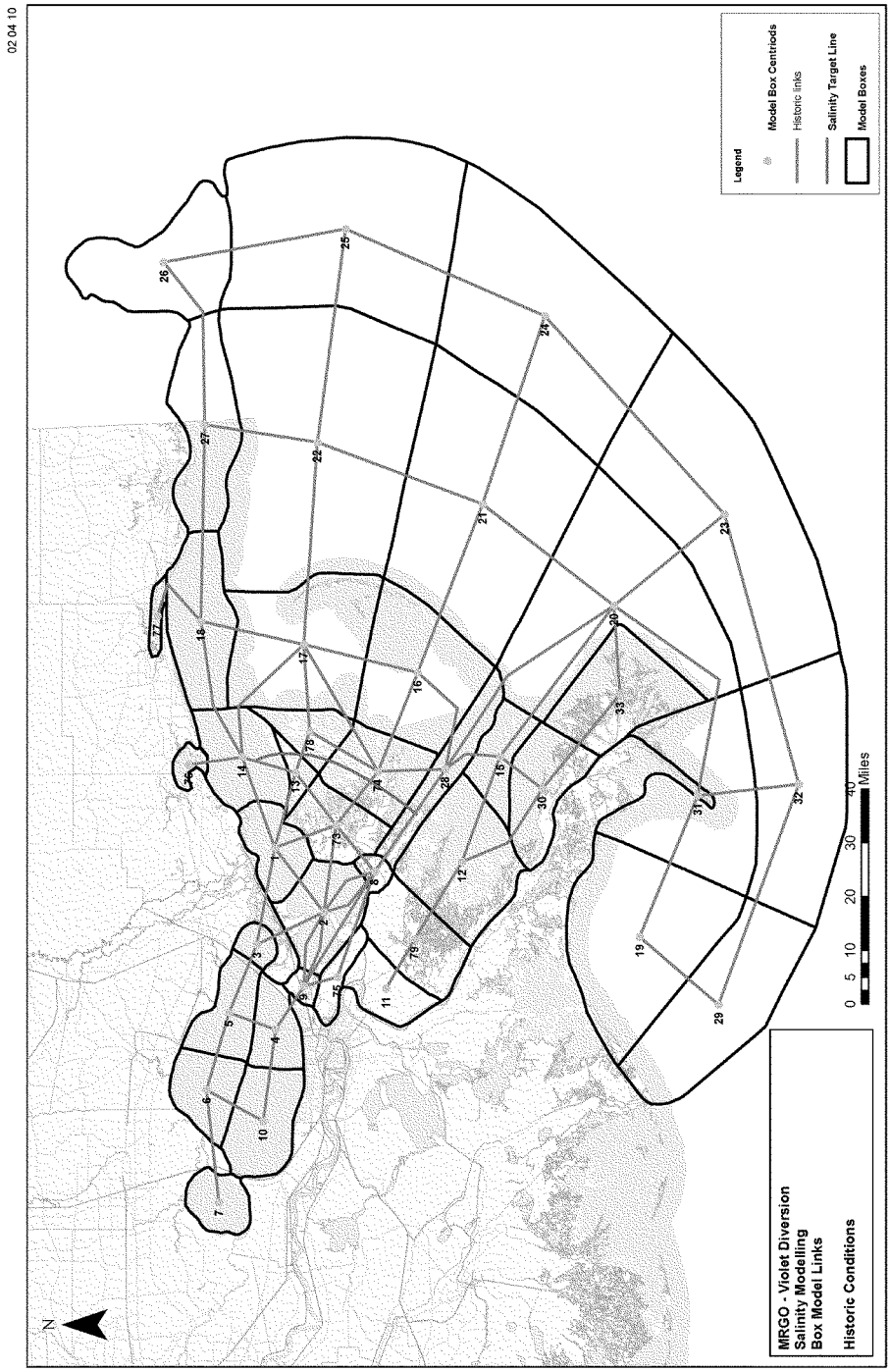
Calibration Values for Historic

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex}	E
83	45	37	1	10026	5279	0.025	0	0.12	0.5	100
84	46	38	1	11426	10364	0.025	0	0.12	0.5	114
85	47	39	1	16093	81	0.025	0	0.12	0.5	160
86	43	44	1	12907	11346	0.025	0	0.12	0.5	129
87	45	44	1	8723	10219	0.025	0	0.12	0.5	87
88	46	45	1	7242	8691	0.025	0	0.12	0.5	72
89	47	46	1	7725	241	0.025	0	0.12	0.5	77
90	48	44	1	4522	3347	0.025	0	0.12	0.5	245
91	49	45	1	5279	1400	0.025	0	0.12	0.5	53
92	50	45	1	2140	81	0.025	0	0.12	0.5	21
93	51	46	1	3444	1448	0.025	0	0.12	0.5	34
94	51	47	1	9061	1062	0.025	0	0.12	0.5	91
95	48	49	1	12778	2044	0.025	0	0.12	0.5	128
96	54	48	1	11475	193	0.025	0	0.12	0.5	115
97	55	48	1	4345	1432	0.025	0	0.12	0.5	44
98	52	49	1	7886	290	0.025	0	0.12	0.5	79
99	53	50	1	7081	708	0.025	0	0.12	0.5	71
100	56	52	1	11459	258	0.025	0	0.12	0.5	115
101	52	53	1	4828	161	0.025	0	0.12	0.5	48
102	53	51	1	1883	274	0.025	0	0.12	0.5	19
103	48	52	1	3267	451	0.025	0	0.12	0.5	33
104	55	56	1	5150	322	0.025	0	0.12	0.5	52
105	56	57	0.2	8964	3380	0.07	0	0.12	0.5	18
106	57	51	0.5	2865	193	0.035	0	0.12	0.5	14
107	57	53	0.5	4989	402	0.05	0	0.12	0.5	25
108	59	55	3	3685	402	0.03	0	0.12	0.5	111
109	58	54	5.5	22128	161	0.025	0	0.12	0.5	114
110	60	55	3.7	7129	2913	0.04	0	0.12	0.5	261
111	61	60	2	4571	81	0.04	0	0.12	0.5	91
112	61	56	1	6759	338	0.04	0	0.12	0.5	68
113	61	57	1	4587	483	0.06	0	0.12	0.5	46
114	65	59	5.5	10252	161	0.025	0	0.12	0.5	163
115	65	61	2	3074	32	0.035	0	0.12	0.5	62
116	66	61	1	2639	16	0.1	0	0.12	0.5	26
117	69	65	3.5	9930	137	0.03	0	0.12	0.5	148
118	64	59	4	3541	644	0.025	0	0.12	0.5	142
119	64	58	4	2816	644	0.025	0	0.12	0.5	113
120	63	58	2	19650	241	0.04	0	0.12	0.5	393
121	62	63	2.1	5343	48	0.024	0	0.12	0.5	53
122	67	63	2	7178	1143	0.024	0	0.12	0.5	144
123	68	64	2	2044	171	0.023	0	0.12	0.5	120
124	58	59	2	12392	10621	0.025	0	0.12	0.5	248

Calibration Values for Historic

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex}	E
125	66	61	4.9	21050	160	0.03	0	0.12	0.5	1027
126	51	50	1	6759	804	0.08	0	0.12	0.5	68
127	59	49	1	6759	1448	0.08	0	0.12	0.5	68
128	72	29	10	20000	10000	0.023	0	0.025	0.25	851
129	72	19	8	20000	15000	0.023	0	0.02	0.25	851
130	72	106	8	20000	12000	0.025	0	0.02	0.25	851
131	74	17	1	5000	100	0.1	0	0.12	0.25	13
132	1	73	1.2	5000	1000	0.05	0	0.12	0.25	235
133	73	13	1.1	5000	1000	0.078	0	0.12	0.25	500
134	74	78	1.1	5000	1000	0.078	0	0.12	0.25	485
135	8	73	1.2	10000	100	0.05	0	0.12	0.25	115
136	8	2	2.3	1000	750	0.023	0	0.12	1.25	135
137	76	14	2.6	4000	2000	0.023	0	0.12	0.25	55
138	77	18	2.3	4000	1000	0.023	0	0.12	0.25	35
139	13	78	1.8	5000	6000	0.035	0	0.02	0.25	141
140	79	12	1.2	10000	6400	0.042	0	0.02	0.25	531
141	75	9	2	15000	50	0.03	0	0.12	10	135
142	75	8	2.5	9500	75	0.03	0	0.5	15	55

Calibration Values for Historic


02.04.10
N
MRGO - Violet Diversion
Salinity Modelling
Box Model Links
Historic Conditions
0 5 10 20 30 40 Miles
Legend
Model Box Centroids
Historic links
Salinity Target Line
Model Boxes

CALIBRATION ALUES FOR FWOP

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex}	E
1	1	14	5.5	3000	15000	0.016	0.007	0.25	1	9
2	3	1	10.5	10500	985	0.024	0.075	0.5	2	2500
3	2	1	4.0	15000	15000	0.021	0.007	0.1	1	50
4	3	2	8	7850	360	0.025	0.075	0.5	1.95	30
5	8	28	6.5	60420	320	CLOSED	0	0.5	1	1
6	9	8	6.5	20000	300	CLOSED	0	0.5	1	1
7	9	2	4.0	12000	150	0.03	0	0.5	10	55
8	4	9	8.5	15000	155	0.025	0.1	0.5	19	350
9	5	3	3	20000	20000	0.023	0	0.025	0.25	155
10	5	4	4.3	40000	40000	0.02	0	0.02	0.25	195
11	6	5	3.9	40000	20000	0.02	0	0.5	1	46
12	7	6	8.1	8800	395	0.024	0	0.5	1	200
13	75	2	3	10500	300	0.03	0	0.5	1	100
14	10	6	3.7	20000	20000	0.025	0	0.02	0.25	56
15	10	4	3.9	40009	20000	0.025	0	0.02	0.25	56
16	1	13	2.1	14500	1000	0.04	0	0.02	1.25	651
17	14	18	5	10000	20000	0.015	0	0.02	0.25	56
18	18	27	5	15000	20000	0.02	0	0.02	0.25	26
19	27	26	5	20000	20000	0.032	0	0.02	0.25	16
20	26	25	5	5000	4000	0.032	0	0.02	0.25	116
21	2	73	1	5000	650	0.075	0	0.02	0.25	271
22	14	13	1	5000	400	0.08	0	0.02	0.25	201
23	14	17	6	3000	7500	0.02	0	0.08	0.25	150
24	78	17	2	3500	5000	0.058	0	0.12	0.25	200
25	17	22	11.	10000	10000	0.018	0	0.02	0.25	201
26	27	22	5	5000	10000	0.023	0	0.02	0.25	16
27	22	25	19	30000	55000	0.02	0	0.02	0.25	151
28	74	16	1	4000	500	0.045	0	0.038	0.25	20
29	16	17	4.6	20000	15000	0.022	0	0.02	0.25	251
30	16	21	11.	3000	18000	0.02	0	0.02	0.25	101
31	21	22	8	20000	15000	0.02	0	0.02	0.25	251
32	21	24	21	30000	60000	0.02	0	0.02	0.25	501
33	24	25	11	30000	20000	0.02	0	0.02	0.25	501
34	28	20	5	20000	4000	0.02	0	0.02	0.25	16
35	28	16	5	20000	10000	0.02	0	0.02	0.25	500
36	15	28	5	20000	10000	0.018	0	0.02	0.25	500
37	28	74	2	20000	10000	0.08	0	0.02	0.25	200
38	20	21	8	20000	15000	0.018	0	0.02	0.25	506
39	20	23	21	30000	50000	0.018	0	0.02	0.25	501

FWOP – LAKE BORGNE OPEN

40	23	24	15	30000	20000	0.02	0	0.02	0.25	501
41	11	79	1	10000	6400	0.04	0	0.02	0.25	126
42	12	15	2.7	20000	25000	0.022	0	0.02	0.25	501
43	15	20	4	10000	5000	0.032	0	0.02	0.25	501
44	20	31	6	10000	5000	0.032	0	0.02	0.25	501
45	23	32	25	45000	25000	0.032	0	0.02	0.25	151
46	19	29	16	20000	20000	0.03	0	0.02	0.25	151
47	73	74	1	5000	1000	0.1	0	0.12	0.25	200
48	18	17	2	15000	15000	0.023	0	0.02	0.25	151
49	30	15	2	8000	2000	0.023	0	0.032	0.25	251
50	33	20	3	10000	20000	0.023	0	0.02	0.25	201
51	12	30	5	20000	300	0.02	0	0.02	0.25	351
52	32	29	5	20000	20000	0.032	0	0.02	0.25	1501
53	31	19	5	20000	20000	0.032	0	0.02	0.25	1501
54	31	32	4	20000	45000	0.033	0	0.02	0.25	201
55	25	101	30	30000	20000	0.028	0	0.02	0.25	1001
56	24	102	30	30000	20000	0.03	0	0.02	0.25	1001
57	23	103	30	30000	20000	0.03	0	0.02	0.25	1001
58	29	104	28	30000	20000	0.03	0	0.02	0.25	1501
59	32	105	27	30000	20000	0.03	0	0.02	0.25	1501
60	9	2	1.5	15000	50	0.041	0	0.12	20	175
61	34	19	2	5000	100	0.035	0	0.12	1	51
62	35	19	4	2000	800	0.025	0	0.12	1	51
63	36	19	18	1000	700	0.025	0	0.12	1	51
64	37	19	6	2000	2300	0.035	0	0.12	1	51
65	38	19	8.5	2000	1900	0.025	0	0.12	1	51
66	35	19	7	2000	870	0.035	0	0.12	1	51
67	36	31	6	2000	500	0.05	0	0.12	1	51
68	37	31	6	2000	500	0.05	0	0.12	1	51
69	38	31	6	2000	500	0.05	0	0.12	1	51
70	34	35	1.5	10638	15723	0.025	0	0.12	0.5	60
71	35	36	2	9222	11877	0.025	0	0.12	0.5	84
72	37	36	2	9366	8884	0.025	0	0.12	0.5	87
73	38	37	2	9157	9189	0.025	0	0.12	0.5	83
74	39	38	2	15047	13679	0.025	0	0.12	0.5	201
75	39	40	2	21372	12022	0.025	0	0.12	0.5	327
76	70	72	2	54374	8280	0.025	0	0.12	0.5	1288
77	71	70	1.5	38280	643	0.025	0	0.12	0.5	524
78	40	41	1	15659	3218	0.025	0	0.12	0.5	157
79	41	42	1	10573	9350	0.025	0	0.12	0.5	106
80	43	34	1	16238	11072	0.025	0	0.12	0.5	162
81	43	35	1	10815	6936	0.025	0	0.12	0.5	108
82	44	36	1	11169	10911	0.025	0	0.12	0.5	112

FWOP – LAKE BORGNE OPEN

83	45	37	1	10026	5279	0.025	0	0.12	0.5	100
84	46	38	1	11426	10364	0.025	0	0.12	0.5	114
85	47	39	1	16093	81	0.025	0	0.12	0.5	160
86	43	44	1	12907	11346	0.025	0	0.12	0.5	129
87	45	44	1	8723	10219	0.025	0	0.12	0.5	87
88	46	45	1	7242	8691	0.025	0	0.12	0.5	72
89	47	46	1	7725	241	0.025	0	0.12	0.5	77
90	48	44	1	4522	3347	0.025	0	0.12	0.5	245
91	49	45	1	5279	1400	0.025	0	0.12	0.5	53
92	50	45	1	2140	81	0.025	0	0.12	0.5	21
93	51	46	1	3444	1448	0.025	0	0.12	0.5	34
94	51	47	1	9061	1062	0.025	0	0.12	0.5	91
95	48	49	1	12778	2044	0.025	0	0.12	0.5	128
96	54	48	1	11475	193	0.025	0	0.12	0.5	115
97	55	48	1	4345	1432	0.025	0	0.12	0.5	44
98	52	49	1	7886	290	0.025	0	0.12	0.5	79
99	53	50	1	7081	708	0.025	0	0.12	0.5	71
100	56	52	1	11459	258	0.025	0	0.12	0.5	115
101	52	53	1	4828	161	0.025	0	0.12	0.5	48
102	53	51	1	1883	274	0.025	0	0.12	0.5	19
103	48	52	1	3267	451	0.025	0	0.12	0.5	33
104	55	56	1	5150	322	0.025	0	0.12	0.5	52
105	56	57	0.2	8964	3380	0.07	0	0.12	0.5	18
106	57	51	0.5	2865	193	0.035	0	0.12	0.5	14
107	57	53	0.5	4989	402	0.05	0	0.12	0.5	25
108	59	55	3	3685	402	0.03	0	0.12	0.5	111
109	58	54	5.5	22128	161	0.025	0	0.12	0.5	114
110	60	55	3.7	7129	2913	0.04	0	0.12	0.5	261
111	61	60	2	4571	81	0.04	0	0.12	0.5	91
112	61	56	1	6759	338	0.04	0	0.12	0.5	68
113	61	57	1	4587	483	0.06	0	0.12	0.5	46
114	65	59	5.5	10252	161	0.025	0	0.12	0.5	163
115	65	61	2	3074	32	0.035	0	0.12	0.5	62
116	66	61	1	2639	16	0.1	0	0.12	0.5	26
117	69	65	3.5	9930	137	0.03	0	0.12	0.5	148
118	64	59	4	3541	644	0.025	0	0.12	0.5	142
119	64	58	4	2816	644	0.025	0	0.12	0.5	113
120	63	58	2	19650	241	0.04	0	0.12	0.5	393
121	62	63	2.1	5343	48	0.024	0	0.12	0.5	53
122	67	63	2	7178	1143	0.024	0	0.12	0.5	144
123	68	64	2	2044	171	0.023	0	0.12	0.5	120
124	58	59	2	12392	10621	0.025	0	0.12	0.5	248
125	66	61	4.9	21050	160	0.03	0	0.12	0.5	1027

FWOP – LAKE BORGNE OPEN

126	51	50	1	6759	804	0.08	0	0.12	0.5	68
127	59	49	1	6759	1448	0.08	0	0.12	0.5	68
128	72	29	10	20000	10000	0.023	0	0.025	0.25	851
129	72	19	8	20000	15000	0.023	0	0.02	0.25	851
130	72	106	8	20000	12000	0.025	0	0.02	0.25	851
131	74	17	1	5000	100	0.1	0	0.12	0.25	13
132	1	73	1.2	5000	1000	0.05	0	0.12	0.25	235
133	73	13	1.1	5000	1000	0.078	0	0.12	0.25	500
134	74	78	1.1	5000	1000	0.078	0	0.12	0.25	485
135	8	73	1.2	15000	100	0.05	0	0.12	0.25	115
136	8	2	2.3	1000	750	0.023	0	0.12	1.25	135
137	76	14	2.6	4000	2000	0.023	0	0.12	0.25	55
138	77	18	2.3	4000	1000	0.023	0	0.12	0.25	35
139	13	78	1.8	5000	6000	0.035	0	0.02	0.25	141
140	79	12	1.2	10000	6400	0.042	0	0.02	0.25	531
141	75	9	2	15000	50	0.03	0	0.12	10	135
142	75	8	2.5	10000	50	0.03	0	0.5	10	155
143	30	33	1.1	30000	5000	0.05	0	0.5	1	100
144	15	28	3.0	3000	78	0.05	0	0.5	1	100
145	75	8	4.1	10000	170	CLOSED	0	0.5	1	155

FWOP – LAKE BORGNE OPEN

CALIBRATION VALUES FOR ALTERNATIVE 1

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex} E	
1	1	14	5.5	3000	15000	0.016	0.007	0.25	1	9
2	3	1	10.5	10500	985	0.024	0.075	0.5	2	2500
3	2	1	4.0	15000	15000	0.021	0.007	0.1	1	50
4	3	2	8	7850	360	0.025	0.075	0.5	1.95	30
5	8	28	6.5	60420	320	CLOSED	0	0.5	1	1
6	9	8	6.5	20000	300	CLOSED	0	0.5	1	1
7	9	2	4.05	12000	150	0.03	0	0.5	10	55
8	4	9	8.5	15000	150	0.025	0.1	0.5	19	350
9	5	3	3	20000	20000	0.023	0	0.025	0.25	155
10	5	4	4.3	40000	40000	0.02	0	0.02	0.25	195
11	6	5	3.9	40000	20000	0.02	0	0.5	1	46
12	7	6	8.1	8800	395	0.024	0	0.5	1	200
13	8	2	3	2000	50	0.03	0	0.5	1	2
14	10	6	3.7	20000	20000	0.025	0	0.02	0.25	56
15	10	4	3.9	40009	20000	0.025	0	0.02	0.25	56
16	1	13	2.1	14500	1000	0.04	0	0.02	1.25	651
17	14	18	5	10000	20000	0.015	0	0.02	0.25	56
18	18	27	5	15000	20000	0.02	0	0.02	0.25	26
19	27	26	5	20000	20000	0.032	0	0.02	0.25	16
20	26	25	5	5000	4000	0.032	0	0.02	0.25	116
21	2	73	1	5000	650	0.075	0	0.02	0.25	271
22	14	13	1	5000	400	0.08	0	0.02	0.25	201
23	14	17	6	3000	7500	0.02	0	0.08	0.25	150
24	78	17	2	3500	5000	0.058	0	0.12	0.25	200
25	17	22	11.	10000	10000	0.018	0	0.02	0.25	201
26	27	22	5	5000	10000	0.023	0	0.02	0.25	16
27	22	25	19	30000	55000	0.02	0	0.02	0.25	151
28	74	16	1	4000	500	0.045	0	0.038	0.25	20
29	16	17	4.6	20000	15000	0.022	0	0.02	0.25	251
30	16	21	11.	3000	18000	0.02	0	0.02	0.25	101
31	21	22	8	20000	15000	0.02	0	0.02	0.25	251
32	21	24	21	30000	60000	0.02	0	0.02	0.25	501
33	24	25	11	30000	20000	0.02	0	0.02	0.25	501
34	28	20	5	20000	4000	0.02	0	0.02	0.25	16
35	28	16	5	20000	10000	0.02	0	0.02	0.25	500
36	15	28	5	20000	10000	0.018	0	0.02	0.25	500
37	28	74	2	20000	10000	0.08	0	0.02	0.25	200
38	20	21	8	20000	15000	0.018	0	0.02	0.25	506
39	20	23	21	30000	50000	0.018	0	0.02	0.25	501
40	23	24	15	30000	20000	0.02	0	0.02	0.25	501
41	11	79	1	10000	6400	0.04	0	0.02	0.25	126

Alternative 1 (Lake Borgne Open)

42	12	15	2.7	20000	25000	0.022	0	0.02	0.25	501
43	15	20	4	10000	5000	0.032	0	0.02	0.25	501
44	20	31	6	10000	5000	0.032	0	0.02	0.25	501
45	23	32	25	45000	25000	0.032	0	0.02	0.25	151
46	19	29	16	20000	20000	0.03	0	0.02	0.25	151
47	73	74	1	5000	1000	0.1	0	0.12	0.25	200
48	18	17	2	15000	15000	0.023	0	0.02	0.25	151
49	30	15	2	8000	2000	0.023	0	0.032	0.25	251
50	33	20	3	10000	20000	0.023	0	0.02	0.25	201
51	12	30	5	20000	300	0.02	0	0.02	0.25	351
52	32	29	5	20000	20000	0.032	0	0.02	0.25	1501
53	31	19	5	20000	20000	0.032	0	0.02	0.25	1501
54	31	32	4	20000	45000	0.033	0	0.02	0.25	201
55	25	101	30	30000	20000	0.028	0	0.02	0.25	1001
56	24	102	30	30000	20000	0.03	0	0.02	0.25	1001
57	23	103	30	30000	20000	0.03	0	0.02	0.25	1001
58	29	104	28	30000	20000	0.03	0	0.02	0.25	1501
59	32	105	27	30000	20000	0.03	0	0.02	0.25	1501
60	9	2	1.5	15000	50	0.041	0	0.12	20	175
61	34	19	2	5000	100	0.035	0	0.12	1	51
62	35	19	4	2000	800	0.025	0	0.12	1	51
63	36	19	18	1000	700	0.025	0	0.12	1	51
64	37	19	6	2000	2300	0.035	0	0.12	1	51
65	38	19	8.5	2000	1900	0.025	0	0.12	1	51
66	35	19	7	2000	870	0.035	0	0.12	1	51
67	36	31	6	2000	500	0.05	0	0.12	1	51
68	37	31	6	2000	500	0.05	0	0.12	1	51
69	38	31	6	2000	500	0.05	0	0.12	1	51
70	34	35	1.5	10638	15723	0.025	0	0.12	0.5	60
71	35	36	2	9222	11877	0.025	0	0.12	0.5	84
72	37	36	2	9366	8884	0.025	0	0.12	0.5	87
73	38	37	2	9157	9189	0.025	0	0.12	0.5	83
74	39	38	2	15047	13679	0.025	0	0.12	0.5	201
75	39	40	2	21372	12022	0.025	0	0.12	0.5	327
76	70	72	2	54374	8280	0.025	0	0.12	0.5	1288
77	71	70	1.5	38280	643	0.025	0	0.12	0.5	524
78	40	41	1	15659	3218	0.025	0	0.12	0.5	157
79	41	42	1	10573	9350	0.025	0	0.12	0.5	106
80	43	34	1	16238	11072	0.025	0	0.12	0.5	162
81	43	35	1	10815	6936	0.025	0	0.12	0.5	108
82	44	36	1	11169	10911	0.025	0	0.12	0.5	112
83	45	37	1	10026	5279	0.025	0	0.12	0.5	100
84	46	38	1	11426	10364	0.025	0	0.12	0.5	114

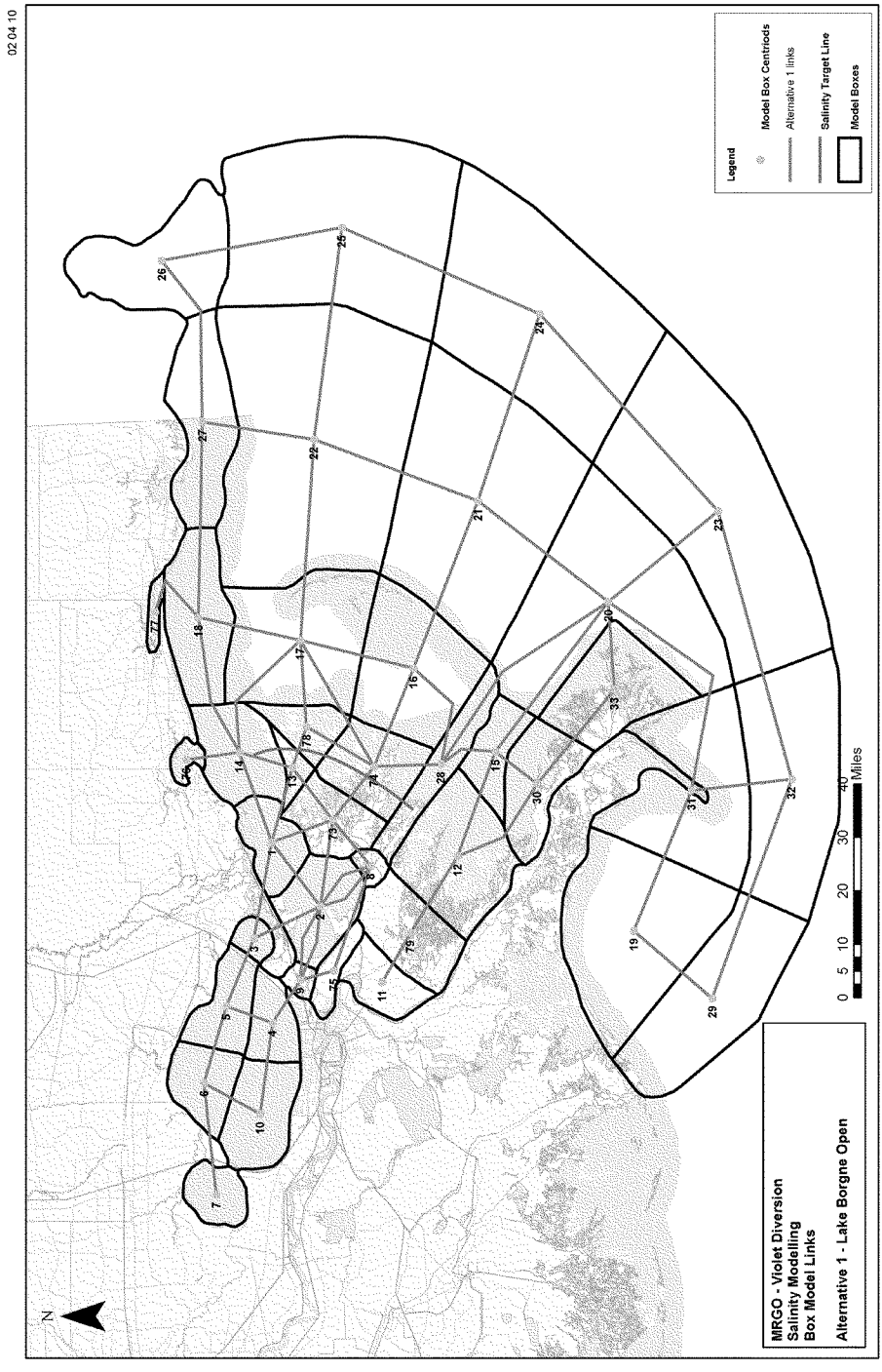
Alternative 1 (Lake Borgne Open)

85	47	39	1	16093	81	0.025	0	0.12	0.5	160
86	43	44	1	12907	11346	0.025	0	0.12	0.5	129
87	45	44	1	8723	10219	0.025	0	0.12	0.5	87
88	46	45	1	7242	8691	0.025	0	0.12	0.5	72
89	47	46	1	7725	241	0.025	0	0.12	0.5	77
90	48	44	1	4522	3347	0.025	0	0.12	0.5	245
91	49	45	1	5279	1400	0.025	0	0.12	0.5	53
92	50	45	1	2140	81	0.025	0	0.12	0.5	21
93	51	46	1	3444	1448	0.025	0	0.12	0.5	34
94	51	47	1	9061	1062	0.025	0	0.12	0.5	91
95	48	49	1	12778	2044	0.025	0	0.12	0.5	128
96	54	48	1	11475	193	0.025	0	0.12	0.5	115
97	55	48	1	4345	1432	0.025	0	0.12	0.5	44
98	52	49	1	7886	290	0.025	0	0.12	0.5	79
99	53	50	1	7081	708	0.025	0	0.12	0.5	71
100	56	52	1	11459	258	0.025	0	0.12	0.5	115
101	52	53	1	4828	161	0.025	0	0.12	0.5	48
102	53	51	1	1883	274	0.025	0	0.12	0.5	19
103	48	52	1	3267	451	0.025	0	0.12	0.5	33
104	55	56	1	5150	322	0.025	0	0.12	0.5	52
105	56	57	0.2	8964	3380	0.07	0	0.12	0.5	18
106	57	51	0.5	2865	193	0.035	0	0.12	0.5	14
107	57	53	0.5	4989	402	0.05	0	0.12	0.5	25
108	59	55	3	3685	402	0.03	0	0.12	0.5	111
109	58	54	5.5	22128	161	0.025	0	0.12	0.5	114
110	60	55	3.7	7129	2913	0.04	0	0.12	0.5	261
111	61	60	2	4571	81	0.04	0	0.12	0.5	91
112	61	56	1	6759	338	0.04	0	0.12	0.5	68
113	61	57	1	4587	483	0.06	0	0.12	0.5	46
114	65	59	5.5	10252	161	0.025	0	0.12	0.5	163
115	65	61	2	3074	32	0.035	0	0.12	0.5	62
116	66	61	1	2639	16	0.1	0	0.12	0.5	26
117	69	65	3.5	9930	137	0.03	0	0.12	0.5	148
118	64	59	4	3541	644	0.025	0	0.12	0.5	142
119	64	58	4	2816	644	0.025	0	0.12	0.5	113
120	63	58	2	19650	241	0.04	0	0.12	0.5	393
121	62	63	2.1	5343	48	0.024	0	0.12	0.5	53
122	67	63	2	7178	1143	0.024	0	0.12	0.5	144
123	68	64	2	2044	171	0.023	0	0.12	0.5	120
124	58	59	2	12392	10621	0.025	0	0.12	0.5	248
125	66	61	4.9	21050	160	0.03	0	0.12	0.5	1027
126	51	50	1	6759	804	0.08	0	0.12	0.5	68
127	59	49	1	6759	1448	0.08	0	0.12	0.5	68

Alternative 1 (Lake Borgne Open)

128	72	29	10	20000	10000	0.023	0	0.025	0.25	851
129	72	19	8	20000	15000	0.023	0	0.02	0.25	851
130	72	106	8	20000	12000	0.025	0	0.02	0.25	851
131	74	17	1	5000	100	0.1	0	0.12	0.25	13
132	1	73	1.2	5000	1000	0.05	0	0.12	0.25	235
133	73	13	1.1	5000	1000	0.078	0	0.12	0.25	500
134	74	78	1.1	5000	1000	0.078	0	0.12	0.25	485
135	8	73	1.2	15000	100	0.05	0	0.12	0.25	115
136	8	2	2.3	1000	750	0.023	0	0.12	1.25	135
137	76	14	2.6	4000	2000	0.023	0	0.12	0.25	55
138	77	18	2.3	4000	1000	0.023	0	0.12	0.25	35
139	13	78	1.8	5000	6000	0.035	0	0.02	0.25	141
140	79	12	1.2	10000	6400	0.042	0	0.02	0.25	531
141	75	9	4	10000	50	0.03	0	0.5	10	135
142	75	8	2.5	10000	50	0.03	0	0.5	10	155
143	30	33	1.1	30000	5000	0.05	0	0.5	1	100
144	15	28	3.0	3000	78	0.05	0	0.5	1	100
145	75	8	4.1	10000	170	0.03	0	0.5	1	155

Alternative 1 (Lake Borgne Open)


02 04 10
N
MRGO - Violet Diversion
Salinity Modelling
Box Model Links
Alternative 1 - Lake Borgne Open
0 5 10 20 30 40 Miles
Legend
Model Box Centroids
Alternative 1 links
Salinity Target Line
Model Boxes

CALIBRATION VALUES FOR ALTERNATIVE 2

Link No.	From Cell	To Cell	Depth (m)	Length (m)	Width (m)	Manning's n	K_m	K_{en}	K_{ex} E	
1	1	14	5.5	3000	15000	0.016	0.007	0.25	1	9
2	3	1	10.5	10500	985	0.024	0.075	0.5	2	2500
3	2	1	4.0	15000	15000	0.021	0.007	0.1	1	50
4	3	2	8	7850	360	0.025	0.075	0.5	2	30
5	8	28	6.5	60420	320	CLOSED	0	0.5	1	1
6	9	8	6.5	20000	300	CLOSED	0	0.5	1	1
7	9	2	4.05	12000	150	0.03	0	0.5	10	55
8	4	9	8.5	15000	150	0.025	0.1	0.5	19	350
9	5	3	3	20000	20000	0.023	0	0.025	0.25	155
10	5	4	4.3	40000	40000	0.02	0	0.02	0.25	195
11	6	5	3.9	40000	20000	0.02	0	0.5	1	46
12	7	6	8.1	8800	395	0.024	0	0.5	1	200
13	8	2	3	2000	50	0.03	0	0.5	1	2
14	10	6	3.7	20000	20000	0.025	0	0.02	0.25	56
15	10	4	3.9	40009	20000	0.025	0	0.02	0.25	56
16	1	13	2.1	14500	1000	0.04	0	0.02	1.25	651
17	14	18	5	10000	20000	0.015	0	0.02	0.25	56
18	18	27	5	15000	20000	0.02	0	0.02	0.25	26
19	27	26	5	20000	20000	0.032	0	0.02	0.25	16
20	26	25	5	5000	4000	0.032	0	0.02	0.25	116
21	2	73	1	5000	650	0.075	0	0.02	0.25	271
22	14	13	1	5000	400	0.08	0	0.02	0.25	201
23	14	17	6	3000	7500	0.02	0	0.08	0.25	150
24	78	17	2	3500	5000	0.058	0	0.12	0.25	200
25	17	22	11.	10000	10000	0.018	0	0.02	0.25	201
26	27	22	5	5000	10000	0.023	0	0.02	0.25	16
27	22	25	19	30000	55000	0.02	0	0.02	0.25	151
28	74	16	1	4000	500	0.045	0	0.038	0.25	20
29	16	17	4.6	20000	15000	0.022	0	0.02	0.25	251
30	16	21	11.5	3000	18000	0.02	0	0.02	0.25	101
31	21	22	8	20000	15000	0.02	0	0.02	0.25	251
32	21	24	21	30000	60000	0.02	0	0.02	0.25	501
33	24	25	11	30000	20000	0.02	0	0.02	0.25	501
34	28	20	5	20000	4000	0.02	0	0.02	0.25	16
35	28	16	5	20000	10000	0.02	0	0.02	0.25	500
36	15	28	5	20000	10000	0.018	0	0.02	0.25	500
37	28	74	2	20000	10000	0.08	0	0.02	0.25	200
38	20	21	8	20000	15000	0.018	0	0.02	0.25	506
39	20	23	21	30000	50000	0.018	0	0.02	0.25	501
40	23	24	15	30000	20000	0.02	0	0.02	0.25	501
41	11	79	1	10000	6400	0.04	0	0.02	0.25	126

ALTERNATIVE 2 (LAKE BORGNE CLOSED)

42	12	15	2.7	20000	25000	0.022	0	0.02	0.25	501
43	15	20	4	10000	5000	0.032	0	0.02	0.25	501
44	20	31	6	10000	5000	0.032	0	0.02	0.25	501
45	23	32	25	45000	25000	0.032	0	0.02	0.25	151
46	19	29	16	20000	20000	0.03	0	0.02	0.25	151
47	73	74	1	5000	1000	0.1	0	0.12	0.25	200
48	18	17	2	15000	15000	0.023	0	0.02	0.25	151
49	30	15	2	8000	2000	0.023	0	0.032	0.25	251
50	33	20	3	10000	20000	0.023	0	0.02	0.25	201
51	12	30	5	20000	300	0.02	0	0.02	0.25	351
52	32	29	5	20000	20000	0.032	0	0.02	0.25	1501
53	31	19	5	20000	20000	0.032	0	0.02	0.25	1501
54	31	32	4	20000	45000	0.033	0	0.02	0.25	201
55	25	101	30	30000	20000	0.028	0	0.02	0.25	1001
56	24	102	30	30000	20000	0.03	0	0.02	0.25	1001
57	23	103	30	30000	20000	0.03	0	0.02	0.25	1001
58	29	104	28	30000	20000	0.03	0	0.02	0.25	1501
59	32	105	27	30000	20000	0.03	0	0.02	0.25	1501
60	9	2	1.5	15000	50	0.041	0	0.12	20	175
61	34	19	2	5000	100	0.035	0	0.12	1	51
62	35	19	4	2000	800	0.025	0	0.12	1	51
63	36	19	18	1000	700	0.025	0	0.12	1	51
64	37	19	6	2000	2300	0.035	0	0.12	1	51
65	38	19	8.5	2000	1900	0.025	0	0.12	1	51
66	35	19	7	2000	870	0.035	0	0.12	1	51
67	36	31	6	2000	500	0.05	0	0.12	1	51
68	37	31	6	2000	500	0.05	0	0.12	1	51
69	38	31	6	2000	500	0.05	0	0.12	1	51
70	34	35	1.5	10638	15723	0.025	0	0.12	0.5	60
71	35	36	2	9222	11877	0.025	0	0.12	0.5	84
72	37	36	2	9366	8884	0.025	0	0.12	0.5	87
73	38	37	2	9157	9189	0.025	0	0.12	0.5	83
74	39	38	2	15047	13679	0.025	0	0.12	0.5	201
75	39	40	2	21372	12022	0.025	0	0.12	0.5	327
76	70	72	2	54374	8280	0.025	0	0.12	0.5	1288
77	71	70	1.5	38280	643	0.025	0	0.12	0.5	524
78	40	41	1	15659	3218	0.025	0	0.12	0.5	157
79	41	42	1	10573	9350	0.025	0	0.12	0.5	106
80	43	34	1	16238	11072	0.025	0	0.12	0.5	162
81	43	35	1	10815	6936	0.025	0	0.12	0.5	108
82	44	36	1	11169	10911	0.025	0	0.12	0.5	112
83	45	37	1	10026	5279	0.025	0	0.12	0.5	100
84	46	38	1	11426	10364	0.025	0	0.12	0.5	114

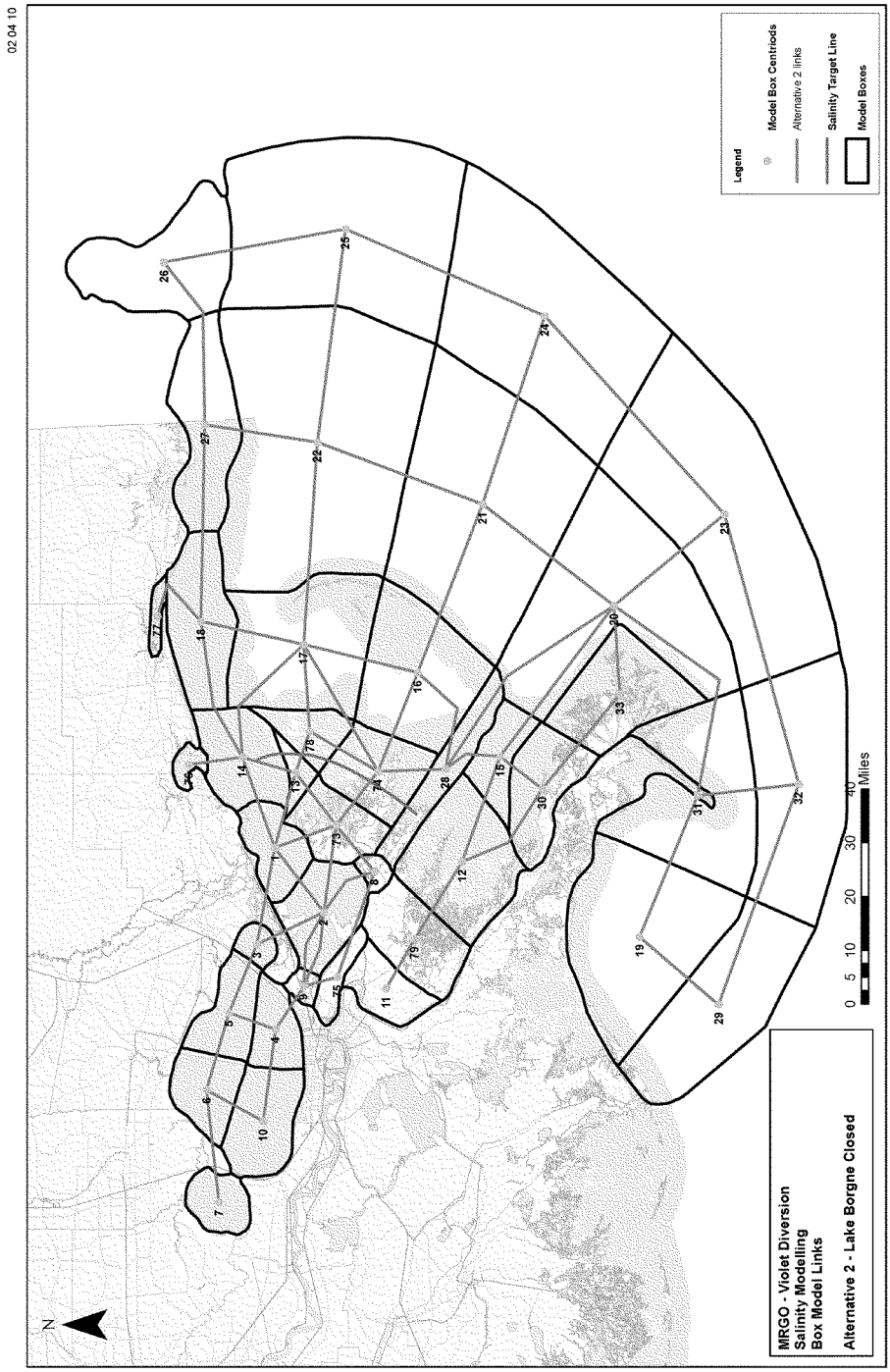
ALTERNATIVE 2 (LAKE BORGNE CLOSED)

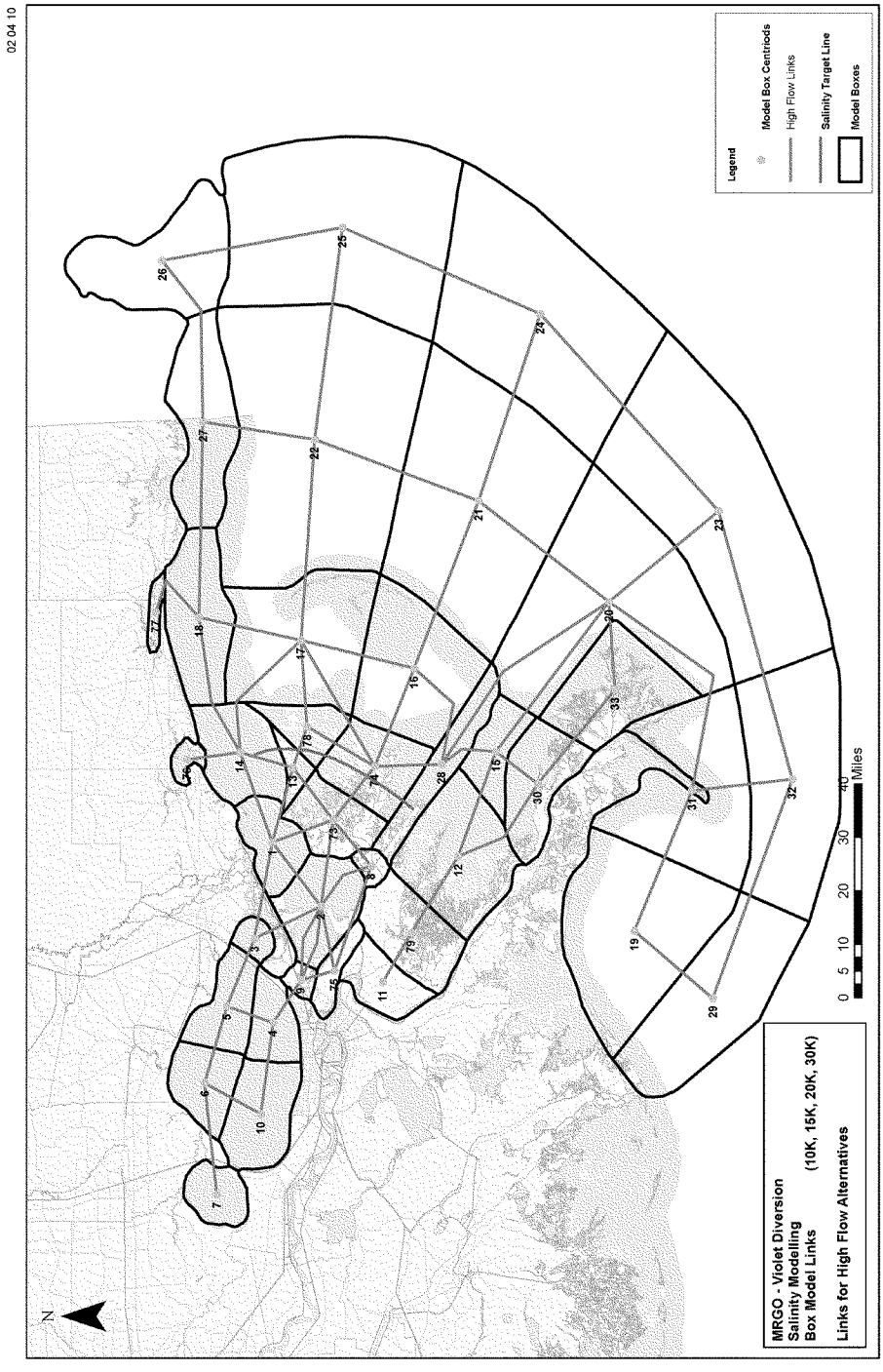
85	47	39	1	16093	81	0.025	0	0.12	0.5	160
86	43	44	1	12907	11346	0.025	0	0.12	0.5	129
87	45	44	1	8723	10219	0.025	0	0.12	0.5	87
88	46	45	1	7242	8691	0.025	0	0.12	0.5	72
89	47	46	1	7725	241	0.025	0	0.12	0.5	77
90	48	44	1	4522	3347	0.025	0	0.12	0.5	245
91	49	45	1	5279	1400	0.025	0	0.12	0.5	53
92	50	45	1	2140	81	0.025	0	0.12	0.5	21
93	51	46	1	3444	1448	0.025	0	0.12	0.5	34
94	51	47	1	9061	1062	0.025	0	0.12	0.5	91
95	48	49	1	12778	2044	0.025	0	0.12	0.5	128
96	54	48	1	11475	193	0.025	0	0.12	0.5	115
97	55	48	1	4345	1432	0.025	0	0.12	0.5	44
98	52	49	1	7886	290	0.025	0	0.12	0.5	79
99	53	50	1	7081	708	0.025	0	0.12	0.5	71
100	56	52	1	11459	258	0.025	0	0.12	0.5	115
101	52	53	1	4828	161	0.025	0	0.12	0.5	48
102	53	51	1	1883	274	0.025	0	0.12	0.5	19
103	48	52	1	3267	451	0.025	0	0.12	0.5	33
104	55	56	1	5150	322	0.025	0	0.12	0.5	52
105	56	57	0.2	8964	3380	0.07	0	0.12	0.5	18
106	57	51	0.5	2865	193	0.035	0	0.12	0.5	14
107	57	53	0.5	4989	402	0.05	0	0.12	0.5	25
108	59	55	3	3685	402	0.03	0	0.12	0.5	111
109	58	54	5.5	22128	161	0.025	0	0.12	0.5	114
110	60	55	3.7	7129	2913	0.04	0	0.12	0.5	261
111	61	60	2	4571	81	0.04	0	0.12	0.5	91
112	61	56	1	6759	338	0.04	0	0.12	0.5	68
113	61	57	1	4587	483	0.06	0	0.12	0.5	46
114	65	59	5.5	10252	161	0.025	0	0.12	0.5	163
115	65	61	2	3074	32	0.035	0	0.12	0.5	62
116	66	61	1	2639	16	0.1	0	0.12	0.5	26
117	69	65	3.5	9930	137	0.03	0	0.12	0.5	148
118	64	59	4	3541	644	0.025	0	0.12	0.5	142
119	64	58	4	2816	644	0.025	0	0.12	0.5	113
120	63	58	2	19650	241	0.04	0	0.12	0.5	393
121	62	63	2.1	5343	48	0.024	0	0.12	0.5	53
122	67	63	2	7178	1143	0.024	0	0.12	0.5	144
123	68	64	2	2044	171	0.023	0	0.12	0.5	120
124	58	59	2	12392	10621	0.025	0	0.12	0.5	248
125	66	61	4.9	21050	160	0.03	0	0.12	0.5	1027
126	51	50	1	6759	804	0.08	0	0.12	0.5	68
127	59	49	1	6759	1448	0.08	0	0.12	0.5	68

ALTERNATIVE 2 (LAKE BORGNE CLOSED)

128	72	29	10	20000	10000	0.023	0	0.025	0.25	851
129	72	19	8	20000	15000	0.023	0	0.02	0.25	851
130	72	106	8	20000	12000	0.025	0	0.02	0.25	851
131	74	17	1	5000	100	0.1	0	0.12	0.25	13
132	1	73	1.2	5000	1000	0.05	0	0.12	0.25	235
133	73	13	1.1	5000	1000	0.078	0	0.12	0.25	500
134	74	78	1.1	5000	1000	0.078	0	0.12	0.25	485
135	8	73	1.2	10000	100	0.05	0	0.12	0.25	115
136	8	2	2.3	1000	750	CLOSED	0	0.12	1.25	1
137	76	14	2.6	4000	2000	0.023	0	0.12	0.25	55
138	77	18	2.3	4000	1000	0.023	0	0.12	0.25	35
139	13	78	1.8	5000	6000	0.035	0	0.02	0.25	141
140	79	12	1.2	10000	6400	0.042	0	0.02	0.25	531
141	75	9	4	10000	50	0.03	0	0.5	10	135
142	75	8	2.5	10000	50	0.03	0	0.5	10	155
143	30	33	1.1	30000	5000	0.05	0	0.5	1	100
144	15	28	3.0	3000	78	0.05	0	0.5	1	100
145	75	8	4.1	10000	170	0.03	0	0.5	1	155

ALTERNATIVE 2 (LAKE BORGNE CLOSED)


02 04 10
MRGO - Violet Diversion
Salinity Modelling
Box Model Links
Alternative 2 - Lake Borgne Closed
N
0 5 10 20 30 40 Miles
Legend
Model Box Centroids
Alternative 2 links
Salinity Target Line
Model Boxes


02 04 10
Legend
Model Box Centroids
High Flow Links
Salinity Target Line
Model Boxes
N
0 5 10 20 30 40 Miles
MRGO - Violet Diversion
Salinity Modelling
Box Model Links (10K, 15K, 20K, 30K)
Links for High Flow Alternatives

APPENDIX E

UNO MASS BALANCE MODEL RESULTS TABLES AND FIGURES

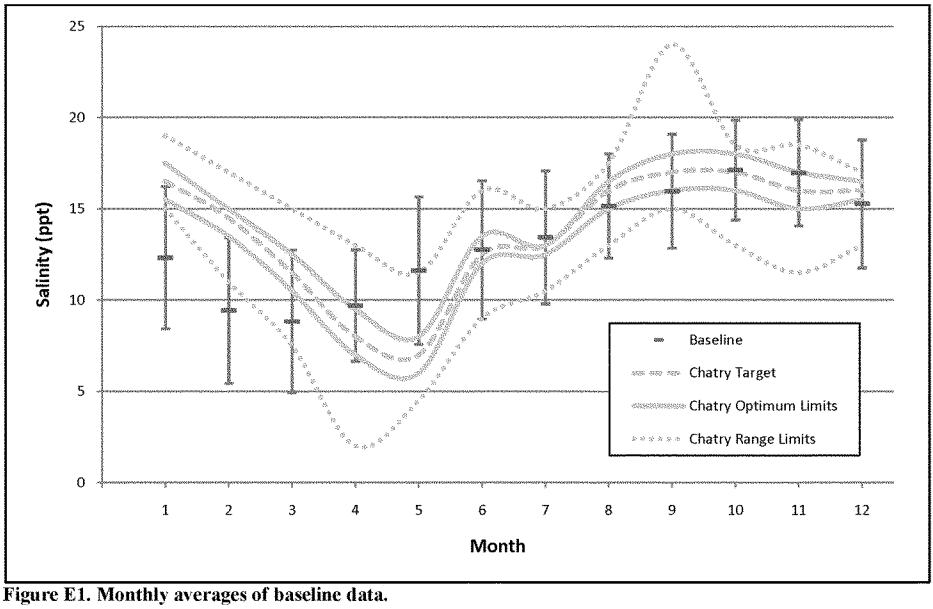


Figure E1. Monthly averages of baseline data.

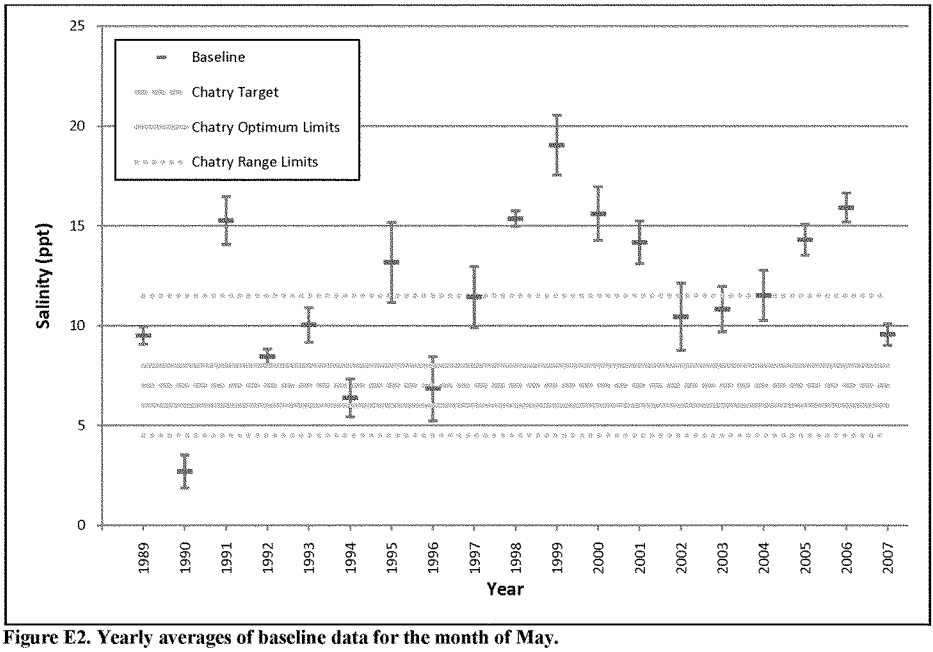


Figure E2. Yearly averages of baseline data for the month of May.

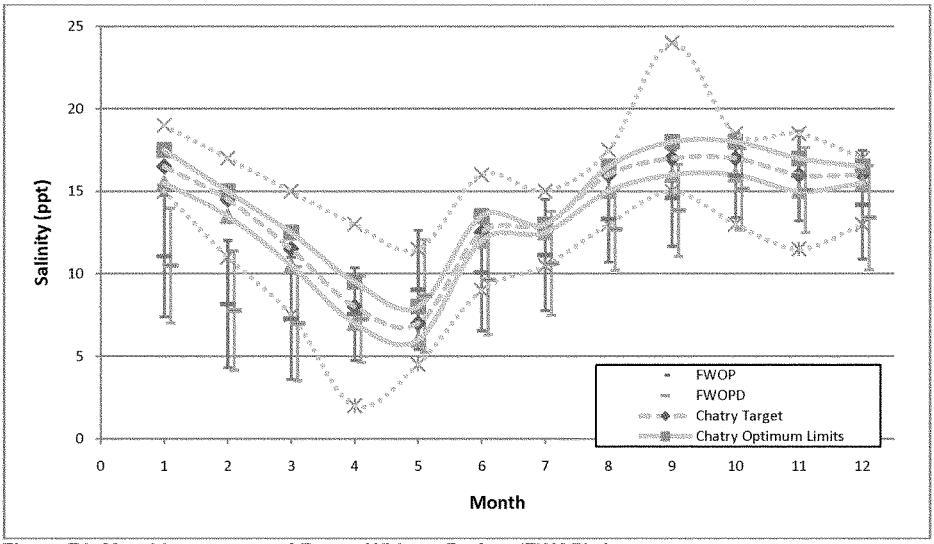


Figure E3. Monthly averages of Future Without Project (FWOP) data.

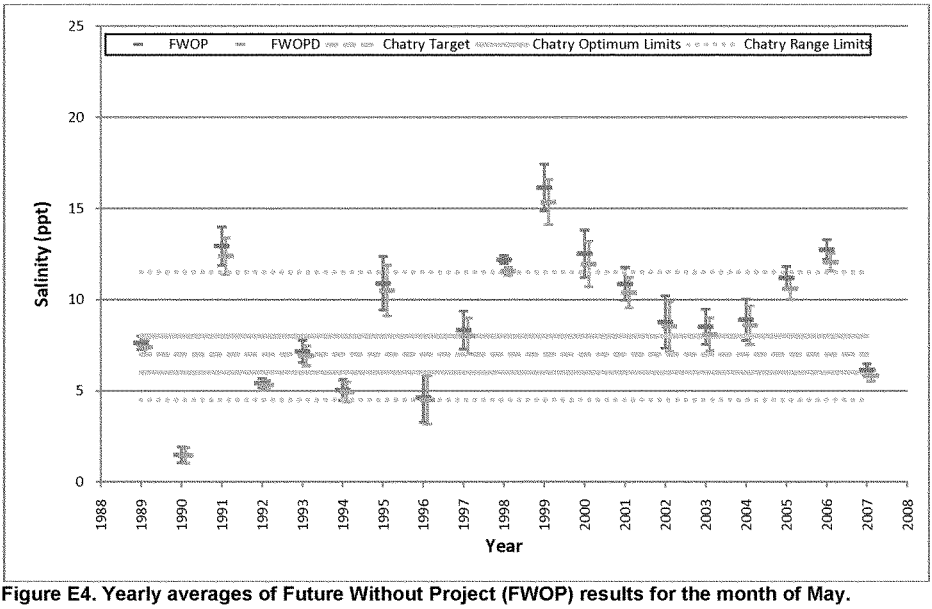


Figure E4. Yearly averages of Future Without Project (FWOP) results for the month of May.

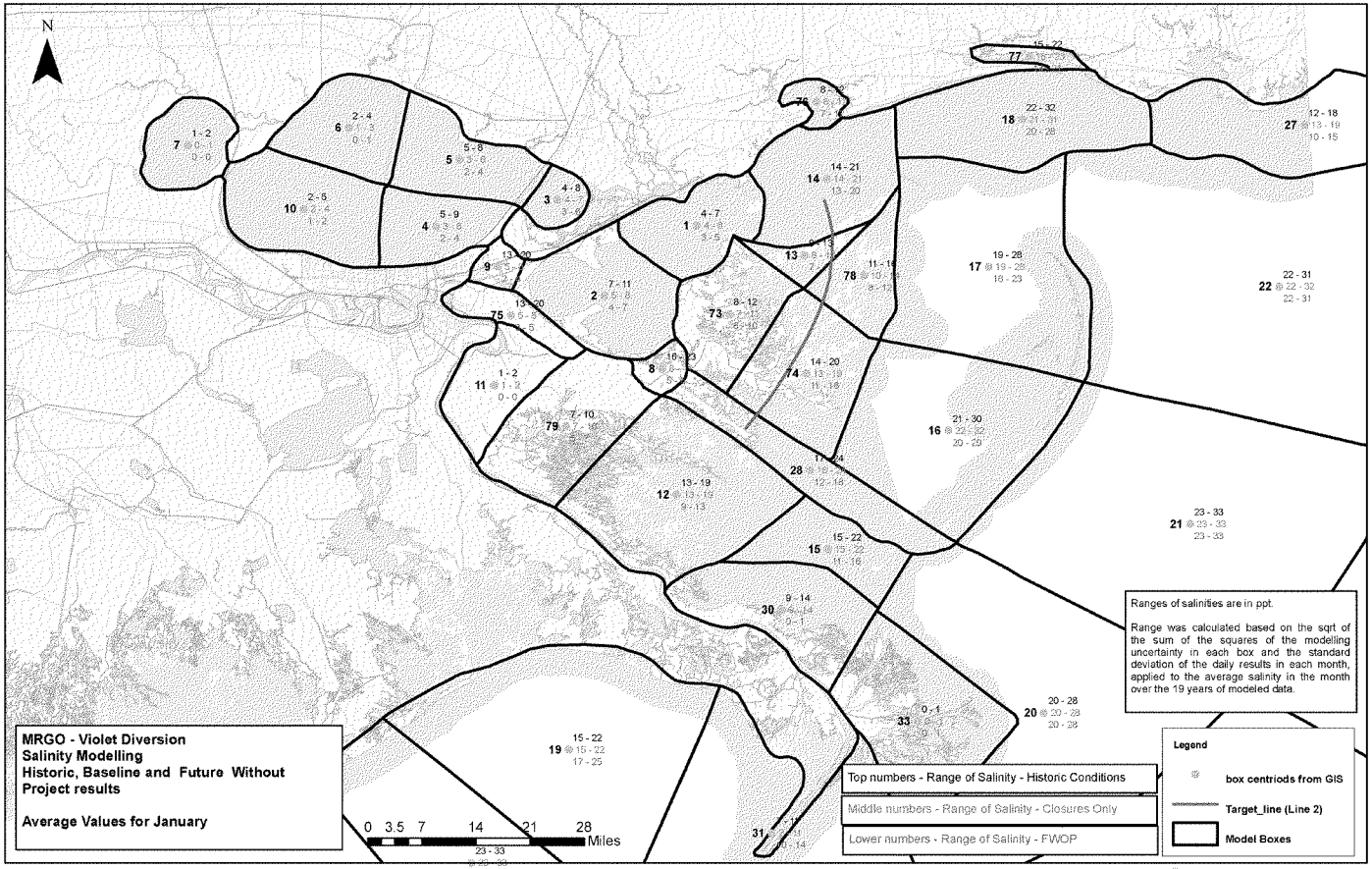


Figure E4. Results Values for Historic, Baseline, and FWOP for January.

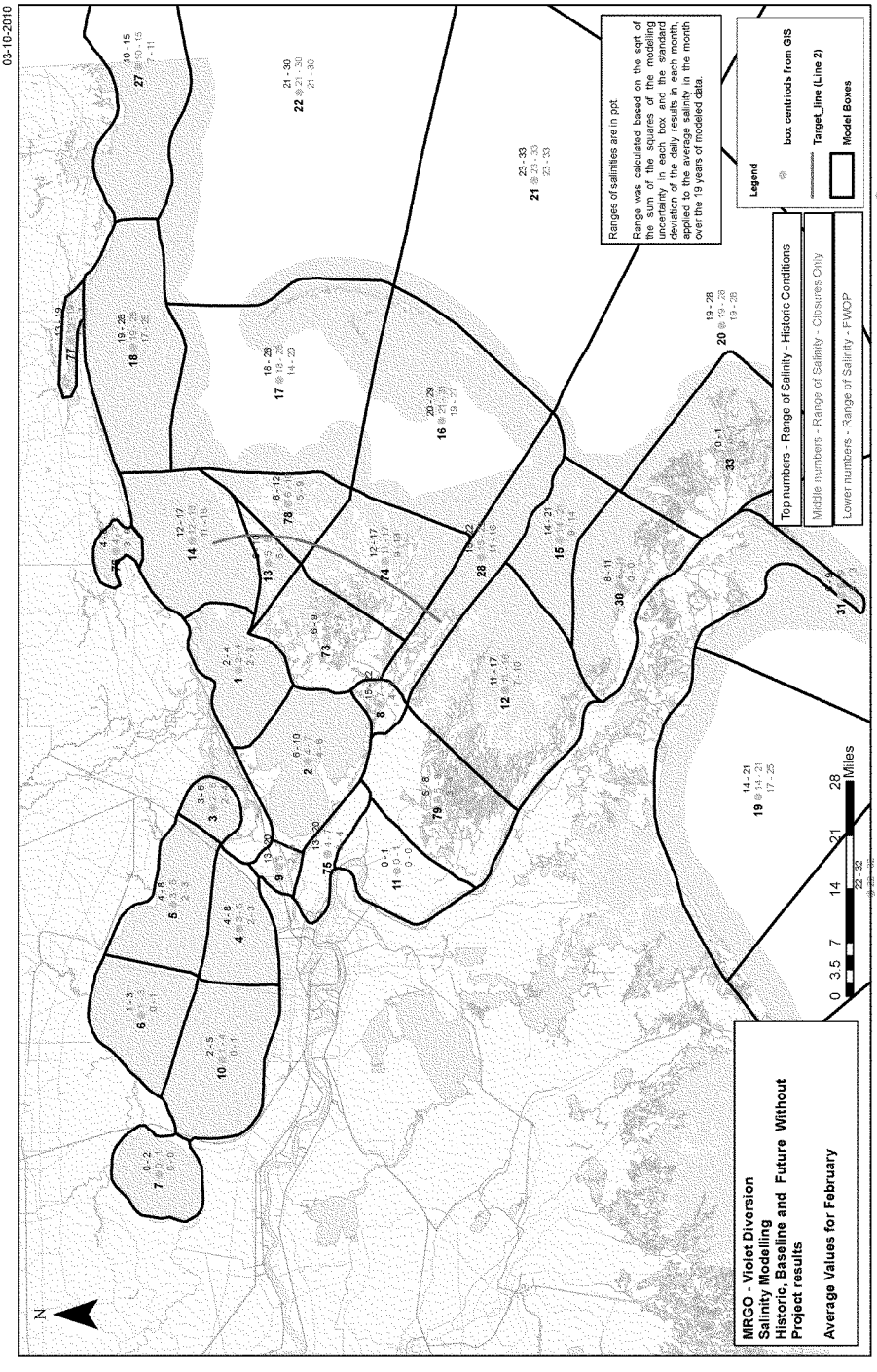


Figure E5. Results Values for Historic, Baseline, and FWOP for February.

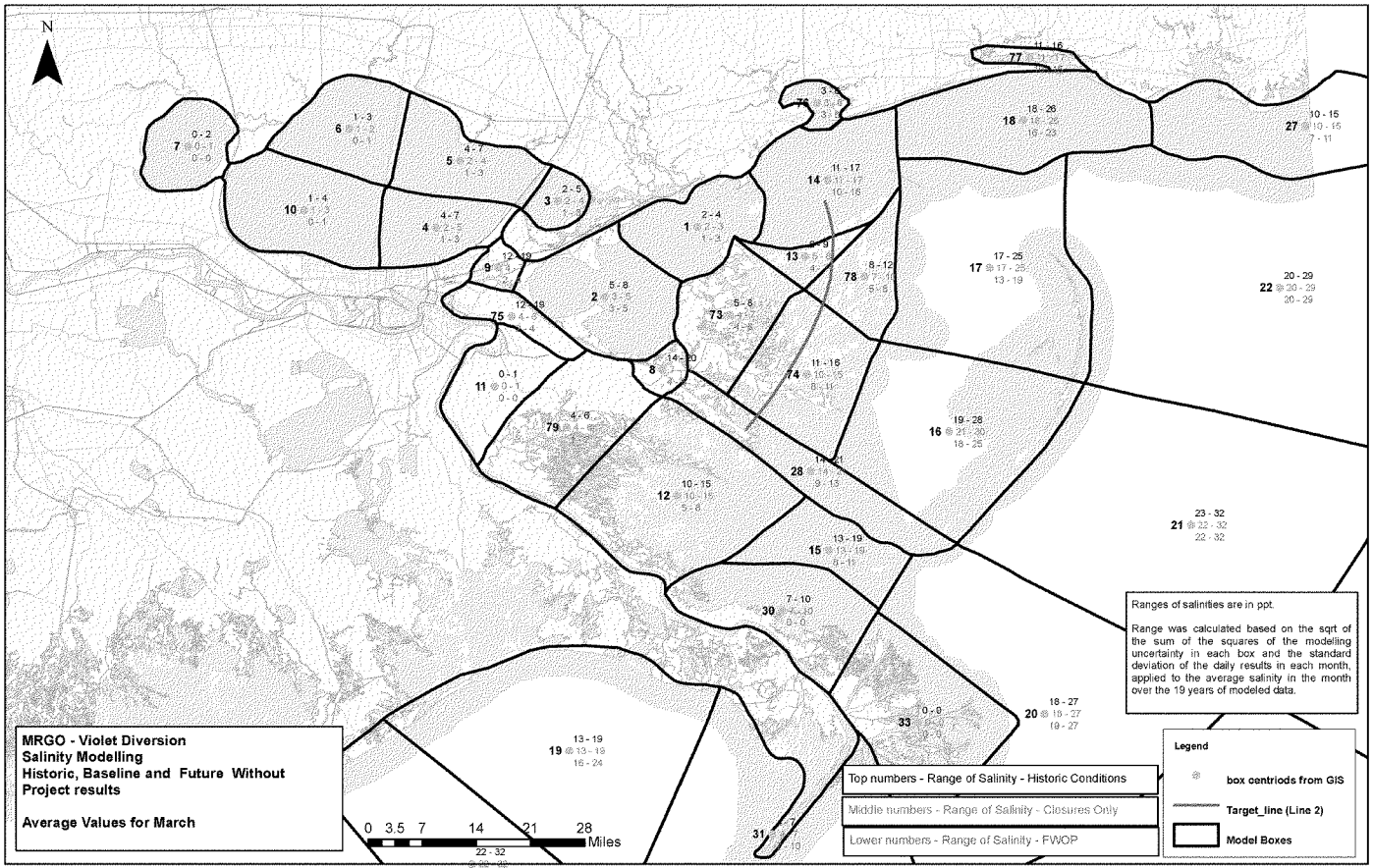


Figure E6. Results Values for Historic, Baseline, and FWOP for March

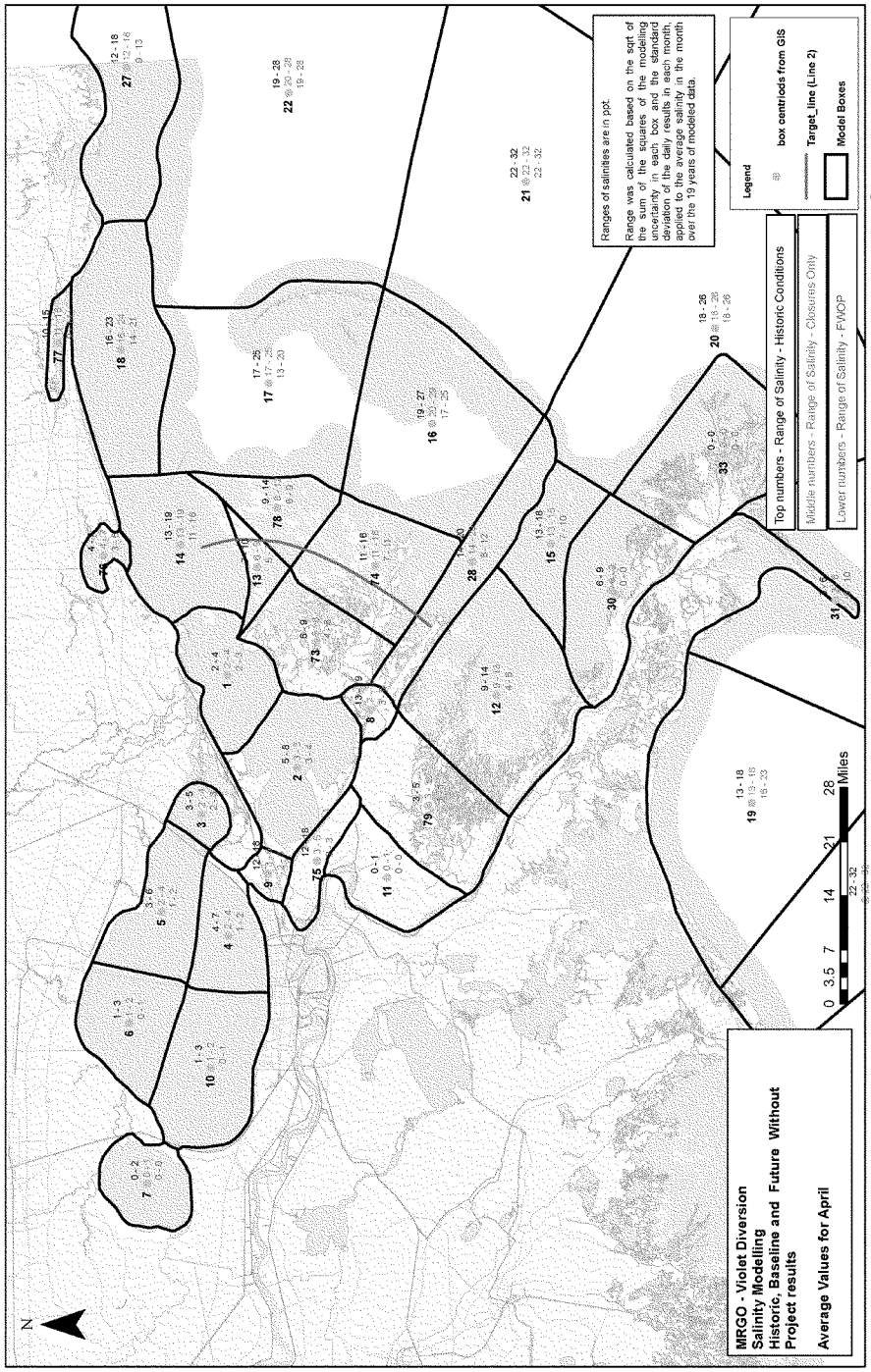


Figure E7. Results Values for Historic, Baseline, and FWOP for April

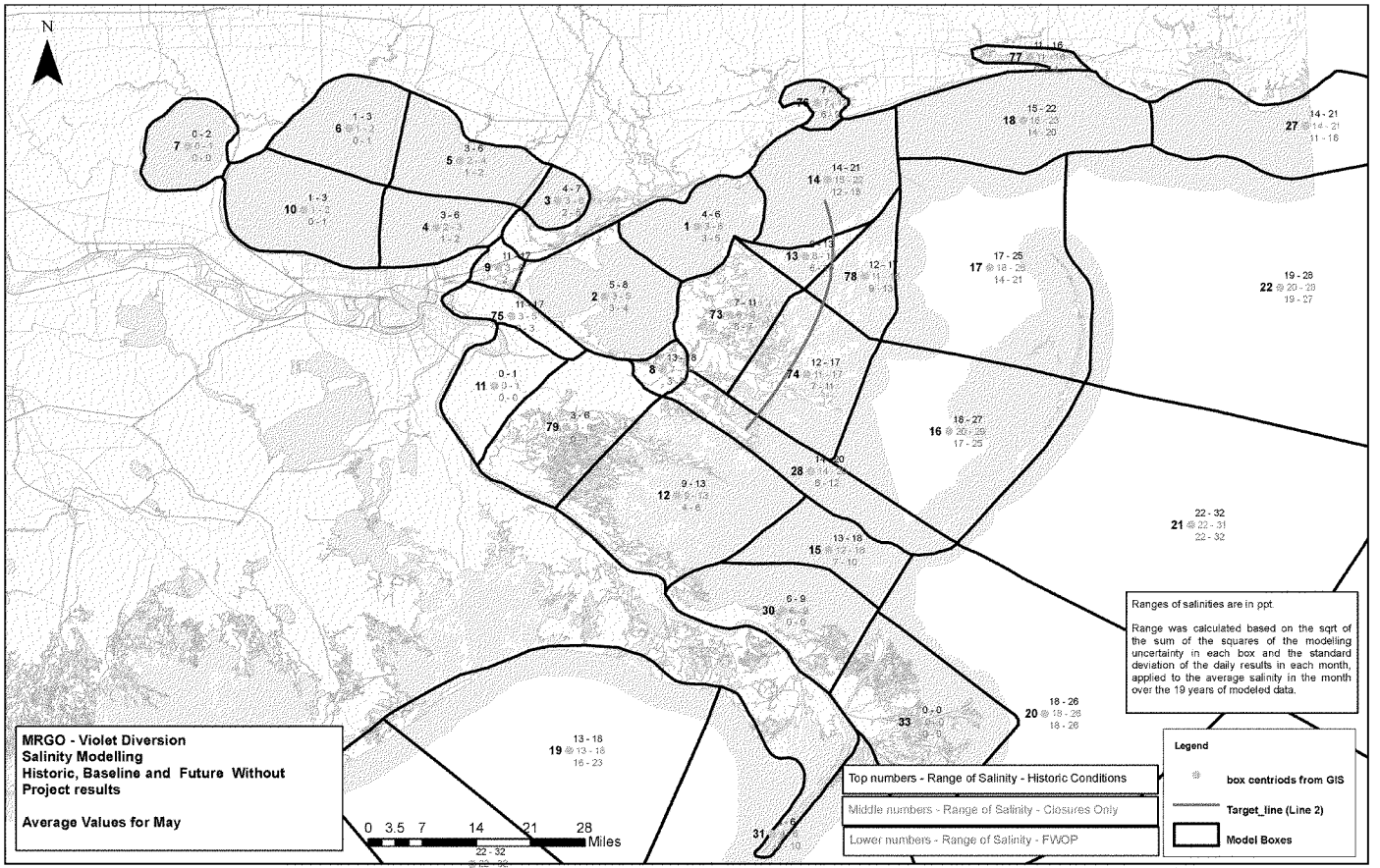


Figure E8. Results Values for Historic, Baseline, and FWOP for May.

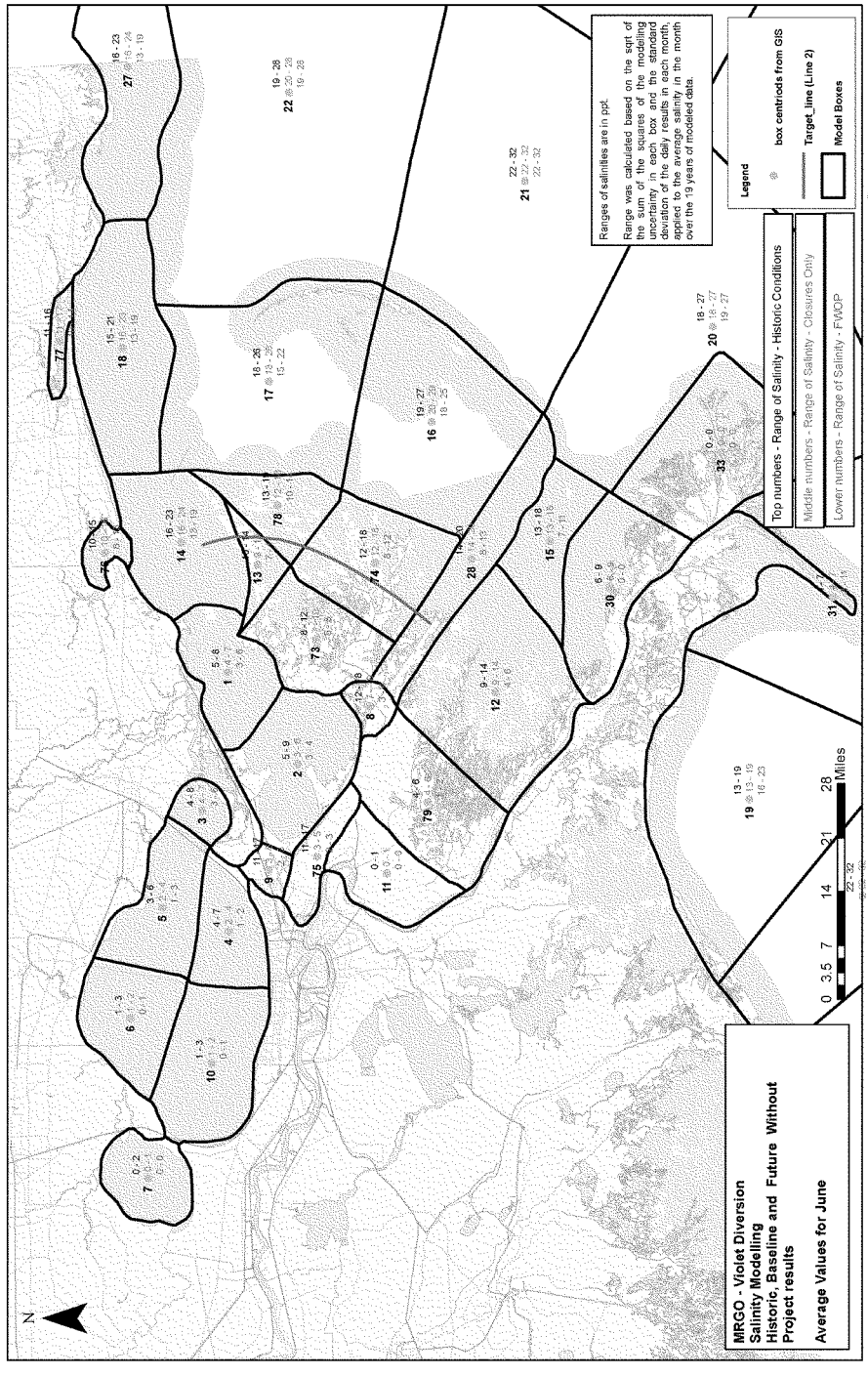


Figure E9. Results Values for Historic, Baseline, and FWOP for June.

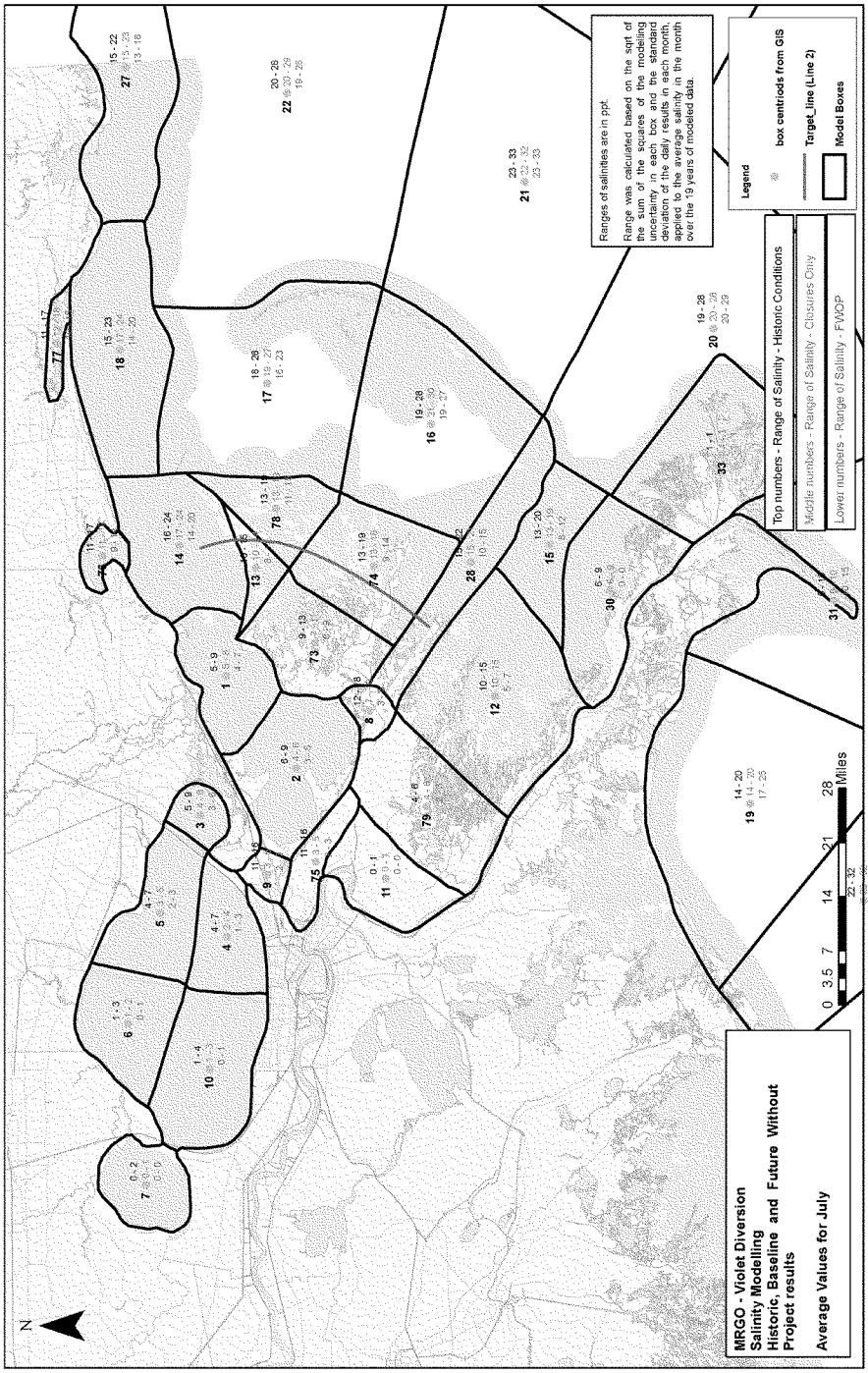


Figure E10. Results Values for Historic, Baseline, and FWOP for July.

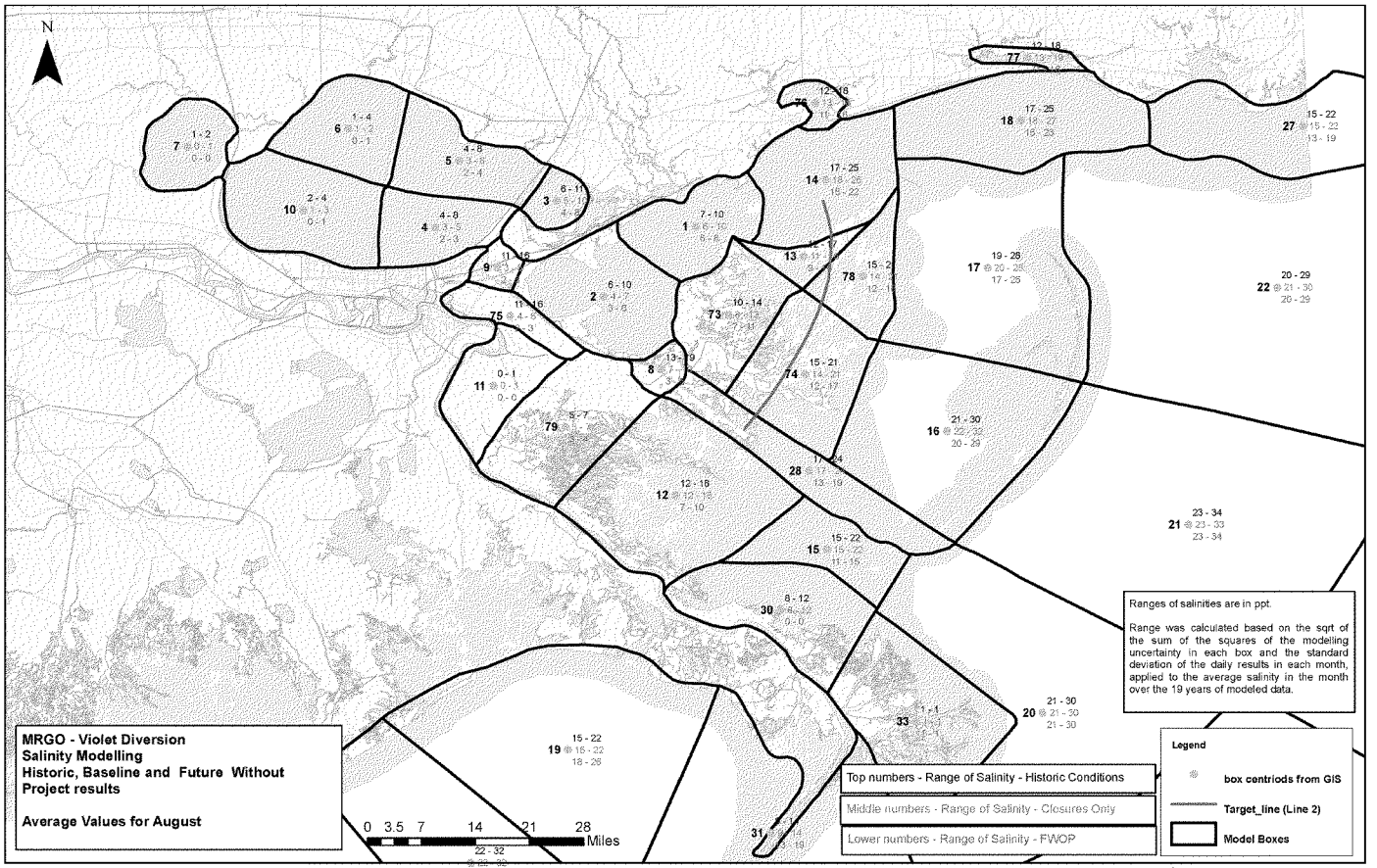


Figure E11. Results Values for Historic, Baseline, and FWOP for August

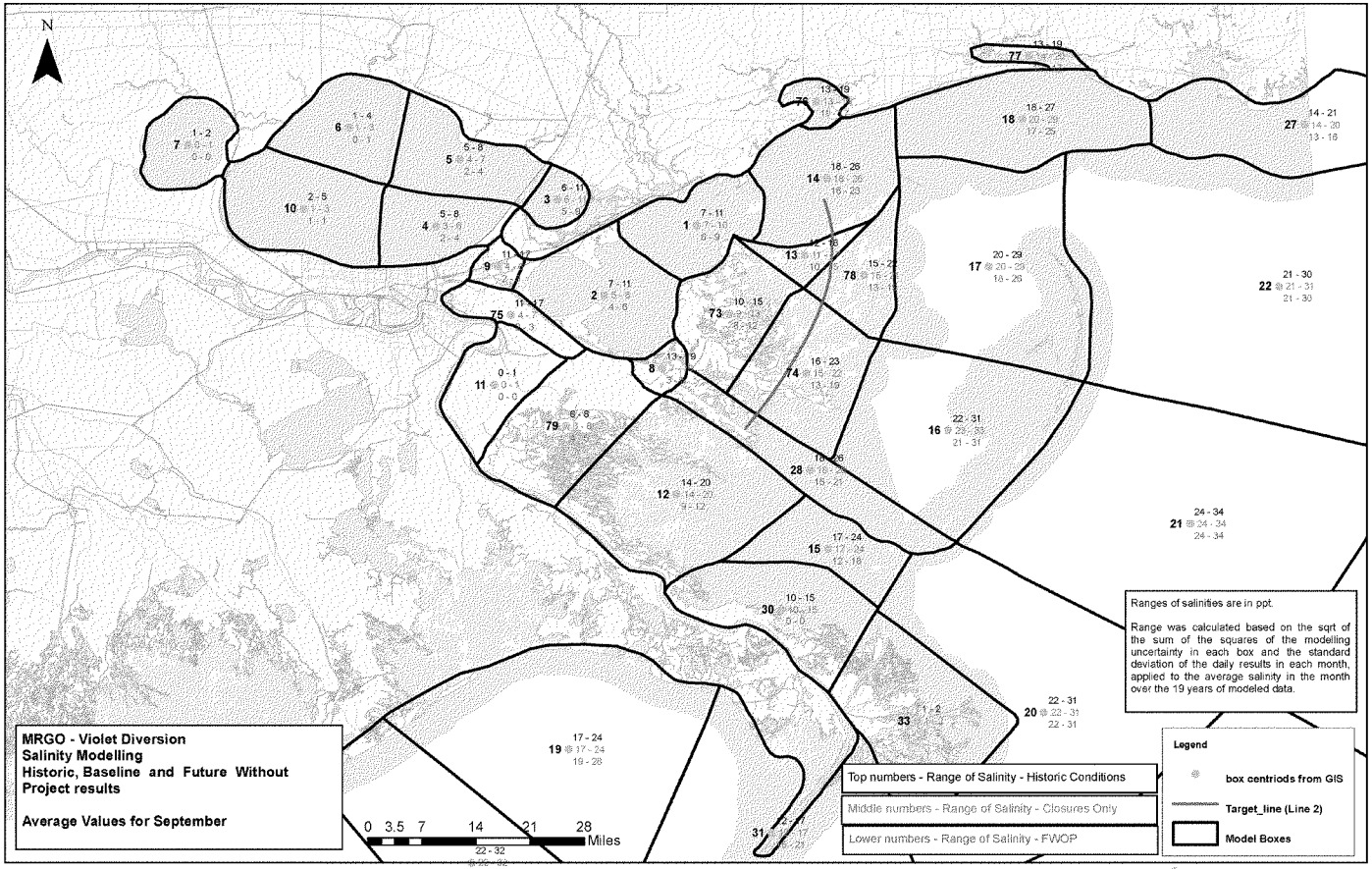


Figure E12. Results Values for Historic, Baseline, and FWOP for September.

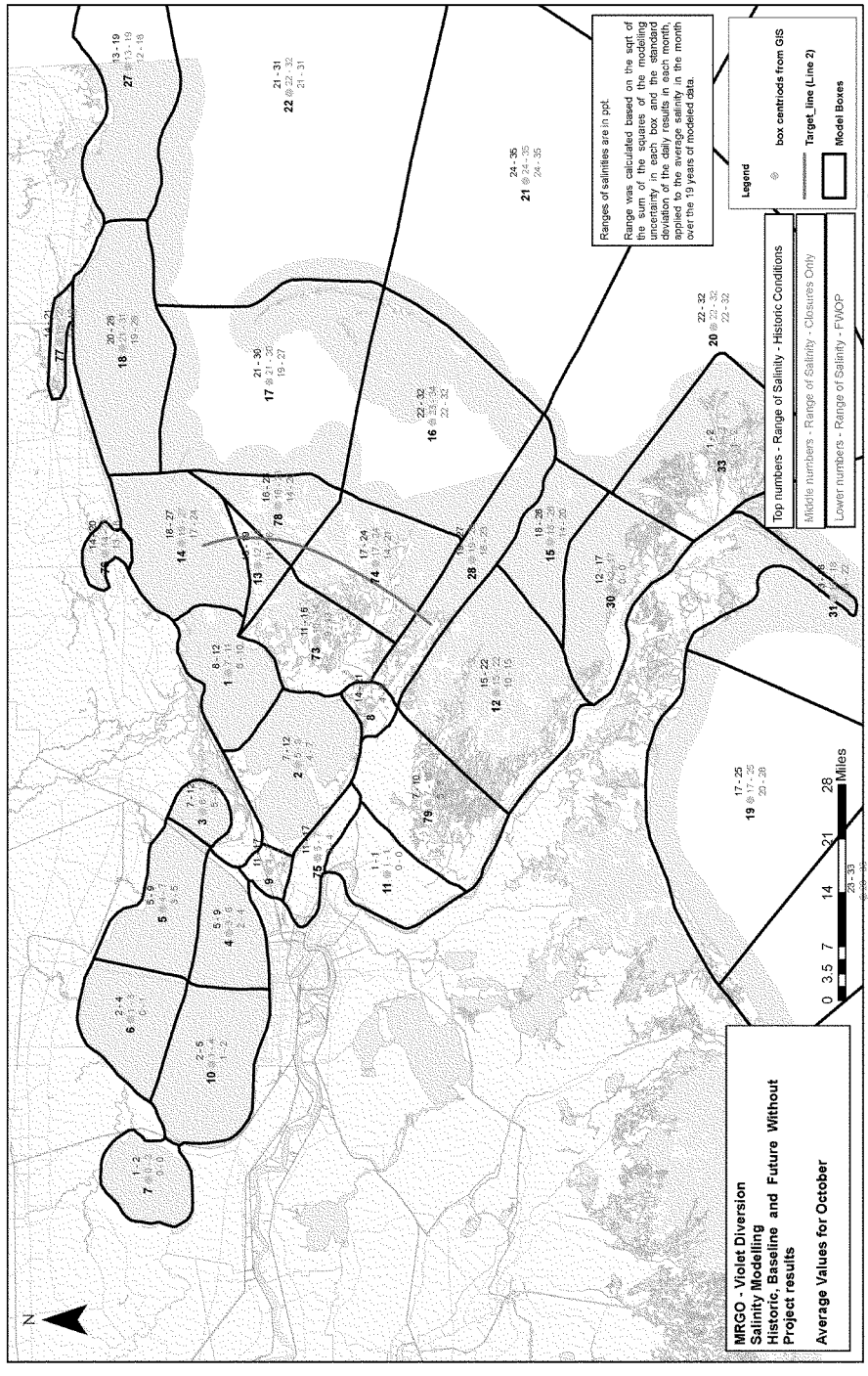


Figure F13. Results Values for Historic, Baseline, and FWOP for October.

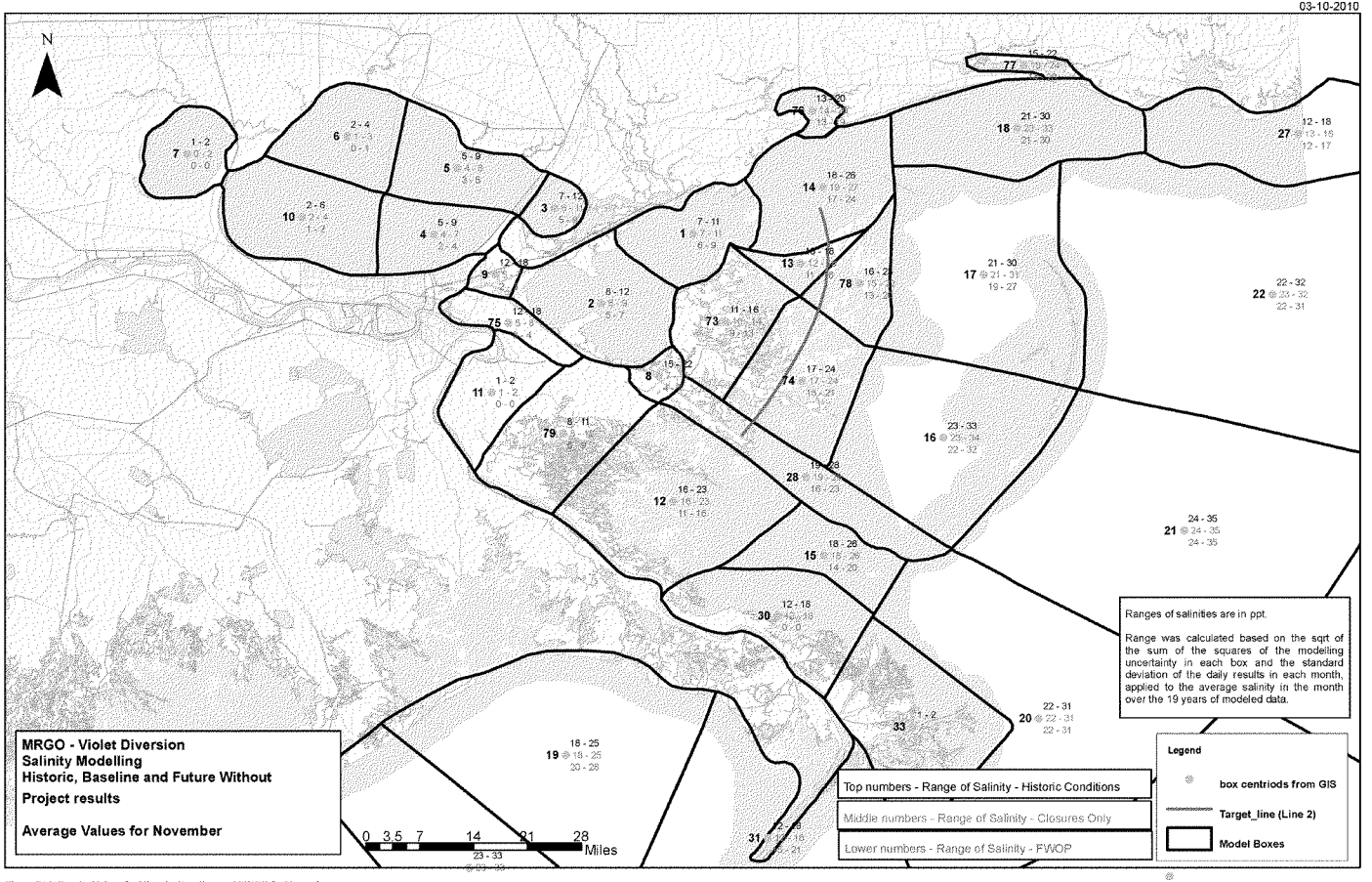


Figure E14. Results Values for Historic, Baseline, and FWOP for November.

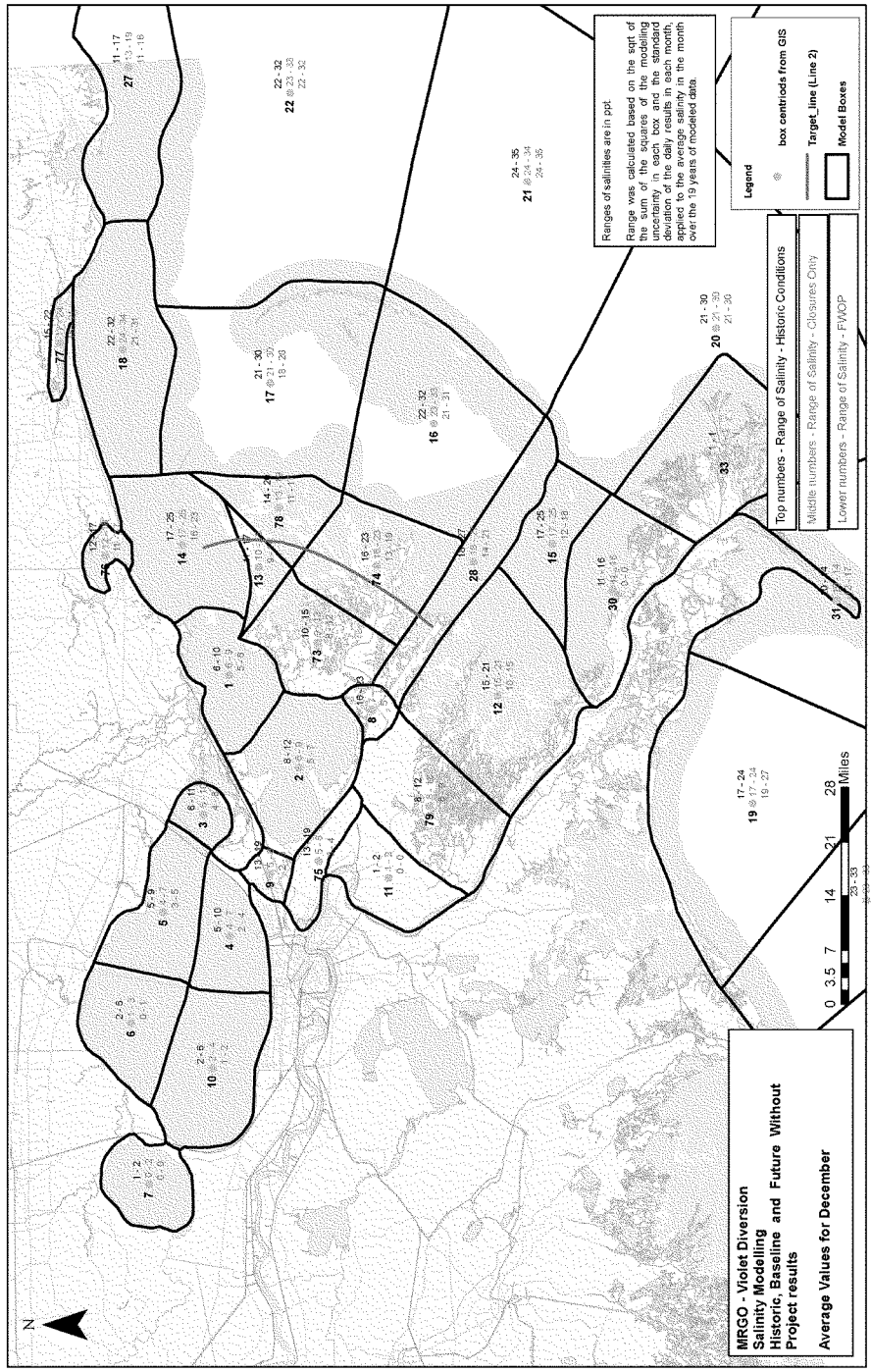


Figure E15. Results Values for Historic, Baseline, and FWOP for December

Table E1. FWP 1,000 cfs with Lake Borgn Open Condition Model Results – 1A1.

	Model Results		Model Uncertainty	
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	Below Chatry Target
January	10.73	3.27	2.07	99.8%
February	8.05	3.51	1.66	100.0%
March	7.32	3.36	1.53	99.9%
April	7.66	2.46	1.49	85.3%
May	9.07	3.40	1.81	26.7%
June	10.03	3.27	1.95	94.4%
July	11.04	3.10	2.11	84.7%
August	13.09	2.37	2.42	91.2%
September	14.24	2.74	2.64	91.7%
October	15.50	2.32	2.84	77.3%
November	15.35	2.45	2.82	70.9%
December	13.61	2.93	2.54	84.2%

Table E2. FWP 1,000/7000 cfs with Lake Borgne Open Condition Model Results – 7A1.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	10.65	3.23	2.06	99.8%
February	8.00	3.47	1.65	100.0%
March	7.28	3.32	1.52	99.9%
April	7.54	2.38	1.46	87.4%
May	8.76	3.22	1.74	31.7%
June	9.75	3.08	1.89	96.2%
July	10.85	2.97	2.07	87.1%
August	12.90	2.28	2.38	92.6%
September	14.06	2.66	2.60	92.9%
October	15.62	2.26	2.81	79.4%
November	15.18	2.41	2.79	73.0%
December	13.48	2.88	2.52	85.4%

Table E3. FWP 10,000 cfs with Lake Borgne Open Condition Model Results – 10A3.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	9.25	2.59	1.77	100.0%
February	7.06	2.80	1.43	100.0%
March	6.51	2.73	1.33	100.0%
April	6.86	2.02	1.32	95.8%
May	8.07	2.87	1.60	46.2%
June	8.85	2.63	1.70	99.1%
July	9.67	2.40	1.83	96.8%
August	11.37	1.77	2.09	98.8%
September	12.27	2.15	2.26	99.0%
October	13.26	1.75	2.42	95.7%
November	13.00	1.89	2.38	94.1%
December	11.51	2.23	2.13	98.0%

Table E4. FWP 15,000 cfs Condition Model Results – 15A3.

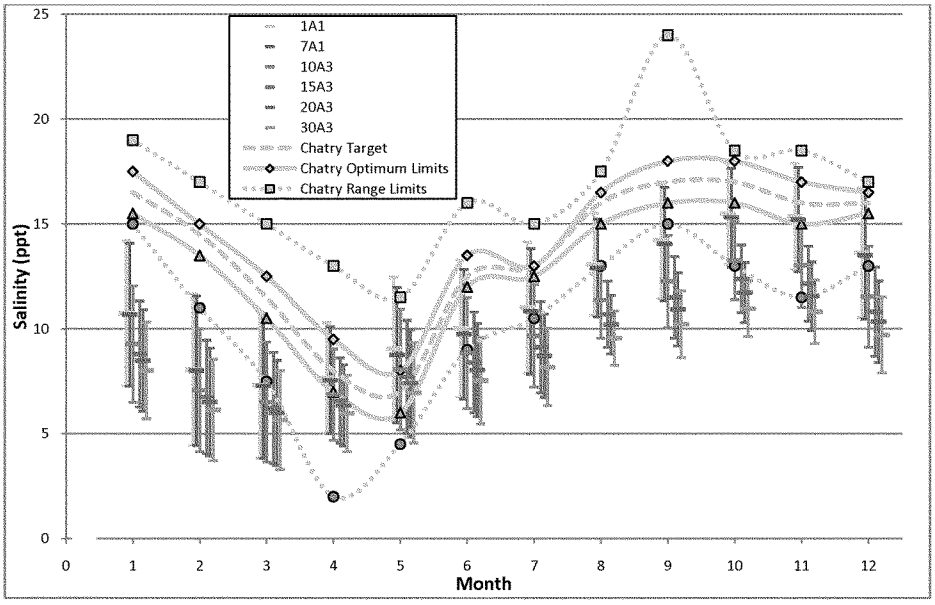
	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	8.78	2.34	1.67	100.0%
February	6.75	2.56	1.35	100.0%
March	6.23	2.50	1.26	100.0%
April	6.58	1.88	1.26	97.7%
May	7.72	2.68	1.52	55.2%
June	8.39	2.37	1.61	99.7%
July	9.13	2.12	1.71	98.7%
August	10.69	1.51	1.96	99.6%
September	11.50	1.88	2.11	99.7%
October	12.39	1.50	2.26	98.4%
November	12.13	1.68	2.22	97.8%
December	10.80	1.96	1.99	99.3%

Table E5. FWP 20,000 cfs Condition Model Results –20A3.

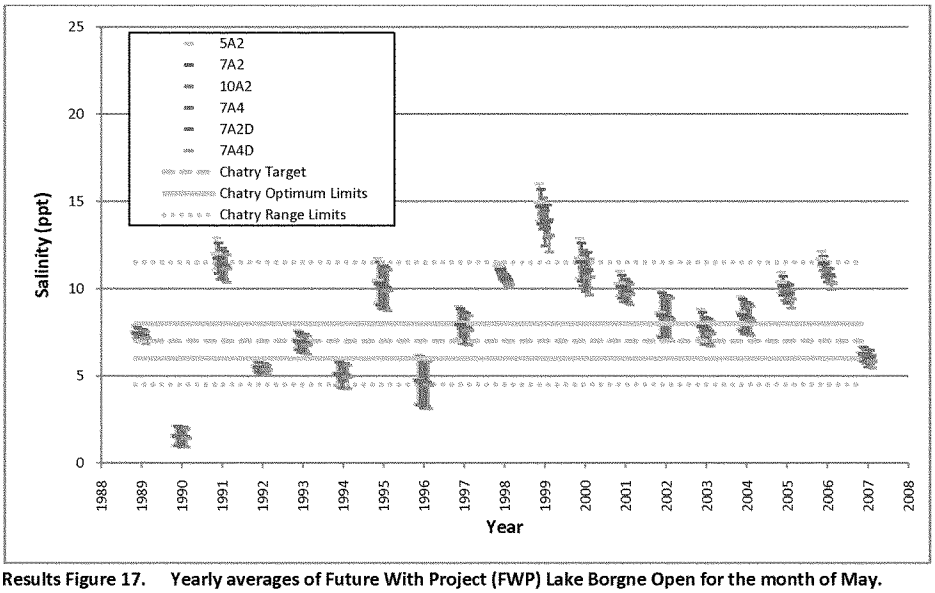
	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	8.47	2.22	1.61	100.0%
February	6.51	2.43	1.30	100.0%
March	6.00	2.35	1.21	100.0%
April	6.34	1.79	1.21	98.7%
May	7.42	2.55	1.46	63.3%
June	8.02	2.19	1.53	99.9%
July	8.73	1.92	1.63	99.4%
August	10.20	1.32	1.86	99.8%
September	10.94	1.67	2.01	99.9%
October	11.74	1.31	2.13	99.4%
November	11.53	1.54	2.11	99.0%
December	10.32	1.77	1.90	99.7%

Table E6. FWP 30,000 cfs Condition Model Results – 30A3.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Error (ppt)	Sigma (ppt)	
Jan	8.47	2.22	1.61	100.0%
Feb	6.51	2.43	1.30	100.0%
Mar	6.00	2.35	1.21	100.0%
Apr	6.34	1.79	1.21	98.7%
May	7.42	2.55	1.46	63.3%
Jun	8.02	2.19	1.53	99.9%
Jul	8.73	1.92	1.63	99.4%
Aug	10.20	1.32	1.86	99.8%
Sep	10.94	1.67	2.01	99.9%
Oct	11.74	1.31	2.13	99.4%
Nov	11.53	1.54	2.11	99.0%
Dec	10.32	1.77	1.90	99.7%



Results Figure 16. Monthly averages of Future With Project (FWP) Lake Borgne Open.



Results Figure 17. Yearly averages of Future With Project (FWP) Lake Borgne Open for the month of May.

Table E7. FWP 1,000/5,000 cfs with Lake Borgne Closed Condition Model Results – 5A2.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	10.58	3.22	2.04	99.8%
February	7.95	3.45	1.63	100.0%
March	7.22	3.30	1.51	99.9%
April	7.44	2.37	1.45	88.9%
May	8.66	3.21	1.72	33.7%
June	9.70	3.11	1.89	96.4%
July	10.80	2.99	2.06	87.6%
August	12.84	2.30	2.37	93.0%
September	13.98	2.67	2.59	93.4%
October	15.23	2.66	2.79	80.4%
November	15.08	2.41	2.77	74.3%
December	13.39	2.88	2.50	86.4%

Table E8. FWP 1,000/7,000 cfs with Lake Borgne Closed Condition Model Results – 7A2.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	10.59	3.21	2.04	99.8%
February	7.94	3.44	1.63	100.0%
March	7.22	3.30	1.50	99.9%
April	7.37	2.35	1.43	89.9%
May	8.50	3.14	1.69	36.7%
June	9.60	3.04	1.86	96.9%
July	10.75	2.95	2.05	88.3%
August	12.80	2.27	2.36	93.3%
September	13.94	2.65	2.58	93.6%
October	15.20	2.52	2.78	80.7%
November	15.05	2.40	2.76	74.6%
December	13.37	2.87	2.49	86.6%

Table E9. FWP 7,000 cfs all year with Lake Borgne Closed Condition Model Results – 7A4.

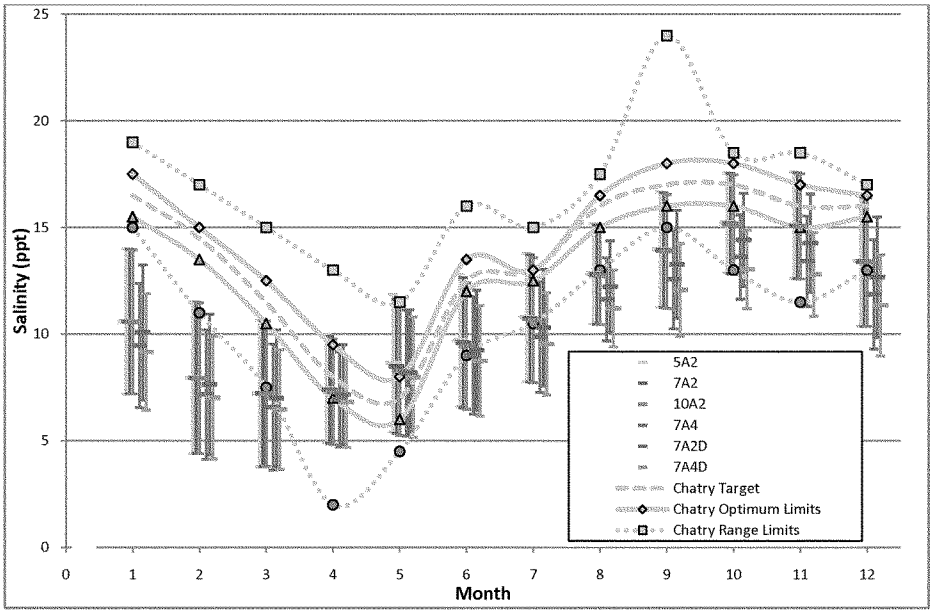
	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	9.45	2.74	1.81	100.0%
February	7.16	2.92	1.45	100.0%
March	6.58	2.82	1.35	100.0%
April	6.93	2.07	1.33	95.2%
May	8.19	2.94	1.62	43.6%
June	9.00	2.74	1.74	98.8%
July	9.87	2.55	1.87	95.7%
August	11.63	1.90	2.14	98.2%
September	12.58	2.28	2.32	98.5%
October	13.62	1.87	2.49	93.9%
November	13.39	2.02	2.45	91.6%
December	11.84	2.39	2.20	96.9%

Table E10. FWP 1,000/7,000 cfs with Lake Borgne Closed and Lake Maurepas Diversions at 4,500 cfs Condition Model Results – 7A2D.

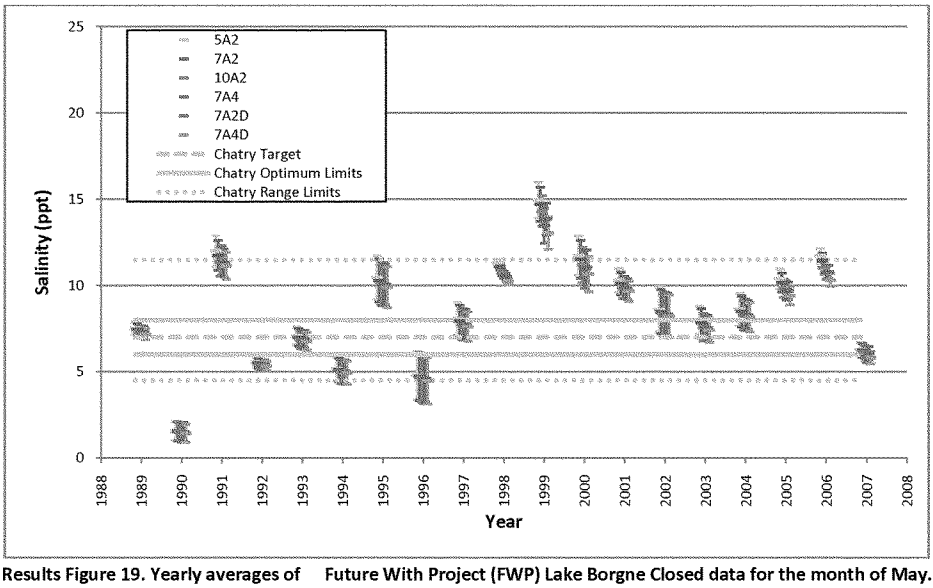
	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	10.06	2.98	1.94	99.9%
February	7.64	3.20	1.56	100.0%
March	7.00	3.07	1.44	99.9%
April	7.15	2.17	1.38	92.9%
May	8.21	2.94	1.62	43.0%
June	9.24	2.81	1.78	98.2%
July	10.32	2.71	1.96	92.5%
August	12.23	2.09	2.25	96.3%
September	13.27	2.49	2.46	96.6%
October	14.43	2.10	2.64	88.2%
November	14.24	2.22	2.61	84.1%
December	12.65	2.66	2.36	92.6%

Table E11. FWP 7,000 cfs all year with Lake Borgne Closed and Lake Maurepas Diversions at 4,500 cfs Condition Model Results – 7A4D.

	Model Results		Model Uncertainty	Below Chatry Target
	Mean (ppt)	Std Dev (ppt)	Sigma (ppt)	
January	9.15	2.56	1.75	100.0%
February	7.01	2.75	1.41	100.0%
March	6.47	2.66	1.31	100.0%
April	6.81	1.97	1.31	96.2%
May	8.00	2.82	1.58	48.1%
June	8.74	2.57	1.68	99.3%
July	9.55	2.35	1.80	97.3%
August	11.20	1.75	2.06	99.0%
September	12.07	2.13	2.23	99.2%
October	13.04	1.73	2.38	96.6%
November	12.77	1.86	2.34	95.3%
December	11.32	2.21	2.10	98.4%



Results Figure 18. Monthly averages of Future With Project (FWP) Lake Borgne Closed.



Results Figure 19. Yearly averages of Future With Project (FWP) Lake Borgne Closed data for the month of May.

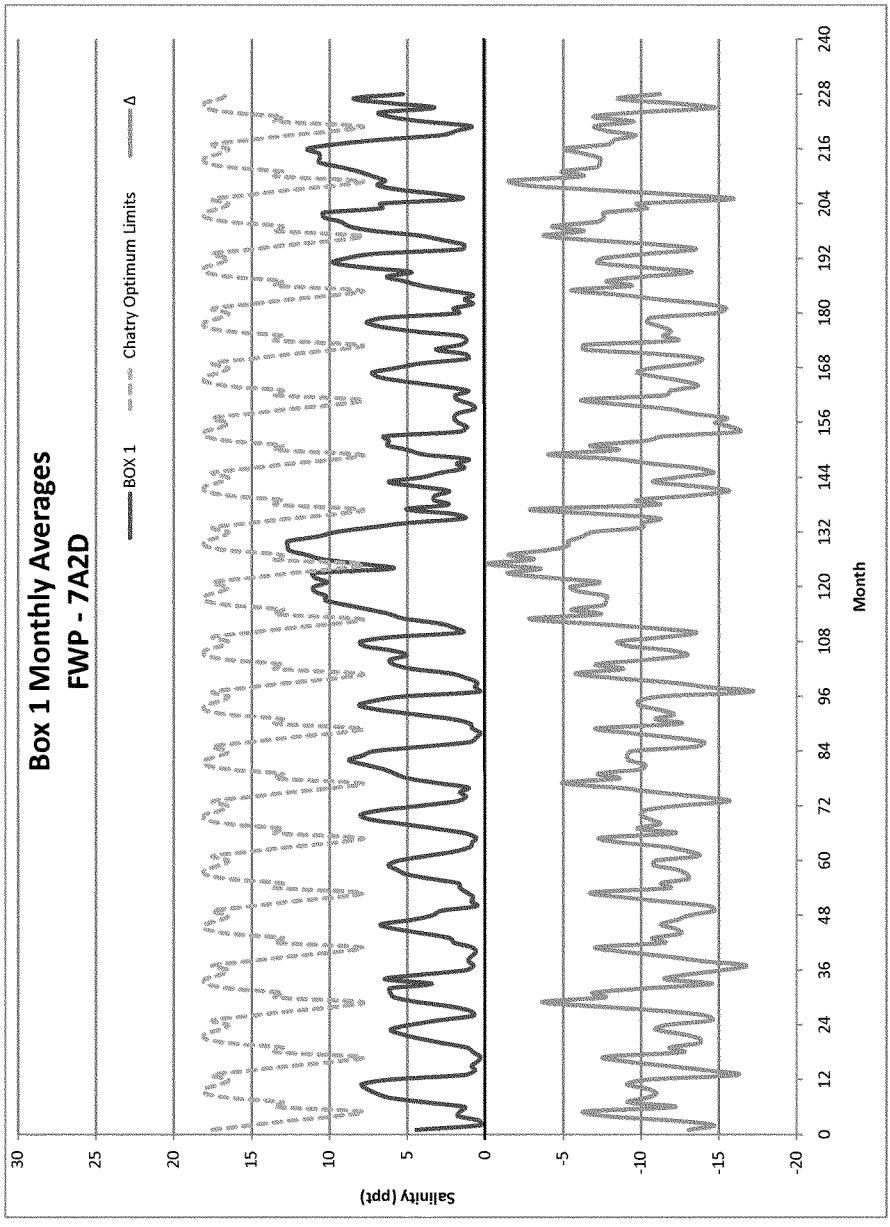


Figure E20. Time Series of Box 1 for Future With Project (FWP) Scenario 7A2D.

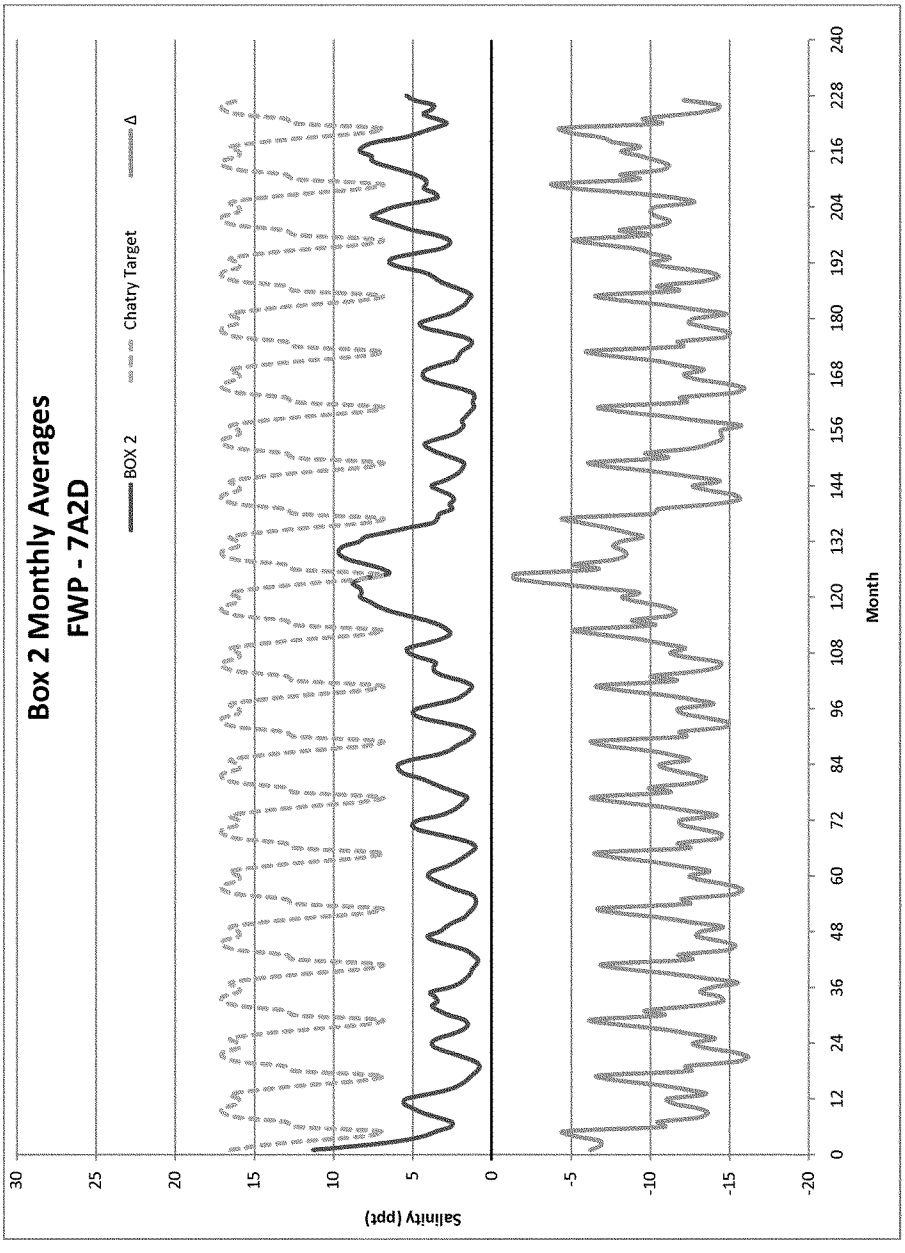


Figure E21. Time Series of Box 2 for Future With Project (FWP) Scenario 7A2D.

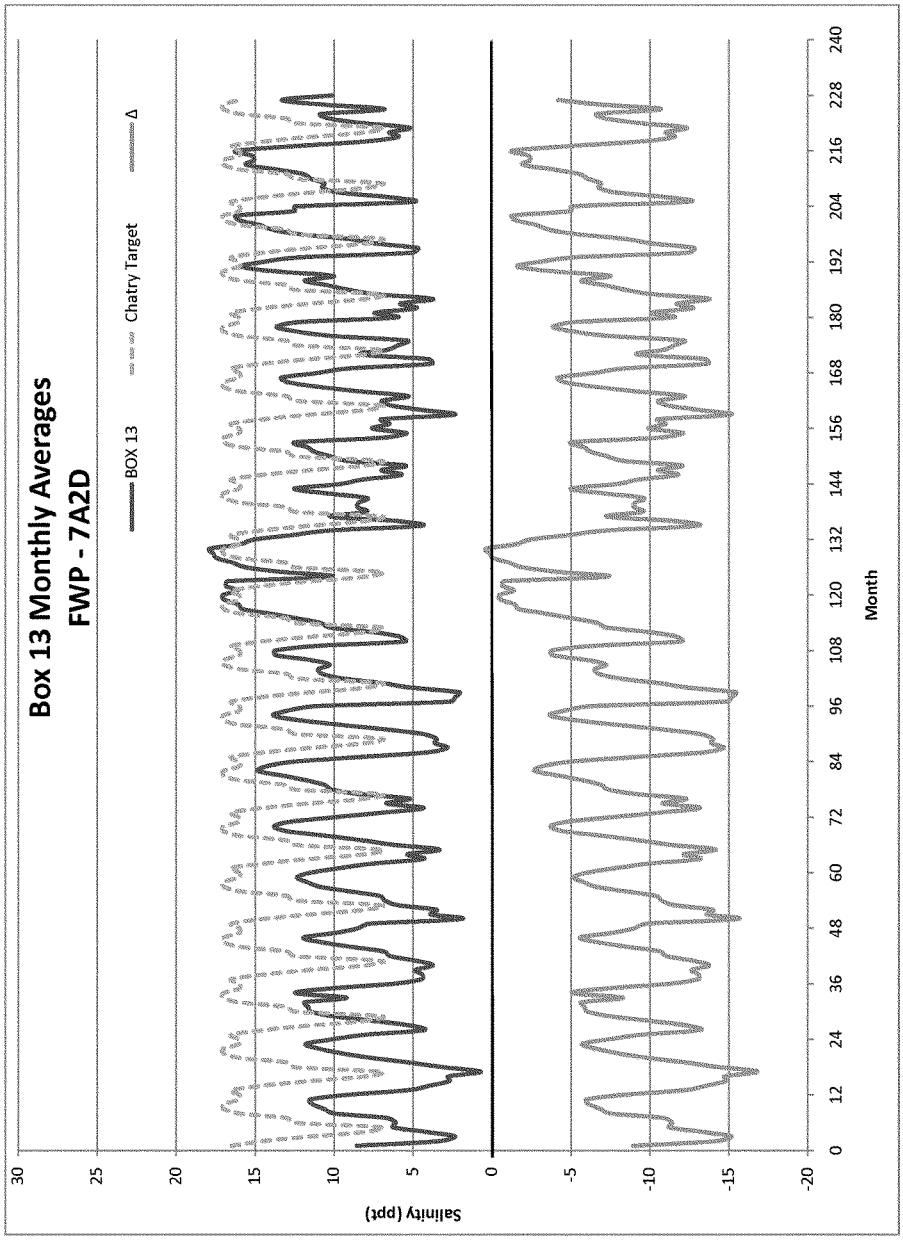


Figure E22. Time Series of Box 13 for Future With Project (FWP) Scenario 7A2D.

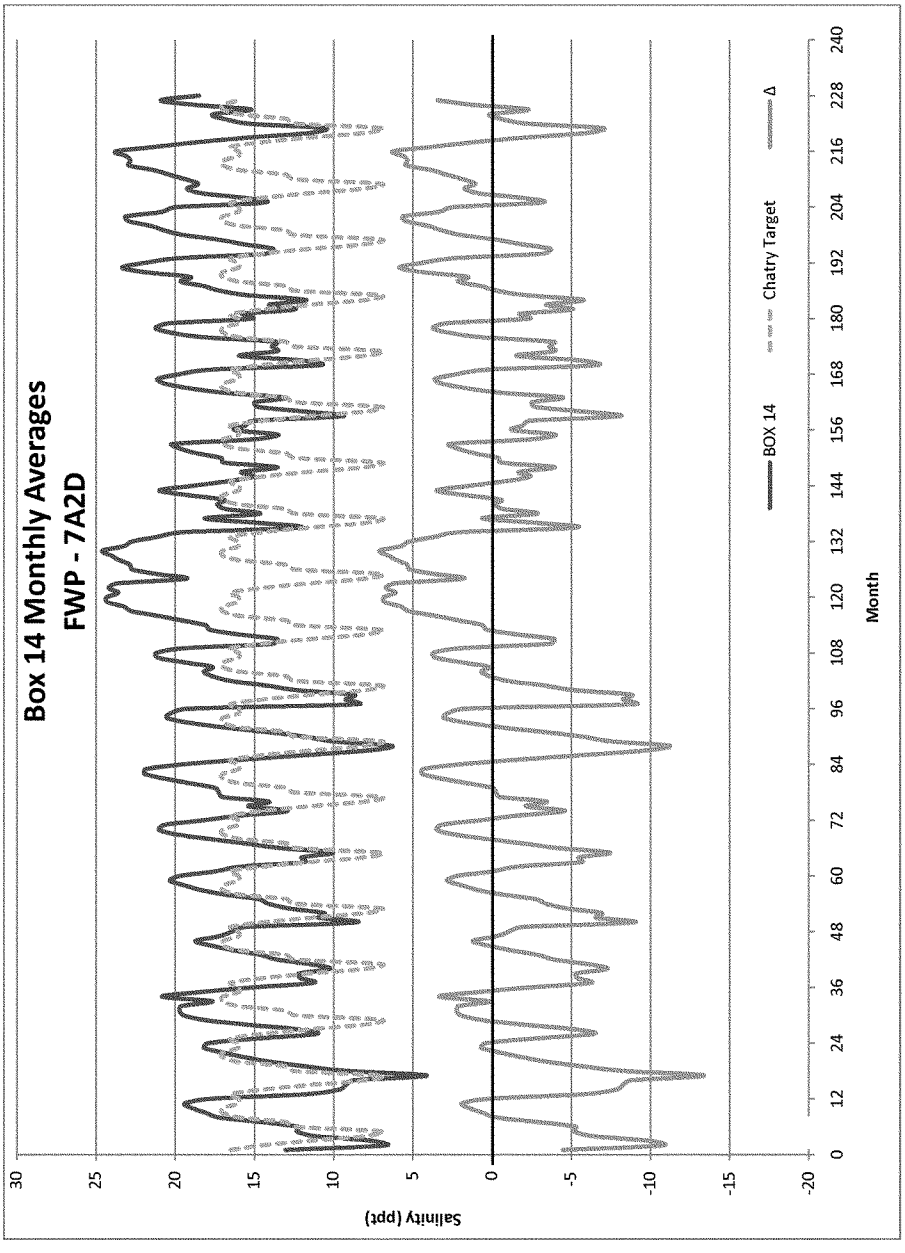


Figure E23. Time Series of Box 14 for Future With Project (FWP) Scenario 7A2D.

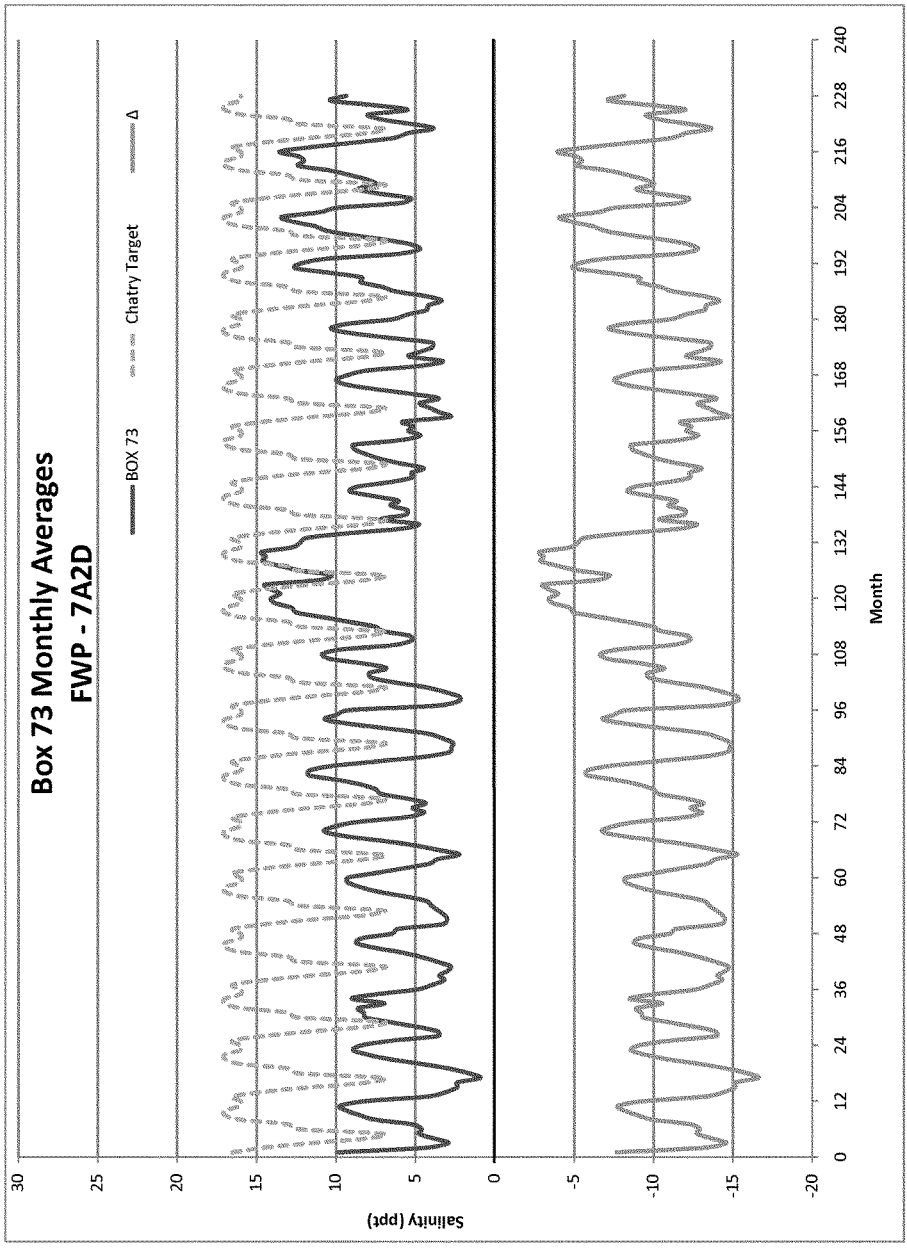


Figure E24. Time Series of Box 73 for Future With Project (FWP) Scenario 7A2D.

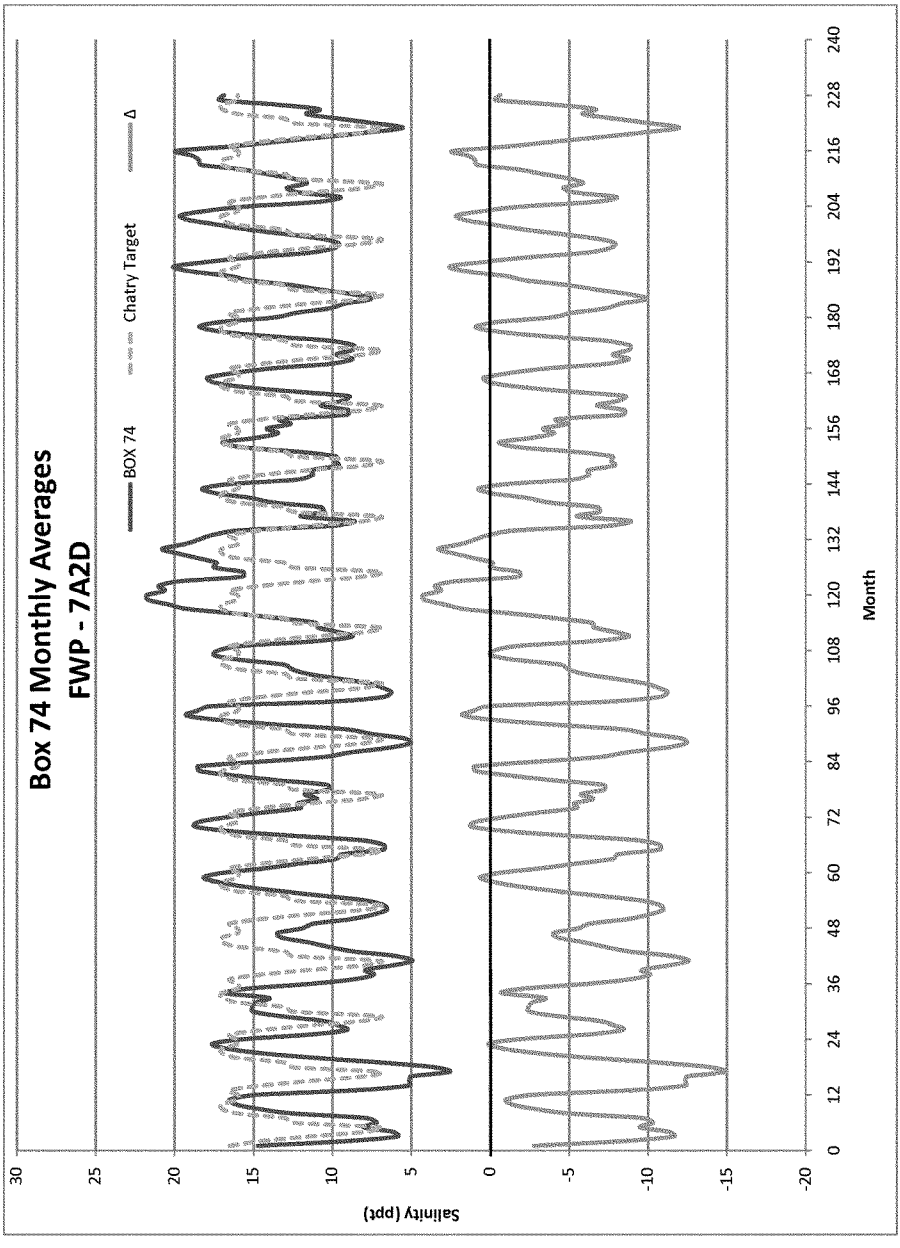


Figure E25. Time Series of Box 74 for Future With Project (FWP) Scenario 7A2D.

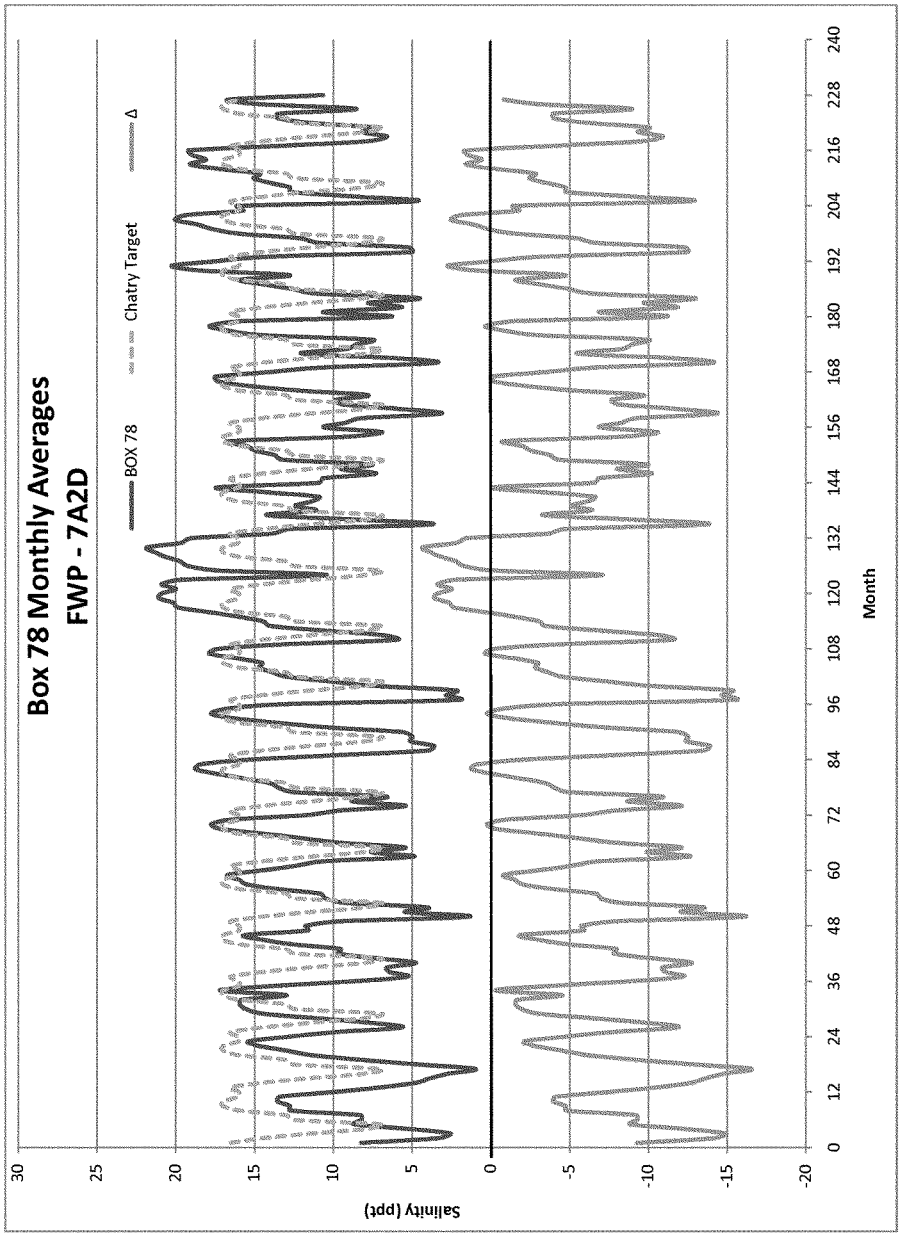


Figure E26. Time Series of Box 78 for Future With Project (FWP) Scenario 7A2D.

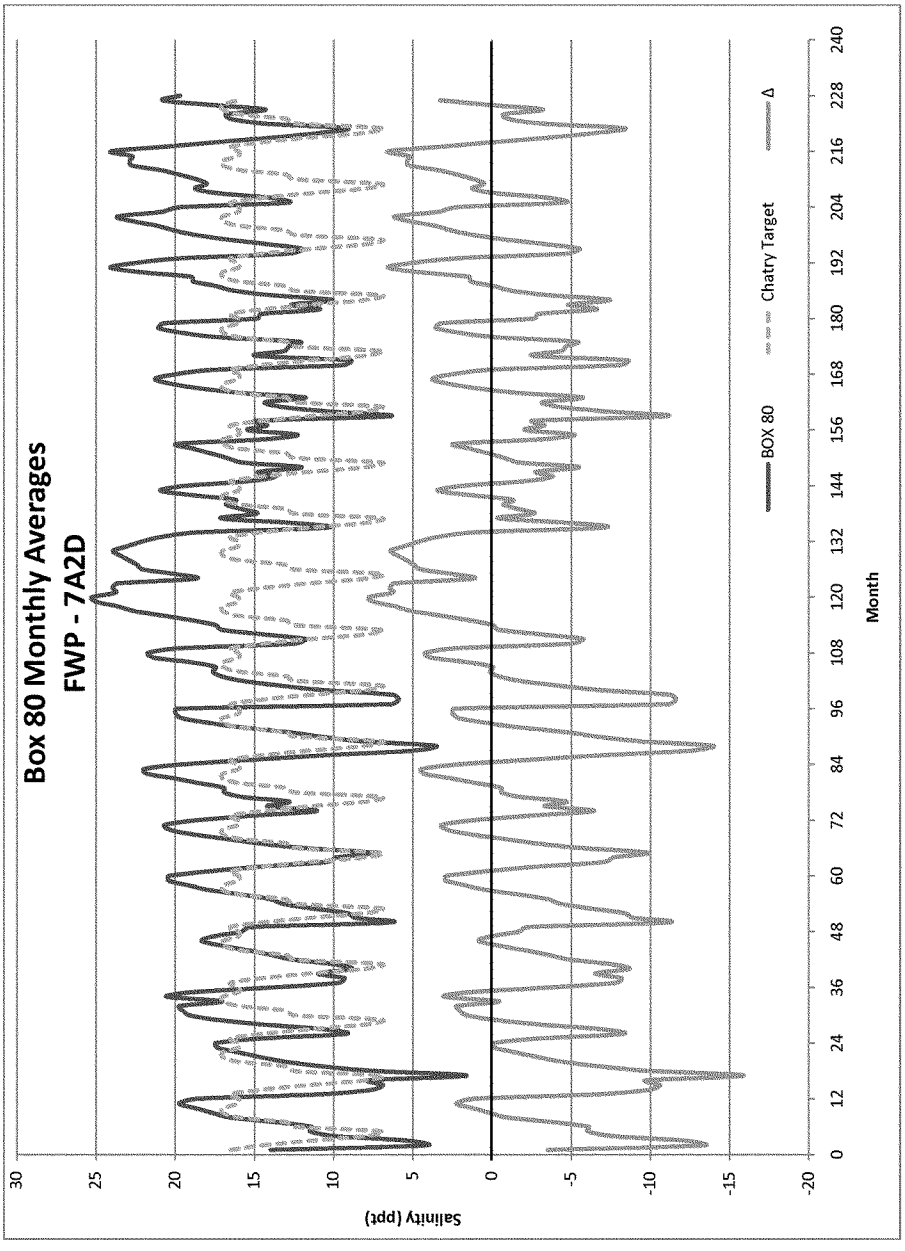


Figure E27. Time Series of Box 80 for Future With Project (FWP) Scenario 7A2D.

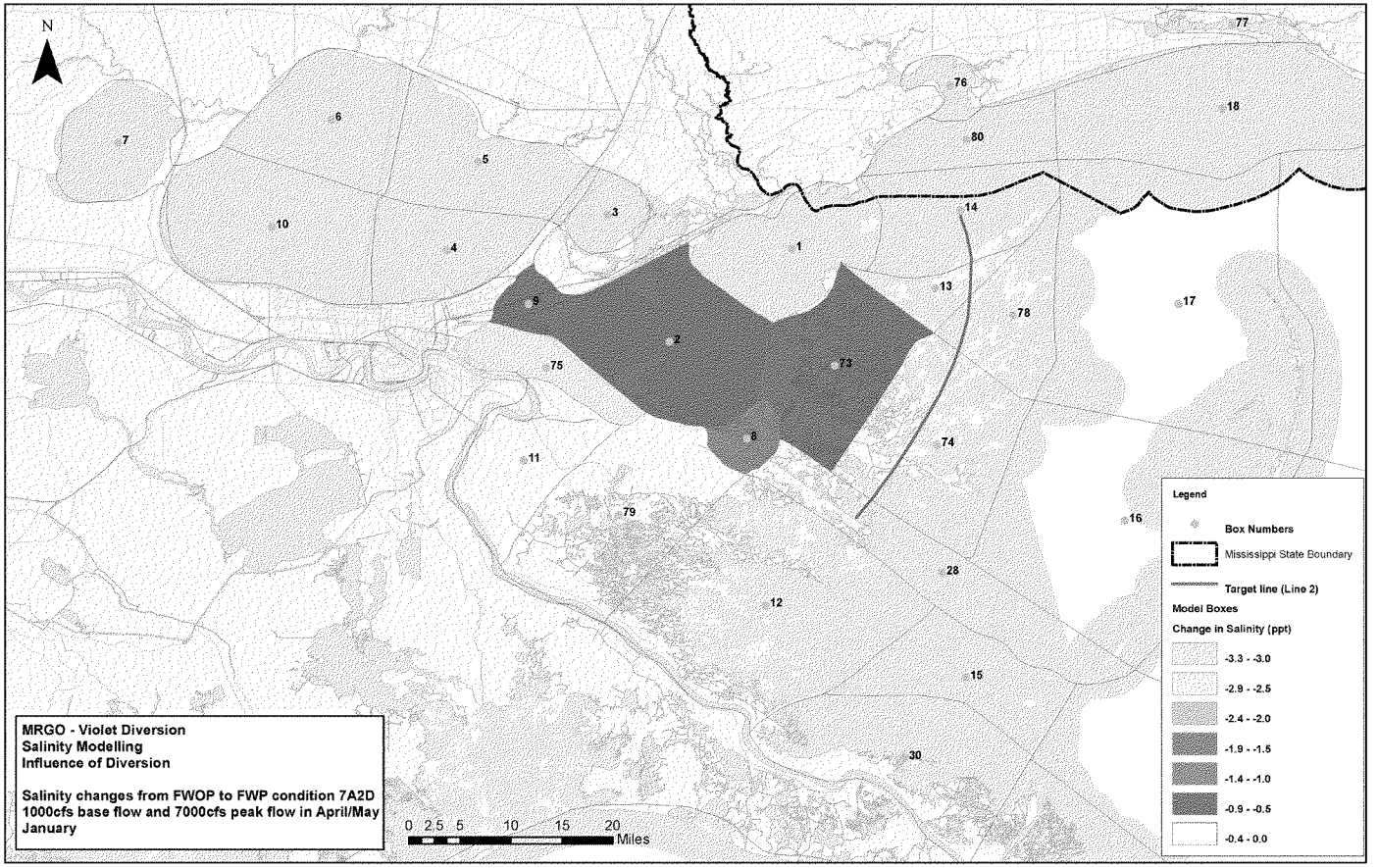


Figure E28. Influence Map showing change from FWOP to 7A2D in January.

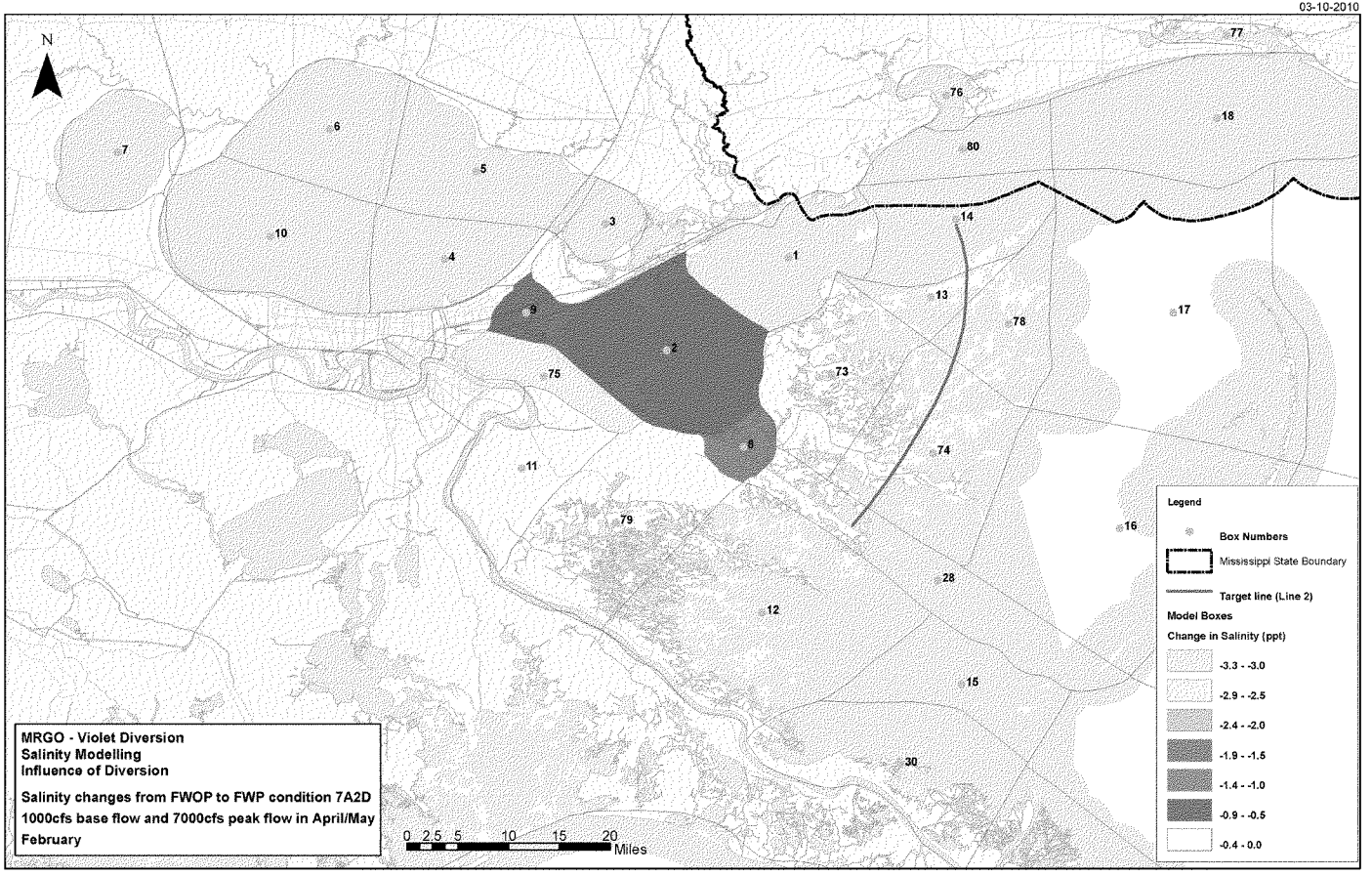


Figure E29. Influence Map showing change from FWOP to 7A2D in February.

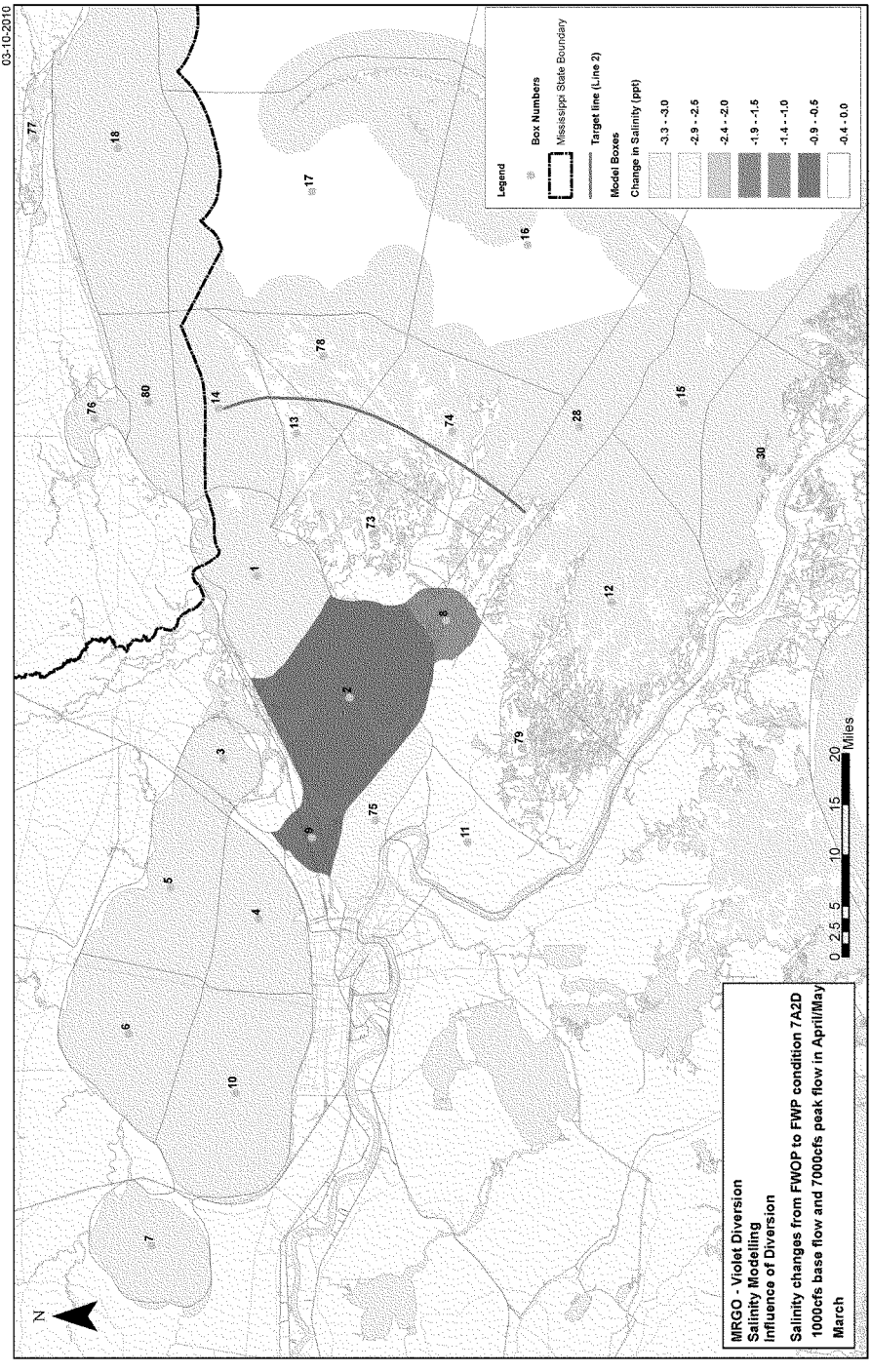


Figure E30. Influence Map showing change from FWOP to 7A2D in March.

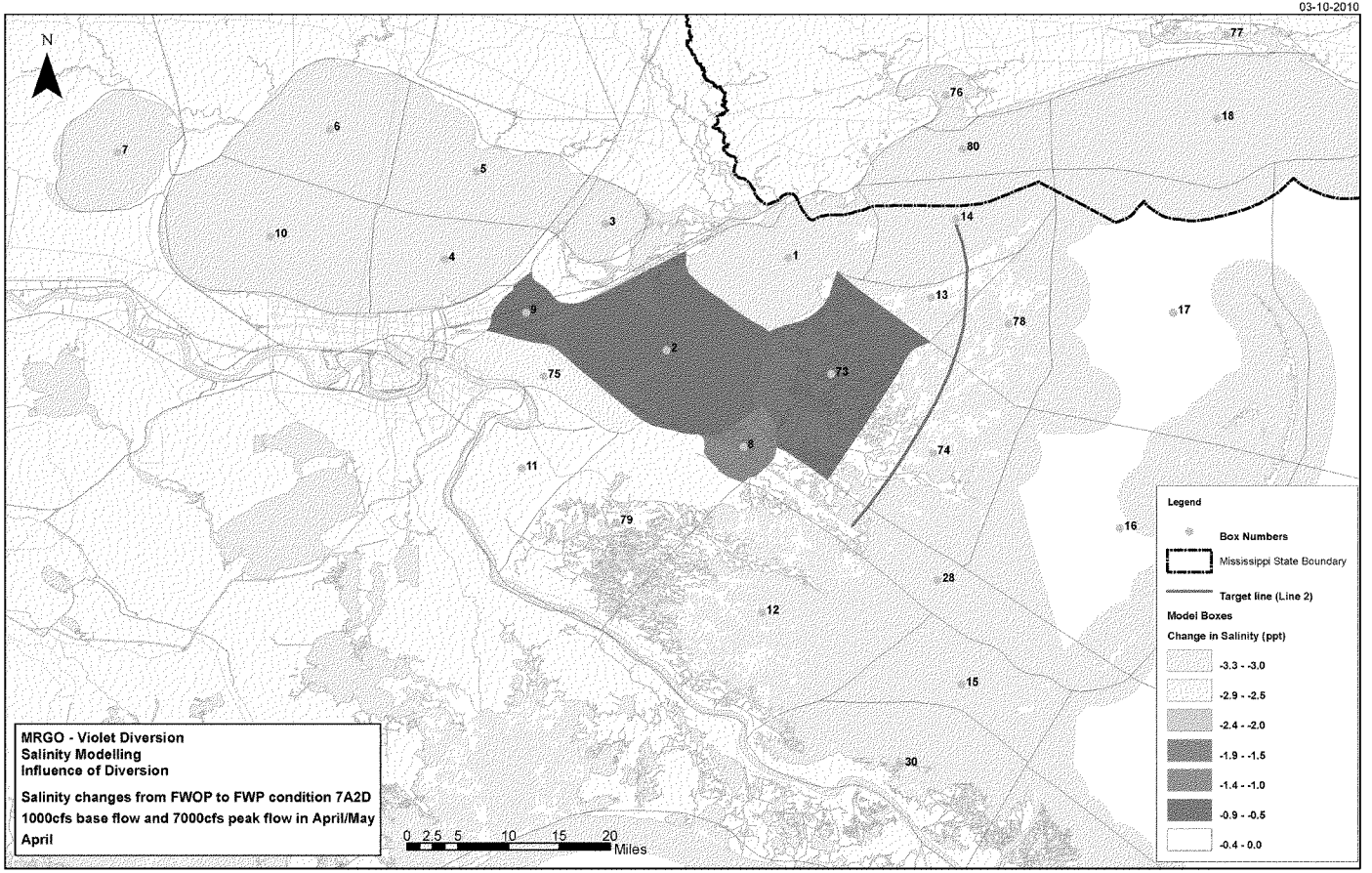


Figure E31. Influence Map showing change from FWOP to 7A2D in April.

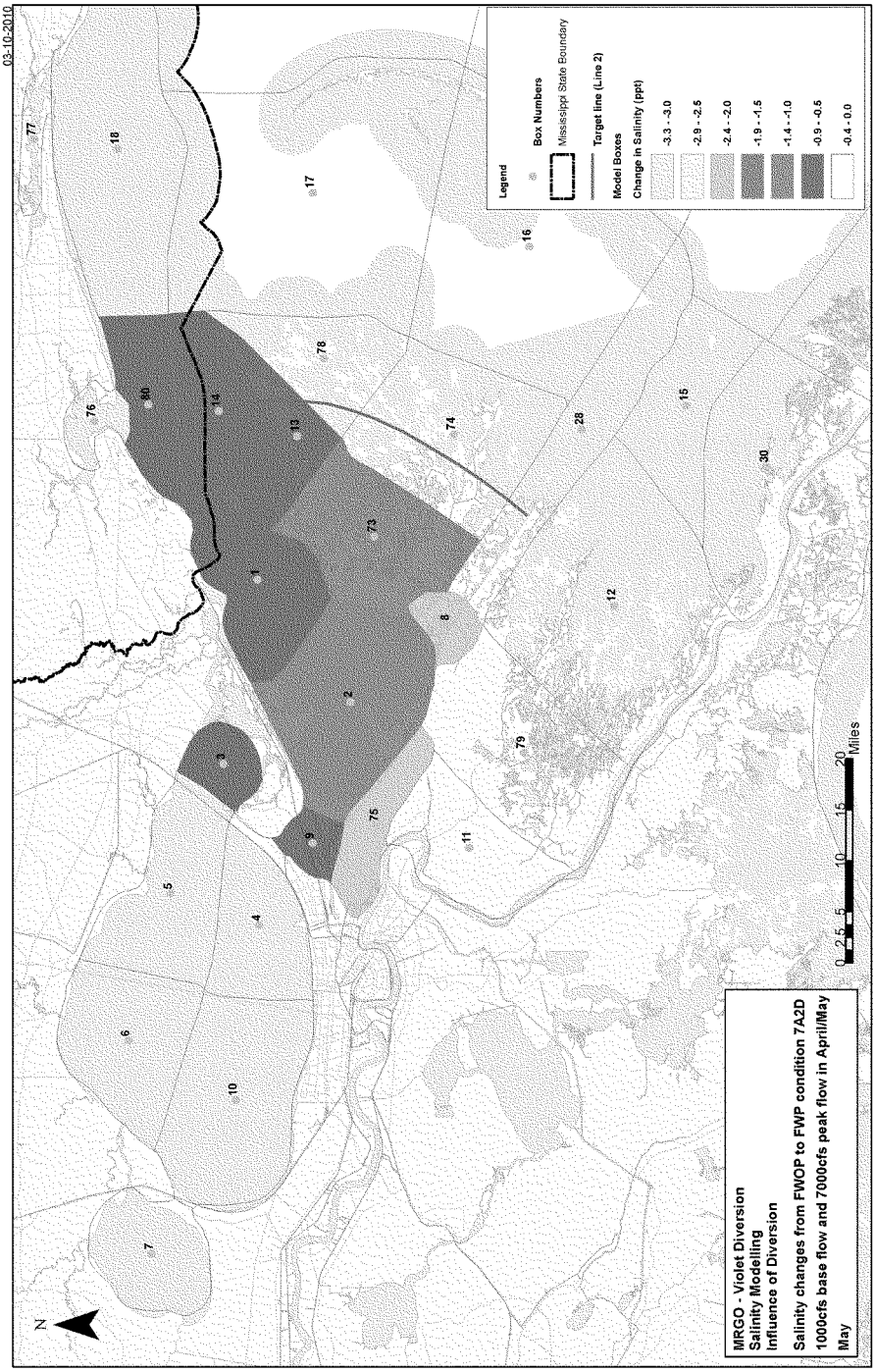


Figure E32. Influence Map showing change from FWOP to 7A2D in May.

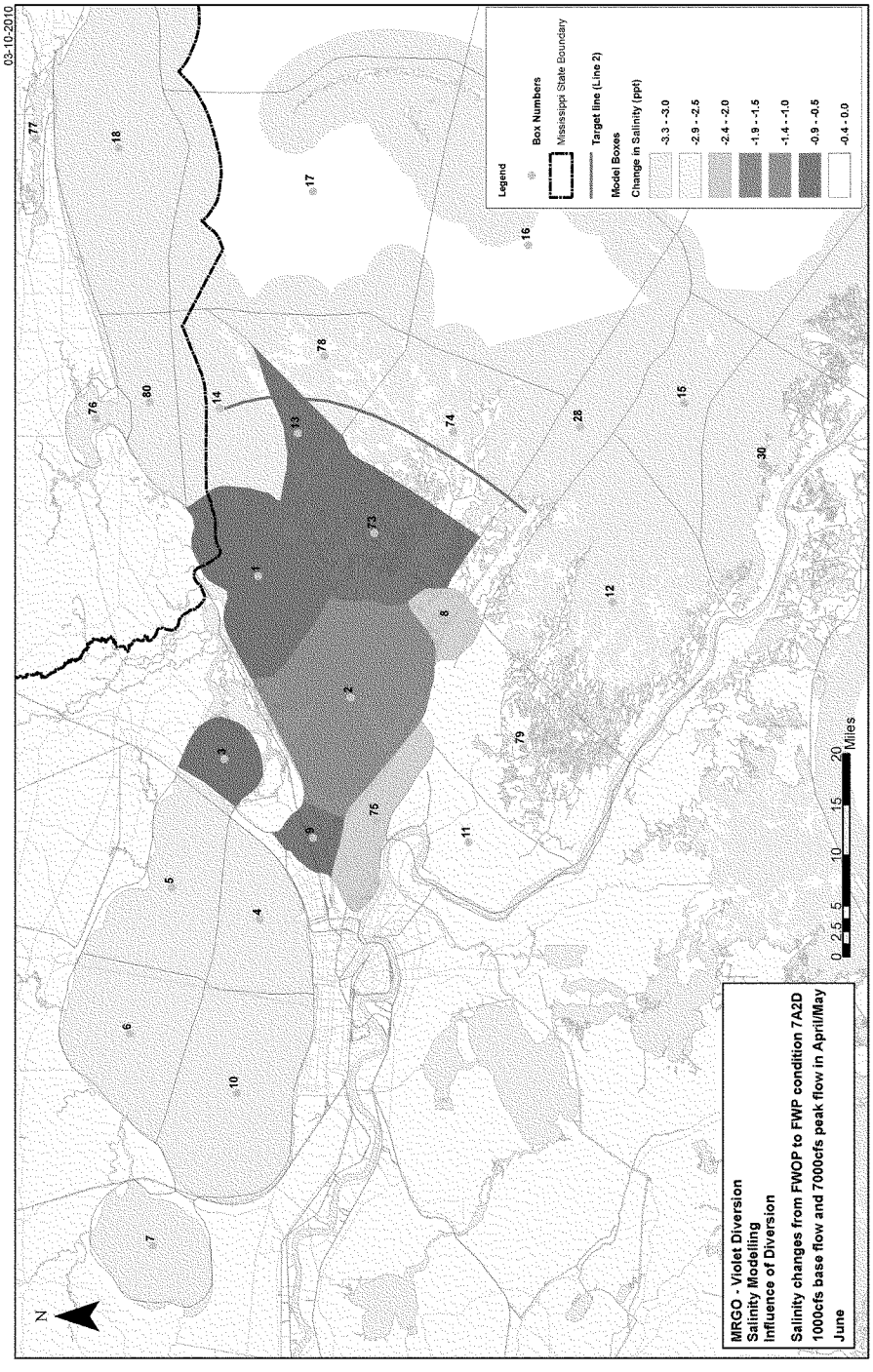


Figure E33. Influence Map showing change from FWOP to 7A2D in June.

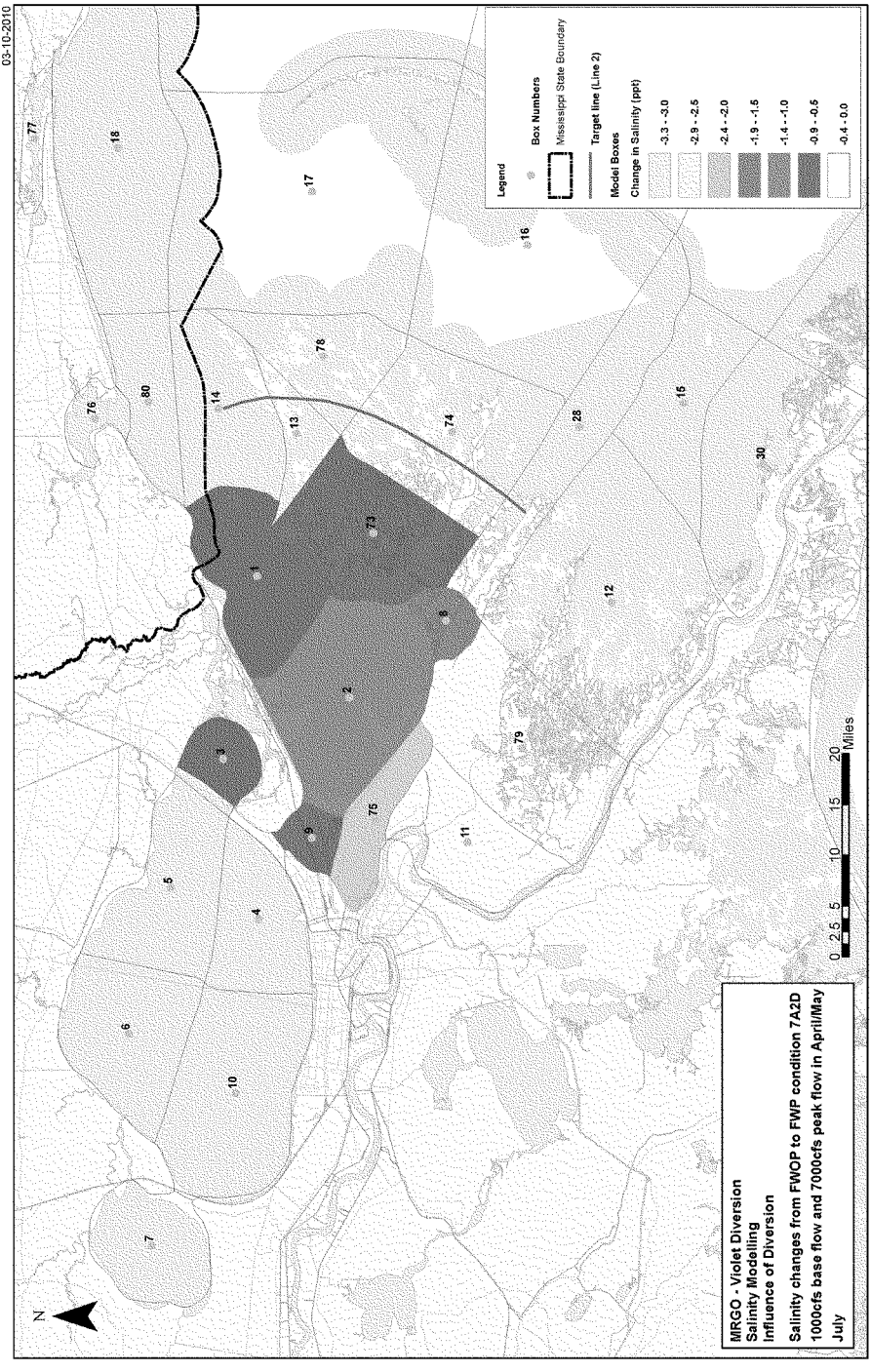


Figure E34. Influence Map showing change from FWOP to 7A2D in July.

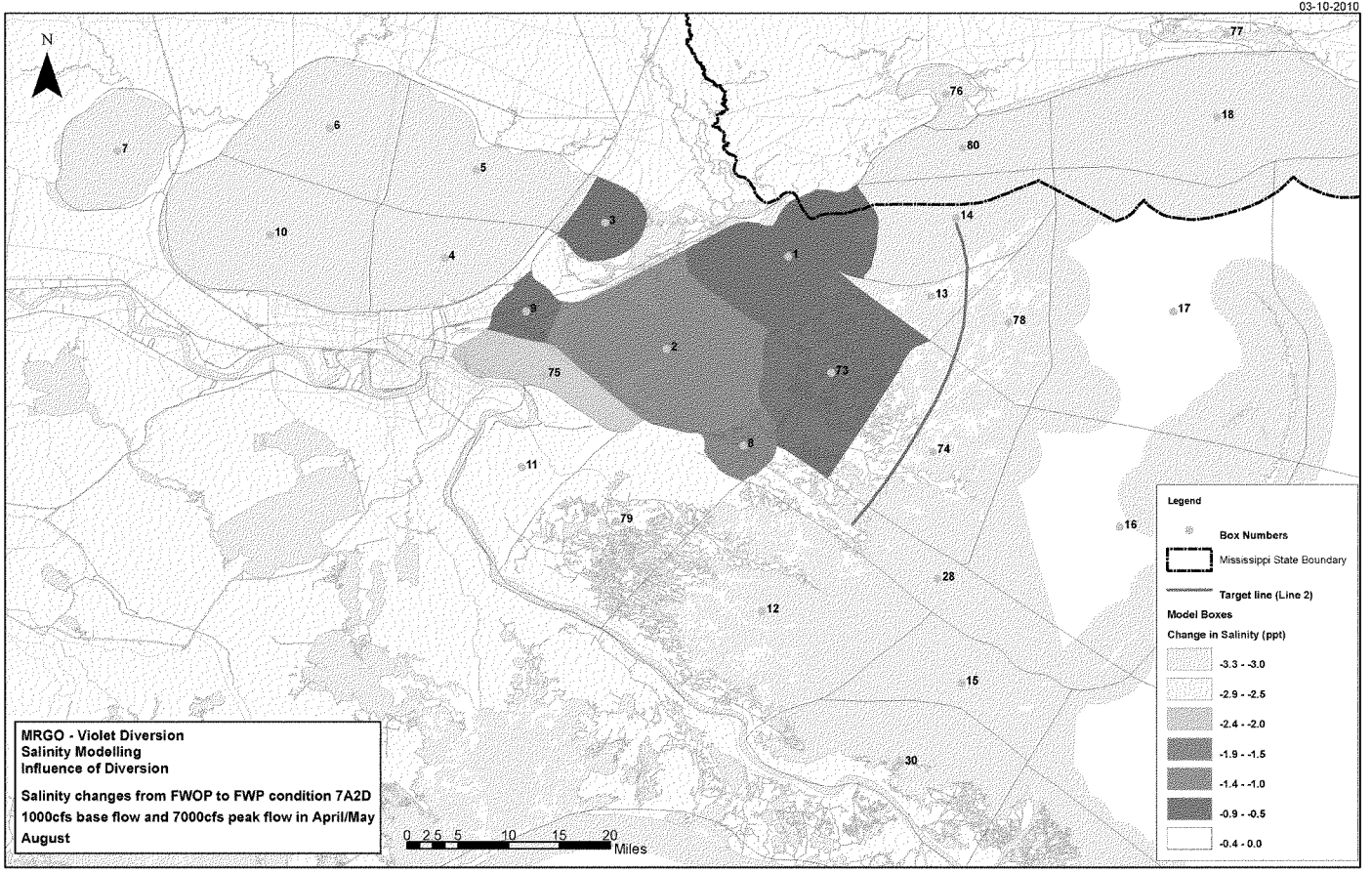


Figure E35. Influence Map showing change from FWOP to 7A2D in August.

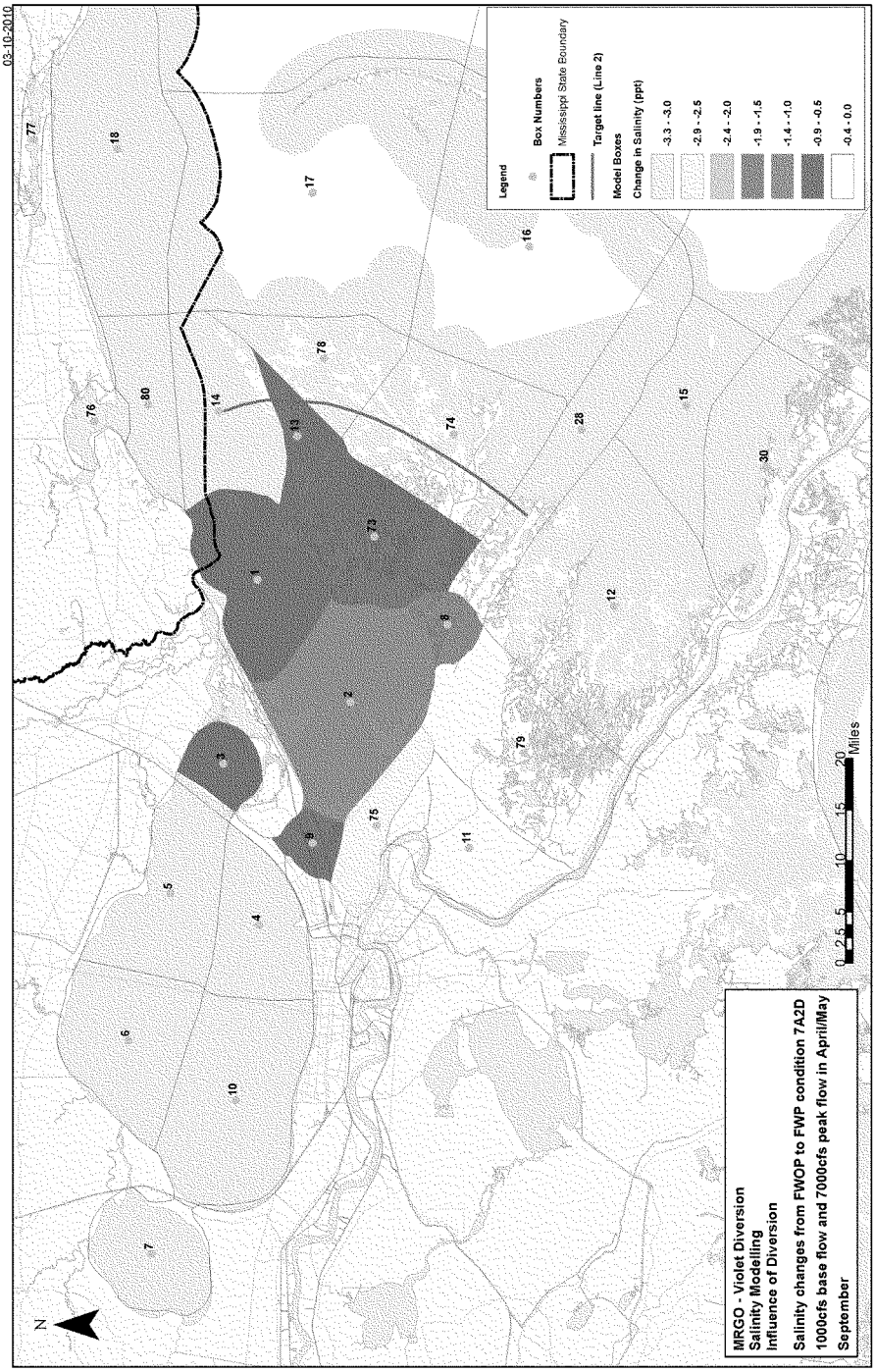


Figure E36. Influence Map showing change from FWOP to 7A2D in September.

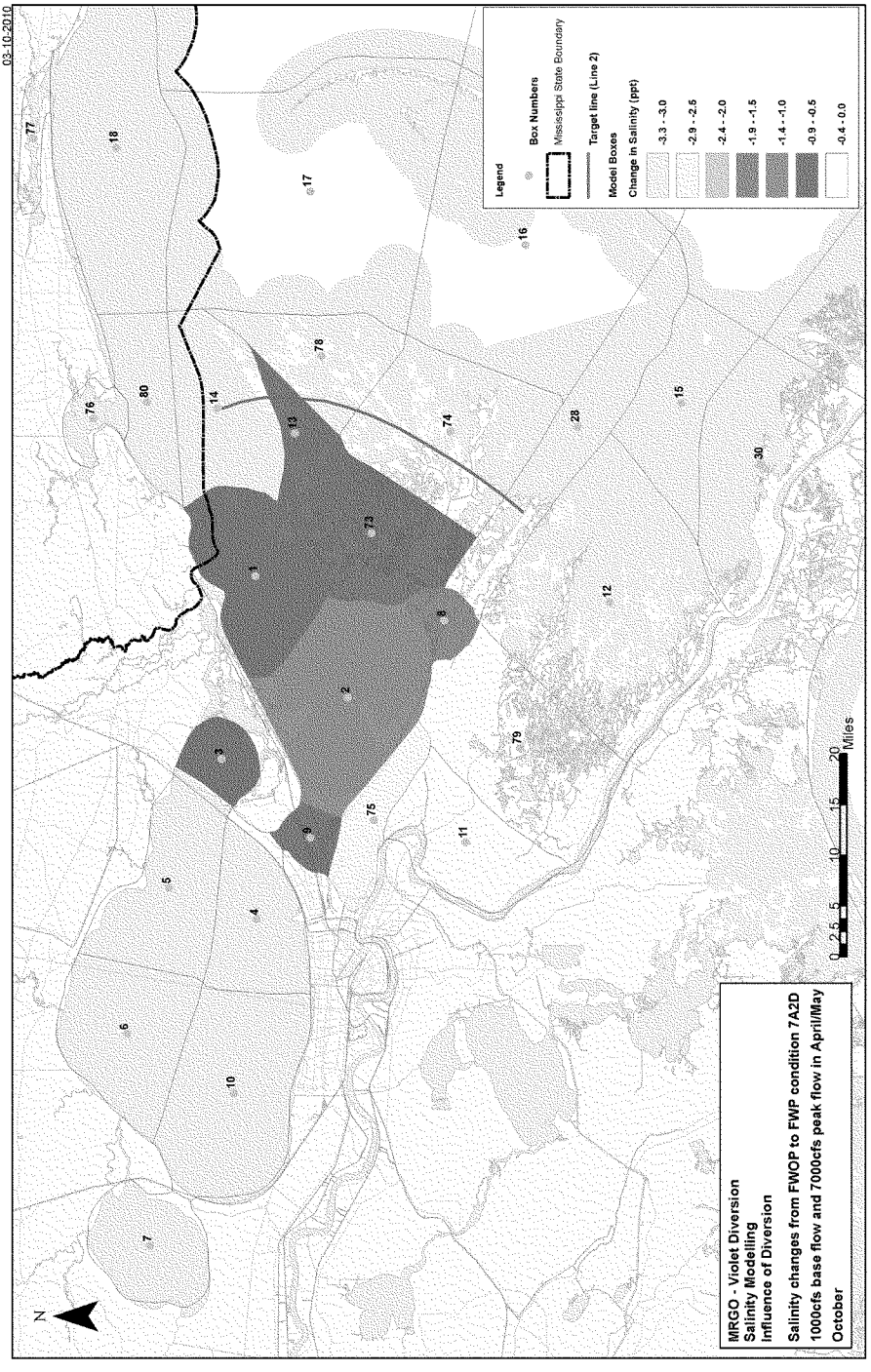


Figure E37. Influence Map showing change from FWOP to 7A2D in October.

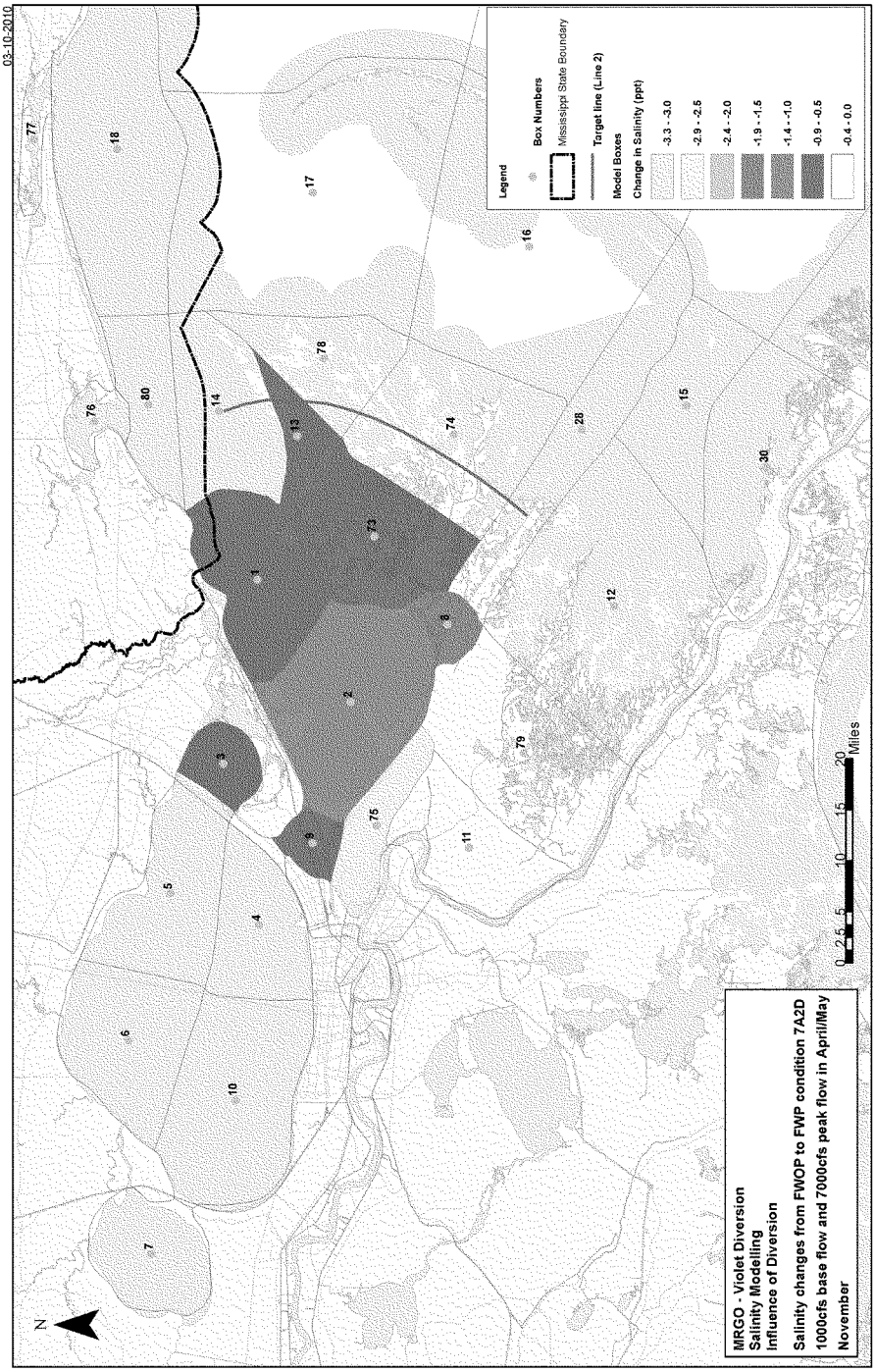


Figure E38. Influence Map showing change from FWOP to 7A2D in November.

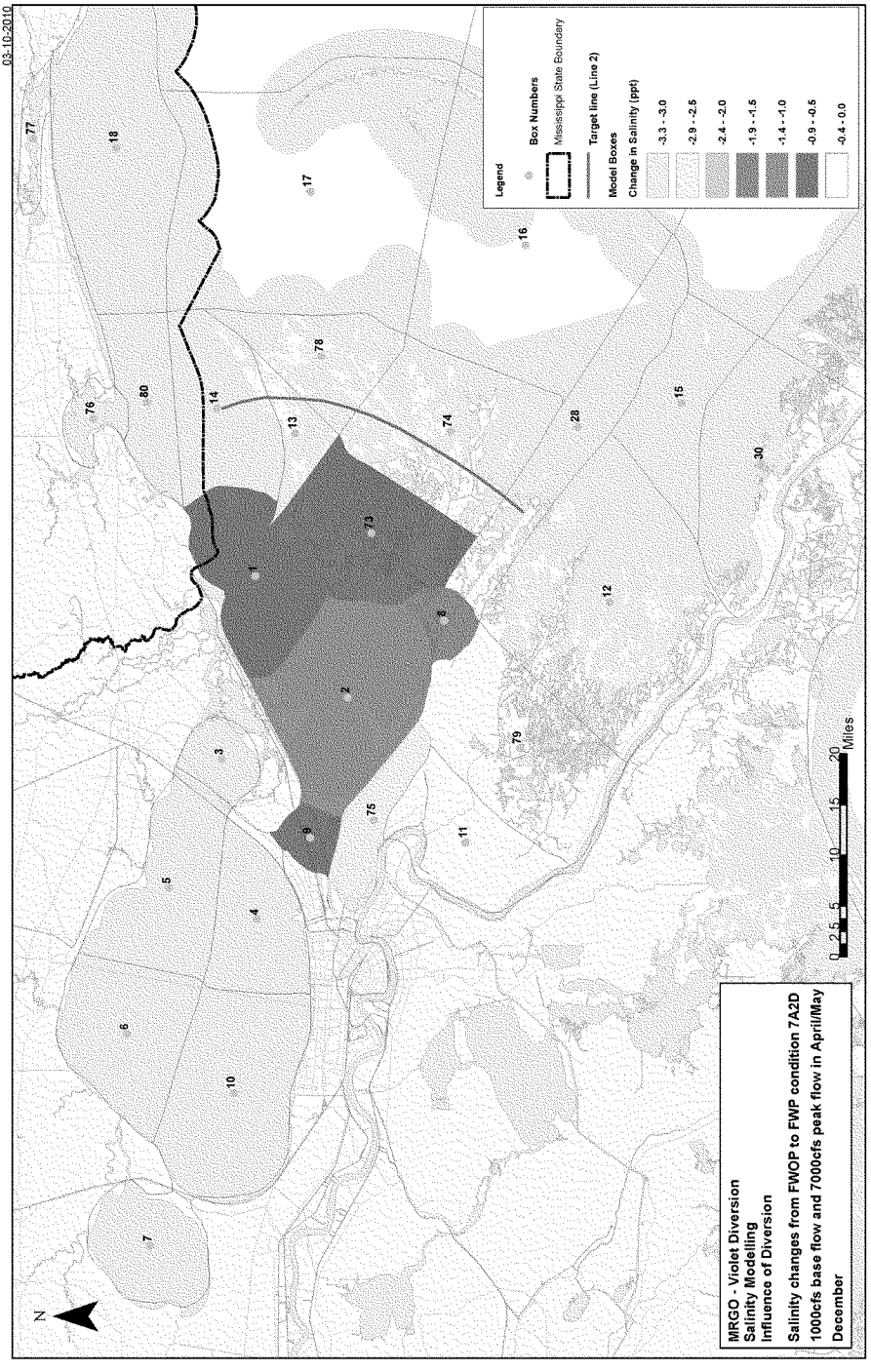
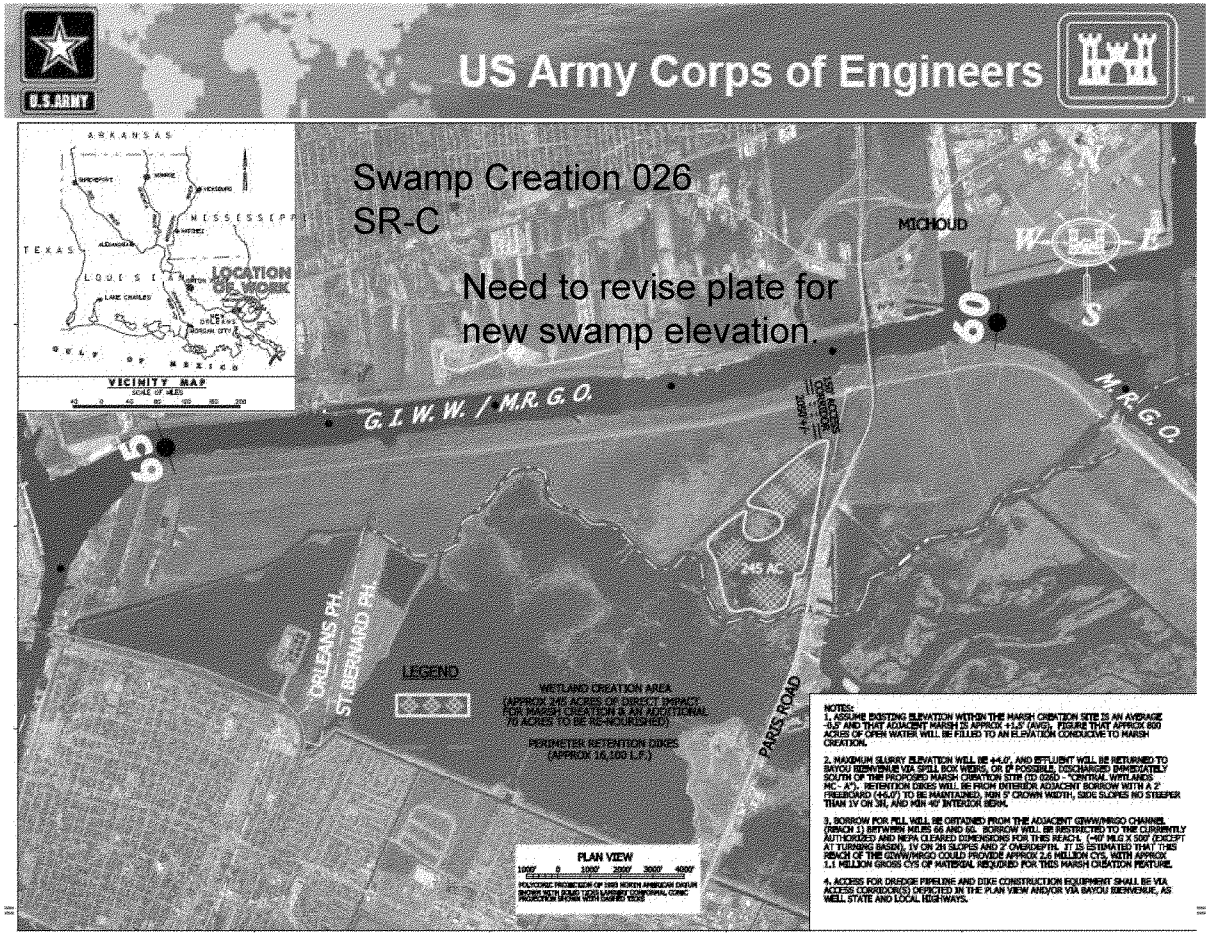
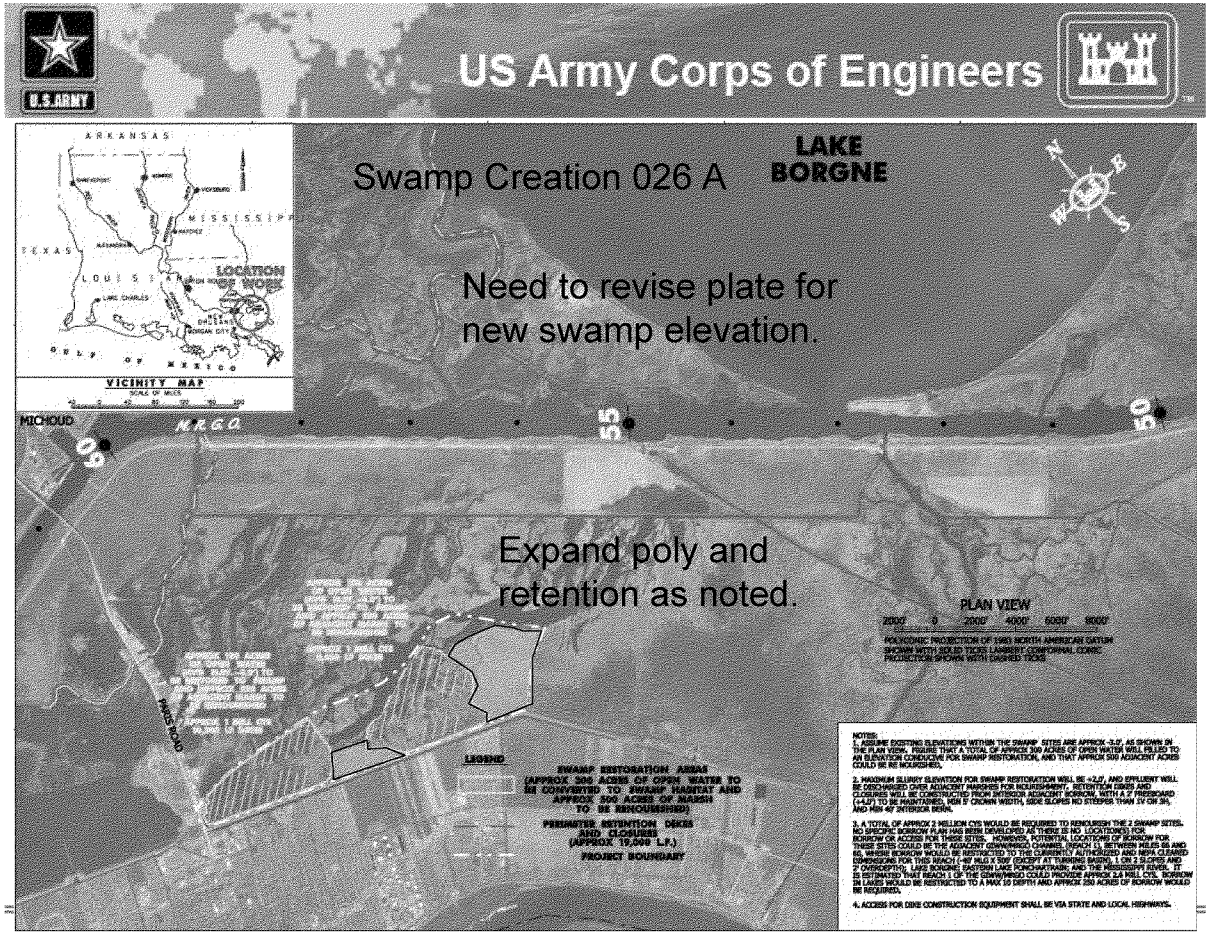
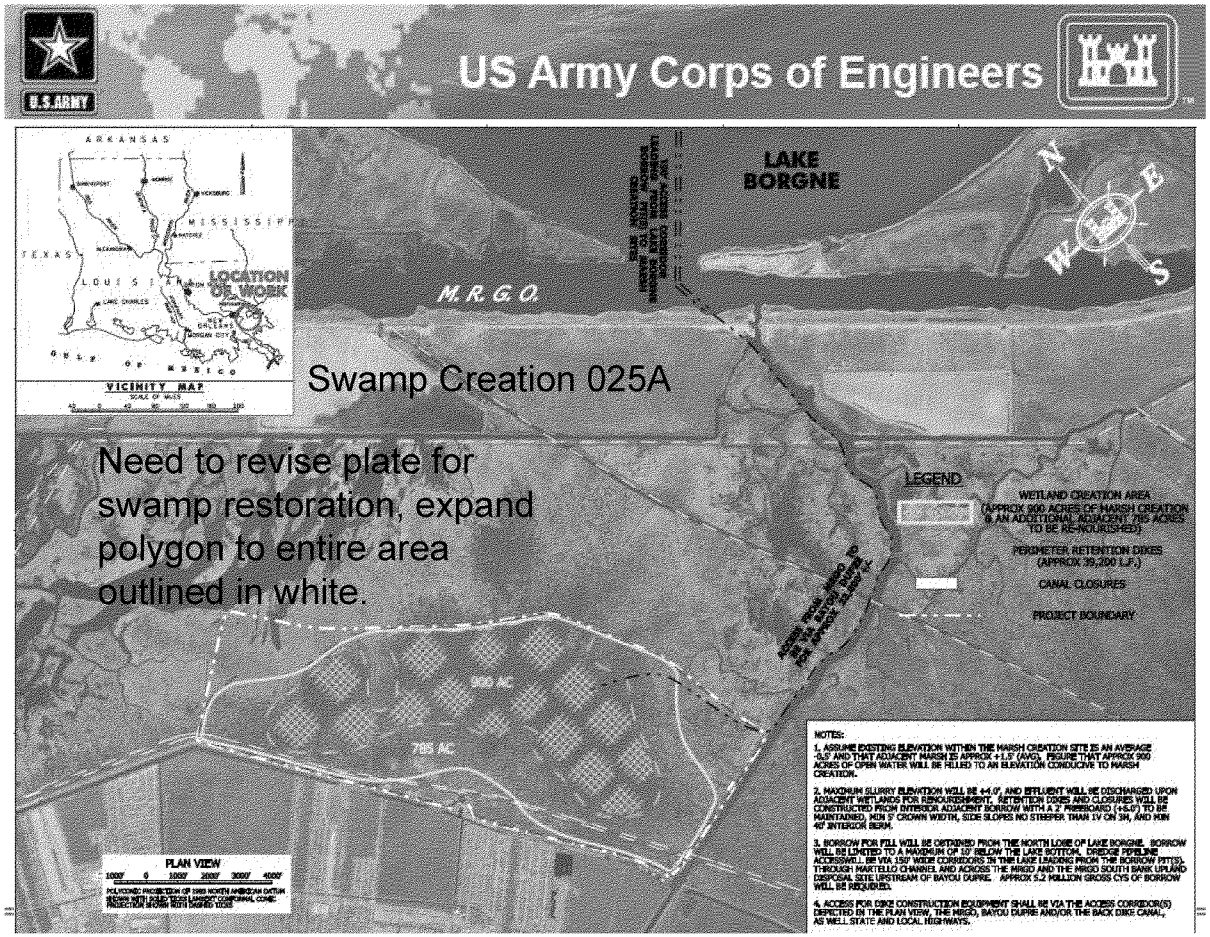
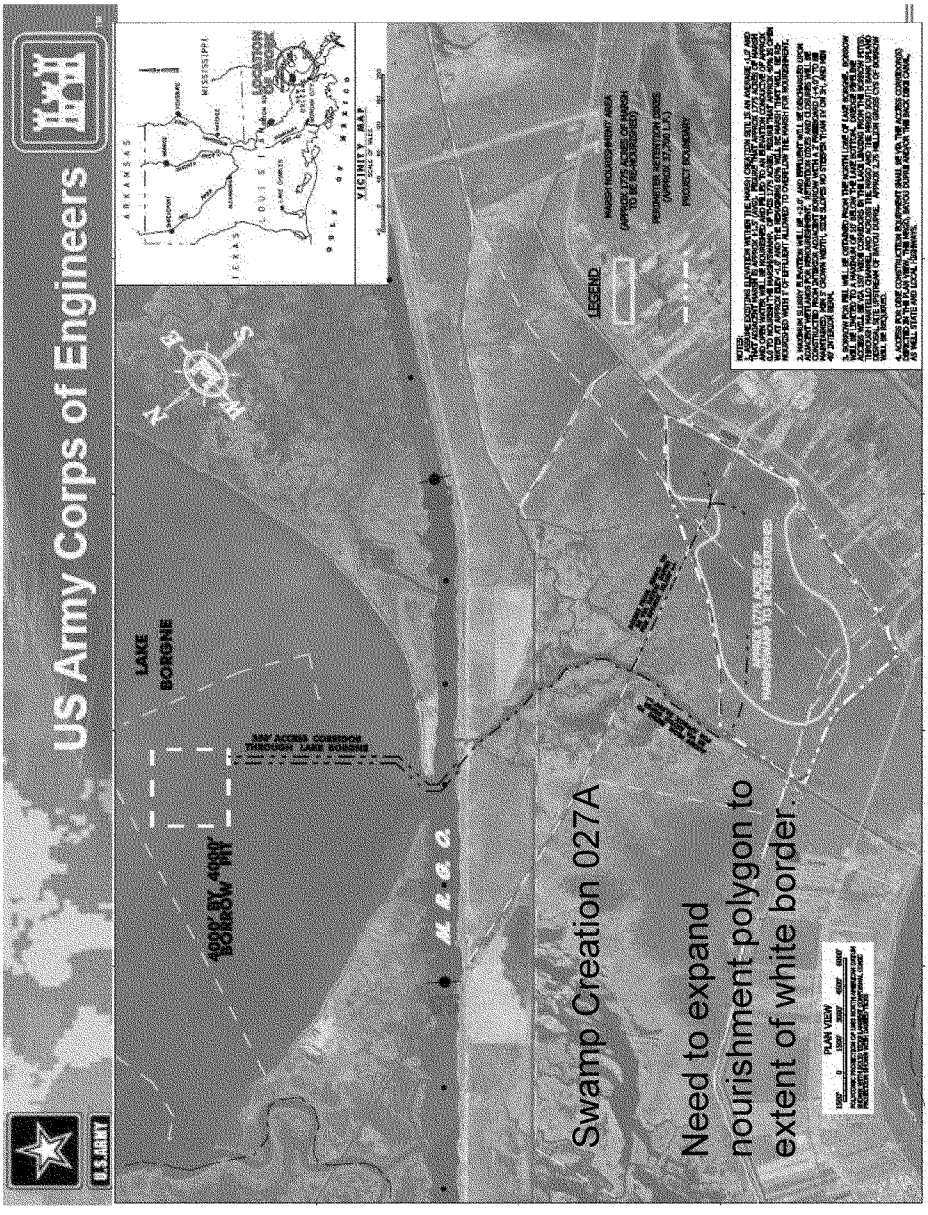


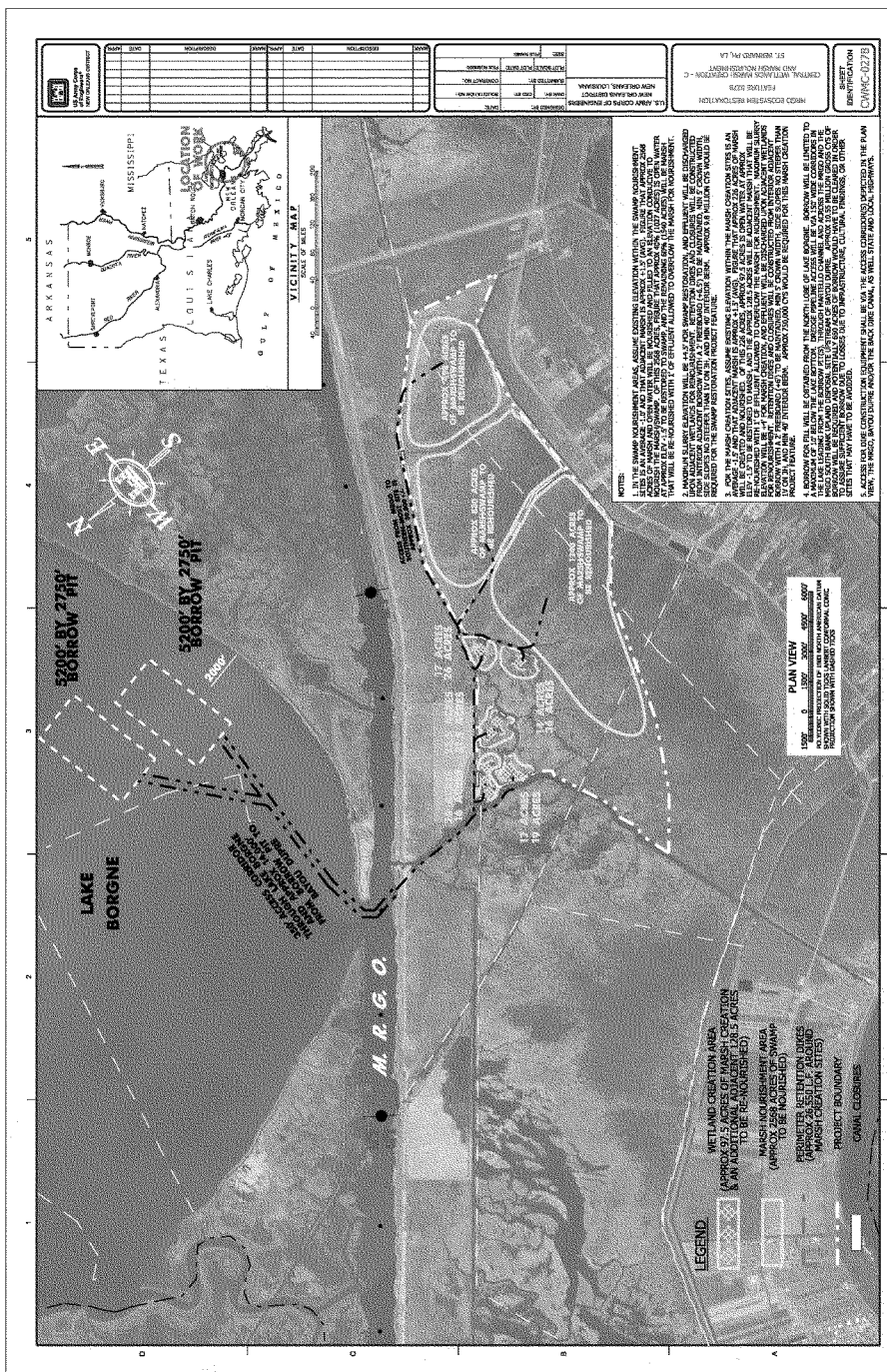
Figure E39. Influence Map showing change from FWOP to 7A2D in December.


U.S. ARMY
US Army Corps of Engineers
Swamp Creation 026
SR-C
Need to revise plate for new swamp elevation.
ARKANSAS
MISSISSIPPI
TEXAS
LOUISIANA
LOCATION OF WORK
LAKE CHARLES
NEW ORLEANS
GULF OF MEXICO
VICINITY MAP
SCALE OF MILES
MICHOUD
G.I.W.W. / M.R.G.O.
M.R.G.O.
59
60
245 AC
ORLEANS PH.
ST. BERNARD PH.
PARIS ROAD
LEGEND
WETLAND CREATION AREA
(APPROX 245 ACRES OF DIRECT IMPACT FOR MARSH CREATION & AN ADDITIONAL 70 ACRES TO BE RE-NOURISHED)
PERIMETER RETENTION DIKES
(APPROX 16,100 L.F.)
PLAN VIEW
1000' 0 1000' 2000' 3000' 4000'
POLYCONIC PROJECTION OF 1983 NORTH AMERICAN DATUM
NOTES:
1. ASSUME EXISTING ELEVATION WITHIN THE MARSH CREATION SITE IS AN AVERAGE -3.5' AND THAT ADJACENT MARSH IS APPROX +1.5' (NAVD). ASSUME THAT APPROX 800 ACRES OF OPEN WATER WILL BE FILLED TO AN ELEVATION CONDUCIVE TO MARSH CREATION.
2. MAXIMUM SLURRY ELEVATION WILL BE +4.0', AND EFFLUENT WILL BE RETURNED TO BAYOU BIENVENUE VIA SPILL BOX WEIRS, OR IF POSSIBLE, DISCHARGED IMMEDIATELY SOUTH OF THE PROPOSED MARSH CREATION SITE (TO 026D - "CENTRAL WETLANDS MC- A"). RETENTION DIKES WILL BE FROM INTERIOR ADJACENT BORROW WITH A 2' FREEBOARD (+6.0') TO BE MAINTAINED, MIN 5' CROWN WIDTH, SIDE SLOPES NO STEEPER THAN 1V OR 3H, AND MIN 40' INTERIOR BERM.
3. BORROW FOR FILL WILL BE OBTAINED FROM THE ADJACENT GIWW/MRGO CHANNEL (REACH 1) BETWEEN MILES 56 AND 60. BORROW WILL BE RESTRICTED TO THE CURRENTLY AUTHORIZED AND NEPA CLEARED DIMENSIONS FOR THIS REACH. (-40' MLG X 500' (EXCEPT AT TURNING BASIN), 1V ON 2H SLOPES AND 2' OVERDEPTH). IT IS ESTIMATED THAT THIS REACH OF THE GIWW/MRGO COULD PROVIDE APPROX 2.6 MILLION CYS, WITH APPROX 1.1 MILLION GROSS CYS OF MATERIAL REQUIRED FOR THIS MARSH CREATION FEATURE.
4. ACCESS FOR DREDGE PIPELINE AND DIKE CONSTRUCTION EQUIPMENT SHALL BE VIA ACCESS CORRIDOR(S) DEPICTED IN THE PLAN VIEW AND/OR VIA BAYOU BIENVENUE, AS WELL STATE AND LOCAL HIGHWAYS.

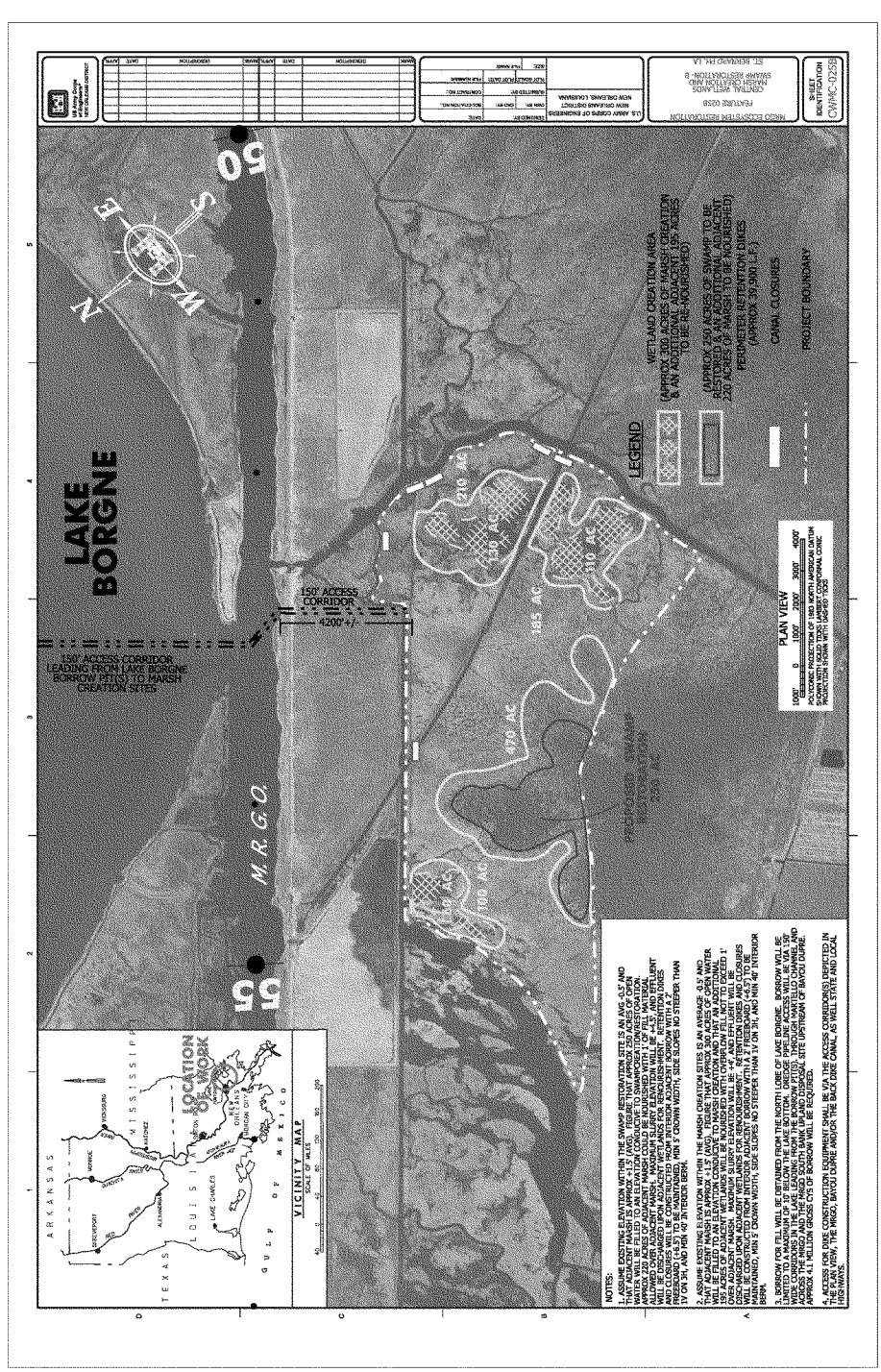

US Army Corps of Engineers
U.S. ARMY
Swamp Creation 026 A
LAKE BORGNE
Need to revise plate for new swamp elevation.
Expand poly and retention as noted.
VICINITY MAP
LOCATION OF WORK
MICHOUD
N.R.G.O.
PLAN VIEW
LEGEND
SWAMP RESTORATION AREAS (APPROX 500 ACRES OF OPEN WATER TO BE CONVERTED TO SWAMP HABITAT AND APPROX 500 ACRES OF MARSH TO BE RENOURISHED)
PERIMETER RETENTION DIKES AND CLOSURES (APPROX 19,000 L.F.)
PROJECT BOUNDARY
PRICES ROAD


US Army Corps of Engineers
U.S. ARMY
ARKANSAS
MISSISSIPPI
TEXAS
LOUISIANA
LOCATION OF WORK
LAKE CHARLES
GULF OF MEXICO
VICINITY MAP
LAKE BORGNE
M.R.G.O.
Swamp Creation 025A
Need to revise plate for swamp restoration, expand polygon to entire area outlined in white.
LEGEND
WETLAND CREATION AREA (APPROX 900 ACRES OF MARSH CREATION & AN ADDITIONAL ADJACENT 785 ACRES TO BE RE-NOURISHED)
PERIMETER RETENTION DIKES (APPROX 39,200 L.F.)
CANAL CLOSURES
PROJECT BOUNDARY
900 AC
785 AC
PLAN VIEW
NOTES:
1. ASSUME EXISTING ELEVATION WITHIN THE MARSH CREATION SITE IS AN AVERAGE -0.5' AND THAT ADJACENT MARSH IS APPROX +1.5' (AVG). REQUIRE THAT APPROX 900 ACRES OF OPEN WATER WILL BE FILLED TO AN ELEVATION CONDUCIVE TO MARSH CREATION.
2. MAXIMUM SLURRY ELEVATION WILL BE +4.0', AND EFFLUENT WILL BE DISCHARGED UPON ADJACENT WETLANDS FOR RENOURISHMENT. RETENTION DIKES AND CLOSURES WILL BE CONSTRUCTED FROM INTERIOR ADJACENT BORROW WITH A 3' FREEBOARD (+5.0') TO BE MAINTAINED, MIN 5' CROWN WIDTH, SIDE SLOPES NO STEEPER THAN 1V ON 3H, AND MIN 40' INTERIOR BERM.
3. BORROW FOR FILL WILL BE OBTAINED FROM THE NORTH LOBE OF LAKE BORGNE. BORROW WILL BE LIMITED TO A MAXIMUM OF 10' BELOW THE LAKE BOTTOM. DREDGE PIPELINE ACCESSWILL BE VIA 150' WIDE CORRIDORS IN THE LAKE LEADING FROM THE BORROW PIT(S), THROUGH MARTELLO CHANNEL AND ACROSS THE MRGO AND THE MRGO SOUTH BANK UPLAND DISPOSAL SITE UPSTREAM OF BAYOU DUPRE. APPROX 5.2 MILLION GROSS CYS OF BORROW WILL BE REQUIRED.
4. ACCESS FOR DIKE CONSTRUCTION EQUIPMENT SHALL BE VIA THE ACCESS CORRIDOR(S) DEPICTED IN THE PLAN VIEW, THE MRGO, BAYOU DUPRE AND/OR THE BACK DIKE CANAL, AS WELL STATE AND LOCAL HIGHWAYS.

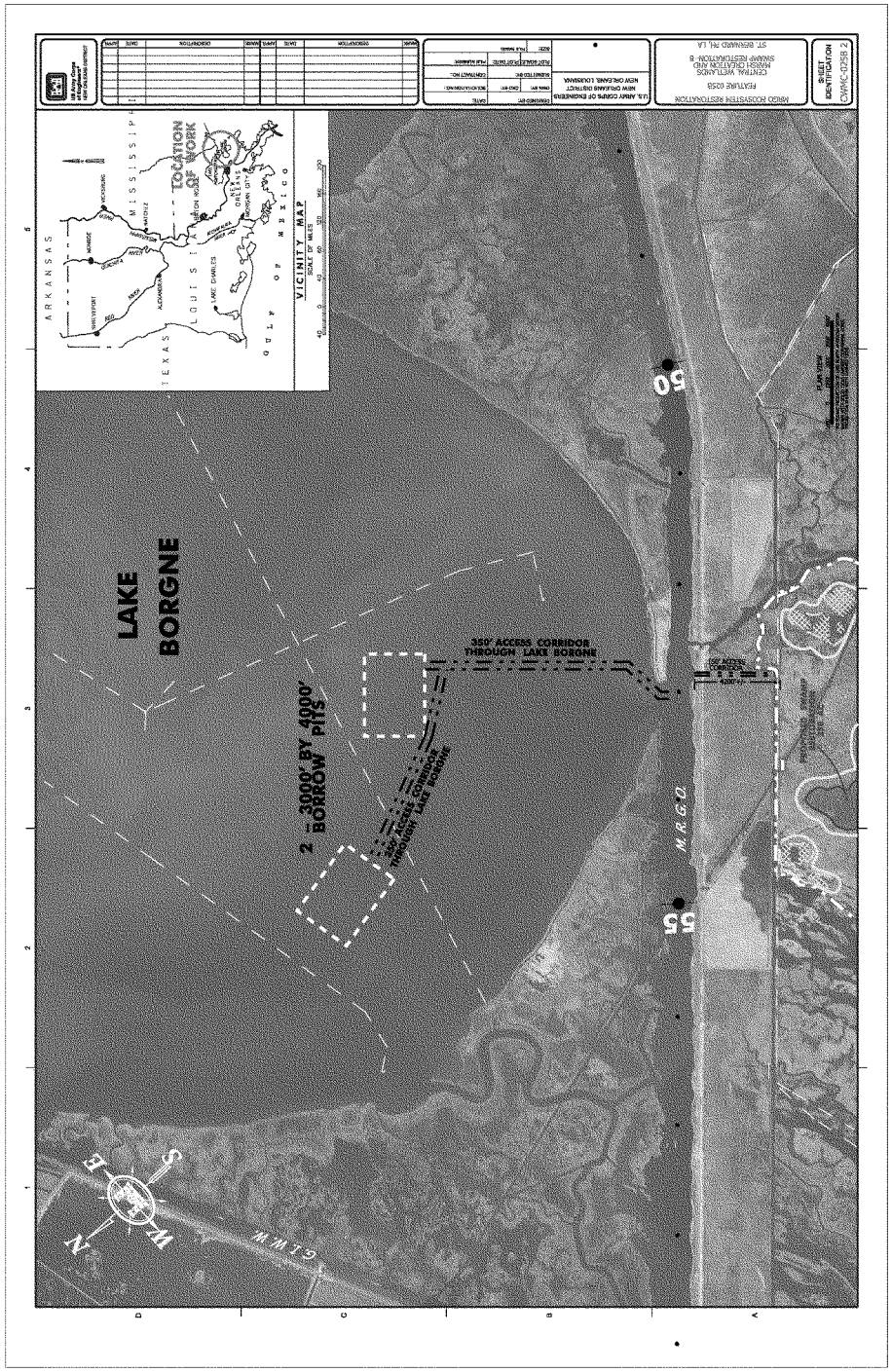

US Army Corps of Engineers
U.S. ARMY
LAKE BORGNE
LEGEND
PROJECT BOUNDARY
VICINITY MAP
LOCATION MAP
Swamp Creation 027A
Need to expand nourishment polygon to extent of white border.



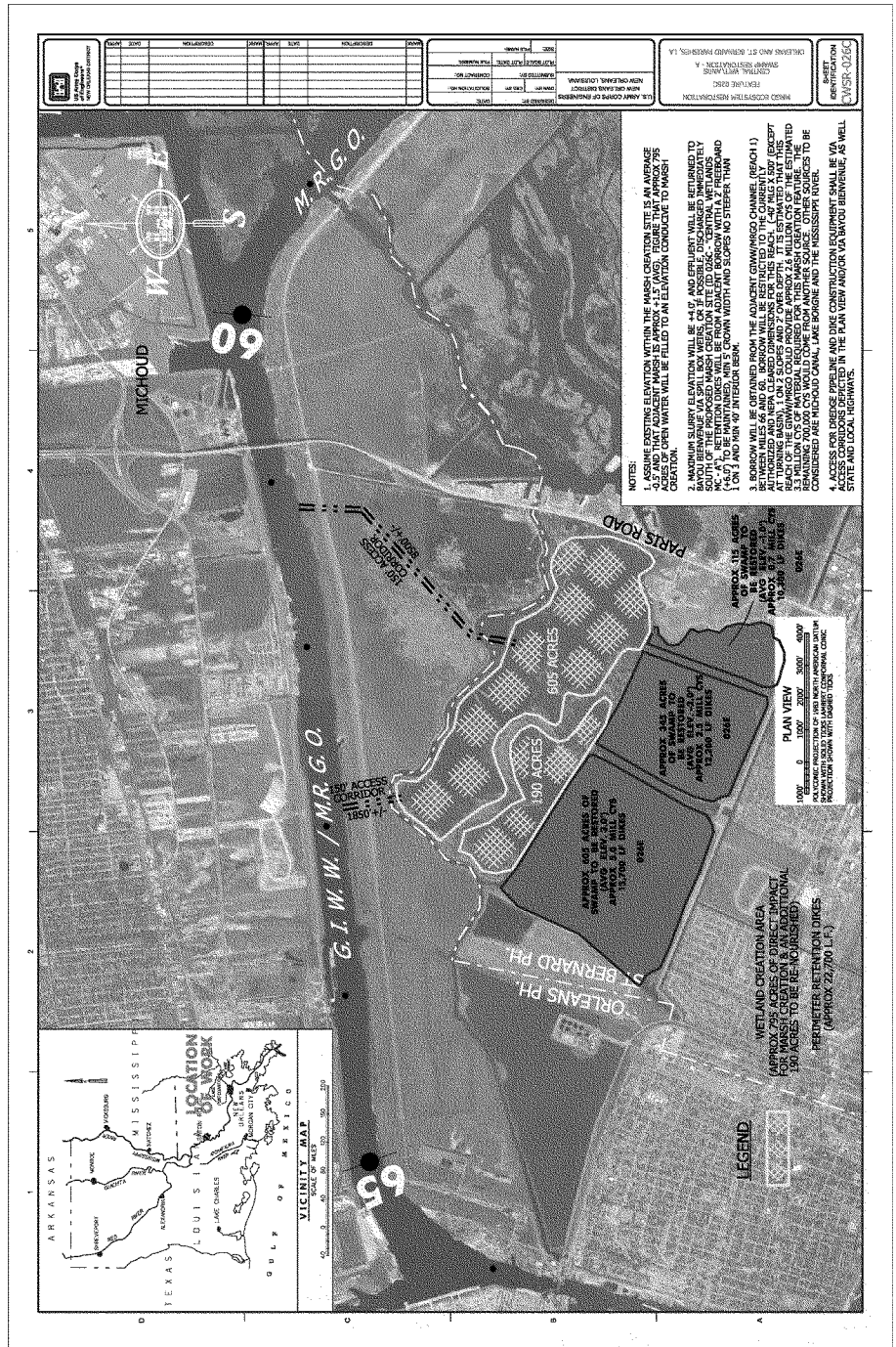
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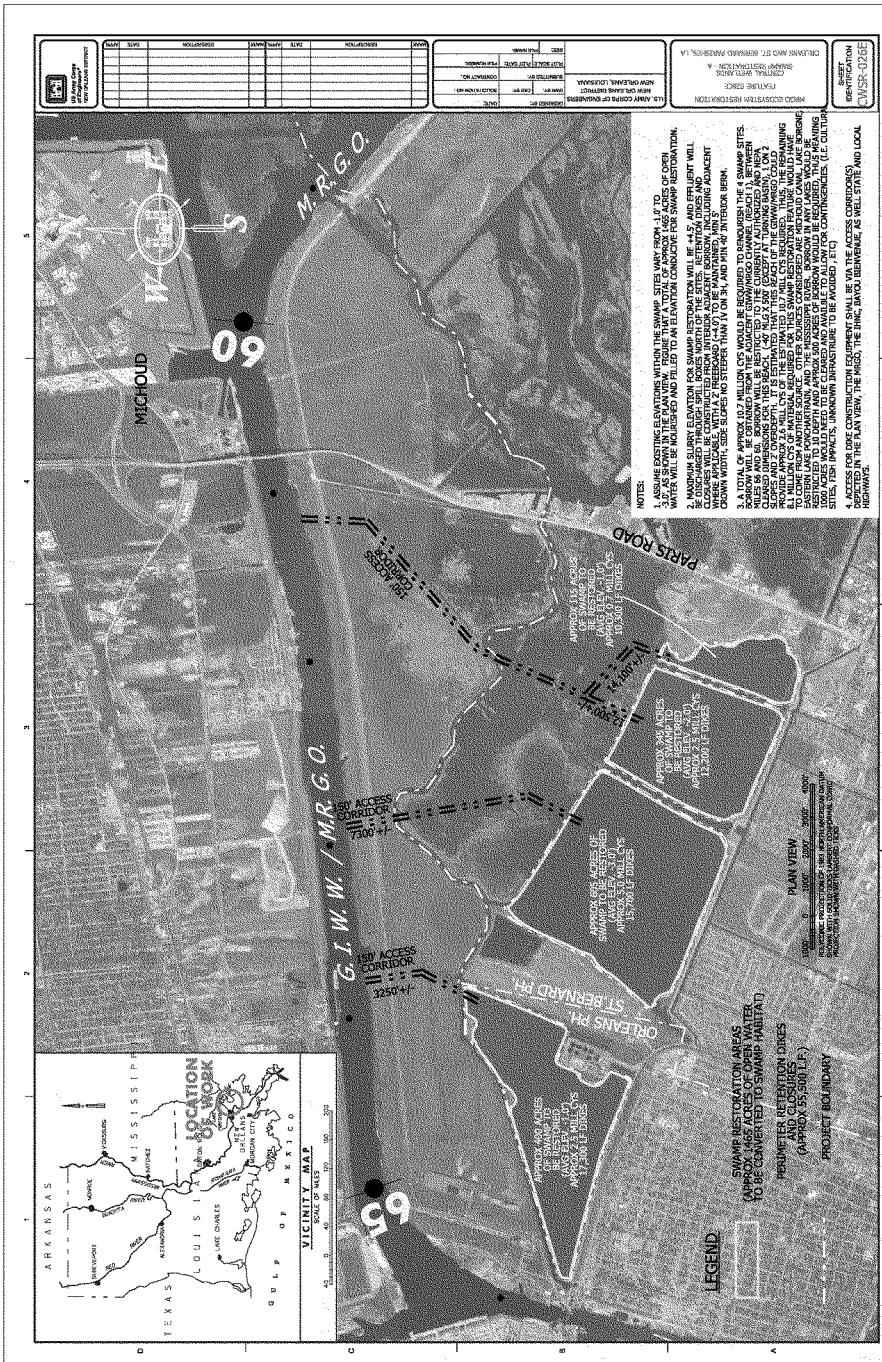
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025B 2 Central Wetlands MC - B.dgn 8/29/2009 11:02:43 AM



026C Central Wetlands MC - A.dgn 8/28/2009 3:25:21 PM



026E Central Wetlands SR - A.dgn 8/28/2009 1:44:10 PM

APPENDIX G

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New Orleans - Central Wetlands Area

Hydrodynamic modelling study

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New Orleans - Central Wetlands Area
Hydrodynamic modelling study

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Evans Graves Engineering Inc

12 March 2010
Final draft report
9V1141.25

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Document title	New Orleans - Central Wetlands Area Hydrodynamic modelling study
Document short title	Modelling report
Status	Final draft report
Date	12 March 2010
Project name	New Orleans - Central Wetlands Area
Project number	9V1141.25
Client	Evans Graves Engineering Inc
Reference	9V1141.25/R00050/901807/Rott

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ROYAL HASKONING

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ROYAL HASKONING

1 INTRODUCTION

1.1 Background

The United States Army Corps of Engineers, New Orleans (USACE) is currently working on a feasibility study to aid in the development of the MRGO Ecosystem Restoration Plan (ERP). The main goal of this plan is to restore and maintain estuarine habitat areas affected by the MRGO navigation channel. In addition, in the coming years the USACE plans restoration of the wetlands by both swamp and marsh recreation. This will result in local areas of increased bed levels and changed vegetation.

Part of the ERP is to divert flow from the Mississippi River through the Central Wetlands Area (CWA), into the MRGO, and ultimately into the Biloxi Marsh. The purpose of this effort is to reduce the salinity in the Biloxi Marsh to enhance the Louisiana and Mississippi oyster production and promote the sustainability of coastal wetlands. The current salinity ranges from 14 ppt in April to 24 ppt in November. For the production of oysters, the salinity should range, ideally, between 8 ppt in April to 17 ppt in November. Meeting this reduced salinity regime at least 40 to 50 percent of the time is a goal of the MRGO Ecosystem Restoration Plan. The proposed solution to achieve this is for fresh water to be diverted from the Mississippi River, through the CWA, towards the Biloxi Marsh.

Regarding the above, the project calls for a study to investigate the hydrodynamic effect of the inflow of fresh water into the CWA for the present situation and for the restored scenario. The impact of the flow through the diversion and how this affects the salinity and the hydrodynamic physics in the channels are to be investigated.

The model simulations are to be undertaken using a detailed, 2-dimensional MIKE21-HD model. The results from these hydrodynamic simulations should be able to address the initial feasibility questions relating to the diversion of flows through the CWA.

The Biloxi Marsh is located between Lake Borgne on the north and west, the MRGO on the south and Chandeleur Sound on the east. The CWA is located between the Saint Bernard Parish to the south and west, Lake Borgne and the MRGO on the east and the IHNC to the north. Figure 1 in Annex 1 shows the project Area.

1.2 Objective

The results from the MIKE21 simulation runs should be able to address the feasibility questions relating to the diversion of flows through the CWA. The following objectives or key questions were formulated:

1. What is the impact of the base flow through the diversion? How does it affect salinity in the CWA?
2. Does the proposed change in topography for the restored marsh impact the base flows, water levels and discharges?
3. What happens during periods of peak diversion flows? Where does the water go? What is the flow split through the existing structures? Is a new outfall needed? How extensive is flooding (frequency levels etc) inside the CWA? Are new channels needed within the wetlands?
4. What are the impacts of localized flooding due to the new diversions?
5. What are the impacts of sea level rise on the marsh?

The developed model will then be available for further runs if needed to answer more of the operational issues as additional effort.

1.3 Report outline

Chapter 2 presents the methodology in which the modeling scenarios, conditions and study approach are discussed. The characteristics of the model are discussed in Chapter 3 in terms of relevant hydrodynamic conditions.

Chapter 4 presents the hydrodynamic model setup and calibration. Questions regarding the boundaries and model settings are answered and the results of calibration and validation are presented. The model results for the different scenario's are discussed in Chapter 5. The report finishes with the conclusions and remarks in Chapter 6.

1.4 Conventions and definitions

Vertical reference level
Water levels and depths mentioned in this study are given in feet with reference to NAVD88 (2004.65). However the model is a European model and works according to international SI conventions. For this reason some plots direct from the model may be in meters. Special attention to the figure annotation is therefore needed.
Conversion between feet and meters: 1 meter = 3.28 feet, 1 foot = 0.3048 m.

Current directions
Current directions refer to the direction towards which the current is flowing. Current directions are always given as bearings (clockwise with respect to (wrt) North). The unit is degrees, where 360 degrees cover the circle. For example: current direction 90° means that the current is flowing towards the East.

Wind directions
All directions referred to in this study are given in the nautical convention, which means that for winds, the direction refers to the direction where the winds are coming from and is measured positive in degrees from true north. This means that winds from a direction of 0°N are coming from the north and winds with direction 270°N are coming from west.

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2 METHODOLOGY

2.1 Introduction

In the early stages of the project, the affects of flushing fresh water through the CWA towards the MRGO and the Biloxi Marsh, were generated by applying the UNO Mass Balance Model [3]. This model led, as expected due to the very limited resolution of the box model, to a very coarse generalized hydrodynamic result in the CWA. To improve the understanding of the CWA area, a more detailed modeling effort was recommended to investigate the effects in this area.

To assess the effects and flow characteristics inside the CWA in more detail, the development of a detailed 2-dimensional hydrodynamic model was needed. Specifically for understanding the hydrologic affects of a near Violet diversion on the Central Wetland Area (CWA) and to better understand the timing and discharge of diverted Mississippi River water through the CWA into the MRGO and ultimately into the Biloxi Marsh.

For this study, the Hydrodynamic Module of MIKE21 (MIKE21-HD) with flexible mesh has been applied. MIKE21, a software package from DHI, is a widely used, state of the art integrated modeling package for application in coastal- and port areas. The hydrodynamic module solves the shallow water equations, depth-averaged, over a 2-dimensional plane, which implies that the salinity is calculated as a depth averaged concentration. This approach is justified if vertical mixing occurs within short distances of the source and no significant stratification occurs, which is what is expected to happen.

Although detailed, the modeling effort at this stage was still aimed at establishing the generalized physics of the reaction of the hydraulics in the CWA to the proposed diversion flows.

2.2 Modeling Scenarios

The following scenarios will be considered.

Scenario	Description	Bathymetry	Diversion Flow
1	Baseline	Existing	Nil
2	Existing with 1000cfs	Existing	1000cfs
3	Restored with 1000cfs	Restored	1000cfs
4	Restored with 7000cfs	Restored	7000cfs
5	Sea Level Rise	Restored	1000cfs

[1] Baseline scenario
This scenario reflects the actual existing situation. This scenario includes the initial bathymetry, vegetation and structures and includes the normal tidal flows through the inlets at Bayou Dupre and Bayou Bienvenue. The most recent bathymetry was used for this scenario. Calibration and validation of the model is per definition done for this scenario as this reflects the most representative conditions during which the measurements were done. The model will cover the CWA and extends only as far into the MRGO to enable the flows within the gates to be established.

[2] *Existing with 1000 cfs Scenario*
The existing with 1000 cfs scenario considers the situation with existing bathymetry but with the 1000cfs base flow from the Mississippi. The purpose is to investigate

the impacts of increasing diversion flows on the current geometry before any future restoration.

The following split of flows is applied:

- 870 cfs through the new diversion channel
- 100 cfs through the old Violet Canal
- 30 cfs through the wastewater re-use scheme

Figure 2.1 shows the flow stations for this baseline scenario with 1000 cfs.

[3] *Restored with 1000 cfs scenario*
This scenario reflects the restored situation. Swamp restoration and marsh nourishment has taken place, resulting in local areas of increased bed levels and changed vegetation. The proposed bathymetry, topography and vegetation map has been provided by the USACE MRGO restoration team. The same 1000cfs base flow condition from scenario 2 is to be applied. A new larger channel will be introduced through the marshland to transfer flow from the back levee into the more open water areas of the existing marshland and potentially through to the MRGO and a possible third gate location.

[4] *Restored with 7000 cfs scenario*
This scenario is almost to the same as scenario 3, covering the restored marshland situation. However, this scenario reflects the 7000cfs peak flow in April and May. This scenario includes a ramping up of flows from the base flow condition (1000cfs) to the peak over a timeframe of 14 days. It also includes a third structure into the MRGO with controls to restrict outflow into the MRGO if required. The initial scenario will be established to divert approximately 6000cfs through the new structure.

[5] *Sea level rise*
This scenario reflects the restored scenario with the base flow of 1000cfs (like scenario 3), but will take into account the impact of potential sea level rise on the stage and salinity within the CWA. It is proposed to consider a high range sea level rise value of 3.7ft (1.12 m) [3].

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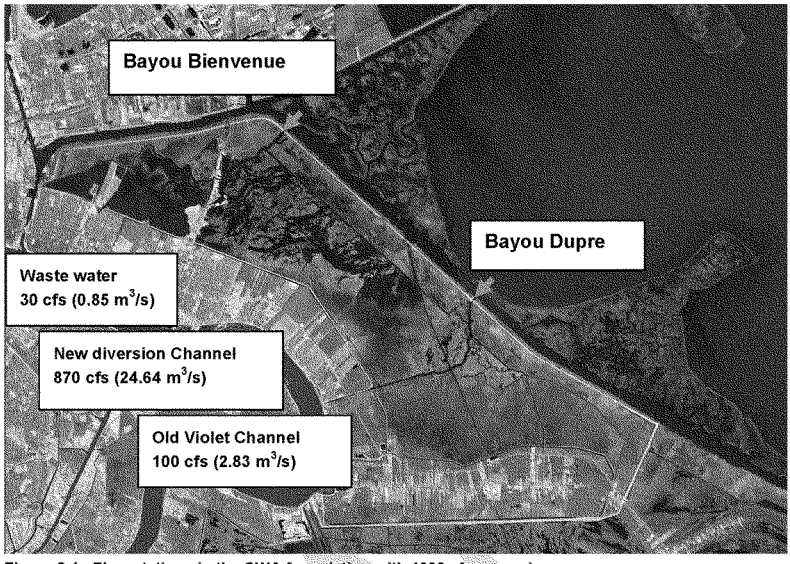


Figure 2.1 - Flow stations in the CWA for existing with 1000 cfs scenario.

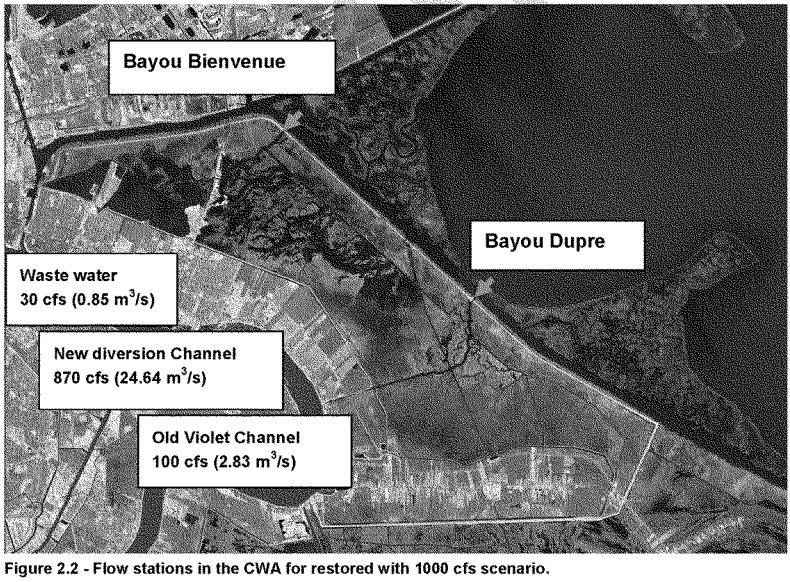


Figure 2.2 - Flow stations in the CWA for restored with 1000 cfs scenario.

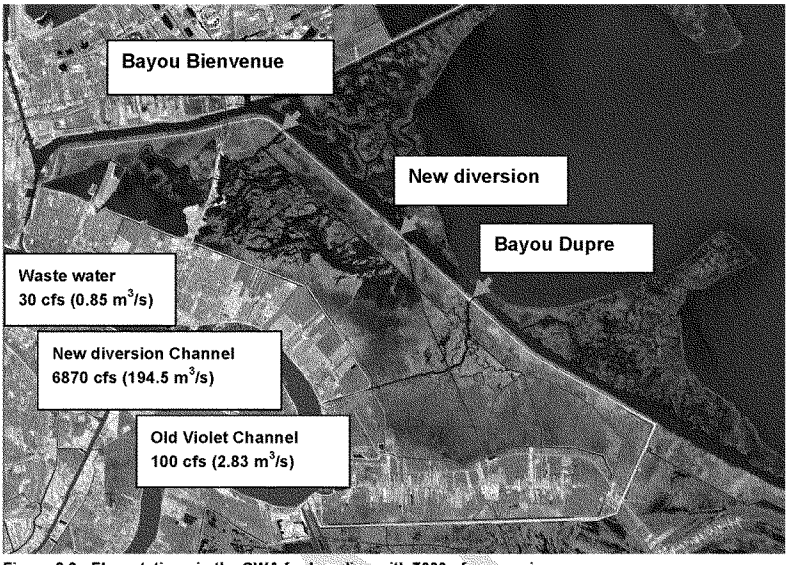


Figure 2.3 - Flow stations in the CWA for baseline with 7000 cfs scenario.

2.3 Approach

To answer the key questions the following approach was applied.

Step 1: Collect data and analyze the actual hydrodynamic system of the CWA

Step 2: Model setup of the baseline scenario
- Step 2.1: Define model area and define model forcings;
- Step 2.2: Setup bathymetry and land classification;
- Step 2.3: Setup computational grid;
- Step 2.4: Define model boundaries and (initial) model settings

Step 3: Calibration and validation of the baseline scenario against measurements
- Step 3.1: Calibration on water levels;
- Step 3.2: Calibration on salinity;
- Step 3.3: Validation of water levels;

Step 4: Production runs for the different scenarios
- Step 4.1: Setup and production run *Existing with 1000 cfs scenario;*
- Step 4.2: Setup and production run *Restored with 1000 cfs scenario;*
- Step 4.3: Setup and production run *Restored with 7000 cfs scenario;*
- Step 4.4: Setup and production run *Sea level rise;*

Step 5: Analyze model results production runs;

Step 6: Sensitivity analysis;

Step 7: Presentation of results and main conclusions

The details of the choices regarding model settings, boundary conditions, calibration and validation locations and periods, bathymetry, computational grid and the setup of the different scenarios are presented in the following chapters.

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3 CHARACTERISTICS OF MODEL AREA

3.1 Introduction

The CWA is located between the Saint Bernard Parish to the south and west, Lake Borgne and the MRGO on the east and the IHNC to the north. The area of the wetland is approximately 31,000 acres (12,500 hectares) with a southeast to northwest length of 15.5 miles (25 km) and a width of 3 miles (5 km). The area consists of low lying land with a level between 1 and 3 ft above NAVD88 (2004.65). The canals and other water bodies have a bottom level of approximately -3 ft to -11 ft. The vegetation in the area consists of mainly emergent Herbaceous wetlands, areas of woody wetland and open water. In addition, there are some areas with developments of low intensity (mainly along the Paris Road).

The Biloxi Marsh is located between Lake Borgne on the north and west, the MRGO on the south and Chandeleur Sound on the east. This area is not included within the model domain, because the key questions are only focused on the hydrodynamic conditions within the CWA.

3.2 Tidal conditions

The tides in the water bodies around the CWA are principally diurnal. The tidal range around the CWA is about 1.2 feet from MLW to MHW. This tidal range is measured at a station located near the Bayou Dupre floodgates. In Lake Maurepas the tidal range is 0.3 ft, in Lake Pontchartrain 0.5 ft and 1.4 ft in the Chandeleur Sound. Mean water levels are affected by winds, freshwater runoff, and seasonal trends in the Gulf of Mexico. Sustained winds can raise or lower peak astronomical tide levels by several feet for short periods of time. The mean water levels are lower in winter and midsummer while higher in spring and fall. Currents and circulation are controlled by tides, winds, freshwater discharges, and Gulf currents and, to a lesser extent, baroclinic conditions [3].

Table 3.1 - Historic monthly means at NOAA station Shell Beach (feet, data referred to MSL)[1]

Year	Month	Highest	MHHW	MHW	MSL	MTL	MLW	MLLW	Lowest
2008	12.00	1.46	0.53	0.48	-0.22	-0.31	-1.09	-1.09	-2.31
2009	1.00	1.13	0.27	0.13	-0.54	-0.57	-1.28	-1.34	-2.15
2009	2.00	1.19	0.38	0.30	-0.35	-0.33	-0.97	-1.09	-2.08
2009	3.00	2.96	0.81	0.77	0.05	0.01	-0.57	-0.75	-2.06
2009	4.00	2.21	0.84	0.73	0.10	0.03	-0.68	-0.78	-1.85
2009	5.00	2.78	1.00	0.96	0.31	0.30	-0.36	-0.42	-1.39
2009	6.00	1.30	0.52	0.51	-0.23	-0.24	-0.99	-1.03	-1.54
2009	7.00	1.03	0.51	0.45	-0.24	-0.26	-0.96	-1.01	-1.46
2009	8.00	1.76	0.98	0.86	0.25	0.23	-0.40	-0.49	-1.30
2009	9.00	3.39	1.54	1.43	0.94	0.89	0.35	0.28	-0.46
2009	10.00	2.71	1.33	1.30	0.73	0.73	0.15	0.10	-0.62
2009	11.00	5.23	1.40	1.35	0.68	0.63	-0.10	-0.09	-1.03

The water levels measured at a NOAA station in Lake Borgne, (Shell Beach), show the variation of the mean sea level during a year. This annual fluctuation in sea level is due to thermal expansion of the upper layers of the Gulf of Mexico.

[1] Source: http://tidesandcurrents.noaa.gov/station_info.shtml?stn=8761305+Shell+Beach,+LA

3.3 Wind conditions

Most of the time, winds in the southern Louisiana estuaries are calm to light. At Shell Beach, the wind speed is less than 10 m/s (about 20 knots, 5 Beaufort) for about 95% of the time (measured in 2009) and 99% of the time, during 2009, wind speeds are less than 13 m/s (about 25 knots, 6 Beaufort).

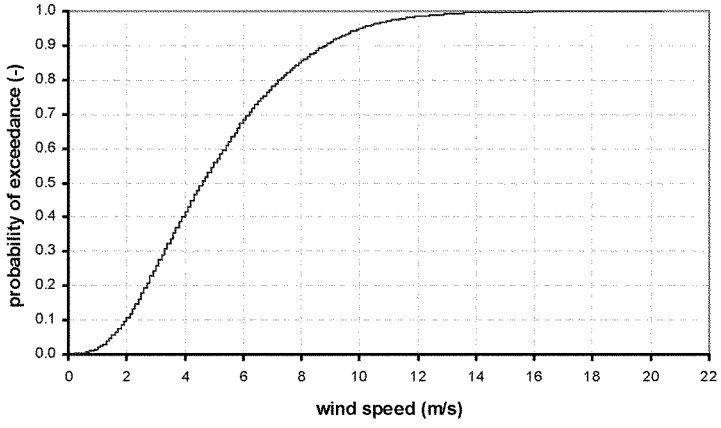


Figure 3.1 - Probability of exceedance of wind speeds at NOAA station Shell Beach (based on hourly data for 2009)

Occasionally, the area is affected by strong winds from hurricanes (tropical storms that occur mainly during summer and fall) or frontal systems (mainly during winter).

The frontal systems generally approach from the north. Northern winds, preceding a frontal passage cause a set down on the continental shelf and this allows for gravity drainage of the estuary. The frontal systems have a more persistent wind speed and wind direction than the tropical storms (USACE, 2009).

The tropical storms are characterized by very strong winds, of which the direction and speed can change within hours during passage of the storm. When the storm approaches the region from the south, it is accompanied by strong to very strong winds from the east and southeast. These winds push the shelf waters inland, piling up the water in a significant rise of water level, commonly called a storm surge (USACE, 2009).

In the coastal area, winds have a strong impact on coastal water levels. Winds from a southerly direction may push water into the bays and lakes, frequently raising water levels in the upper part of the estuarine zone.

3.4 Salinity

Figure 3.2 and Table 3.2 show the average salinity for the Biloxi marshes and the area of Chandeleur Sound. During the summer and fall, the salinity reaches it highest values. During this time of the year, the influences from freshwater sources are at a minimum. For more information about the salinity of the area and the impact of the freshwater sources, reference should be made to the report of USACE (2009) about the proposed freshwater diversion in the vicinity of Violet.

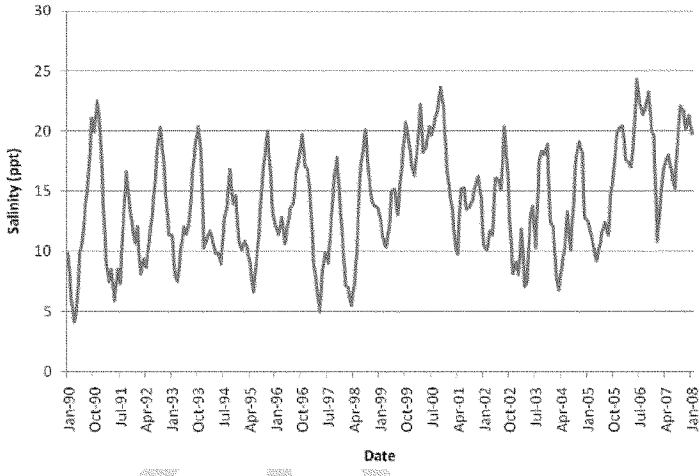


Figure 3.2 - Salinity variations in the area of Chandeleur Sound from 1990 to 2008

Table 3.2 - Average salinity for the Biloxi Marshes (in ppt) (McAnally 1997).

	jan	feb	mar	apr	may	Jun	jul	aug	sep	oct	nov	dec
Salinity (ppt)	19.5	16.5	15	14	15	17	20.5	22	23	24	24	23

4 MODEL SETUP, CALIBRATION AND VALIDATION

4.1 Introduction

This chapter describes the setup, calibration and validation of the numerical model which will be used to evaluate the several scenarios as described in Chapter 2.

The modeling approach is outlined with a short description of the field data used and the applied model. Sections 4.2 to 4.5 describe the setup for the schematization and calibration. Section 4.6 describes the results of the model calibration and validation.

4.2 Applied model

The model simulations were done using the hydrodynamic module (HD) of the MIKE21 package of the Danish Hydraulic Institute (MIKE21-HD). This program is developed for modeling of non-steady water flow and the transport of dissolved matter. MIKE21-HD solves the two-dimensional (depth averaged) shallow-water equations for arbitrary boundary conditions. The equations are solved by a finite volume method (DHI, 2008) on a rectangular or a triangular grid (in this study a triangular grid was used). For this project, MIKE21-HD was used in the one layer mode which implies that the velocities and salinity levels are calculated by the model as depth-averaged values. The following contributions are included in the momentum equations:

- acceleration due to changes in the local velocity (convective accelerations);
- earth rotation;
- water level gradients;
- horizontal momentum exchange due to eddy viscosity;
- density differences (horizontally), due to salinity variations;
- bed friction;
- wind influences;

Wind generated waves are not taken into account in this study.

4.3 Model setup

The hydrodynamic model includes the total area of the CWA. The open boundary on the 'offshore' side is formed by the MRGO. Tidal water levels and salinities varying along this boundary are imposed to force the hydrodynamic model. The diversions are applied as boundaries in the model at which an inflowing discharge is specified.

In addition to the hydrodynamic equations, the density equations are solved which is required to calculate the spreading of saline or fresh water into the model area. Temperature gradients are neglected.

The calculated salinity gradients are fed back to the hydrodynamic equations, which establish a coupling between the water flow and the salinity at runtime.

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4.3.1 Computational grid

Figure 4.1 shows a part of the computational grid. The layout of the grid is based on the locations of the several channels inside the CWA. Inside the channels, the grid is much finer than outside the channels. The channels are represented in the grid with at least 1 grid cell at the lowest part of the channel and 1 grid cell on each slope. Because of the small width of some of the channels, this requires a large amount of computational points (about 78,000), a short computational time step and long simulation times. The grid resolution varies from 15ft in the channels to 200ft in the flat higher located areas.

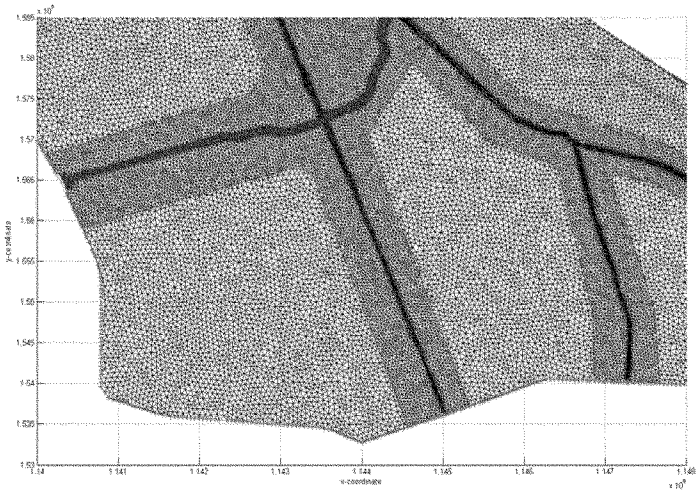


Figure 4.1 - Part of the computational grid and the open boundaries. Blue is the MRGO boundary, green is the Violet channel boundary and red is the land boundary (closed).

The following has been taken into account when designing the grids:

- the dimensions of an individual cell, partly based on the dimensions of the channels;
- the total number of computational points;
- the orthogonality of the individual cells;
- the spatial variation of the dimensions of the cells;
- the areas in which the grid has to be refined

The optimum computational grid is a compromise between the above items and the geographic limits of the model.

4.3.2 Bathymetry and levees

The model bathymetry is shown in Figure 4.2. This bathymetry is based on a combination of Lidar data, surveys of the Violet Canal and the Bayou Bienvenue collected for other projects, and additional channel and open water survey undertaken by UNO as part of this study. All the data has been combined in a bathymetric and topographic database based on NAD 1983 State Plane Louisiana South FIPS 1702 (m) for positional coordinates and NAVD88 (2004.65) for elevation. As shown in the figure,

all main channels are implemented in the model. The MRGO (bottom level -10 m, -32.8 feet), is partly included and is used as a model boundary.

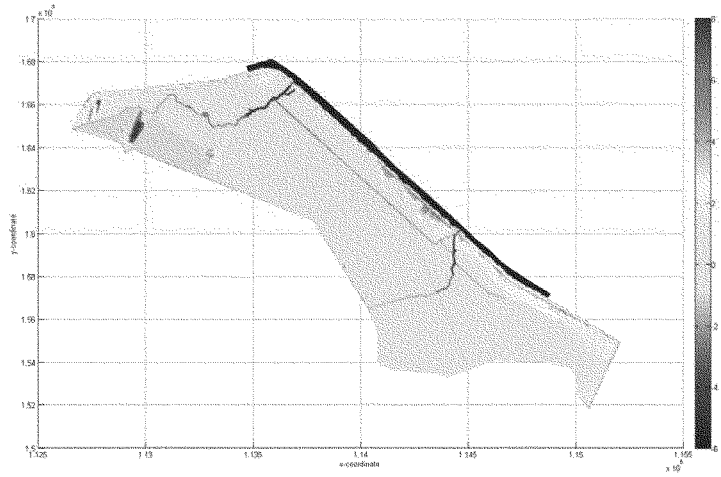


Figure 4.2 - Bathymetry of the CWA, as implemented in the model. Values are in m w.r.t. the reference level.

The levees and Paris Road are included within the bathymetry; however, due to the coarser grid cells in some of those areas, the height of these features is not very well represented. At some locations, water would be able to flow into the CWA or over the Paris road at elevations well below the actual levels. For this reason the levees and Paris Road have been implemented in the model as weirs (line elements with a certain height and width). The weirs are shown in Figure 4.3, the heights are based on values from the more detailed topographic data. These weirs restrict the potential for flooding over the levees and Paris Road. No weirs have been included where channels pass through these structures.

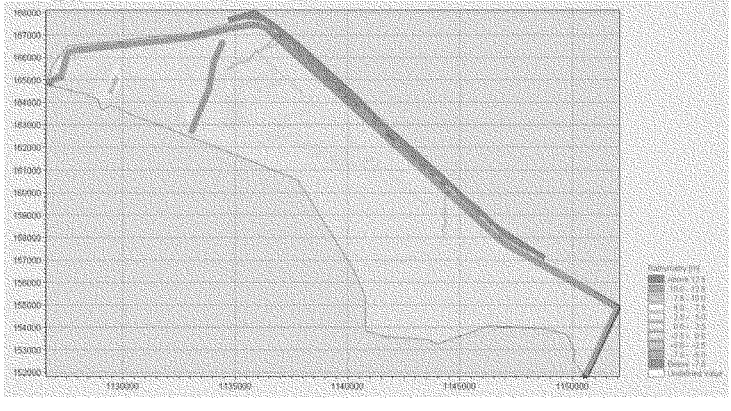


Figure 4.3 - Location of the levees (brown line), implemented as weirs. Values are in m w.r.t. the reference level

4.3.3 Bed Resistance

A spatially varying bed resistance based on land classification maps of the CWA was applied in the model domain. The bed resistance as applied in the model is shown in Figure 4.4.

The land classification maps are linked with bed resistance values (Manning – n), which is based on earlier work by FEMA (2007).

In the MIKE21 software, the bed resistance can be included in two ways: a Chezy coefficient or a Manning coefficient. The main difference is that the Chezy coefficient depends on the water depth. Both coefficients are linked by the following formula (as implemented in the MIKE software):

$C = Mh^{1/6}$, with

C = Chezy coefficient ($m^{1/2}/s$)
M = Manning - M coefficient ($m^{1/3}/s$)
h = (local) water depth (m)

In this formulation, both parameters are smoothness coefficients. An increase of the value of M or C relates to a lower bed resistance. In this model the Manning - M coefficient is used, which is defined by: M = 1/n. The Manning - M coefficient can be seen as a roughness coefficient, thus: increasing M relates to a larger roughness.

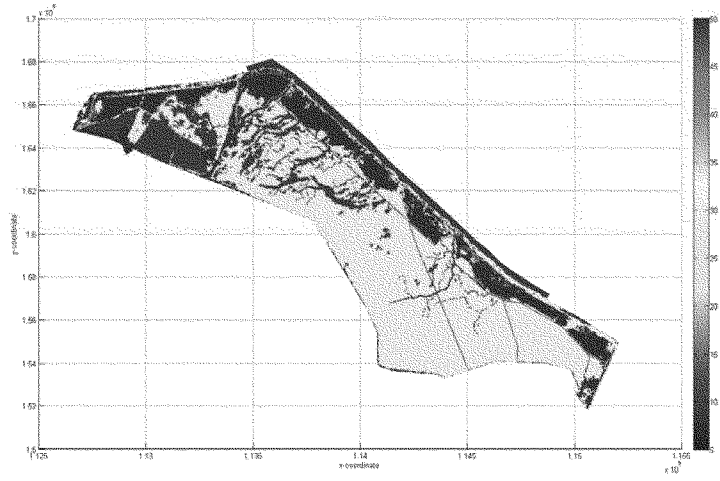


Figure 4.4 - Bed resistance map, values as Manning M coefficients

Table 4.1 shows all the types of land classification used in this model, together with their Manning values.

Most of the area consists of Emergent Herbaceous Wetlands and Woody Wetlands.

Table 4.1 - Land classification with corresponding Mannings n (From FEMA, 2007) and M values.

Land Classification	Manning, n	Manning, M
Barren Land	0.030	33.3
Cultivated crops	0.040	25.0
Deciduous forest	0.160	6.3
Developed, high intensity	0.121	8.3
Developed, low intensity	0.120	8.3
Developed, medium intensity	0.120	8.3
Developed. open space	0.035	28.6
Emergent Herbaceous Wetlands	0.035	28.6
Grassland, Herbaceous	0.035	28.6
Mixed Forrest	0.170	5.9
Open water	0.020	50.0
Pasture. Hay	0.033	30.3
Shrub / Scrub	0.070	14.3
Woody wetlands	0.140	7.1

4.3.4 Boundary conditions

Water levels

The water level is defined at the open boundary within the MRGO. The applied water levels for the calibration are shown in Figure 4.5 and for the validation in Figure 4.6. These figures show the water levels measured at the eastern side of the Bienvenue and Dupre gates. Between the stations the water levels were linearly interpolated. The water level data were provided by USACE [4] .

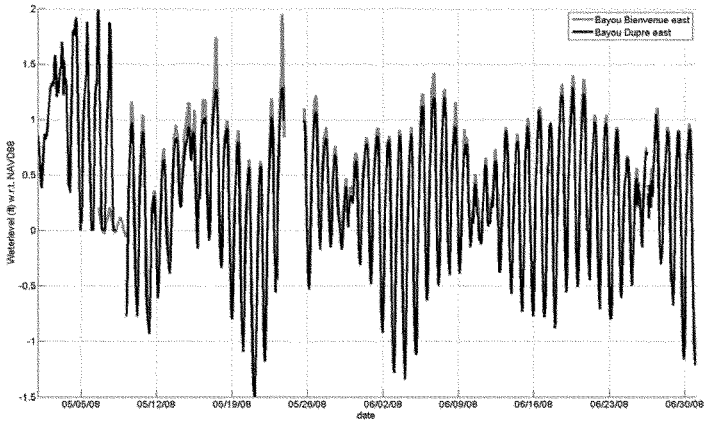


Figure 4.5 - Water level (ft) boundary conditions at the MRGO for the calibration period in 2008

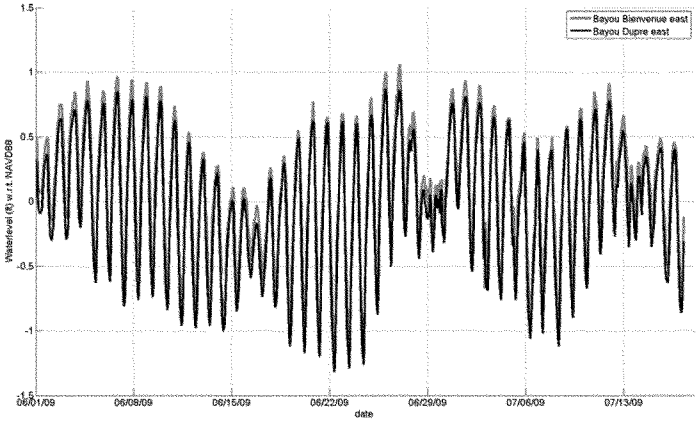


Figure 4.6 - Water level (ft) boundary conditions at the MRGO for the validation period in 2009

Salinity

The salinity values (in ppt) are prescribed at the MRGO boundary (measured at the Bayou Bienvenue structure) . It is assumed that the salinity is uniform along the boundary, but varies in time. This time variation for the validation period is shown in Figure 4.7. Two types of variation can be distinguished: the short term variations which are associated with the tide and have a cyclic character and the fluctuations which have a time span in the order of a few days. These variations have a non-cyclic character and are much larger than the short term variations. The nature of these variations is unknown but may be attributed to wind variations and/or rainfall events.

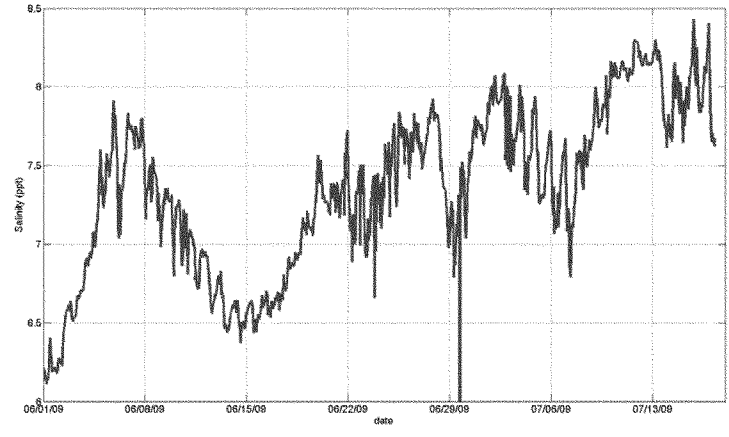


Figure 4.7 - Salinity (ppt) boundary condition at the MRGO for the validation period in 2009

Wind and Rainfall

Wind conditions and rainfall are taken as being uniform over the whole domain as no spatial data was available to account for spatial variations. The wind and rainfall data for the calibration and validation period is shown in Figure 4.8 and Figure 4.9 respectively. Data was collected at the Bayou Bienvenue Structure

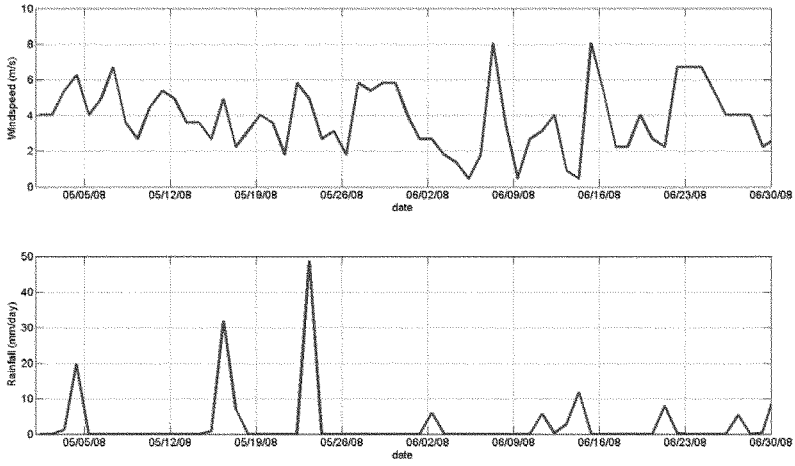


Figure 4.8 - Wind speed (m/s) and rainfall (mm/day) during the calibration period in 2008.

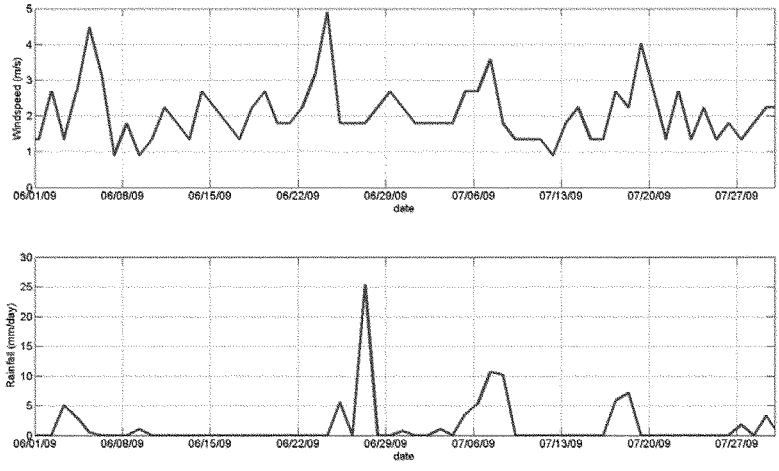


Figure 4.9 - Wind speed (m/s) and rainfall (mm/day) during the validation period in 2009.

Note that the maximum wind speed during the simulation period was 8 m/s (26.2 ft/s), which is Beaufort 4. Such wind conditions will cause no significant effects on the hydrodynamic conditions within the model domain.

Rainfall is limited to a few days during the computational period. From comparison between model results with and without rain it was concluded that the effect of rain on the water levels is negligible. However, for completeness, rainfall was taken into account in all runs. Evaporation is neglected in the model simulations, as no data was available about this parameter. Like rainfall, it is expected that evaporation will have a minor impact on the model results.

4.4 Model settings

Model settings govern the behavior of the model and indicate which processes are taken into account. Table 4.2 gives an overview of the final model settings (after calibration and validation) applied for the study. For a detailed description of the settings, reference is made to the users' manual of MIKE21-HD [1].

Note that the applied values are in fact the settings as selected at the final stage of the calibration process, which is reported in Sections 4.5 and 4.6. The selected settings of the various model parameters gave the best results over a number of runs with the flow model.

Table 4.2 - Final model settings for the simulations

Description	Settings
Bathymetry	See Figure 4.2.
Time set interval	1800 sec (for output storage)
Minimum time step	0.01 sec
Maximum time step	30 sec
Critical CFL number	0.8
Flooding and drying	Included, default values: h_0=0.005 m, h_{dry}=0.05 m and h_{wet}=0.1m
Density	Function of salinity, reference temperature 27 °C, reference salinity 6.5 ppt
Bed resistance	Manning, varying in domain: See figure 4.4
Horizontal eddy viscosity	Smagorinsky formulation with a constant coefficient of 0.28
Coriolis	Varying in domain
Wind	Varying in time, constant in domain (figures 4.8-4.9), friction constant = 0.001255
Precipitation	Varying in time, constant in domain (figures 4.8-4.9)
Structures	Weirs, see figure 4.3
Salinity – Equation	Minimum 0 ppt, maximum 45 ppt
Salinity – Solution technique	Time and space: higher order scheme
Salinity – Dispersion	Dispersion coefficient, constant in domain: 1.85 m2/s
Salinity – Initial conditions	Constant in domain: 2 ppt

4.5 Calibration

4.5.1 General

Usually, a flow study can be split up into a calibration/validation stage and a production stage. In the calibration stage a check is made whether the model can reproduce the observed parameters and tidal movement for the existing situation. The purpose of

model calibration is to match the model results with the measurements and increase the accuracy of the model predictions.

The tidal movement is characterized by water levels, current velocities and directions and can be influenced by adjusting (within the limits of their uncertainties) for instance the bed roughness, the local depths, the boundary conditions or other numerical or physical parameters. As a result of the calibration, a set of parameters becomes available which 'describe' the processes for the existing situation in a proper way, particularly in the area of interest. In the present study, salinity is also a parameter of interest.

The model was calibrated for two parameters: water level and salinity. In a first step, the hydrodynamic part of the model was tuned by comparing computed and observed water levels. Typical parameters adapted in this step were the bed roughness and the local water depth.

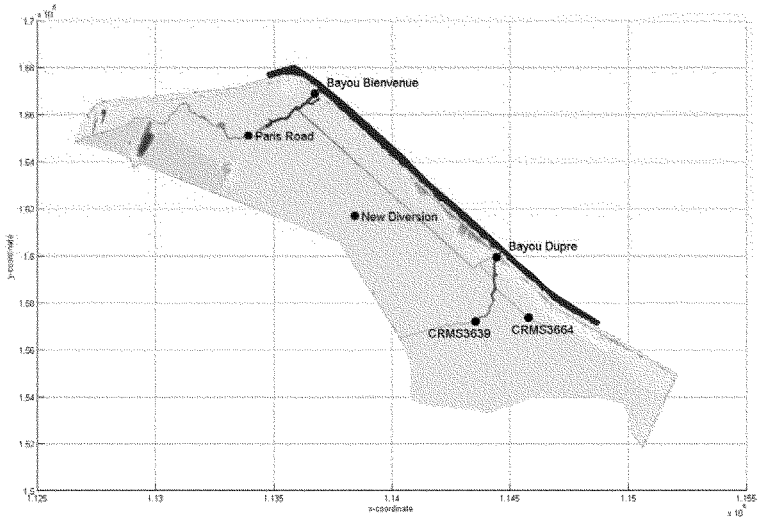


Figure 4.10 - Model output points. CRMS points were used for the calibration and validation

In a second step, the transport processes are tuned. These processes govern the distribution of fresh/saline water within the model domain and are determined by convection and diffusion processes. A typical parameter adapted in this step was the diffusion coefficient. This coefficient may be constant for the whole domain or spatially varying. Given the timeframe for undertaking the present study, this parameter was taken as constant within the domain.

The calibration was done based on measured water levels for the period May 2008 to June 2008 and salinity measurements for the period June 2009 to July 2009. No good quality salinity data was available for the period in 2008. For this reason, the salinity was calibrated for the period in 2009, which is the same period used for the validation of the water levels. Validation for the salinity was not possible, due to the limited amount of good quality data.

The hydrodynamic model was calibrated based on measured water levels at two locations inside the CWA, CRMS3639 and CRMS3664 (Figure 4.10). Unfortunately, no data points were available in the northern part of the CWA.

4.5.2 Results

Water levels

The final results of the calibration process are shown in Figure 4.11 and Figure 4.12. These figures show time series of the water levels for the period 10 May 2008 – 30 June 2008, for both calibration points. For location CRMS3664, the water levels are biased low (under predicted). For location CRMS3639 they are over predicted. This observation is also shown in the scatter plots in Figure 4.13.

During the calibration process, several parameters are modified to match the model results with the observations. First, the bed resistance in the open water parts of the model was adjusted. After the first series of simulations, it was concluded that the bed resistance has a minor influence on the water levels in the CWA.

In a second step, the bathymetry of some water parts was adjusted based on more recent bed level data that became available during the study. This resulted in a deepening of some channels and improved the model results. However, the tidal amplitude in the model domain was too large which was caused by an over prediction of in- and out flowing water during a tidal cycle. For this reason, the bed level in the Bayou Dupre opening was raised in several steps.

The simulation with the optimum settings is shown in the final results in Figure 4.11 and Figure 4.12.

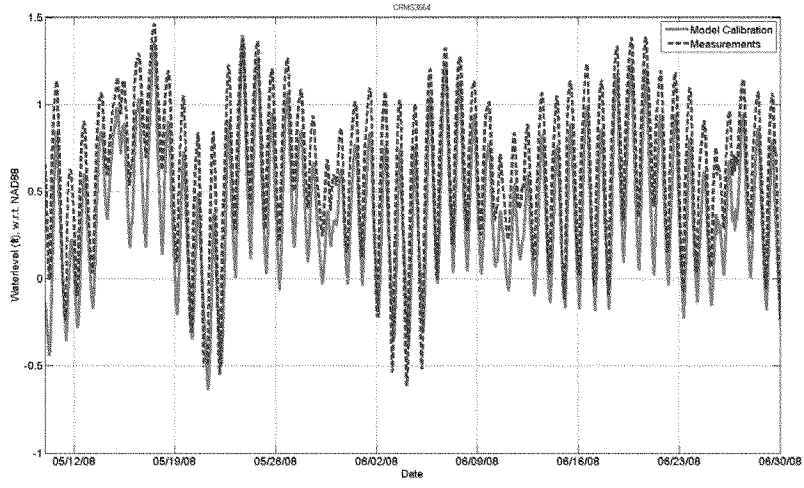


Figure 4.11 - Final results of calibration, time series of water level at point CRMS3664

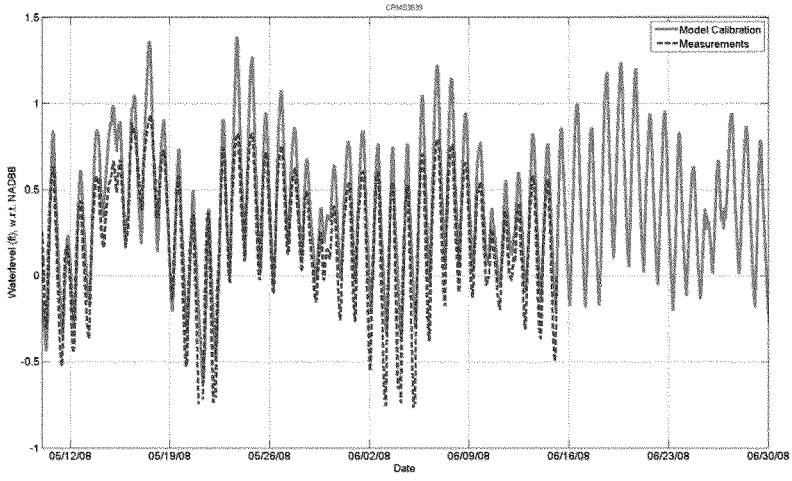


Figure 4.12 - Final results of calibration, time series of water level at point CRMS3639

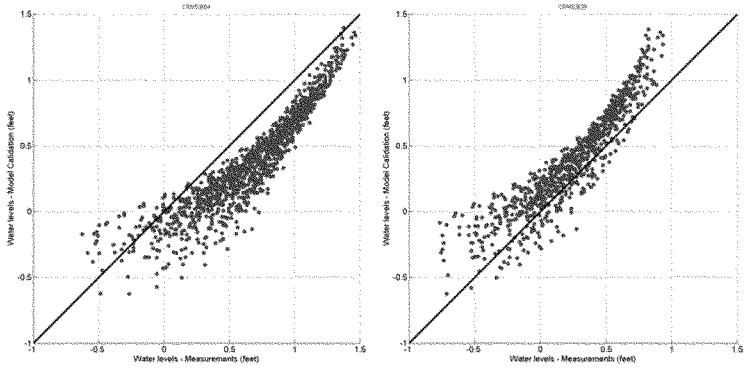


Figure 4.13 - Scatter plots, water level measurements vs. model results for the locations CRMS3664 (left) and CRMS3639 (right).

As shown in the Figure 4.11 to Figure 4.13, the water levels are somewhat over- and under predicted by the model, but the correlation between the model and the measurements (shown in the scatter plots) is acceptable. This over- and under prediction is explained by the uncertainty in the reference level of the measurements.

A difference of 0.2 – 0.3 m (0.66 – 1 ft) was found between the water level measurements at the boundary and for a location within the model domain for the calibration period.

It was concluded that the measured water levels in the domain are approximately 0.2 m (0.66 ft) too high (compared to the water levels in MRGO). For this reason, these were reduced by 0.2 m (0.66 ft) at both locations. However, given the uncertainty about the vertical datum of the measurements, it is possible that this correction should be different for each location.

A tidal analysis was carried out to get the tidal amplitude and -phase of the main components (K_1 and O_1) of the computed and the observed water levels. Figure 4.14 shows the result of that tidal analysis. The predicted phase of the main components matches very well with the measured phase, as well the amplitude of the O1 component. However the amplitude of the K1 in the model is somewhat over predicted.

Overall it can be concluded that the model results of the water levels match the measurements for this calibration period. The accuracy of the predictions is in the order of 0.3 ft.

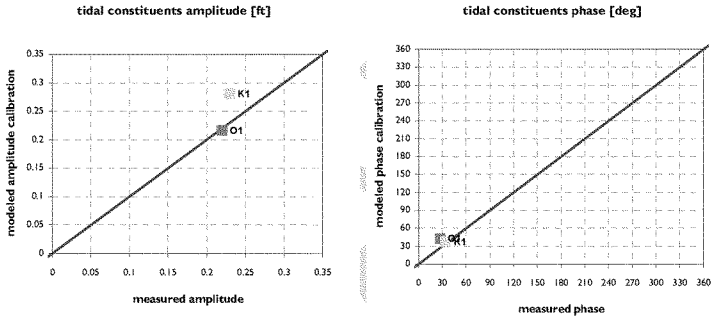


Figure 4.14 - Results of tidal analysis of final calibration run: amplitude (left) and phase (right) for location CRMS3664

Salinity

After the calibration for the water levels, several model runs were made to tune the model predictions for salinity. As noted in Section 4.3.4, the non-tidal oscillations of the salinity level are much larger than the variations associated with the tide. Such oscillations may be related to influences such as (local) rainfall and/or wind. Typical parameters varied in this stage of the calibration are the dispersion formulation, value of the dispersion coefficient and the initial conditions.

Several runs were required to get model results that are within the same order of magnitude as the observations. This may be related to the fact that the calibration locations are located at sheltered locations within small creeks and shallow water.

The best result, as shown in Figure 4.15 was achieved using a dispersion coefficient of 1.85 m^2/s and an initial salinity concentration of 2 ppt. Note that the first five days are considered as the spin up period and as such the starting concentration rapidly moves towards the values observed and therefore plays little if any role in the final calibration results. Figure 4.15 shows the results during a two-week period. The figure shows that the (moving) average value is roughly the same as the observation. However, the daily fluctuations seem to be difficult to capture. Predicting these correctly would require a

local calibration requiring spatially varying model dispersion coefficients. This is both time consuming, and potentially of little value once the bathymetry and flow conditions are radically changed throughout the life of the project. Therefore the global coefficients were used for this modelling effort.

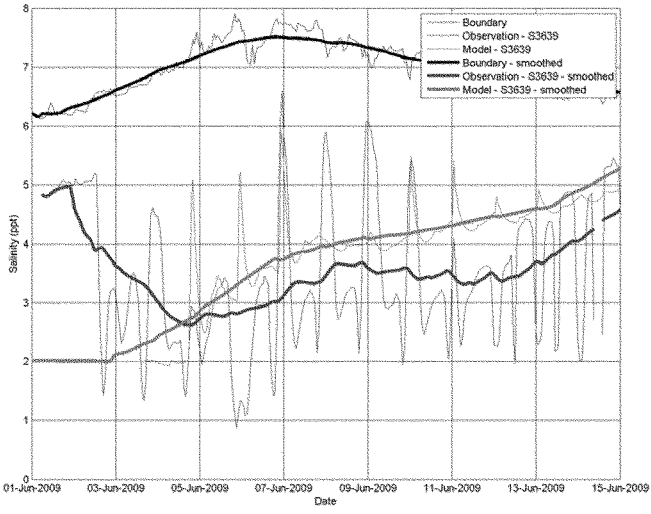


Figure 4.15 - Calibration result of salinity

4.6 Validation

4.6.1 General

A validation run was done in order to validate the model against measurements not used for the calibration. The purpose of this is to verify the accuracy of the model and check whether the model is suitable for use in arbitrary situations.

The validation was done based on measured water levels for the period June 2009 to July 2009.

4.6.2 Results

Figure 4.16 and Figure 4.17 show time series for the water levels, both measured and predicted, at the locations CRMS3664 and CRMS3639. As shown in the figures, the predicted water levels match (much) better with the measurements than during the calibration period. At the location CRMS3664 the high waters match very well, the low waters are somewhat over predicted.

At location CRMS3639, the modelled water levels are just above the measured levels.

These observations are also shown in the scatter plots in Figure 4.18. The correlation between the predicted water levels and measured water levels is better than for the calibration period, most of the data points are near the 1:1 line.

For low water the scatter around the line is larger, which means that the model over predicts the water levels by about 0.15 -0.3 ft.

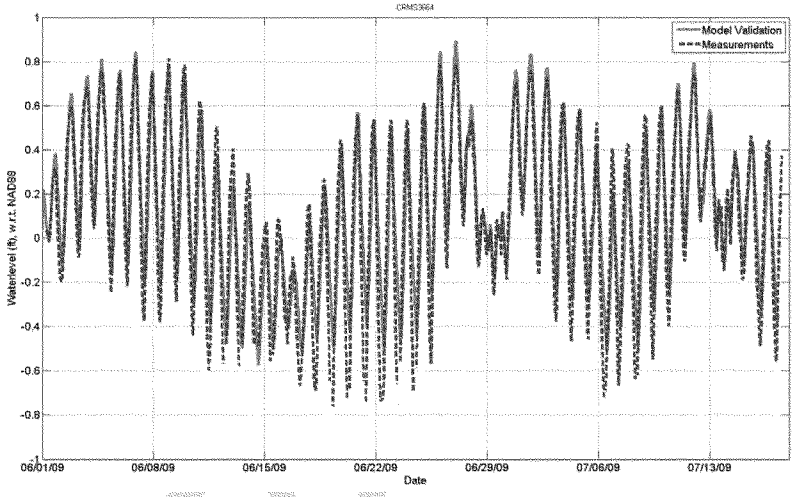


Figure 4.16 - Final results of validation, time series of water level at point CRMS3664

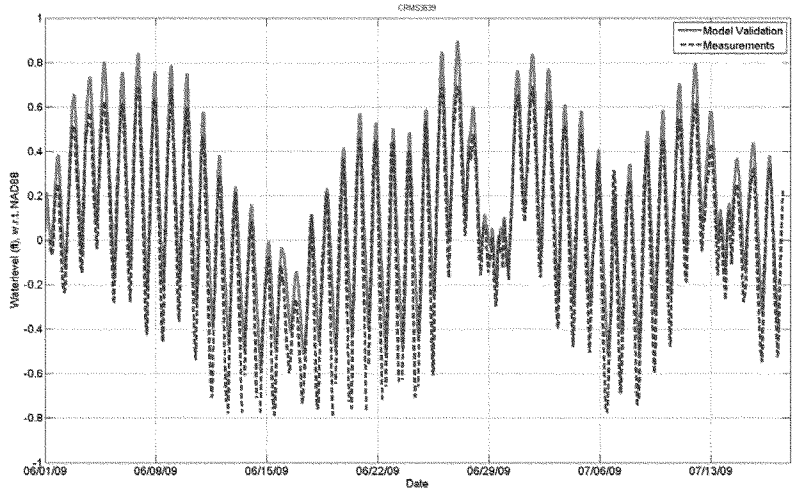


Figure 4.17 - Final results of validation, time series of water level at point CRMS3639

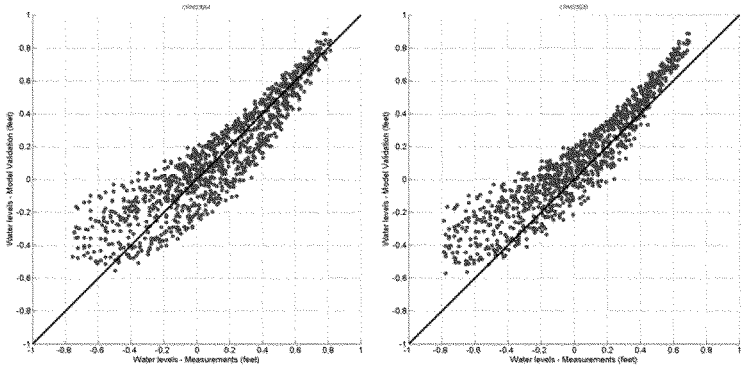


Figure 4.18 - Scatter plots validation period, water level measurements vs. model results for the locations CRMS3664 (left) and CRMS3639 (right).

Also for the validation period, a tidal analysis for the main components was carried out, for both observation points. Figure 4.19 shows the results. The predicted phase of the components is in line with the measurements. However, the predicted tidal amplitude is under predicted for both components and for both locations. The difference is about 0.03 - 0.065 ft between the measurements and the model results. However, for the calibration period the tidal amplitude is a bit too large. This means that the amplitude is during some periods too low and during some periods too large. However, overall the model predictions match the measurements within an acceptable error margin.

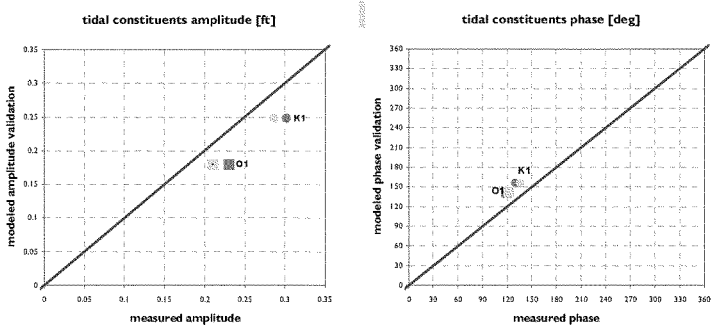


Figure 4.19 - Results of tidal analysis of final validation run: amplitude (left) and phase (right) for location CRMS3664. Red points CRMS3664, green points CRMS3639

The modeling team consider the accuracy of the model sufficient and it was decided that no further calibration and validation of the modeled water levels was required and that the model can be used to simulate the effects of the fresh water outflows on the hydrodynamic conditions and salinity in the CWA and to address the main objectives of the study.

5 HYDRODYNAMIC MODEL RESULTS

5.1 Introduction

This chapter describes the results of the hydrodynamic simulations for the different scenarios of which the layouts are presented in Section 2.2.

For each scenario, the following results are presented and analyzed:
- Discharge distribution (flow split) through the different outfalls to the MRGO;
- Water levels, current velocities and salinity at 4 specific locations (shown in Figure 4.10) and basic statistical values for the whole area (mean and maximum values).

The simulation period for all scenarios is 1 to 30 June 2009 during which 2 spring – neap cycles are simulated.

5.2 Model results for Baseline scenario (1)

The water levels and salinity values for the baseline scenario are presented in the previous chapter within the discussion on the calibration of the model. The same parameters, as well as the current velocities, are also plotted for the other scenarios. Effects of the scenarios with respect to the baseline scenario can be determined from those figures.

Flow split

Figure 5.1 shows the discharge distribution over the Bayou Dupre and Bayou Bienvenue outflows to the MRGO. The discharges through the openings fluctuates with the tide. The maximum discharge through the Bayou Bienvenue is much larger (about 1500 – 3000 cfs) than through the Bayou Dupre (300 -700 cfs).

The average discharges are low, about 9.3 cfs for Dupre and -19.2 cfs for Bienvenue. Positive discharge is defined as flowing into the MRGO, negative discharge is defined as flowing into the CWA. Although the values appear to show a small net inflow into the CWA this is small when compared to the flows through the structures (2% or less) and is within the tolerances of the model and so the model is effectively balanced.

Water levels

The maximum water levels in the area are shown in Figure F1 and the mean water levels in Figure F6. As shown in both figures, a small water level gradient from north to south is seen. The water levels are higher near Bayou Bienvenue, maximum 1 – 1.05 feet, whereas near Bayou Dupre the maximum levels are almost 0.1 feet lower.

Inside the CWA this variability is lower, except the western part. In that area the maximum water levels are limited to 0.6 – 0.8 feet, probably caused by the blocking effect of Paris Road.

Current velocities

The maximum current velocities are generally low. Figure H1 shows that the maximum velocities In the channels in the CWA this is low, approximately 0.3 – 0.6 ft/s. In the small channels, as well as the open water parts, the current velocities drop to almost 0 ft/s.

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Salinity

Figure 5.2 shows the average salinity during the simulation period for the baseline scenario. See also Figure G1. The average salinity along the channels in the CWA decreases from the value outside in the MRGO. Within the central wetlands, the mean salinity is typically about 4 ppt. In the Violet Channel the mean salinity drops to 2 ppt in the most western part.

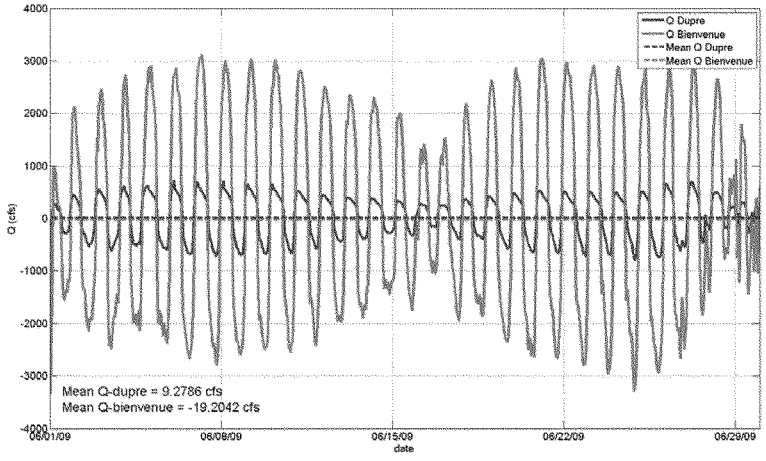


Figure 5.1 - Discharge distribution over the Bayou Dupre and Bayou Bienvenue for the baseline scenario.



Figure 5.2 - Average salinity in the baseline scenario

5.3 Model results for Existing with 1000 cfs scenario (2)

5.3.1 Model adjustments

This section presents the results of the existing with 1000 cfs inflow through the new diversion. For this scenario the model was adjusted on several points. The new diversion channel was implemented in the bathymetry (Figure 5.3), the bed level of the channel is set to -3 feet w.r.t. the reference level of the model. The roughness in the channel was changed to an 'open water' classification.

The 1000 cfs inflow was split between 3 inflow locations (as indicated with the red arrows in Figure 5.3) according to the configuration of Figure 2.1:

- New diversion : 870 cfs
- Violet channel : 100 cfs
- Waste water outlet : 30 cfs

For the new diversion and the Violet channel, 2 new open boundaries were created, with a constant discharge. The waste water outlet is modelled as a source point in the model, with a constant discharge. The water from all fresh water inlets has a salinity of 0 ppt.

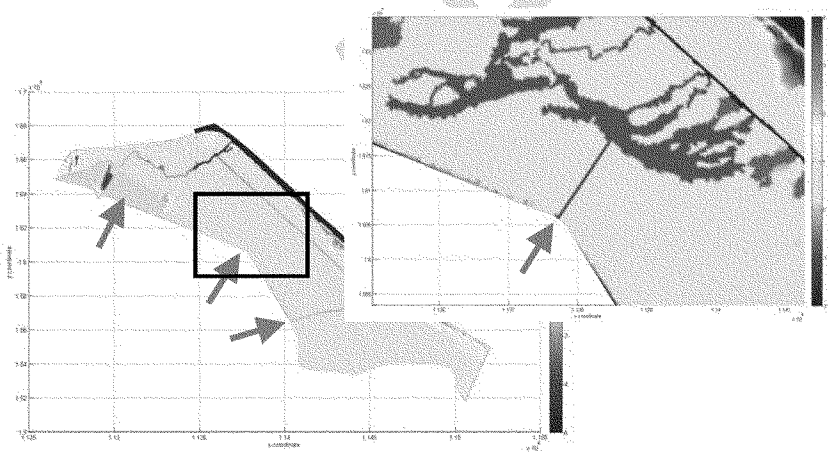


Figure 5.3 - Bathymetry for the existing with 1000 cfs scenario. The inflow locations are shown in red.

5.3.2 Results

Flow Split

Figure 5.4 shows the temporal variation and the average discharge distribution over the Bayou Dupre and Bayou Bienvenue gates. The maximum discharge through the Bayou Bienvenue is again much larger (about 1800 – 3400 cfs) than through the Bayou Dupre (300 – 1000 cfs). On average about 385 cfs flows through the Bayou Dupre and 596 cfs

through Bayou Bienvenue. The discharge distribution is roughly 40 % Dupre and 60 % Bienvenue.

The total outflow in to the MRGO is approximately 1000 cfs, which is the same as the total discharge input on the model boundaries. This concludes that the water that flows into the CWA, also flows out to the MRGO and that no storage occurs during the simulation period.

Water levels

Annex B shows the model results on the 4 specified locations inside the CWA. Water levels are presented in Figures B1 – B4.

At the end of the new diversion channel, the water level increases significantly. In the actual situation only during high waters is the area flooded. In the baseline scenario with 1000 cfs, the water levels increase to 0.3 – 1.1 feet and the tidal range is about 0.1 – 0.5 feet at that location.

At the Paris Road and at Bayou Bienvenue there is hardly any change in water levels. However at the Bayou Dupre, the water level increases by approximately 0.1 – 0.5 feet and the tidal range decreases by almost 0.3 feet during high waters.

Annex F shows 2D figures of the maximum and mean water levels in the area. For the baseline scenario with 1000 cfs the maximum water levels are found in the new diversion channel (above 1.2 feet) and in the adjacent wetlands (1 – 1.1 feet). Also the mean water level increases most in those areas, in the channel by over 0.7 feet and in the wetlands around 0.6 feet.

Current velocities

Current velocity plots are shown in Figures B5 – B8. The current velocity inside the new channel is approximately 2.5 ft/s. At the Paris Road no changes in velocities were observed. At the Bayou Dupre and Bayou Bienvenue there are some changes, but hardly in the maximum values. At Bienvenue the maximum velocity increases slightly by 0.1 ft/s during ebb flow (to the MRGO). Overall the velocities during ebb flow are larger than during flood flow (to the CWA). During flood flow the current velocities decrease by almost 0.2 – 0.3 ft/s at Bienvenue. This can be explained by the extra freshwater outflow from the CWA into the MRGO increasing the ebb flow and decreasing the flood flow. At the Bayou Dupre hardly any flood flow can be distinguished due to this freshwater outflow. Annex H shows the maximum velocities in the area. The only significant change is observed in the new diversion channel, with maximum velocities of about 1.5 – 2.5 ft/s. In the adjacent wetlands the maximum velocities increase slightly to approximately 0.5 ft/s.

Salinity

The salinity plots are shown in Figures B9 – B12. The salinity in the new diversion channel drops to 0 ppt, whereas in the baseline scenario during high water peaks of 2 – 5 ppt were computed. At the Paris Road the salinity fluctuates around 1 - 3 ppt in the baseline scenario with 1000 cfs as compared to 4 – 7 ppt in the baseline scenario. At the Bayou Bienvenue the salinity drops to 1 – 2 ppt during ebb flow (due to fresh water outflow), but does not change (w.r.t. the baseline situation) at flood flow. In the baseline scenario values of 6 – 8 ppt were found.

At the Bayou Dupre the salinity drops to almost 0 ppt in the baseline scenario with 1000 cfs. Only at high water inflow, the salinity levels increase locally, but don't reach the baseline values of 6 – 8 ppt.

Figure 5.5 (also shown in Annex G) shows the averaged salinity for the whole area. Compared to the baseline scenario, the wetland area in the centre of the CWA, almost becomes fresh, with salinity values of 0 – 0.5 ppt. Also the main channels in the systems, for example the Violet Channel, become fresh (mean of 0.5 ppt). Near the Bayou Bienvenue the mean salinity is higher, around 4 – 5 ppt.

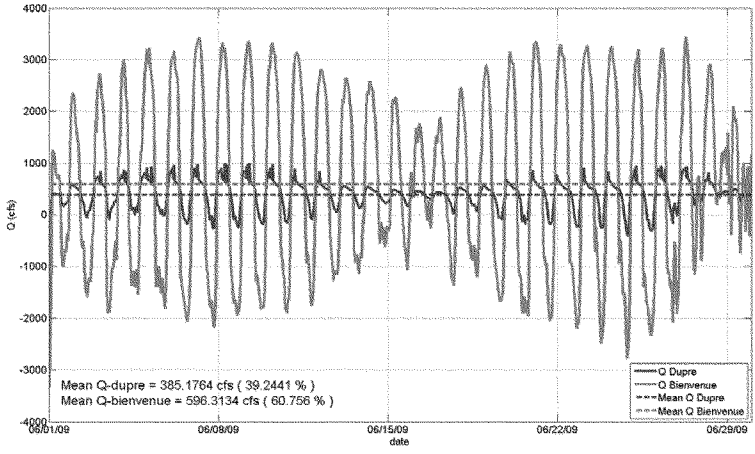


Figure 5.4 – Discharge (cfs) through the Bayou Dupre (Blue) and Bayou Bienvenue (red) gates. Dashed line indicates the mean discharge through the gates.



Figure 5.5 – Mean salinity during June 2009, existing with 1000 cfs scenario.

5.4 Model results Restored with 1000 cfs scenario (3)

5.4.1 Model adjustments

This section presents the results of the restored with 1000 cfs inflow through the new diversion scenario. The restored situation is characterized by a new diversion channel, which is wider and deeper and runs through to the levees along the MRGO.

The new channel is approximately 328 feet wide and has a bed level at -12 feet w.r.t. the reference level. In this scenario there is no open connection with the MRGO, the channel is closed by a weir, located near the outflow point to the MRGO. Figure 5.6 shows the location of the new diversion channel and the bathymetry.

In addition the bed level in some areas within the wetlands was increased and the land classification was adjusted. Figure 5.7 shows the new bed resistance map, which was created from the new land classification maps. Most of the area in the western part of the CWA is now classified as woody wetlands. Other raised areas are defined as emergent herbaceous wetlands.

The 1000 cfs inflow was again diverted over 3 inflow locations, with the same distribution as in the baseline 1000 cfs scenario:

- New diversion : 870 cfs
- Violet channel : 100 cfs
- Waste water outlet : 30 cfs

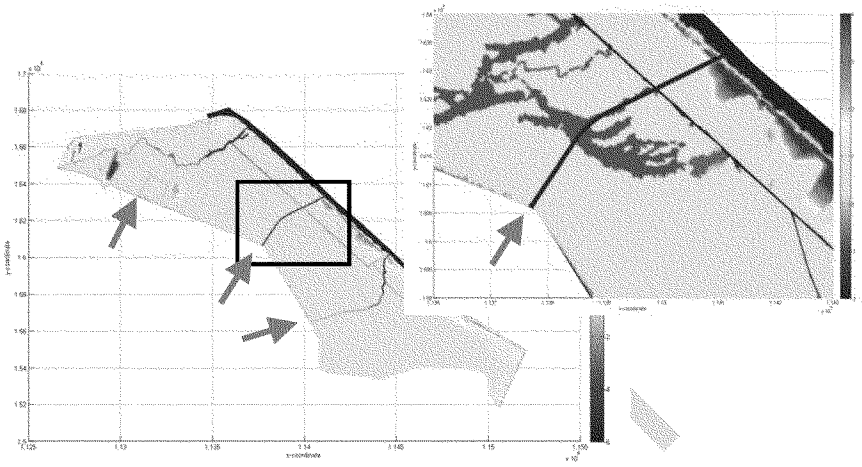


Figure 5.6 – Bathymetry for the Restored scenario. In red the new inflow locations.

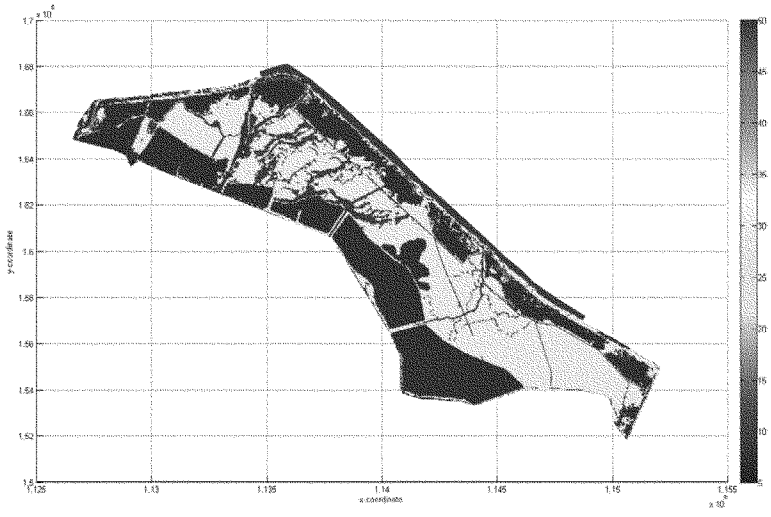


Figure 5.7 – Bed resistance map for the Restored scenario

5.4.2 Results

Flow Split

Figure 5.8 shows the discharge distribution over the Bayou Dupre and Bayou Bienvenue for this scenario including the mean discharges.

The inflow of fresh water is the same as in the previous scenario, 1000 cfs, with only the lay out of the new channel and the surrounding wetlands being changed.

These changes cause a small change is discharge distribution over the two openings: with 377 cfs (38 %) flows through the Bayou Dupre and 626 cfs (62 %) through Bayou Bienvenue. In the baseline scenario the ratio was 40 % - 60 %. Again, the total outflow is almost the same as the 1000 cfs which is put in at the model boundaries.

The discharge through the opening to the MRGO from the new diversion is 0 cfs as intended; the channel is blocked by the weir.

Water levels

Annex C shows the model results at the 4 specific locations inside the CWA. Water levels are presented in figures C1 – C4.

The results of the water levels are almost the same as the results of the existing with 1000 cfs scenario. At the end of the new diversion channel the water levels increase to 0.2 – 1.1 feet. Only the tidal range increases slightly to 0.1 – 0.6 feet.

Also at the Paris Road the tidal range slightly increase by approximately 0.1 – 0.3, to 0.5 – 1.6 feet. At Bayou Bienvenue there is again hardly any change in water levels. However at the Bayou Dupre the water level increases by approximately 0.1 – 0.5 feet and the tidal range decreases by almost 0.3 feet during high waters.

Annex F shows 2D figures of the maximum and mean water levels in the area. For the restored scenario with 1000 cfs the maximum water levels are found in the new diversion channel (1.1 feet) and in the adjacent wetlands (also 1.1 feet).

Compared to the existing scenario with 1000 cfs, a larger area is affected by the fresh water outflow, but the maximum level in the new channel is lowered by 0.1 feet. The maximum water level in the Violet Channel becomes 1.0 – 1.05 feet

Also the mean water level increases most in the new channel and surrounding wetlands, in the channel to 0.55 – 0.60 feet and in the wetlands to 0.40 – 0.60 feet.

The higher water levels in the north-western part of the CWA can the explained by the wastewater outflow, which flows on to a piece of land which is increased in level and also in roughness. This results in less flow to the neighbouring channels and the water is stored in the area.

Current velocities

The figures of the current velocities are shown in Annex C (Figures C5 – C8).

The current velocity inside the new channel drops significantly due to the deepening and widening of the channel. The mean velocity is about 0.3 – 0.35 ft/s at the end of the new diversion channel.

Due to the restoration works in the wetlands the velocity also decreases at the location of the Paris Road to almost half of the velocities in the baseline scenario.

At Bayou Bienvenue, the same pattern is observed as in the existing with 1000 cfs scenario: The maximum velocity slightly increases by 0.1 ft/s during ebb flow and decreases by almost 0.2 – 0.3 ft/s during flood flow. Again, the velocities during ebb flow are larger than during flood flow.

Annex H shows the maximum velocities in the area. Compared to the existing with 1000 cfs scenario, the most significant changes are found in the new diversion channel. The maximum velocity is limited to approximately 0.3 ft/s, whereas in the existing with 1000 cfs scenario the maximum velocities were about 1.5 – 2.5 ft/s.

Salinity

Annex C shows the salinity plots at the 4 locations, Figures C9 – C12. The water in the new diversion channel is completely fresh, 0 ppt. At the Paris Road the salinity fluctuates around 1 - 2 ppt, which is slightly lower than in the existing with 1000 cfs scenario. At the Bayou Bienvenue the salinity drops to 1 – 2 ppt during ebb flow (due to fresh water outflow), but does not change at flood flow. In the baseline scenario values of 6 – 8 ppt were found.

At the Bayou Dupre the salinity drops to almost 1 ppt. Only at high water does the salinity increase, but does not reach the value of the baseline scenario of around 6 – 8 ppt.

Figure 5.9 (also shown in Annex G) shows the monthly averaged salinity for the whole area. The overall picture is the same as in the existing with 1000 cfs scenario. The fresh water discharge from the Mississippi causes a decrease in salinity, not only in the wetland area in the centre of the CWA, but also in the main channels like the Violet channel.

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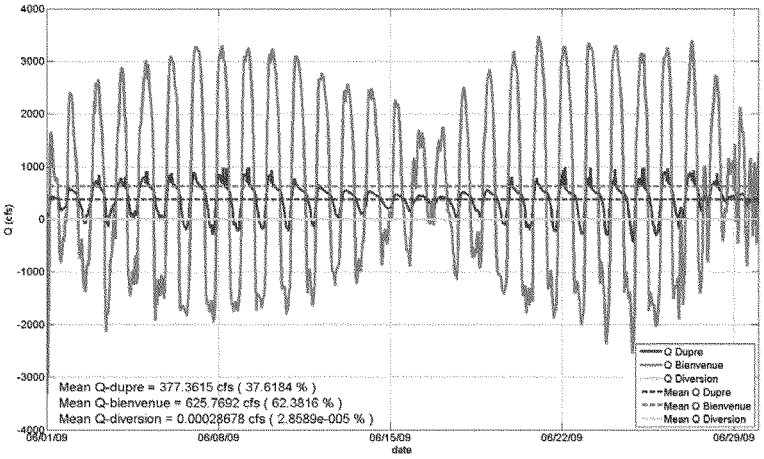


Figure 5.8 – Discharge (cfs) through the Bayou Dupre (Blue), Bayou Bienvenue (red) and new Diversion (green) gates. Dashed line indicate the mean discharge through the gates.



Figure 5.9 – Mean salinity during June 2009, Restored with 1000 cfs scenario.

5.5 Model results Restored with 7000 cfs scenario (4)

5.5.1 Model adjustments

This section presents the results of the restored with 7000 cfs inflow through the new diversion scenario. The model input for this scenario is the same as for the restored with 1000 cfs scenario, except from the fresh water discharge through the new diversion channel.

The 7000 cfs outflow is diverted over 3 inflow points, according to the configuration in Figure 2.3:

- New diversion : 6870 cfs
- Violet channel : 100 cfs
- Waste water outlet : 30 cfs

The discharges in the Violet channel and the waste water outlet are the same as in the previous scenario. Most of the fresh water inflow flows through the new channel. For this reason the blockage of the new channel near the MRGO was removed. The aim was to fix the discharge through this channel at around 6000 cfs. To maintain this discharge, a control structure might be needed if the free outflow is too large.

5.5.2 Results

Flow Split

Figure 5.10 shows the discharge distribution over the Bayou Dupre, Bayou Bienvenue and the new diversion for this scenario, as well as the mean discharges.

Due to the opening of the new diversion channel, most of the discharge is through the new channel, 5660 cfs or 81.8 %. The discharge through the new channel was intended to be around 6000 cfs, however, even without a control structure this level was not achieved with the size of channel proposed. Approximately 1260 cfs flows through the other two openings (479 cfs through Dupre and 781 through Bienvenue).

Including a structure at the end of the new channel will potentially result in lower discharges through the channel and will increase the discharge through the two Bayou's.

Water levels

Annex D shows the water levels of this scenario at the four locations (Figure D1 – D4). Due to the larger fresh water discharge through the new diversion channel, the water level at the end of the new diversion channel increases significantly. Peak levels are found at 1.4 feet and the tidal range becomes 0.2 – 0.9 feet. For the baseline scenario this was 0.1 – 0.6 feet.

Also, near the Paris Road, the water levels increase during high water by about 0.2 – 0.3 feet w.r.t. the baseline scenario, but decreases during low water (about 0.2 feet). At Bayou Bienvenue a small increase of 0.1 feet was found, however at the Bayou Dupre the effect appears to be larger.

Annex F shows 2D figures of the maximum and mean water levels in the area. For this restored with 7000 cfs scenario the maximum water levels are higher in the new

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diversion channel (above 1.2 feet) and in the adjacent wetlands (also above 1.2 feet). The area which is affected by the fresh water inflow is more than in the other scenarios. Mean water levels in the channel and the surrounding wetlands are above 0.7 feet.

Although the water levels in and near the new channel increase significantly, no flooding of the higher wetlands areas occur. This means that the water levels do not reach the level of the banks of the channel. It is expected that sea level rise will influence the flooding of the area.

Current velocities

The current velocity in the new channel (Annex D Figures D5 – D8) fluctuates around 2.5 ft/s, which is almost the same as the velocity in the smaller channel in the existing with 1000 cfs scenario. Although there is a larger discharge the channel also has larger dimensions which limits the velocities. The current velocities at the other locations show the same results as in the other scenarios with additional fresh water inflow.

The maximum flow velocities for the whole area are shown in Figure H4. Inside the new diversion channel, the flow velocities increase to above 2.1 ft/s, which is significantly larger than in the other channels within the CWA.

Salinity

Due to the large fresh water discharge, the CWA area almost completely becomes fresh. This is shown in the mean salinity, Figure 5.11 and G4. The mean salinity in all major channels and wetland parts is 1 ppt or below. Even at the MRGO a plume of fresher water is found at the outflow of the new diversion. Only at the main channel near the Bayou Bienvenue does higher salinity values penetrate slightly into the area.

The time series Figures (D8 – D12) at the four locations support these findings. At the point in the new channel and near Bayou Dupre the salinity drops to 0 ppt.
At the Paris Road the salinity drops to an equilibrium value of 0.2 – 0.3 ppt.
Only at the Bayou Bienvenue the salinity fluctuates with the tide, just as with the other scenarios: it drops to 1 – 2 ppt during ebb flow (due to fresh water outflow), but does not change noticeably at flood flow.

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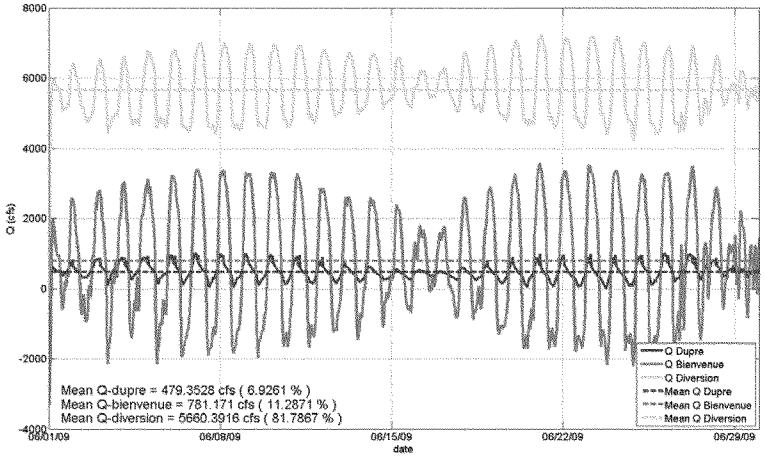


Figure 5.10 – Discharge (cfs) through the Bayou Dupre (Blue), Bayou Bienvenue (red) and new Diversion (green) gates. Dashed line indicate the mean discharge through the gates.



Figure 5.11 – Mean salinity during June 2009, Restored with 7000 cfs scenario.

5.6 Model results Sea Level Rise (restored with 1000 cfs and SLR scenario) (5)

This section presents the results of the restored with 1000 cfs inflow through the new diversion and a sea level rise of 3.7 ft.

5.6.1 Model adjustments

The basic input of the scenario is taken from the restored with 1000 cfs scenario.All the input files are the same, except for the water level boundary at the MRGO. These water levels are raised by 3.7 feet, using the high range of sea level rise estimates. This value was established as part of the wider Ecosystem restoration Study [3]. The new boundary conditions are shown in Figure 5.12.

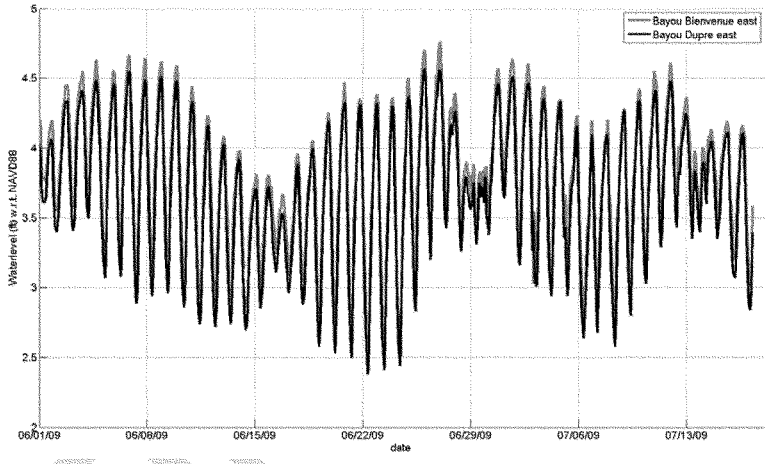


Figure 5.12 – Water level boundaries along the MRGO for the Sea level rise scenario.

- It has been assumed that the land classification does not change due to sea level rise. Marsh and swamp areas which are flooded have not been changed to open water, because of the shallow water depth and the influence of the existing vegetation.
- No allowance has been made for growth of the marsh and swamp over the period of sea level rise.
- It has been assumed that the salinity at the model boundary does not change. The same dataset has been taken as for the other scenarios. In reality the salinity may change with the increase in water levels. However, it is unknown what effect the sea level rise will have on the salinity in the MRGO. For this reason it is assumed that the salinity does not change.
- It has been assumed that the tidal amplitude at the boundary is the same as in the original situation. The water levels are increased with a constant value of 3.7 feet. In reality it is possible that the tidal wave may be deformed if the sea level rises, due to a different geometry or bed resistance. As a result the tidal amplitude might change. However, nothing is known about this interaction in this situation. For this reason the tidal amplitude is taken as in the other scenarios.

5.6.2 Results

Flow Split

Figure 5.13 shows the discharge distribution over the Bayou Dupre, Bayou Bienvenue and the new diversion for this scenario, as well as the mean discharges.

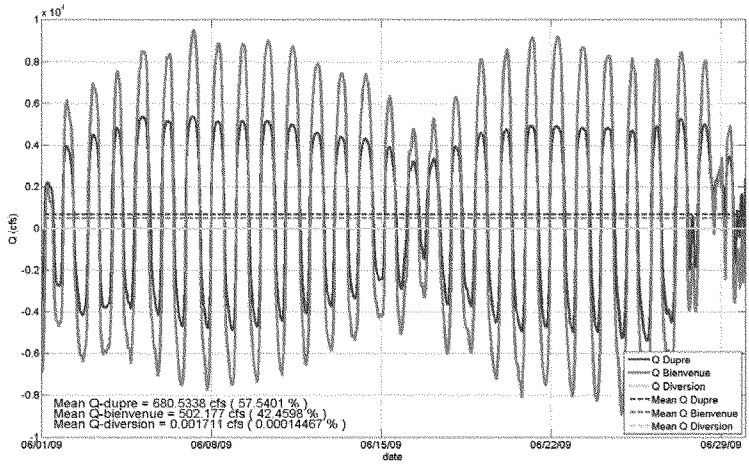


Figure 5.13 – Discharge (cfs) through the Bayou Dupre (Blue), Bayou Bienvenue (red) and new Diversion (green) gates. Dashed line indicate the mean discharge trough the gates.

Due to the sea level rise, the maximum discharges through the Bayou Dupre and Bayou Bienvenue opening increase significantly. The maximum discharge through Bienvenue is now 5000 – 9000cfs, which was 1500 – 3500 cfs in the original restored with 1000 cfs scenario, so about 3 times larger.

Through Dupre the maximum discharge increases to 3000 – 5000 cfs. This was 600 – 1000 cfs, so approximately 5 times larger.

The mean discharges are in the same order as the restored scenario with 1000 cfs, as the total fresh water outflow does not change. However, the flow split over the Dupre and Bienvenue outflows changes. In this scenario 680 cfs flows through Dupre (57,5 %) and 502 flows through Bienvenue (42.5 %). The ratio was 38 % Dupre and 62 % Bienvenue. So, the sea level rise causes a shift in discharge distribution: the majority of the discharge is now through the Bayou Dupre.

The discharge through the opening in the new diversion channel is 0 cfs, as the channel is closed by a weir structure.

Water levels

The water levels increase significantly in this scenario. As shown in Figures F5 to F10, a large part of the CWA area is flooded due to the 3.7 feet increase of sea level. All coloured parts in this figure are now flooded.

Figures E.1 – E.4 show the water levels at the 4 specified locations.

At all locations the water levels increase by almost 3,7 feet. The tidal range inside the CWA decreases. At location number 1, in the new diversion channel, the tidal range becomes 0.1 – 0.5 feet. In the original restored with 1000 cfs scenario the tidal range was 0.1 – 0.6 feet.

At the Paris Road, the tidal range completely damps out. In this scenario it becomes 0.1 – 0.5, whereas it was 0.5 – 1.6 feet in the original restored scenario.

This is also the case at Bienvenue: tidal range in this scenario is 0.2 – 0.8 feet, originally it was 0.4 – 1.7 feet. The same holds for the Bayou Dupre outflow.

Peak water levels are found at 4.3 - 4.4 feet for all locations.

Current velocities

Whereas the tidal range decreases, the current velocities increase in both Bayou's. Peak velocities inside Bienvenue are approximately 2.7 ft/s, at Dupre it is 2.1 ft/s. In the restored with 1000 cfs scenario this is respectively 1.5 ft/s and 0.5 ft/s. Inside the Dupre outflow the velocities increase significantly. This is also due to the increased discharge through that opening.

At the Paris Road the same order of current velocities are as in the baseline scenario, however this is an increase with respect to the restored 1000 cfs scenario. In this scenario the velocities decreased with respect to the actual situation.

Figure H5 shows the peak velocities of the whole area. Maximum velocities inside the CWA are found in the two main channels which run from the both Bayou's into the wetlands. Velocities of 0.8 – 1.0 ft/s are found in those channels. In the rest of the CWA area, the velocity does not exceed 0.5 ft/s.

Salinity

Due to the sea level rise, the salinity can penetrate more easily into the CWA area.

Figure 5.14 (also shown in annex G5) shows the mean salinity in the CWA. In the areas near the both Bayou's the mean salinity becomes 4 – 6 ppt, whereas the central part of the area is influenced by the fresh water inflow from the new diversion channel (salinity 0 -2 ppt). Also in the area western of the Paris Road, the water becomes saltier with mean salinity of 3 – 4 ppt.

These effects are also shown at the 4 specified locations. At point nr 1 the salinity is below 0.5 ppt. Near the Paris Road the salinity fluctuates with the tide: at peak flood the salinity is 6 – 7 ppt, during ebb the salinity drops to 3 – 4 ppt.

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At both the Bayou Dupre and the Bayou Bienvenue the salinity during flood matches the values of the baseline scenario: 6.5 – 8 ppt.

During low tide the salinity drops at both Bayou's: at Dupre to 3 – 4 ppt, at Bienvenue to 4 – 5 ppt.

The salinity inside the CWA fluctuates with the tide. Figures 5.15 and 5.16 show the salinity during respectively high water and low water. During high high water salinity values of above 7 ppt are found west of the Paris Road. During low water the maximum salinity is approximately 4 ppt. Also notice the number of white cells during low water (figure 5.16), which indicates that these cells have become dry.

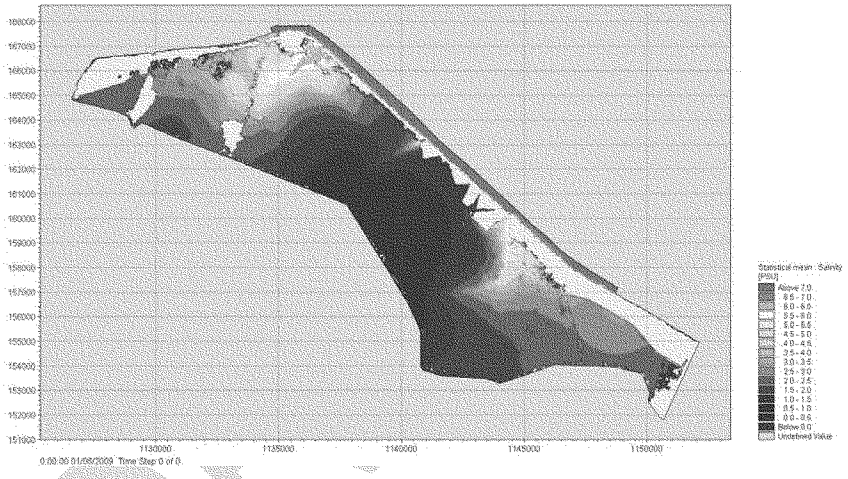


Figure 5.14 – Mean salinity during June 2009, restored scenario with 1000 cfs including Sea level rise.

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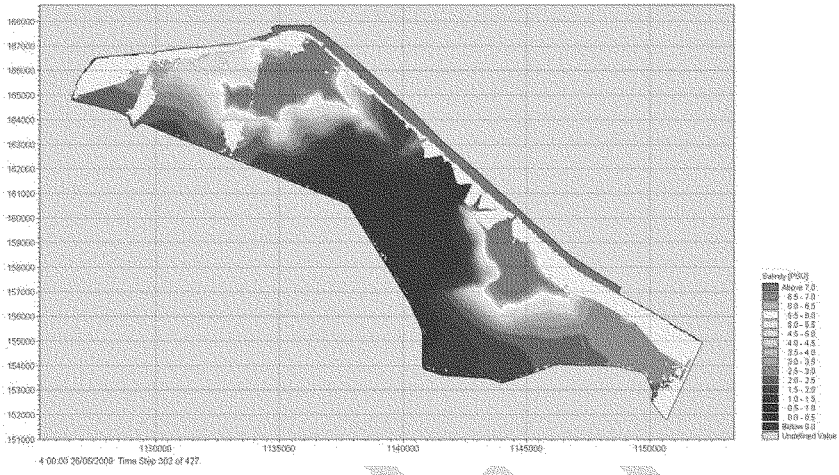


Figure 5.15 – Salinity during high water, 26th June 2009, 4h00.

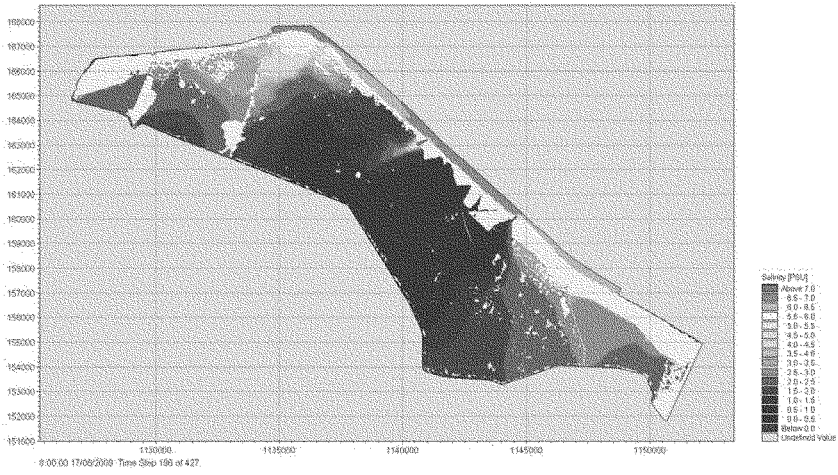


Figure 5.16 – Salinity during low water, 17th June 2009, 8h00.

5.7 Summary and Discussion

Table 5.1 - Discharge distribution for all scenarios

	Baseline Scenario	Existing with 1000 cfs	Restored with 1000 cfs	Restored with 7000 cfs	Sea level rise
Discharge:					
Dupre	9.3 cfs	385 cfs	377 cfs	479 cfs	681 cfs
Bienvenue	-19.2 cfs	596 cfs	626 cfs	781 cfs	502 cfs
Diversion	-	-	-	5660 cfs	-
Discharge %:					
Dupre	-	39.2 %	37.6 %	3.9 %	57.5 %
Bienvenue	-	60.8 %	62.4 %	11.3 %	42.5 %
Diversion	-	-	-	81.8 %	-

Table 5.2 - Water levels, current velocities and salinity for all scenarios

	Baseline Situation	Existing with 1000 cfs	Restored with 1000 cfs	Restored with 7000 cfs	Sea level rise
Water levels					
Dupre	-0.55 – 0.9 feet	-0.1 – 0.9 feet	-0.1 – 0.9 feet	-0.2 – 1.1 feet	3.3 – 4.4 feet
Bienvenue	-1.1 – 1 feet	-1 – 1.1 feet	-1 – 1 feet	-1 – 1.1 feet	3.1 – 4.4 feet
Diversion	Dry – 0.9 feet	0.1 – 1.1 feet	-0.15 – 1.1 feet	0.7 – 1.4 feet	3.4 – 4.4 feet
Paris Road	-0.9 – 0.9 feet	-0.7 – 0.95 feet	-1 – 1.1 feet	-1 – 1.1 feet	3.4 – 4.4 feet
Currents					
Dupre	Max 0.5 ft/s	Max 0.45 ft/s	Max 0.45 ft/s	Max 0.55 ft/s	Max 2.2 ft/s
Bienvenue	Max 1.4 ft/s	Max 1.5 ft/s	Max 1.5 ft/s	Max 1.5 ft/s	Max 2.8 ft/s
Diversion	Max 0 ft/s	Max 2.7 ft/s	Max 0.35 ft/s	Max 2.7 ft/s	Max 0.3 ft/s
Paris Road	Max 0.8 ft/s	Max 0.8 ft/s	Max 0.55 ft/s	Max 0.55 ft/s	Max 0.85 ft/s
Salinity					
Dupre	6 – 8 ppt	0 – 7 ppt	1 – 7 ppt	0 ppt	2 – 8 ppt
Bienvenue	6 – 8 ppt	0.5 – 8 ppt	0.5 – 8 ppt	0 - 8 ppt	3.5 – 8 ppt
Diversion	Peaks 2 – 5 ppt	0 ppt	0 ppt	0 ppt	0 – 0.5 ppt
Paris Road	4 – 7 ppt	1 – 3 ppt	1 – 2 ppt	0.3 ppt	3 – 7.5 ppt

Discharge distribution:

- The amount of water which flows into the CWA, also flows out to the MRGO. In the baseline situation the in and outflow through both of the Bayou's is balanced.
- For the 1000cfs diversion scenarios the mean discharge splits approximately 40 % through Dupre and 60 % through Bienvenue,. Also the maximum discharge fluctuations with the tide are much larger at Bienvenue than at Dupre. Bienvenue (3 – 5 times larger).
- In the restored scenario with 7000 cfs, 5660 cfs (82 %) flows out through new diversion without a structure (planned 6000 cfs). No structure was needed in the model for this case, however in reality a structure will be needed to prevent inflow from the MRGO at times of low or no diversion and also to act as a flood defence in times of storm surge.
- Due to the sea level rise, the maximum discharges trough the Bayou Dupre and Bayou Bienvenue opening increase significantly, respectively 5 and 3 times larger then in the restored scenario with 1000 cfs. The mean discharges are in the same

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order, but the flow split over the Dupre and Bienvenue outflows changes. The majority of the discharge is now trough the Bayou Dupre, 57.5 %.

Water levels, current velocities and salinity:

- Water levels increase with the increased inflows in the diversion noticeably at Bayou Dupre: 0.1 – 0.5 feet. The tidal range also decreases by around 0.3 feet at that location. At Bienvenue and near the Paris Road, the water level change is less.
- The fresh water inflow does not result in flooding of the higher wetlands, not even during 7000 cfs outflow. The new and existing channels are large enough to keep the inflow within their profile.
- At the Bayou Bienvenue the flow velocities during ebb are larger than during flood. With the fresh water inflow, the ebb flow increases by 0.1 ft/s and the flood flow decreases by 0.2 – 0.3 ft/s. This occurs in all scenarios.
- At the Bayou Dupre the flow velocities do not change in magnitude, only in phase due to the fresh water inflow.
- Flow velocities increase significantly in the new diversion channel, with maximum values of 2.7 ft/s. Bed protection inside the channel might be needed.
- In the restored situation flow velocities decrease near the Paris Road by almost 0.3 ft/s.
- Due to the fresh water inflow, the salinity decreases. In the case of the 7000 cfs inflow at all locations, except Bayou Bienvenue, the water becomes fresh. In the case of 1000 cfs inflow the salinity at Paris Road drops to 1-3 ppt and near Dupre to 0 – 1 ppt with some peaks to 7 ppt.
- In all cases with fresh water inflow the water near Bienvenue becomes fresh (1 – 2 ppt) during ebb flow, but is still saltier during flood flow (around 7 ppt).
- In all scenarios with fresh water inflow the central area (near the new channel) and the main channels (like the Violet channel) become fresh (approximately 0.5 ppt).
- The water levels increase significantly in the sea level rise scenario: peak water levels are found at 4.3 - 4.4 feet for all locations.
- The current velocities increase in both Bayou's: Peak velocities inside Bienvenue are approximately 2.7 ft/s, at Dupre it is 2.1 ft/s.
- Due to the sea level rise, the salinity can penetrate more easily into the CWA area, however the salinity inside the CWA fluctuates with the tide.

Although the salinity model is not very well calibrated, this will not have a large influence on the conclusions. The effect of the fresh water inflow on the salinity in the CWA is large; salinity values drop to zero in the main channels and larger water bodies. It is expected that this will not change if the model is better calibrated.

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6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The following objectives or key questions were formulated in Section 1 and the results presented above were targeted at answering these 5 questions:

1. What is the impact of the base flow through the diversion? How does it affect salinity in the CWA?
2. Does the proposed change in topography for the restored marsh impact the base flows, water levels and discharges?
3. What happens during periods of peak diversion flows? Where does the water go? What is the flow split through the existing structures? Is a new outfall needed? How extensive is flooding (frequency levels etc) inside the CWA? Are new channels needed within the wetlands?
4. What are the impacts of localized flooding due to the new diversions?
5. What are the impacts of sea level rise on the marsh?

Question 1

The base flow (1000cfs) generally lowers salinity levels within the CWA but raises levels and flow rates to some degree. The increase in water levels is generally < 0.25ft across the wetland - see Figure 6.1.



Figure 6.1 - Comparison of the Existing with 1000cfs and Baseline Scenarios for Peak Water Level.

Question 2

The change in topography due to marsh and swamp recreation has little impact on the flows, levels and salinity values within the CWA, particularly with the increased channel designed to transfer the higher flows from the Mississippi River to the MRGO.

The water level increase is greatest to the west of Paris Road where the impact of the sewage treatment works discharge is felt together with the increase in marsh and wetland - see Figure 6.2



Figure 6.2 - Comparison of Restored with 1000cfs with Baseline Scenarios for Peak Water Level

Question 3

Initial screening before developing the Mike21 model suggested that a third structure would be needed to prevent excessive flows in the existing channels and extensive flooding.

Therefore during periods of peak flow the water was diverted mainly directly to the MRGO via the new channel. The flow split through the existing structure followed the same proportions as with the 1000cfs background flow. There is some raising of water levels with the 7000cfs flow, but it was kept within the new and existing channels when the majority of the flow was passed directly to the MRGO - see Figure 6.3

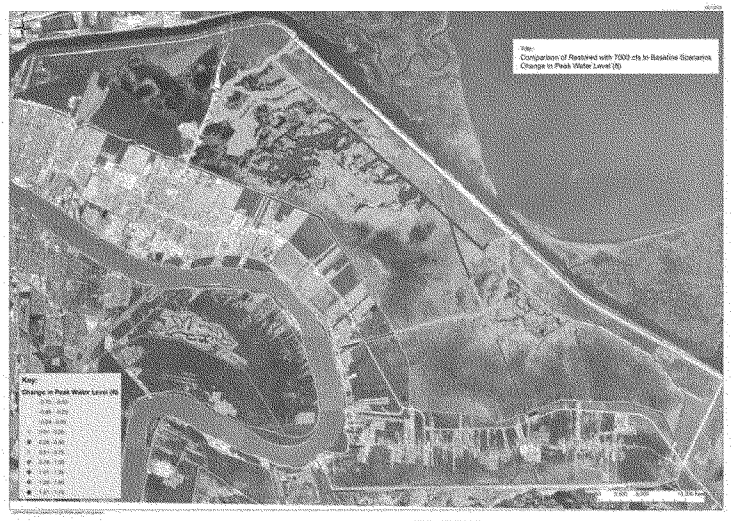


Figure 6.3 - Comparison of Restored with 7000cfs with Baseline Scenarios for Peak Water Level

Question 4

The new diversions have no influence on the water levels outside of the channels. For the 1000cfs scenario, in the central area the effect is less than 0.5ft, for the 7000cfs scenario, the effect is less than 1ft. Flow velocities increase within the channels.

Question 5

About 80% (rough estimate) of the area will flood during high waters for the SLR scenario. This will change drastically the hydrodynamic behaviour for the whole area and will likely indirectly induce morphological changes to the area. More areas will experience larger salinity levels.

6.2 Recommendations

Model Improvements

The model at present has been calibrated to meet the needs of the investigation. However calibration data was limited, particularly in spatial extent, and further model calibration could lead to improved model accuracy in some areas. Points of improvement could be:

- Provide measurements of water levels, current velocities and salinity in the northern part of the CWA, to calibrate the model in that area as well.
- Carry out current velocities measurements within the whole area. The flow model has not been calibrated with current velocities.
- Undertake discharge measurements in both the Bayou Dupre and the Bayou Bienvenue openings to the MRGO. The model can be calibrated on the instantaneous discharge, or mean discharge through both openings, to match

the amount of water flow in and out of the CWA in the model, with the present situation.

- Additional calibration on salinity by varying the dispersion coefficient over the model domain. This would require more data points in the area, to provide spatially distributed salinity data. It may also be of limited value once the marshland had been restored as this would change some of the spatial characteristics.

Besides further calibration, an extension of the model domain could also be considered. A larger model could investigate the effects of the freshwater inflow in to the MRGO and the Lake Borgne and Biloxi marsh.

However, improved boundary conditions would be required within the MRGO and Lake Borgne, the run time of the model would increase, and significant modifications would be required to adequately reflect the new IHNC barrier. In addition we understand that there are other models which cover this areas which could be used to understand any impacts from the diversion.

In the current model, the results within the MRGO are influenced by the boundary effects of the model and therefore the salinity, flow and water level values derived within the MRGO should not be used.

Additional Investigations

The model could be used to consider a range of operational scenarios, and to test adaptive management options. The inclusion of the structure at the end of the new diversion channel would allow for the discharge to be controlled, thus raising levels within the CWA and increasing flows within the channels.

Also concerns with respect to stagnation in the outer reaches of the Marsh could be investigated further, together with potential options for improving base flow in these areas to improve long term water quality.

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[2] FEMA (2007). Flood Insurance Study, Volume 1 of 2: Southeastern Louisiana Engineering Methods - ADCIRC, preliminary version, April 2007

[3] United States Army Corps of Engineers, 2009. Mississippi River – Gulf Outlet (MRGO) Ecosystem Restoration Study Louisiana and Mississippi. Hydraulics and hydrology. Preliminary Hydrodynamic and Hydraulic Modeling for a proposed Freshwater Diversion in the vicinity of Violet, Louisiana. October 2009.

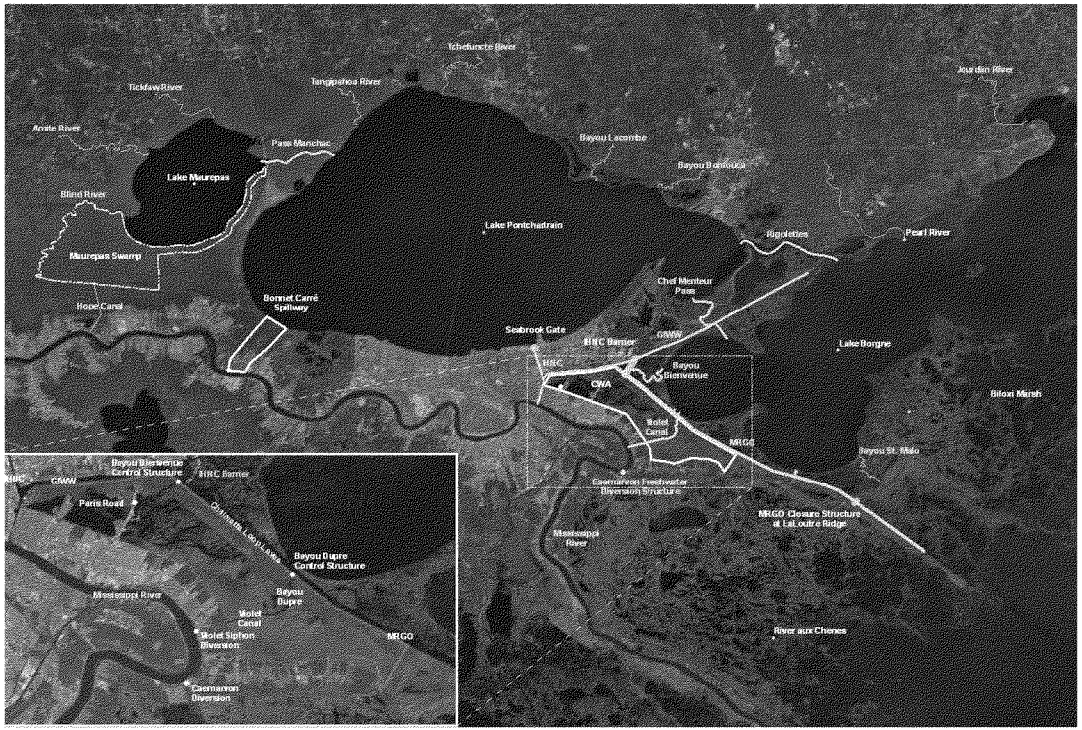
[4] www.rivergauges.com

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Annex A
Project Area

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Tchefuncte River
Tangipahoa River
Tickfaw River
Amite River
Pass Manchac
Lake Maurepas
Blind River
Maurepas Swamp
Bayou Lacombe
Bayou Bonfouca
Lake Pontchartrain
Rigolettes
Pearl River
Jourdan River
Chef Menteur Pass
Bonnet Carré Spillway
Hope Canal
Seabrook Gate
IHNC Barrier
GIWW
IHNC
Bayou Bienvenue
CWA
Lake Borgne
Biloxi Marsh
Bayou St. Malo
Inner Harbor Navigation Canal
MRGO
Caernarvon Freshwater Diversion Structure
MRGO Closure Structure at LaLoutre Ridge
Mississippi River
River aux Chenes
Bayou Bienvenue Control Structure
IHNC Barrier
GIWW
Paris Road
Chalmette Loop Levee
Bayou Dupre Control Structure
Bayou Dupre
Mississippi River
Violet Canal
Violet Siphon Diversion
MRGO
Caernarvon Diversion

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Annex B
Results baseline scenario 1000 cfs

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Water levels

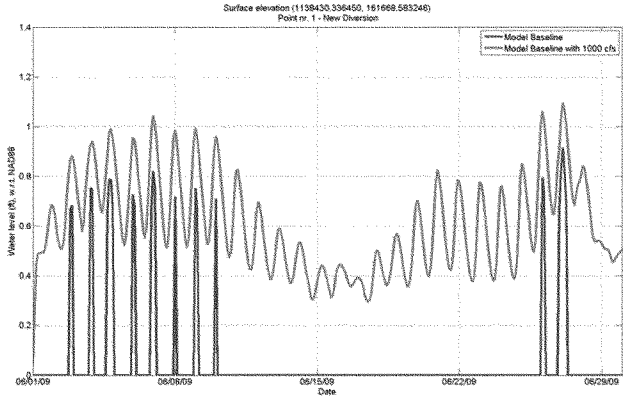


Figure B1: Water levels at point nr 1, New Diversion, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

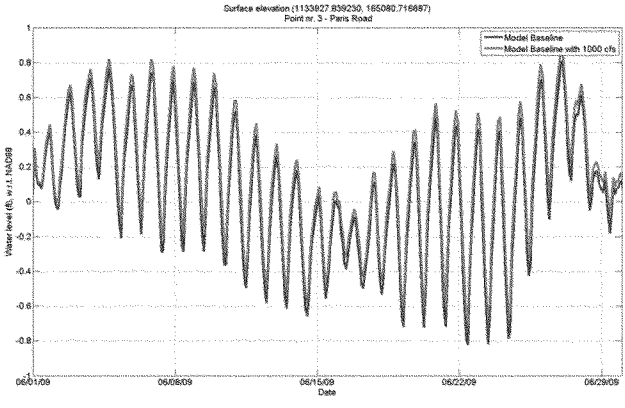


Figure B2: Water levels at point nr 3, Paris Road, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

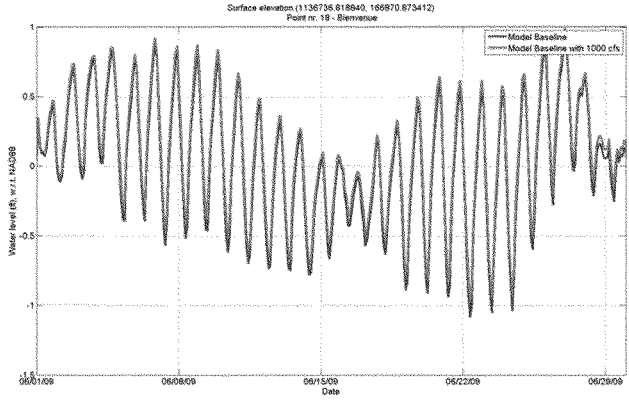


Figure B3: Water levels at point nr 18, Bayou Bienvenue, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

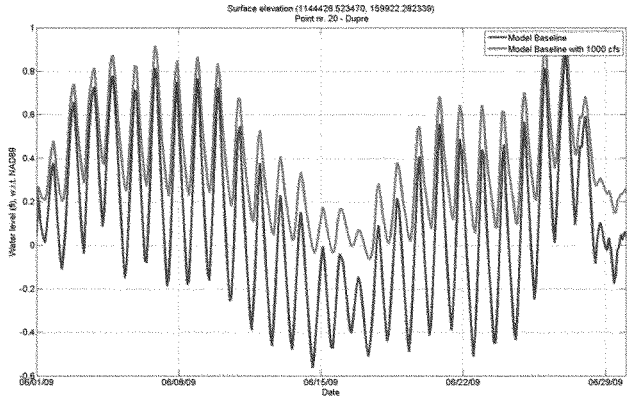


Figure B4: Water levels at point nr 20, Bayou Dupre, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

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Current velocities

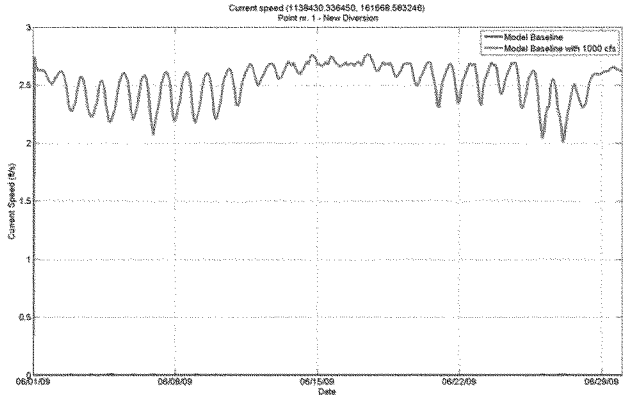


Figure B5: Current velocities at point nr 1, New Diversion, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

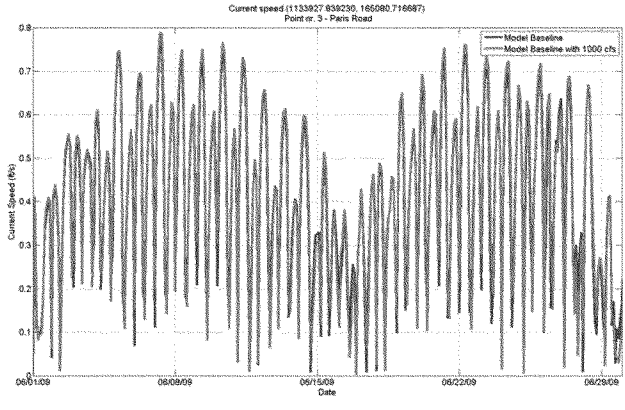


Figure B6: Current velocities at point nr 3, Paris Road, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

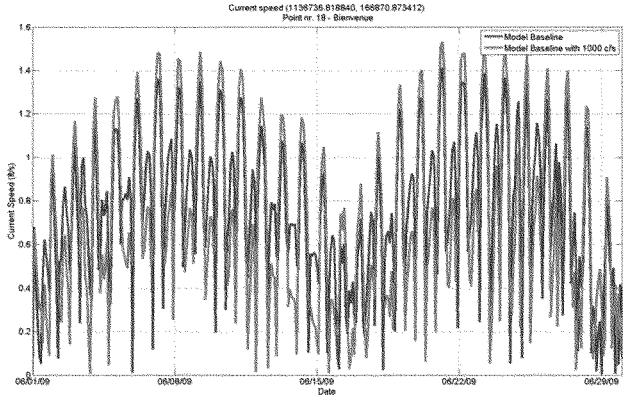


Figure B7: Current velocities at point nr 18, Bayou Bienvenue, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

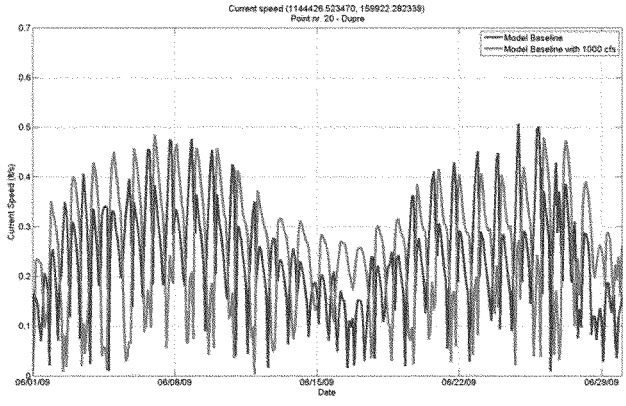


Figure B8: Current velocities at point nr 20, Bayou Dupre, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

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Salinity

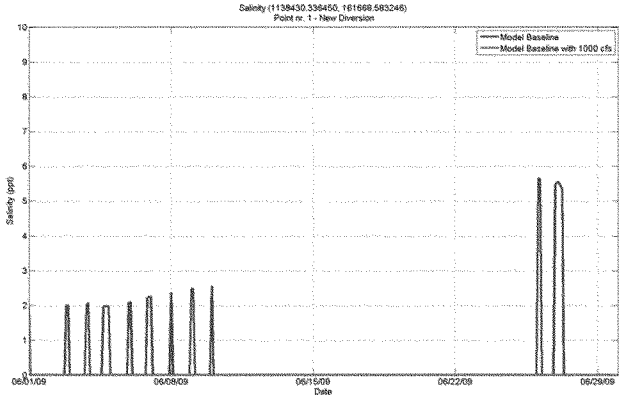


Figure B9: Salinity at point nr 1, New Diversion, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

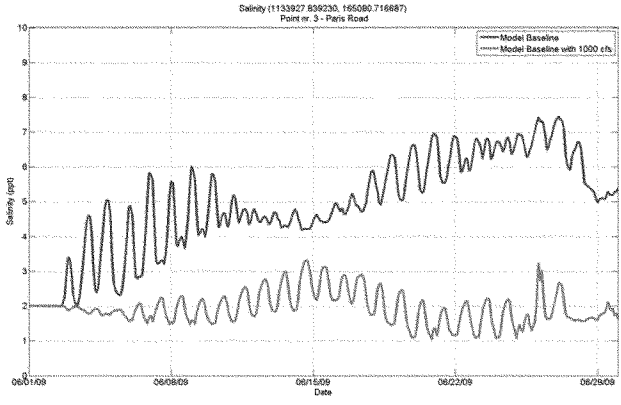


Figure B10: Salinity at point nr 3, Paris Road, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

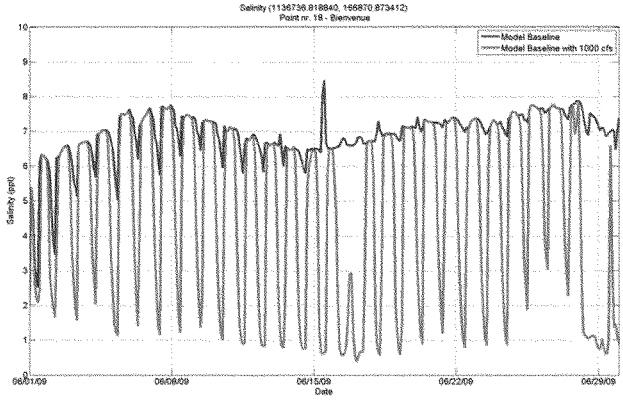


Figure B11: Salinity at point nr 18, Bayou Bienvenue, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

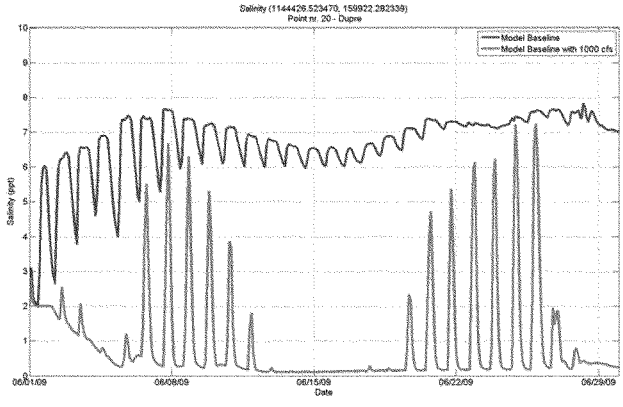


Figure B12: Salinity at point nr 20, Bayou Dupre, for the baseline (blue) and baseline with 1000 cfs (red) scenarios.

ROYAL HASKONING

Annex C
Results restored scenario 1000 cfs

DRAFT

ROYAL HASKONING

Water levels

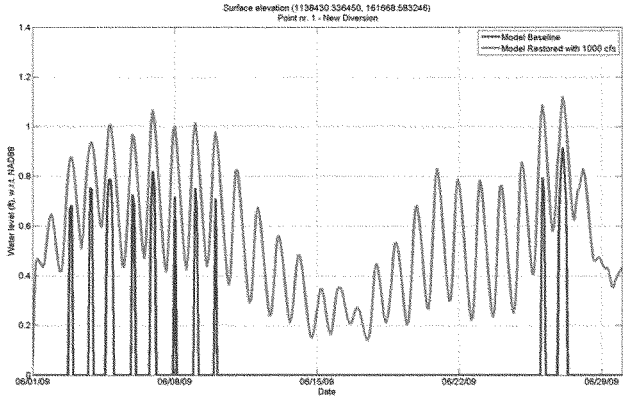


Figure C1: Water levels at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

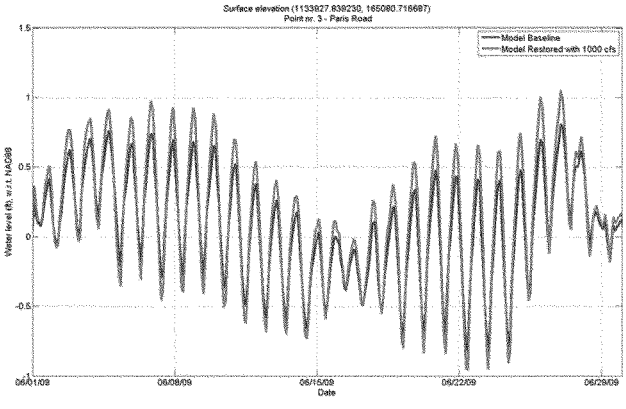


Figure C2: Water levels at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

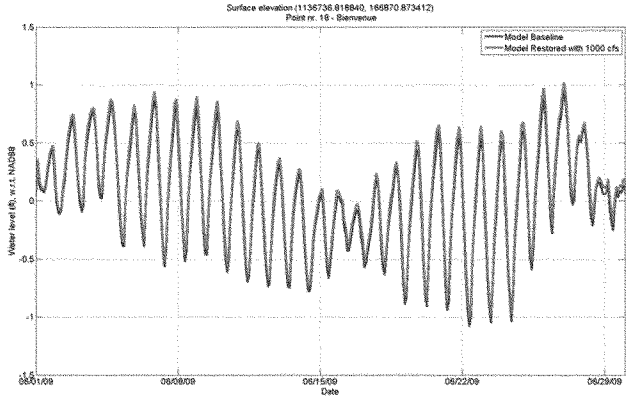


Figure C3: Water levels at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

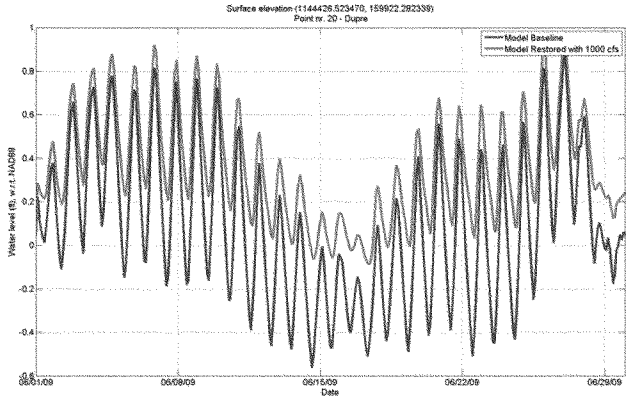


Figure C4: Water levels at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

ROYAL HASKONING

Current Velocities

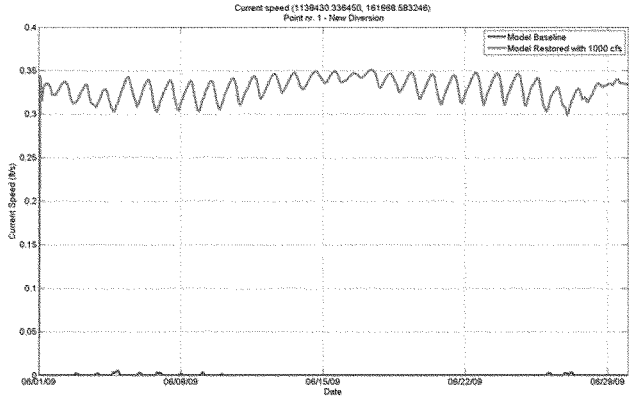


Figure C5: Current velocities at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

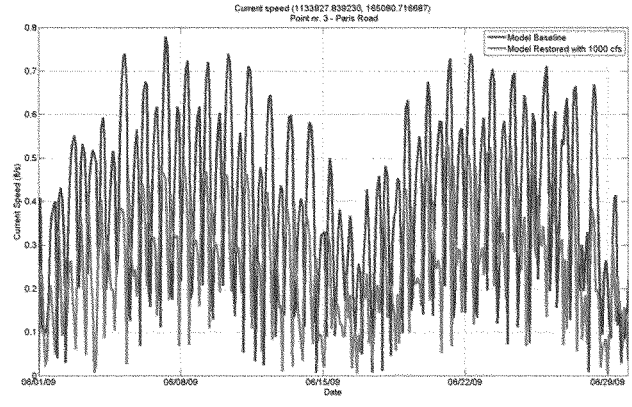


Figure C6: Current velocities at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

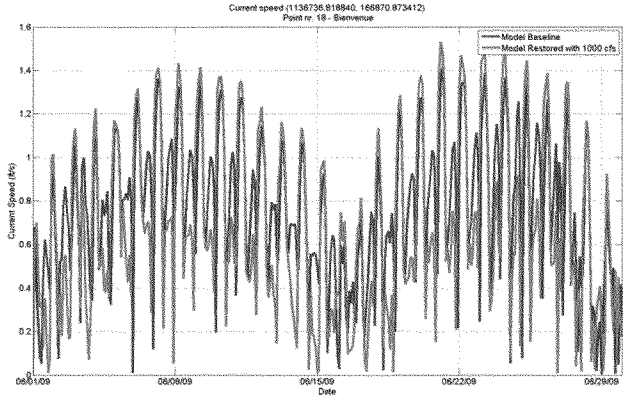


Figure C7: Current velocities at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

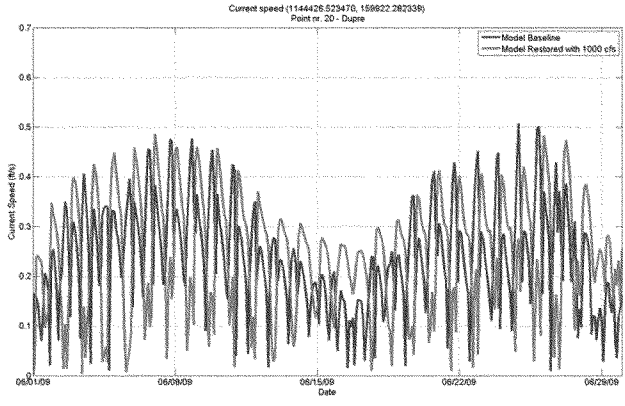


Figure C8: Current velocities at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

ROYAL HASKONING

Salinity

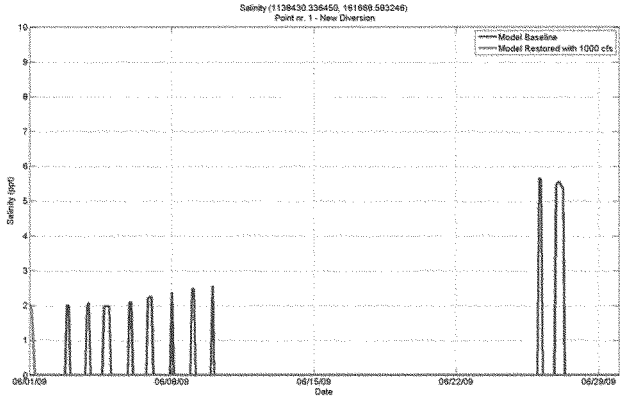


Figure C9: Salinity at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

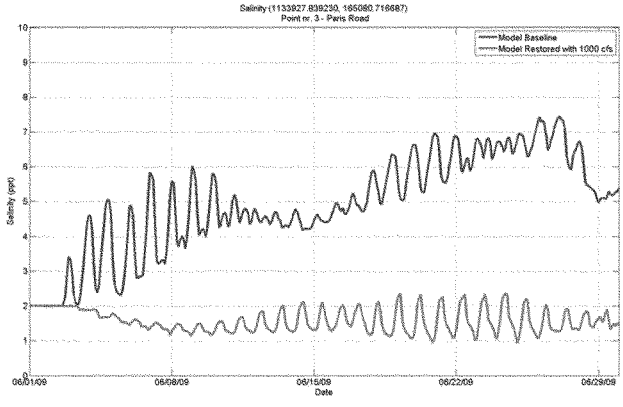


Figure C10: Salinity at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

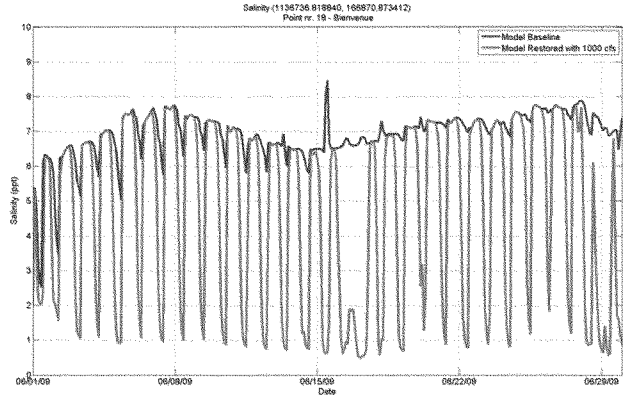


Figure C11: Salinity at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

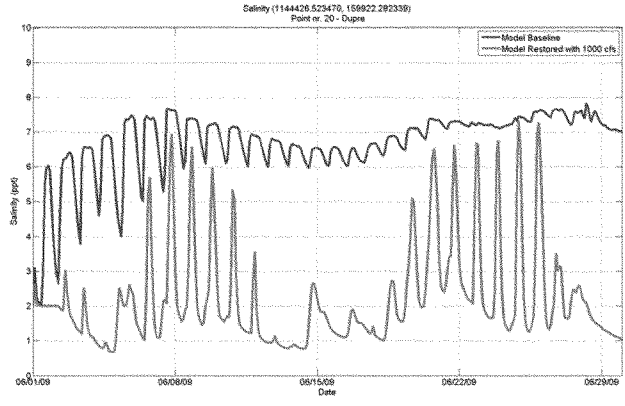


Figure C12: Salinity at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs (red) scenarios.

ROYAL HASKONING

Annex D
Results restored scenario 7000 cfs

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ROYAL HASKONING

Water levels

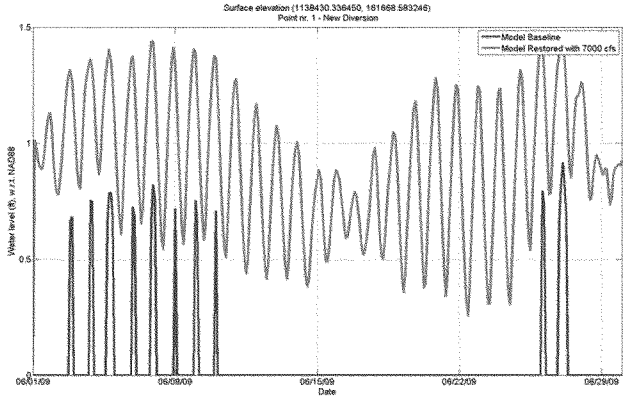


Figure D1: Water levels at point nr 1, New Diversion, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

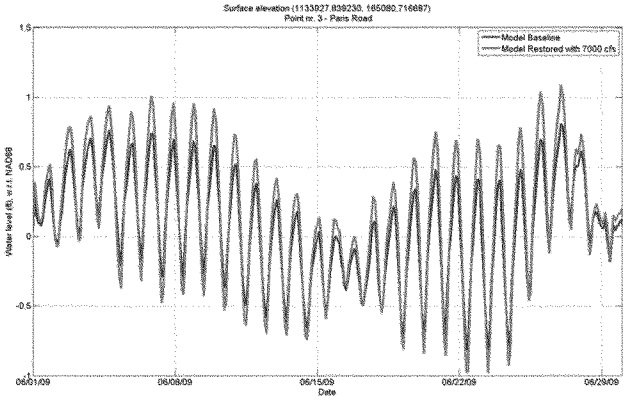


Figure D2: Water levels at point nr 3, Paris Road, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

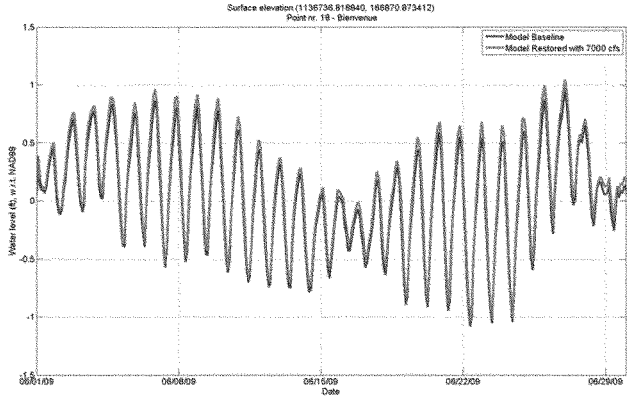


Figure D3: Water levels at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

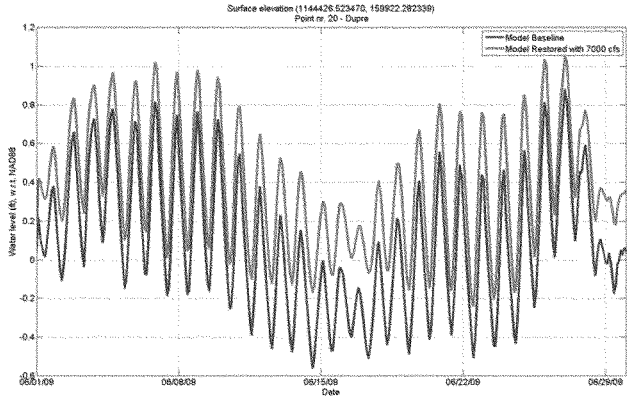


Figure D4: Water levels at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

ROYAL HASKONING

Current Velocities

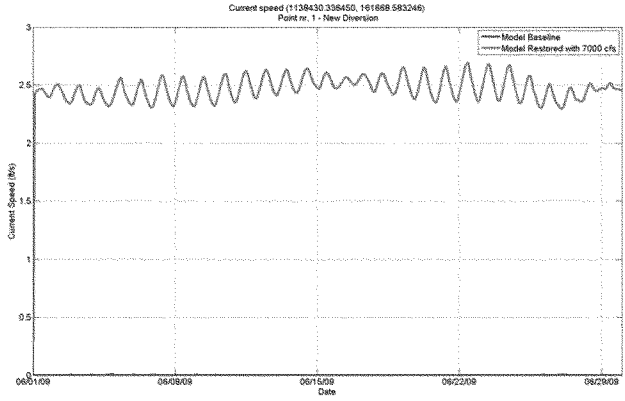


Figure D5: Current velocities at point nr 1, New Diversion, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

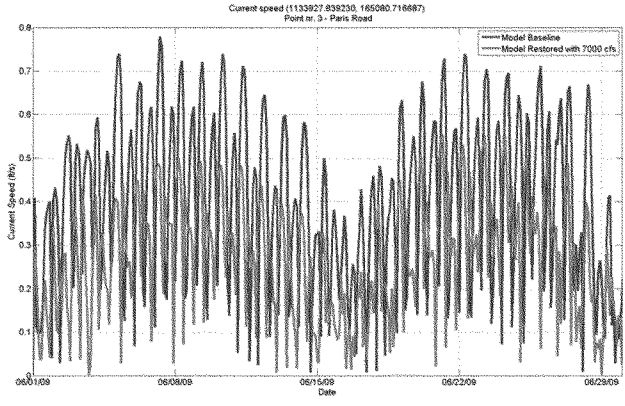


Figure D6: Current velocities at point nr 3, Paris Road, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

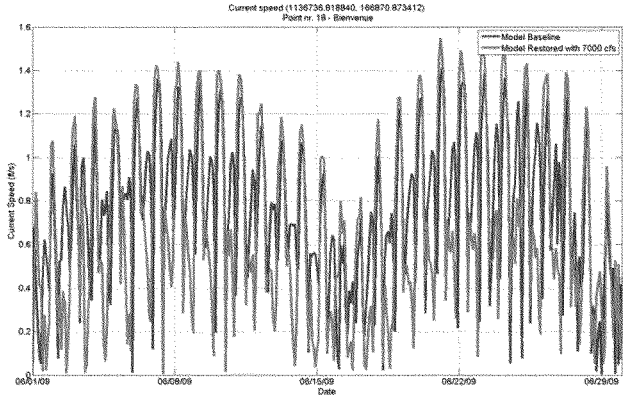


Figure D7: Current velocities at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

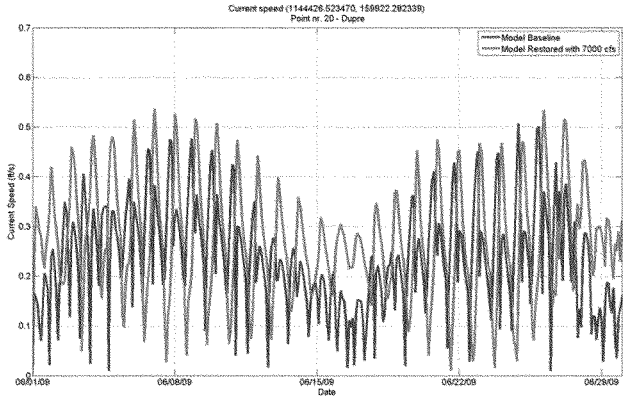


Figure D8: Current velocities at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

ROYAL HASKONING

Salinity

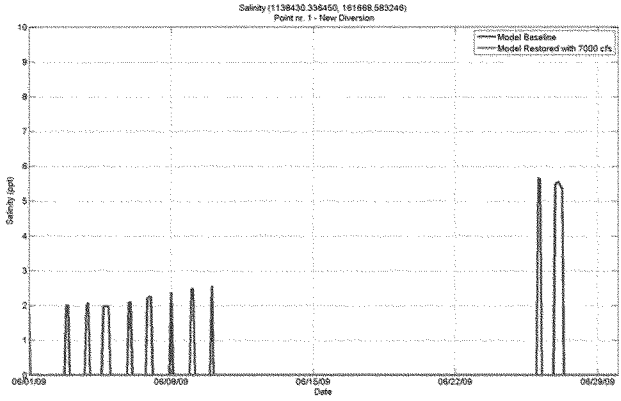


Figure D9: Salinity at point nr 1, New Diversion, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

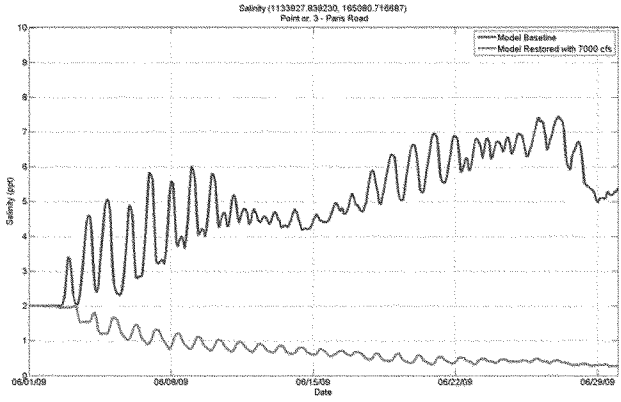


Figure D10: Salinity at point nr 3, Paris Road, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

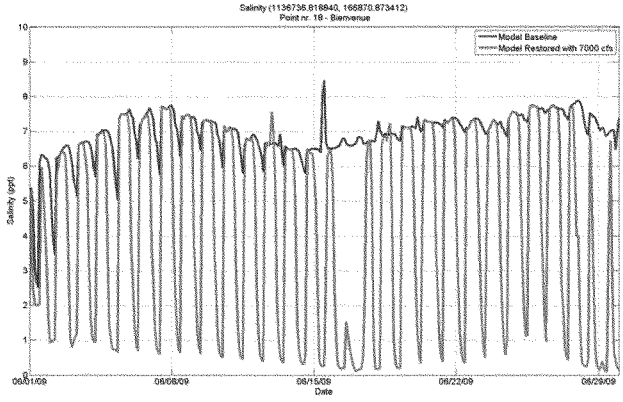


Figure D11: Salinity at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

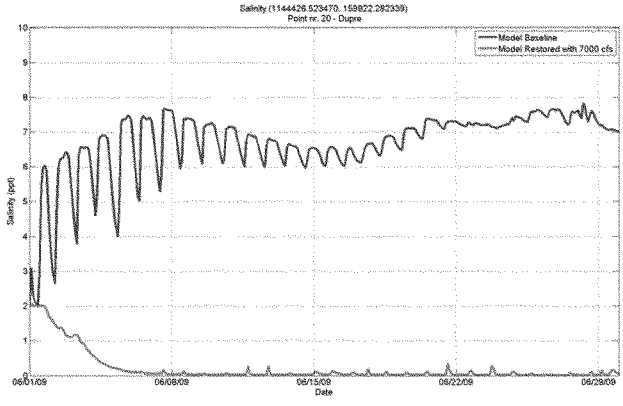


Figure D12: Salinity at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 7000 cfs (red) scenarios.

ROYAL HASKONING

Annex E
Results Sea Level Rise – restored scenario 1000 cfs

DRAFT

ROYAL HASKONING

Water levels

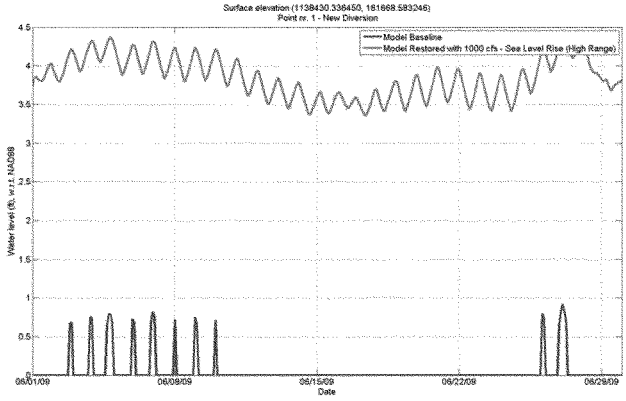


Figure E1: Water levels at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

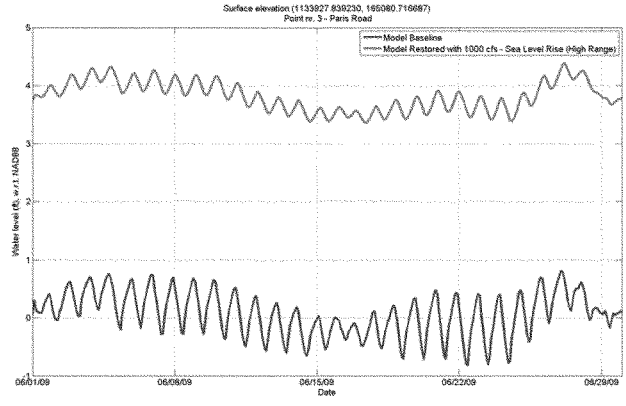


Figure E2: Water levels at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

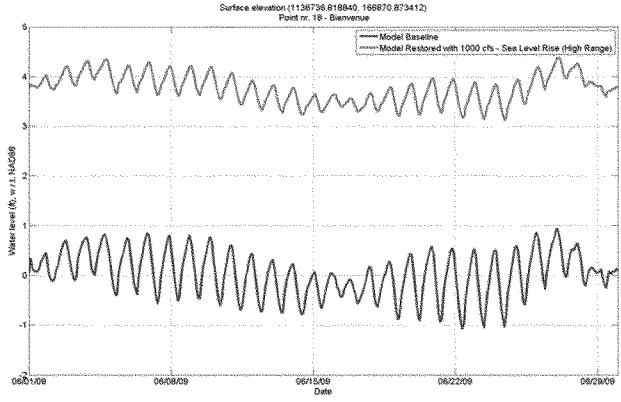


Figure E3: Water levels at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

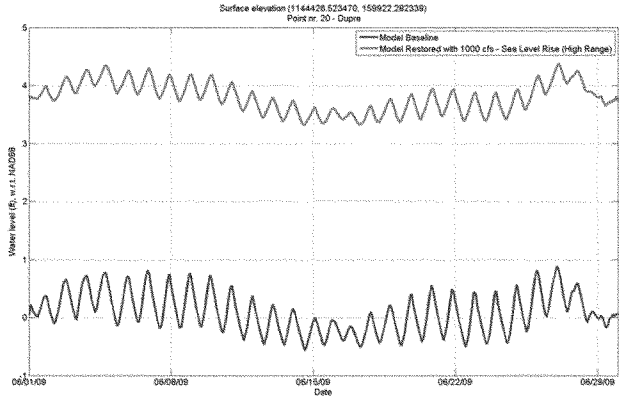


Figure E4: Water levels at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

Current Velocities

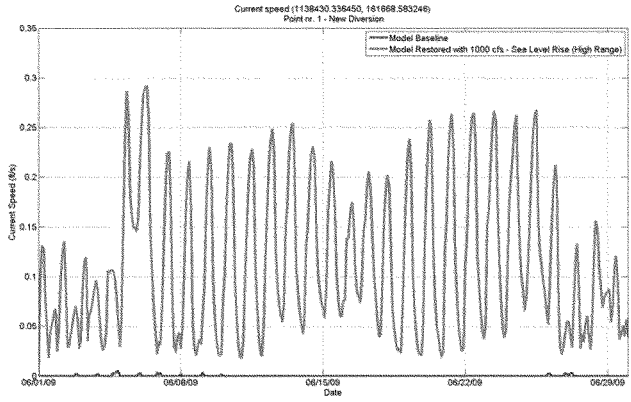


Figure E5: Current velocities at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

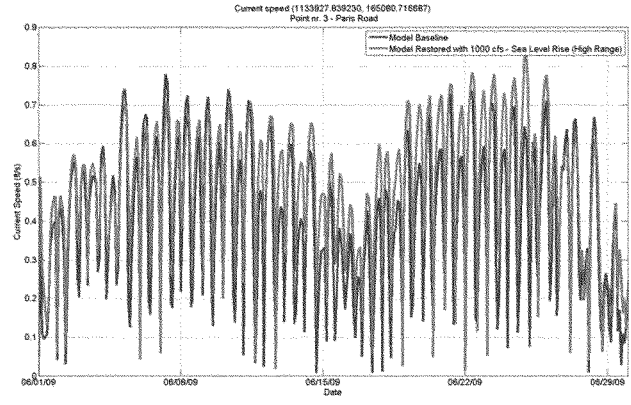


Figure E6: Current velocities at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

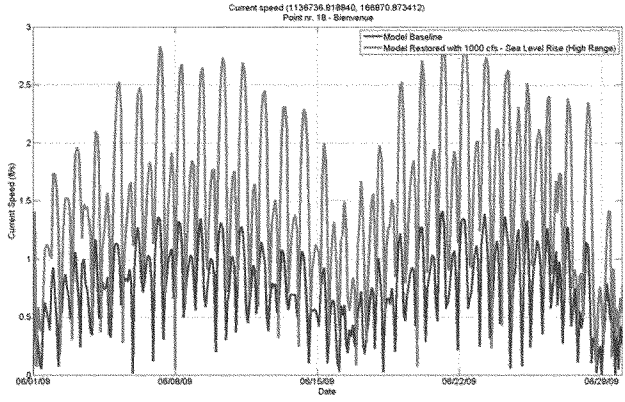


Figure E7: Current velocities at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

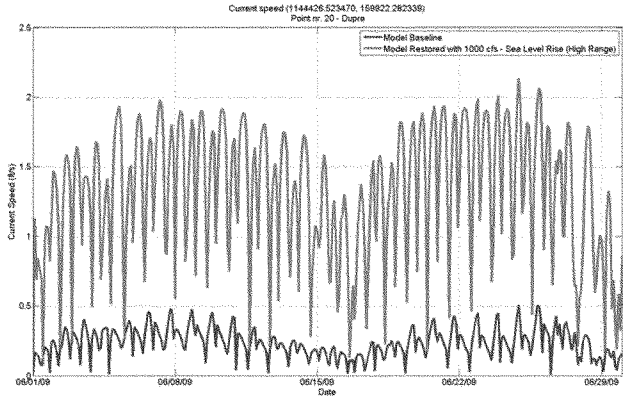


Figure E8: Current velocities at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

ROYAL HASKONING

Salinity

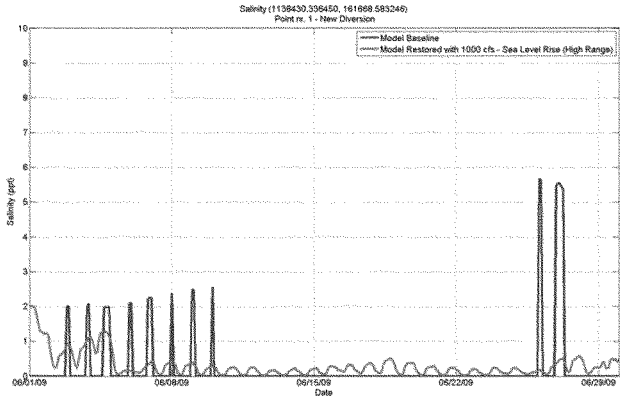


Figure E9: Salinity at point nr 1, New Diversion, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

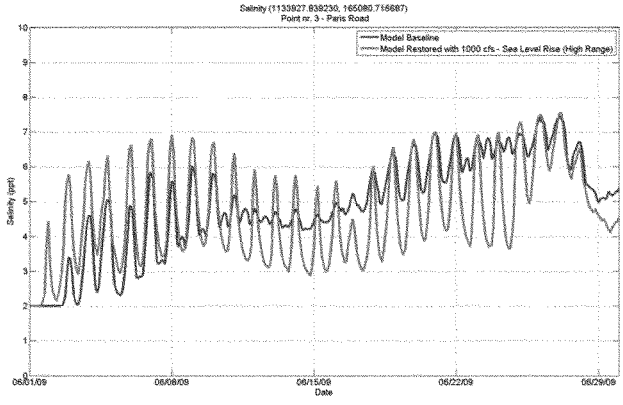


Figure E10: Salinity at point nr 3, Paris Road, for the baseline (blue) and restored with 1000 cfs (red) with Sea level rise scenarios.

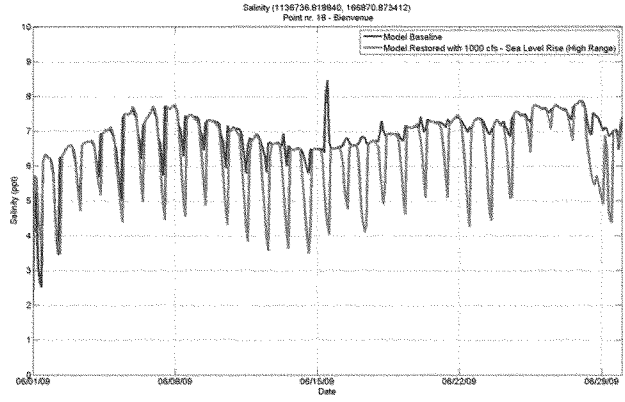


Figure E11: Salinity at point nr 18, Bayou Bienvenue, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

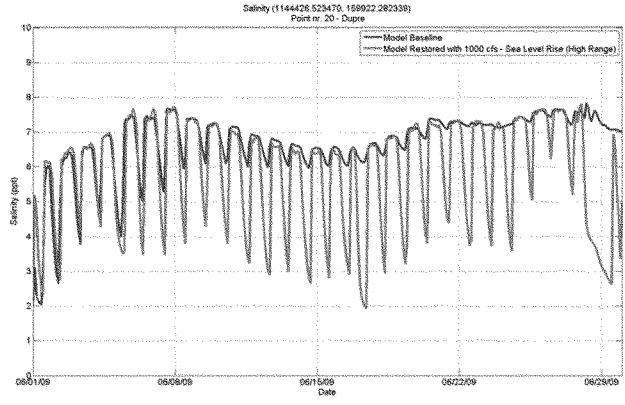


Figure E12: Salinity at point nr 20, Bayou Dupre, for the baseline (blue) and restored with 1000 cfs with Sea level rise (red) scenarios.

ROYAL HASKONING

Annex F
Mean and maximum water levels

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ROYAL HASKONING



Figure F1: Maximum water level, Baseline Scenario: Actual situation



Figure F2: Maximum water level, Baseline Scenario with 1000 cfs

ROYAL HASKONING



Figure F3: Maximum water level, Restored Scenario with 1000 cfs (error in legend, in ft, not m)



Figure F4: Maximum Water level, Restored Scenario with 7000 cfs (error in legend, in ft, not m)



Figure F5: Maximum Water level, Restored Scenario with 1000 cfs and sea level rise (notice: error in legend, in ft, not in m)

ROYAL HASKONING



Figure F6: Mean water level, Baseline Scenario: Actual situation



Figure F7: Mean water level, Baseline Scenario with 1000 cfs (notice: error in legend, in ft, not in m)



Figure F8: Mean water level, Restored Scenario with 1000 cfs (notice: error in legend, in ft, not in m)



Figure F9: Mean water level, Restored Scenario with 7000 cfs (notice: error in legend, in ft, not in m)

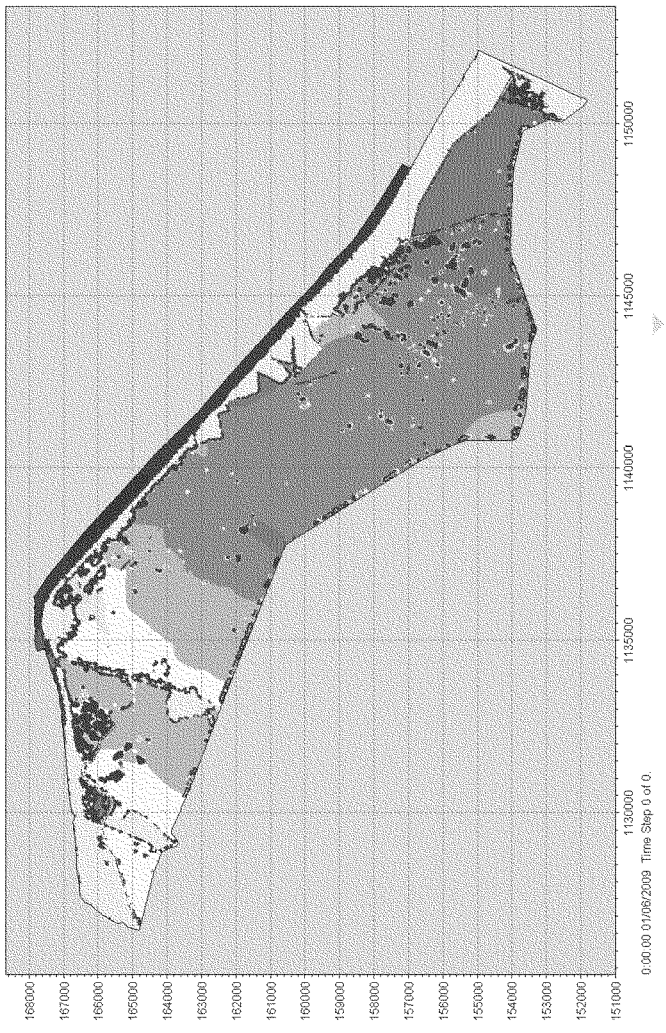


Figure F10: Mean Water level, Restored Scenario with 1000 cfs and sea level rise (notice: error in legend, in ft, not in m)

ROYAL HASKONING

DRAFT

ROYAL HASKONING

Annex G
Mean salinity values

DRAFT



Figure G1: Mean salinity, Baseline Scenario: Actual situation



Figure G2: Mean salinity, Baseline Scenario with 1000 cfs

ROYAL HASKONING



Figure G3: Mean salinity, Restored Scenario with 1000 cfs

ROYAL HASKONING

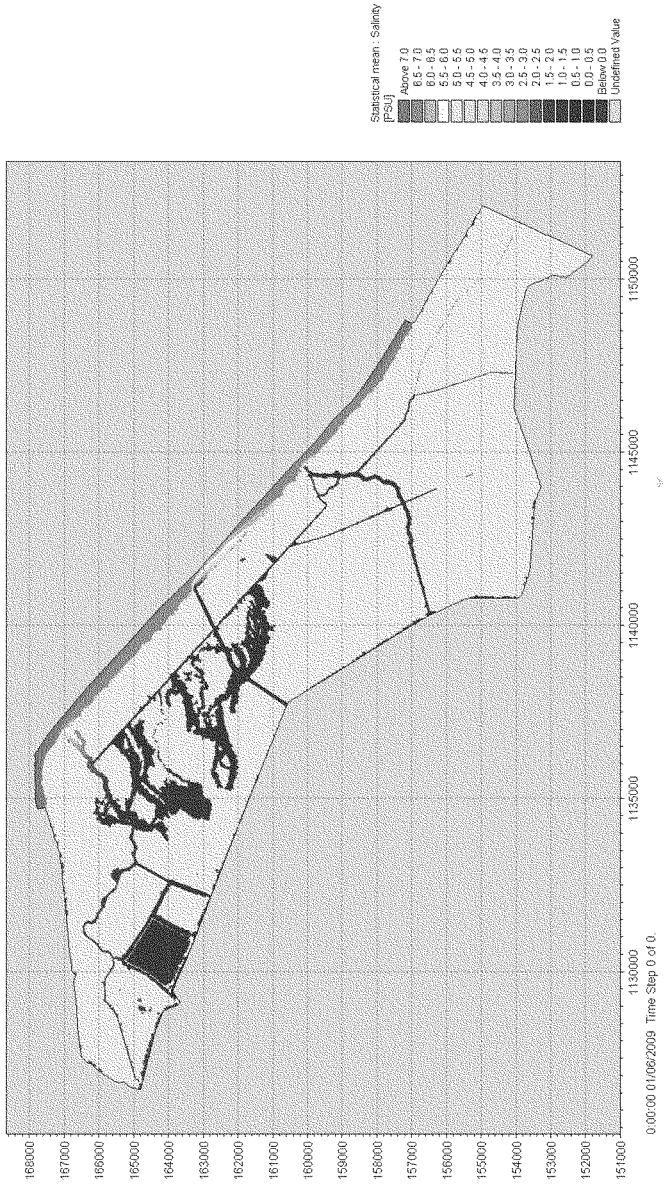


Figure G4: Mean salinity, Restored Scenario with 7000 cfs

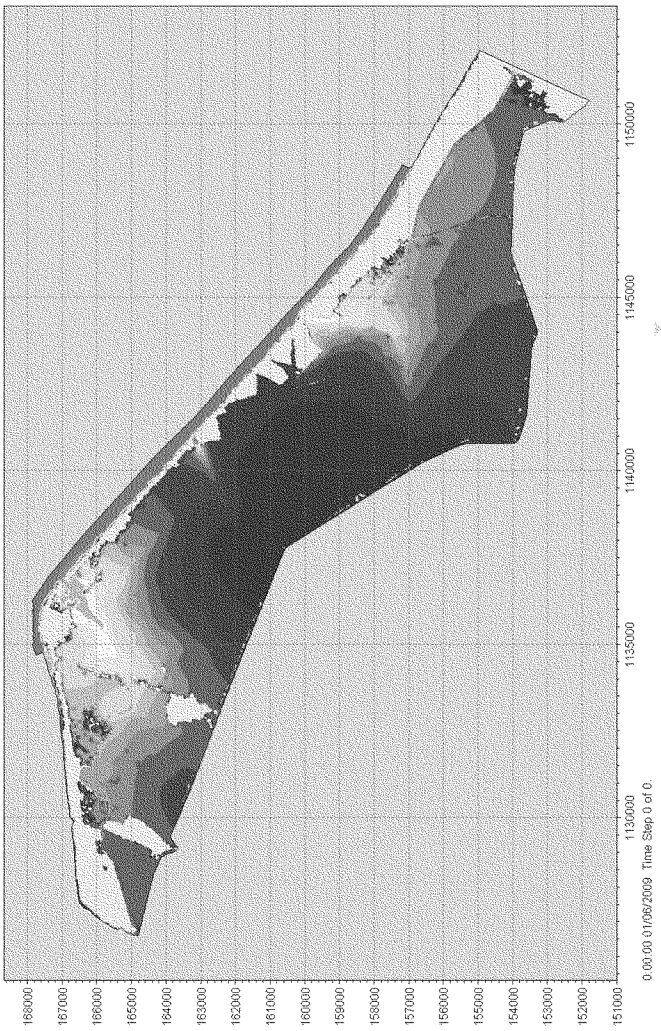


Figure G5: Mean salinity, Restored Scenario with 1000 cfs and sea level rise

ROYAL HASKONING

Annex H
Maximum current velocities

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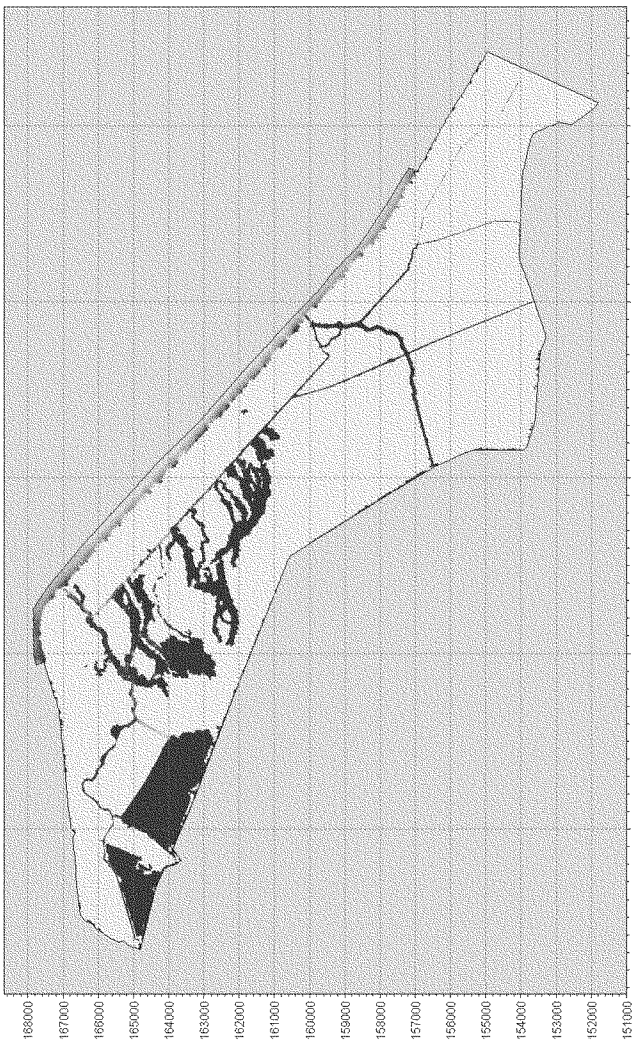


Figure H1: Maximum velocity, Baseline Scenario: Actual situation (notice: error in legend, in ft/s, not in m/s)

ROYAL HASKONING



Figure H2: Maximum velocity, Baseline Scenario with 1000 cfs (notice: error in legend, in ft/s, not in m/s)



Figure H3: Maximum velocity, Restored Scenario with 1000 cfs (notice: error in legend, in ft/s, not in m/s)



Figure H4: Maximum velocity, Restored Scenario with 7000 cfs (notice: error in legend, in ft/s, not in m/s)

ROYAL HASKONING



Figure H5: Maximum velocity, Restored Scenario with 1000 cfs and sea level rise (notice: error in legend, in ft/s, not in m/s)

APPENDIX H

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High Frequency Response and Transport in the Pontchartrain Basin due to wind stress

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High Frequency Response and Transport in the Pontchartrain Basin due to wind stress

Final Report to:

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March 12 2010

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INTRODUCTION AND STUDY AREA

The Pontchartrain Estuary is one of the largest estuaries in the northern Gulf of Mexico, covering an area of over 12,000 km^2 on the eastern side of the Mississippi River (Figure 1). The upper Pontchartrain Estuary is composed of three lakes (from west to east - Maurepas, Pontchartrain and Borgne) connected by natural tidal meandering channels and artificial navigation complexes. The estuary occupies a shallow depression between the alluvial ridge of the Mississippi River to the west, the sloping uplands to the north, the Pearl River basin to the east, and Mississippi Sound to the southeast (U.S. Army Corps of Engineers (USACE) 1982). The lakes are connected to the Breton, Chandeleur, and Mississippi Sounds through two natural tidal passes: the Rigolets (opening into Lake Borgne/Western Mississippi Sound) and Chef Menteur (opening into Lake Borgne) and an artificial navigation canal, the Inner Harbor Navigation Canal (IHNC), which is located on the south of the Lake and opens into the Intracoastal Waterway and the Gulf of Mexico through the Mississippi River Gulf Outlet (MRGO). The MRGO, authorized by the River and Harbor Act of 1956 as an alternate navigation route to the port of New Orleans, was constructed in 1958 through 1968 but was de-authorized in 2009 due to a number of impacts including, among others, channel enlargement due to shoreline erosion by tidal currents and vessel wakes, saltwater intrusion, and increased conveyance during storms (LPBF, 2006).

Lake Pontchartrain receives runoff from several rural drainage basins and an urban watershed to the south of the Lake (HARALAMPIDES, 2000), which includes the City of New Orleans. In addition, the estuary receives water from periodic diversions from the Mississippi River through the Bonnet Carré Spillway during times of high stage in the River as a result of high runoff in the Midwest. The return period for floods that require opening of the Spillway has historically been of the order of 10 years. Runoff from the Pearl River basin and other tributaries surrounding the estuary, namely the Amite, Tickfaw, Tangipahoa, and Tchefuncte Rivers, and numerous smaller local streams and bayous provide an additional source of freshwater to the basin. Finally, storm water runoff enters the estuary from the City of New Orleans through pumping via outfall canals along the south shore (CARNELOS et al, 2003).

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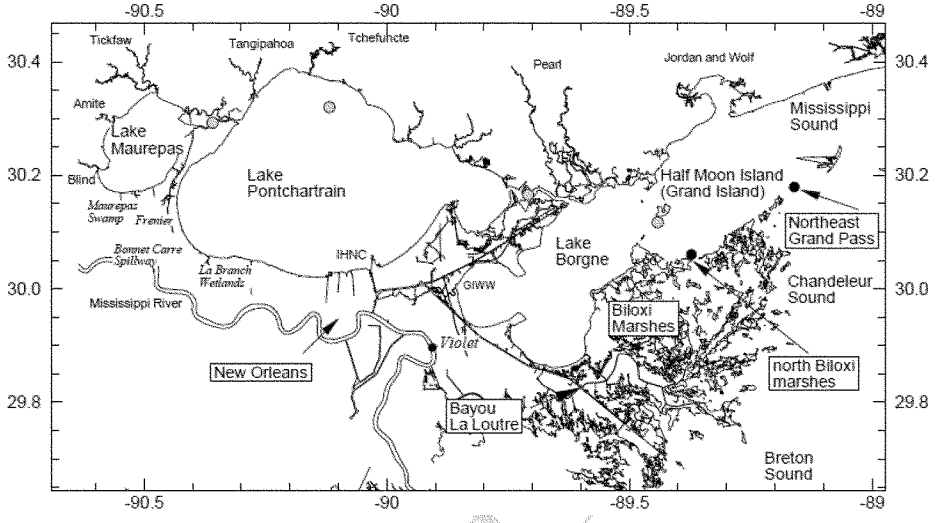


Figure 1 Map of the upper and central Pontchartrain Estuary. Names in italics show the diversion sites. Gray circles show the locations where model tidal validation was compared to observations.

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Hydrodynamics

The Pontchartrain Estuary is shallow and mostly well mixed (HARALAMPIDES, 2000). Circulation currents are largely wind driven and vary in direction and magnitude; typical along-wind magnitudes are approximately 10- 15 cm/s near the lake shorelines and generally much lower in the interior (GEORGIOU, 2002; HARALAMPIDES, 2000; SIGNELL AND LIST, 1997). Tropic tidal range varies along the estuarine axis with typical range in the central portion of the estuary in Lake Pontchartrain of approximately 0.15 m. Total exchange flow during the tropic ebb/flood tides through the tidal passes is approximately 7,800 m^3/s (HARALAMPIDES, 2000), with approximately 1000 m^3/s going through Pass Manchac. Flow distribution among the three main passes (IHNC, Chef Menteur and the Rigolets) is 6%, 30%, and 64% respectively (HARALAMPIDES, 2000).

Hydrodynamics of the upper Pontchartrain Estuary are well modeled. Depth-averaged hydrodynamics were simulated numerically (GAEL, 1980; HAMILTON ET AL., 1985;

HARALAMPIDES, 2000), and three-dimensional hydrodynamics were performed by SIGNELL AND LIST (1997). With the exception of the model developed by Haralampides, these studies were focused on Lake Pontchartrain and did not include the IHNC or thermal and saline gradients. Following the work of SIGNELL AND LIST (1997), three-dimensional hydrodynamics with salinity transport were undertaken by MCANALLY AND BERGER (1996) and BERGER ET AL., (2002) for the entire estuary. GEORGIOU (2002) and GEORGIOU ET AL., (2007;2009) provided similar analysis for Lake Pontchartrain, while CHILMAKURI (2005) added the transport of pathogens and fine sediment transport for a Lake Pontchartrain application.

Previous works have shown that circulation and transport in the estuary is reflective of the geometry, size, and tidal exchange of each part of the estuary. For instance, HAMILTON ET AL. (1985), SIGNELL AND LIST (1997) and HARALAMPIDES (2000) showed that a specific circulation and transport pattern emerges under wind straining, which was present at both a macro (10-15 Km) and a micro scale (2-3 Km). This consisted of downwind currents along the coastline and upwind currents in the center. This pattern was more pronounced in the upper estuary, which is semi-enclosed and includes Lake Maurepas and Lake Pontchartrain. Seasonal shifts in wind could produce the same transport pattern (geometry wise), but net transport within each segment or each Lake is proportional to the wind direction and magnitude (HARALAMPIDES, 2000; RETANA, 2008). SIGNELL AND LIST (1997) also reported that there is an additional forcing to the upper estuary besides the local wind forcing, and that is the tidal forcing. Although tidal forcing produces weaker currents compared to wind straining (GEORGIOU, 2002; SIGNELL AND LIST, 1997), it promotes exchange between the middle and lower estuary (GEORGIOU, 2002), and it is the only mechanism to diffuse higher salinity water up-estuary (RETANA, 2008). Since there are two mechanisms for up-estuary forcing (SIGNELL AND LIST, 1997), mixing and residence time in the estuary could be influenced by both. This could ultimately influence the distribution of salinity in the estuary, especially with additional freshwater input. Since long-term wind distribution in the estuary is uniform for both magnitude and direction (GEORGIOU, 2002), it is expected that while increased mixing and reduced residence time are likely, salinity transport to the upper estuary will be driven by tidal exchange between the upper and lower estuary. Georgiou et al (2009) showed that using a numerical model in the Pontchartrain Basin, and noted that differences in salinity are within demonstrated that although wind stress can impact the

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density field and promote transport and mixing at short scales, for longer simulations they reported that the variance observed in the density field can be explained more by tidal variation rather that wind stress.

OBJECTIVES

The study objectives where to

1. Better understand and quantify high frequency variability of the salinity field in open water using a numerical model, and
2. To understand the transient salinity field during a transition from low to high hypothetical flow magnitude and distribution between sites at Bayou Bienvenue and bayou Dupre in the Central Wetlands Area (CWA).

METHODS

Model description

The Finite Volume Coastal Ocean Model (FVCOM) was selected for this study because it is a prognostic, unstructured-grid, finite-volume, free-surface, 3-D primitive equation coastal ocean circulation model developed by CHEN ET AL., (2003). The model consists of momentum, continuity, temperature, salinity, and density equations and is closed physically and mathematically using turbulence closure sub-models (BURCHARD, 2002; MELLOR AND YAMADA, 1982). The horizontal grid is composed of unstructured triangular cells, and the irregular bottom is represented using generalized terrain-following coordinates (otherwise known as sigma coordinates). The General Ocean Turbulent Model (GOTM) developed by BURCHARD (2002) has been added to FVCOM to provide optional vertical turbulent closure schemes. FVCOM is solved numerically by a second-order accurate, discrete flux calculation in the integral form of the governing equations over an unstructured triangular grid. This approach combines the best features of finite-element methods (grid flexibility) and finite-difference methods (numerical efficiency and code simplicity) and provides a much better numerical representation of both local and global momentum, mass, salt, heat, and tracer conservation. The equations for momentum, continuity, temperature, salinity, and density are as follows:

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$$\frac{\partial u}{\partial t}+u\frac{\partial u}{\partial x}+v\frac{\partial u}{\partial y}+w\frac{\partial u}{\partial z}-fv=-\frac{1}{\rho_0}\frac{\partial P}{\partial x}+\frac{\partial}{\partial z}\left(K_m\frac{\partial u}{\partial z}\right)+F_u \quad (1)$$

$$\frac{\partial v}{\partial t}+u\frac{\partial v}{\partial x}+v\frac{\partial v}{\partial y}+w\frac{\partial v}{\partial z}+fu=-\frac{1}{\rho_0}\frac{\partial P}{\partial y}+\frac{\partial}{\partial z}\left(K_m\frac{\partial v}{\partial z}\right)+F_v \quad (2)$$

$$\frac{\partial P}{\partial z}=-\rho g \quad (3)$$

$$\frac{\partial u}{\partial x}+\frac{\partial v}{\partial y}+\frac{\partial w}{\partial z}=0 \quad (4)$$

$$\frac{\partial \theta}{\partial t}+u\frac{\partial \theta}{\partial x}+v\frac{\partial \theta}{\partial y}+w\frac{\partial \theta}{\partial z}=\frac{\partial}{\partial z}\left(K_h\frac{\partial \theta}{\partial z}\right)+F_\theta \quad (5)$$

$$\frac{\partial s}{\partial t}+u\frac{\partial s}{\partial x}+v\frac{\partial s}{\partial y}+w\frac{\partial s}{\partial z}=\frac{\partial}{\partial z}\left(K_h\frac{\partial s}{\partial z}\right)+F_s \quad (6)$$

$$\rho=\rho(\theta,s) \quad (7)$$

where x, y, and z are the east, north, and vertical axes of the Cartesian coordinate; u, v, and w are the x, y, and z velocity components; θ is the potential temperature; s is the salinity; ρ is the density; P is the pressure; f is the Coriolis parameter; g is the gravitational acceleration; K_m is the vertical eddy viscosity coefficient; and K_h is the thermal vertical eddy diffusion coefficient. Here F_u, F_v, and F_s represent the horizontal momentum, thermal, and salt diffusion terms. For a more detailed description of model development and other capabilities the reader is directed to CHEN ET AL. (2003). The model was used in three-dimensional mode due to the episodic and seasonal stratification that the estuary experiences (ABADIE AND POIRRIER, 2000; GEORGIOU, 2002; LI ET AL., 2008) and to capture additional stratification potentially induced near freshwater input sources. Finally, the freely available source code for FVCOM does not readily offer salinity transport under the two-dimensional mode without code modifications.

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Model implementation

The model used in this study was previously developed and validated by Georgiou et al (2007). In that study, the model was set up for an area of the Pontchartrain Basin that includes Lakes Maurepas, Pontchartrain, and Borgne; the Biloxi Marshes; and the Mississippi, Breton, and Chandeleur Sounds. The computational domain consists of 9,306 computational nodes and 15,697 elements (Figure 3). The horizontal grid resolution varies spatially from 40 m in navigation channels and constrictions to approximately 100 m in the tidal passes. The maximum grid resolution is near the open boundary and is more than 1 Km. The vertical resolution of the model includes six vertical layers equally distributed over the water column.

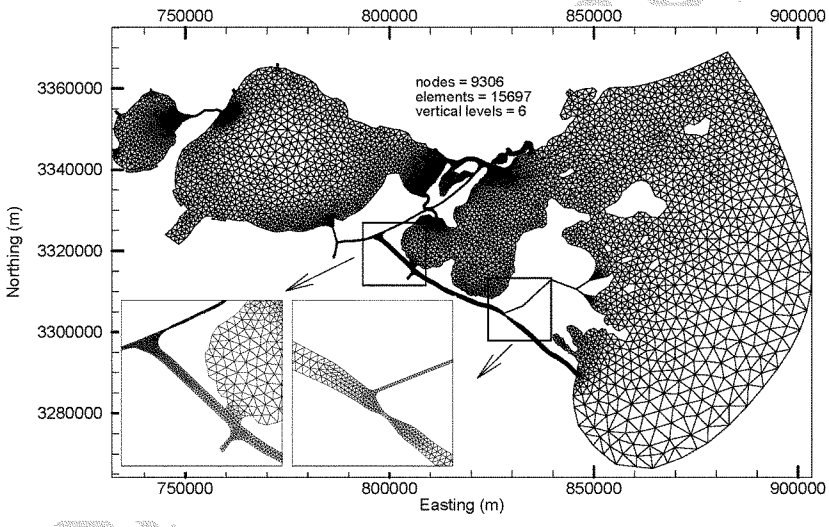


Figure 2 Model computational domain. Resolution varies from more than 1 Km near the open boundary to 100 m in the tidal passes. Bayou La Loutre, ICWW and the IHNC have lower resolution of the order 40 m. Inserts show grid details and resolution at the three locations where closures are taking palce.

This model was subsequently used by Georgiou et al (2009) to study the impact of multiple diversions within the upper and middle parts of the estuary, following recommendations by Federal and State agencies, and additional recommendations proposed by other groups, listed in detail in LPBF (2006). The adopted grid for this study was similar to that of Georgiou et al

(2007; 2009), except for the inclusion of Bayou La Loutré, the full closure of the MRGO at Bayou La Loutre and at another location near bayou Bienvenue, and for some simulations an additional closure at the connection of the MRGO and Lake Borgne.

Initial Conditions

The model bathymetry was obtained from a combination of sources: National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS) hydrographic surveys, and supplements from hydrographic surveys conducted by the United States Geological Survey (USGS) in 1996. Additional data in Breton and Chandeleur Sound were obtained from historic NOAA hydrographic surveys (Figure 4).

Initial salinity conditions were generated using datasets collected from various sources (GEORGIOU, 2002; HARALAMPIDES, 2000; Georgiou et al, 2009). These datasets were used to generate average conditions for a normal year, and were used to populate the model computational grid using spatial interpolation methods, while maintaining the natural estuarine gradient. Once a uniform gradient was generated, the model was executed for 30 days with tidal forcing and mean tributary flows to bring the system to a dynamic equilibrium in the vicinity of freshwater inputs such as tributaries and in areas with dynamic conditions such as those near the tidal passes. For all simulations, initial elevation was set to zero (relative to mean sea level – MSL). The model subsequently started each simulation from rest (still water surface) and the spin-up times for all boundary conditions (tributary flows and tidal elevations at open boundaries) were of the order of two days.

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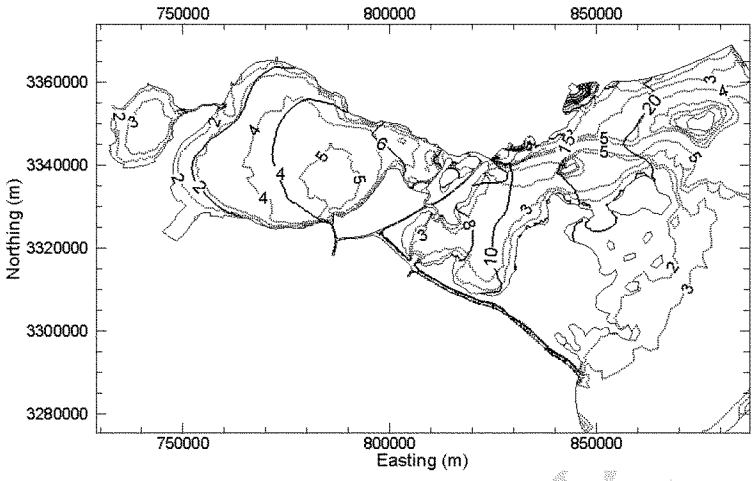


Figure 3 Model Bathymetry (dotted lines) in meters relative to mean sea level, and long-term average isohalines in the Pontchartrain Estuary (solid lines – in ppt). Isohalines were also used as initial condition for the model for most of the simulations (from Georgiou et al, 2009).

Boundary Conditions

At the open boundary, tidal constituents, S_2, M_2, N_2, K_1, and O_1 were derived for each open boundary node using a method after MUKAI ET AL. (2002). Salinity at the open boundary is dynamic and is influenced by the Mississippi River at high flows. For these simulations, the salinity boundary condition was simplified to only reflect seasonal variations during the simulation period due to the lack of observations. The values were generated in part by discrete measurements taken in the vicinity of the boundary as stated in Georgiou et al (2009), and from climatology derived from operational model results maintained by the Naval Research Laboratory, Ocean Dynamics and Prediction Branch. Salinities at the open boundary varied from 28 ppt at the ends of open boundary near coastlines to 34 ppt in the central portion of the open boundary. The open boundary was assumed to be fully mixed (i.e. no stratification was applied) and was constant in time. The same boundary condition was used for all simulations. For the longer simulation (45 days), boundary conditions for salinity and tributary flows were the same as those used in the link-node model. Time dependent daily salinity at the open boundary obtained from the link-node model was used to drive salinity at the open boundary. In space, these daily values were linearly interpolated across the 43 open boundary nodes.

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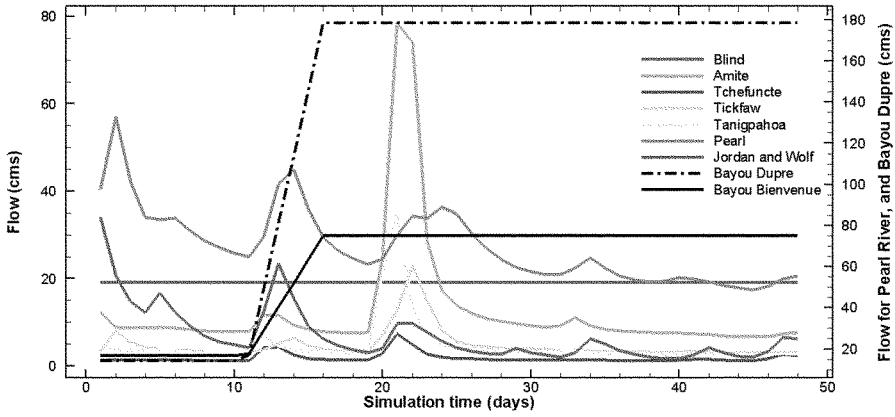


Figure 4 Tributary and diversion flows used in the model for all simulations; Flows are the same as those used in the link-node model.

Tributary discharges for all major rivers flowing into the Pontchartrain Basin including the Amite, Blind, and Tickfaw in Lake Maurepas; the Tangipahoa and Tchefuncte Rivers in Lake Pontchartrain; the Pearl River near the Louisiana and Mississippi State line; and the Wolf and Jordan Rivers in Bay St. Louis. Additionally diversions were included in the model. All flows for tributaries and for diversions were identical as those used in the link-node model. This included daily tributary flows for all simulations, including the longer simulation during spring. The flows for the longer simulation are shown in Figure 4.

Frontal weather and wind input

Extra-tropical storms associated with cold fronts form above the tropics (above the Tropic of Cancer in the Northern Hemisphere) and occur more frequently regardless of their lower intensity than hurricanes or tropical storms. For example, in an average year 20 to 30 cold fronts will pass through coastal Louisiana (Chaney, 1998).

Cold-fronts are defined as narrow transition zones (25 – 250 Km) between two air masses of different densities; polar air from Canada moves south meeting the warm, often moist, air mass

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of the southwestern and southeastern regions. Cold-fronts move west to east and commonly extend to the Gulf of Mexico. They are characterized by spatial and temporal changes in wind speed, direction, barometric pressure, temperature and humidity (Mossa and Roberts, 1990). The pressure gradient at the front controls the intensity of the system and the transfer of energy to the coast. This energy is manifested in the form of strong winds, large waves, low water levels, and abnormal rates of shoreline erosion and sediment transport and deposition (Pepper and Stone, 2002; 2004). The frontal system can be oriented oblique or parallel to the east-west trend of the coast depending upon the initial position of the air masses and how the weather system evolves. An eastward migrating low pressure system will generate an oblique frontal system, and alternatively, when a deep arctic air mass descends toward the Gulf of Mexico a frontal system parallel to the coast develops. The type of cold front controls the duration of the storm and magnitude of the resulting wind fields.

Typically, cold fronts have duration of 12 – 24 hours depending on the storm speed. Studies by scientists at Louisiana State University's Coastal Studies Institute characterized the cold-fronts passage in three phases, the pre-frontal, frontal passage, and post-frontal (Roberts et al, 1987). Initially, a pre-frontal phase occurs during which, strong, warm, moist winds blow from the southerly quadrant. The resulting frontal phase is characterized by a sudden drop in air pressure, erratic winds, and short-lived, but occasionally intense, rain squalls. Finally, a post-frontal phase occurs, during which time temperature and humidity drop, air pressure rises, and winds are strong and northwesterly to northeasterly.

Model input for wind was prepared by use of a combination of realistic wind fields obtained from gauges in the vicinity of the Basin, as well as reconstructed wind field to represent those produced during frontal weather. For instance, rotary type winds, which mimic the pre-frontal-frontal and post-frontal conditions, were also prepared. An example input file for the short simulations used is shown in Figure 5. This is the realistic frontal weather file, and includes the pre-frontal phase with southeast winds gusting at slowly at 10 m/s or more during the peak of the storm, followed by a slow rise in pressure, a slow reduction in wind gusts, and then the switch to northerly winds sustained at slightly lower speeds until the storm passes through.

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For the constructed rotary winds, the following methodology was employed. Low magnitude winds were first kept constant at near 2 m/s, while the direction was slowly changing from east to southeast, followed by a more abrupt change to a north-westerly direction. During this switch the wind speed changed from 2 m/s to 9 m/s, and the direction and magnitude was subsequently held constant for the remaining of the simulation period. This is shown in Figure 6.

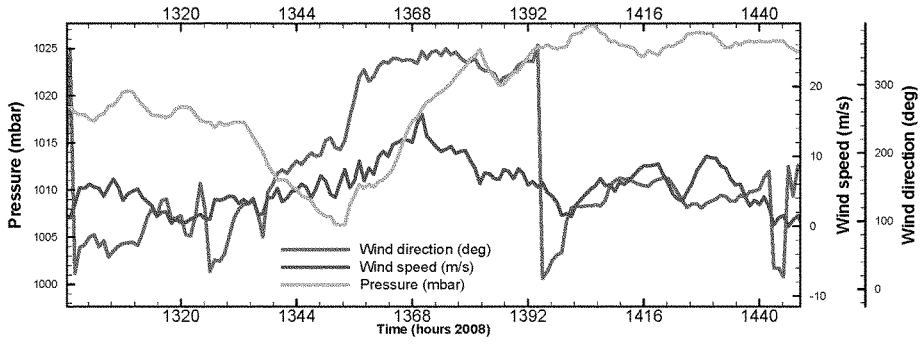


Figure 5 Wind dynamics during frontal weather in Mississippi Sound; Data obtained from NOAA buoy 42007 in 2008.

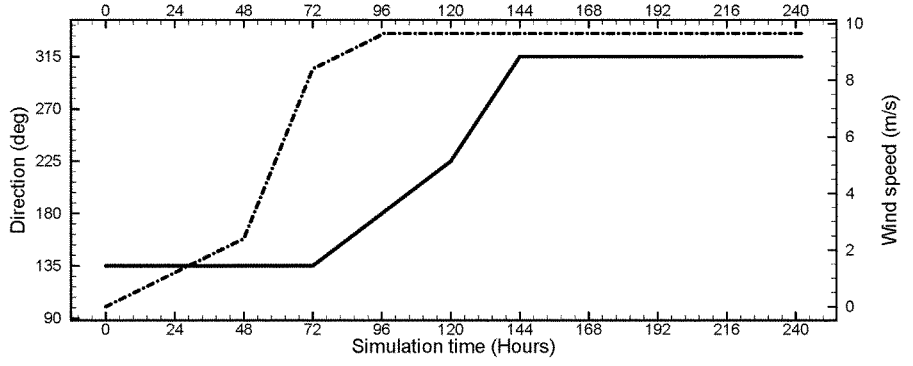


Figure 6 Reconstructed rotary winds used in some of the model simulations; note how the wind speed increase in lagging the direction switch, typically observed during frontal weather.

Simulation Matrix

The following simulation matrix was considered to address the objectives of this study. First, two simulations, one with wind and one without wind were conducted to compare the high frequency variability in the open water areas of the Basin such as Lake Borgne and Mississippi Sound in the vicinity of the Biloxi marshes. These simulations were conducted with the realistic winds, and did not include a closure at the connection between Lake Borgne and the MRGO and without a diversion. The second set of simulations, were performed using reconstructed winds as shown in Figure 6, included a diversion of a constant flow of 7,000 cfs, and an active connection between Lake Borgne and the MRGO. Finally, a longer simulation of 45 days was performed, to investigate the time-dependent evolution of the salinity field resulting from a diversion of 1,000 cfs (split at 50/50 between Bayou Bienvenue and Bayou Dupre) to 7,000 cfs (with a split of 10/90 respectively). During this simulation, the MRGO channel was closed at two locations, and so was the connection between MRGO and Lake Borgne. Table 3 shows a summary of the simulations performed.

Table 1 Casename and initial and boundary conditions for each simulation performed.

casename	simulation time (days)	MRGO closure La Loutre	MRGO closure Bienvenue	MRGO and Lake Borgne	Wind stress	Diversion flow	Open BC (salinity)
OPT1	5	yes	No	open	Yes, realistic	no	Gaussian/marine
OPT2	5	yes	No	open	No wind	no	Gaussian/marine
OPT3	5	yes	yes	open	Yes, realistic	yes	Gaussian/marine
OPT5	10	yes	yes	closed	Yes, constructed	yes/7,000	Gaussian/marine
OPT6	10	yes	yes	closed	No wind	yes/7,000	Gaussian/marine
OPT7	45	yes	yes	closed	No wind	yes/(1,000-7,000)	Gaussian/marine
OPTF	45	yes	yes	closed	No wind	yes/(1,000-7,000)	from link-node model

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MODEL CALIBRATION AND VALIDATION

The model was calibrated previously by Georgiou et al, (2007; 2009), to reproduce observed tidal variations at selected locations in the estuary and to reproduce observed tidal flow through the main tidal passes and the navigation complex connecting Lake Pontchartrain and Lake Borgne (ICWW, IHNC). The model was not re-calibrated for this study and was used as is, following a re-validation of the tidal range in Lake Pontchartrain after the addition of the La Loutre channel. The results from the previous validation of the model performed by Georgiou et al, (2007; 2009) are shown in Tables 2. Discharge measurements in the tidal passes performed in August 1997 by the U.S. Geological Survey and the University of New Orleans were used to validate the model (HARALAMPIDES, 2000). The measurements were conducted using a vessel-towed Acoustic Doppler Current Profiler (ADCP), which was used to collect synoptic flow data across all tidal channels (IHNC, Pass Manchac, Rigolets, and Chef Menteur) over a 2 day period (Table 3). Local depth, water surface elevation, and velocities were extracted from the model every hour to compute tidal flows through the passes.

Table 2 Simulated and observed tidal ranges and phases for the spring tide

		Lake Pontchartrain	Rigolets	Half Moon Island	Pass Manchac
Simulated	Range (m)	0.16	0.43	0.66	0.15
	Phase* (hours)	23.5	23.5	24.2	23.3
Observed	Range (m)	0.17	0.31	0.65	0.16
	Phase* (hours)	24	25	25	26

* Phase is measured relative to the previous maxima during spring tides

Table 3 Simulated and observed flows for August 1997

	Flows in (m^3/s)	IHNC	Chef Menteur	Pass Manchac	Rigolets	Total
Simulated	Flood/Ebb	439 (15,500)	2322 (82,000)	1034 (36,500)	4955 (175,000)	8764 (309,500)
Observed	Flood/Ebb	368 (13,000)	2407 (85,000)	991 (35,000)	5097.03 (180,000)	8863 (313,000)

* Measured and simulated flow is the maximum during the tidal cycle and is averaged for Flood and Ebb. Flows in cfs are shown in parentheses.

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MODEL RESULTS AND DISCUSSION

Tidal variation in the Pontchartrain Basin

During the equatorial cycle, tidal range in the upper estuary can be as low as 0.01 – 0.03 m, while during the tropic tides tidal range can reach 0.23 m. Tidal currents in the Pontchartrain Estuary vary in time and space. Depth averaged tidal currents in Lakes Pontchartrain and Borgne and generally in open and non-constricted watercourses are of the order of 0.01 – 0.02 m/s during equatorial tides and reach 0.10 – 0.15 m/s during tropic tides or when strong wind forcing is present (wind speed in excess of 5 m/s). In navigation channels and tidal passes, currents are swift and can reach magnitudes of more than 1 m/s. Lunar-averaged currents achieved magnitudes of 0.8 m/s in the IHNC, and vary from 0.2 – 0.4 m/s in the remaining passes. The currents, once entering interior water bodies, decrease rapidly to magnitudes typically of the order of 0.02 – 0.1 m/s. Strong tidal currents also occurred in the northern region of Lake Borgne near the Pearl River, the area near Half Moon islands, and the waterway between Grand Pass and Chandeleur Sound. It is noted here that this is the main corridor for tidal propagation to the middle and upper estuary, with average tidal velocities varying from 0.15 to 0.2 m/s.

Simulated salinity distribution under wind stress

Initially the model was used to investigate the short term high frequency variability in open water (in Lake Borgne and Mississippi Sound). This was accomplished by use of realistic wind fields (Figure 5). Two simulations were performed, one with wind as shown in Figure 5 (opt1) and one without (opt2). Figure 7 shows the depth-integrated distribution of salinity averaged over the 5 day simulation period for the case with wind, and Figure 8 sows the same solution without wind. By comparison these two simulations look very similar, and an initial conclusion would be to infer that there are negligible changes between the two simulations. When we compare the variance or dispersion in the system however, by means of calculating he standard deviation of each node (in time), and plot the results in two dimensions we see a different pattern emerge. Figure 9 shows that wind induced circulation within Lake Pontchartrain will cause variation in the salinity near the coastlines where currents are larger. Similarly, higher variability is observed in Mississippi Sound, although small, near half moon island, and the interaction of the Pearl River freshwater plume in that vicinity, as well as within the Biloxi Marsh area.

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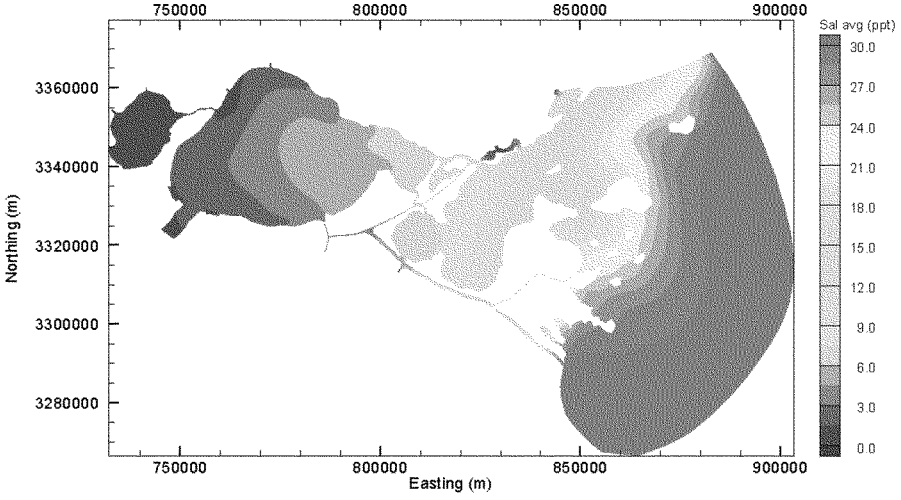


Figure 7 Model simulated depth-integrated salinity distribution averaged over 5 days (case opt1; frontal wind).

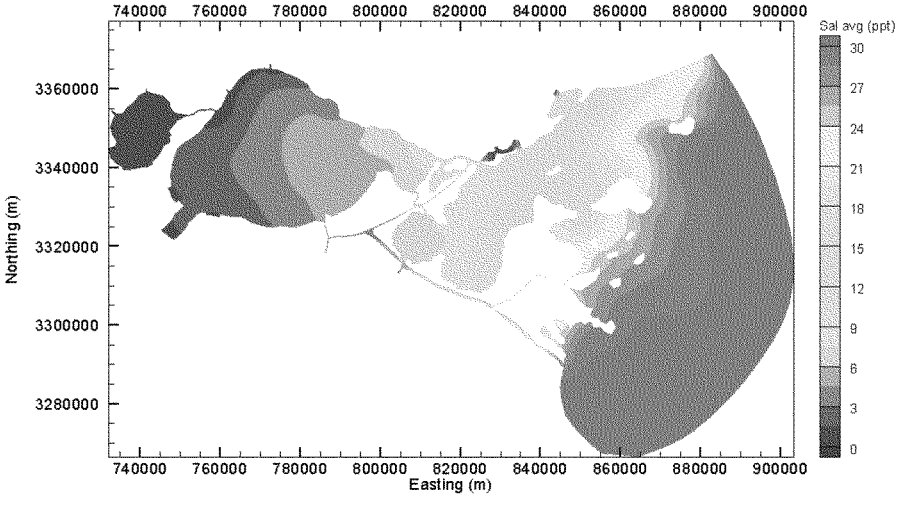


Figure 8 Model simulated depth-integrated salinity distribution averaged over 5 days (case opt2; no wind).

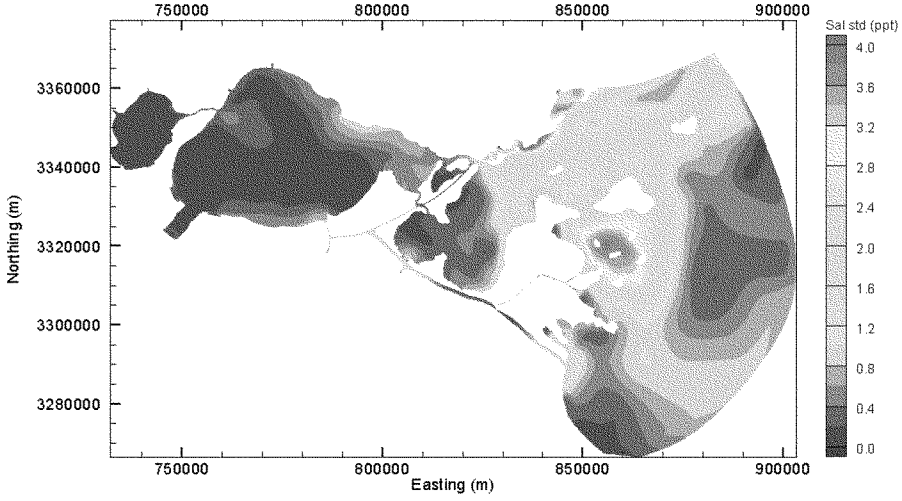


Figure 9 Model simulated depth-integrated standard deviation distribution for 5 days (case opt1; frontal wind).

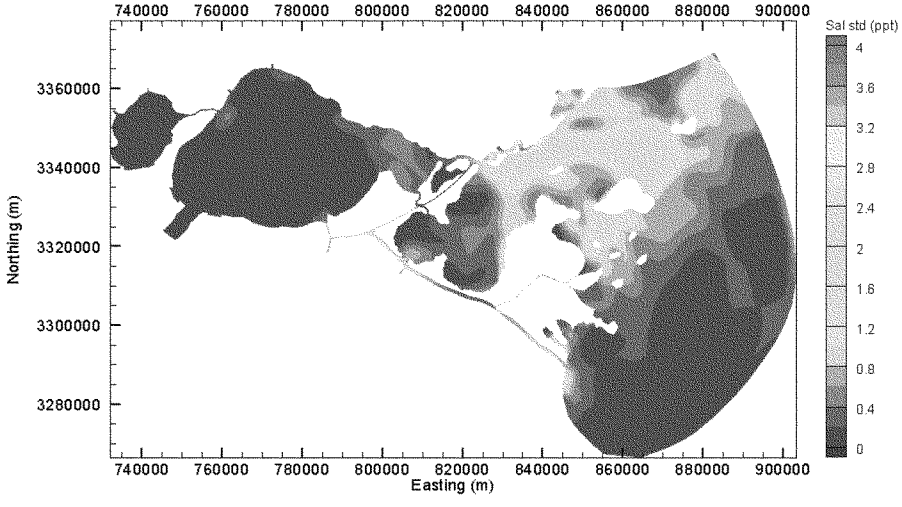


Figure 10 Model simulated depth-integrated standard deviation distribution for 5 days (case opt2; no wind).

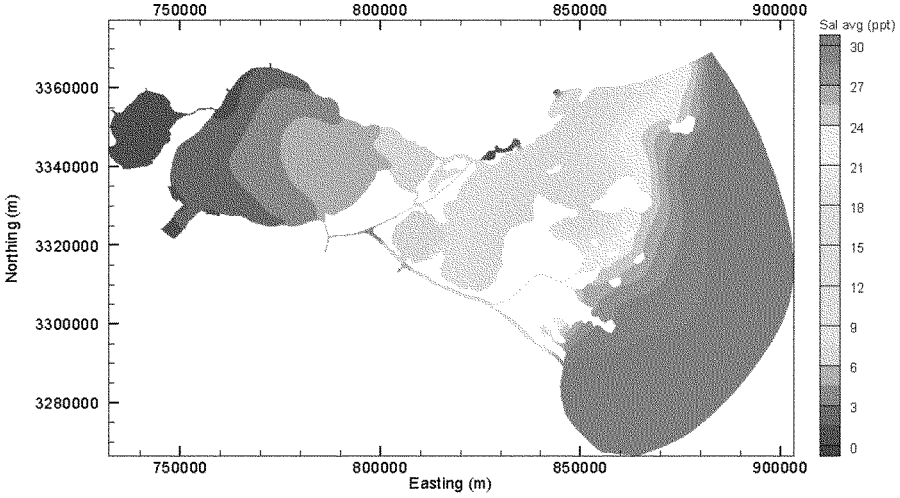


Figure 11 Model simulated depth-integrated salinity distribution averaged over 5 days (case opt1; frontal wind).

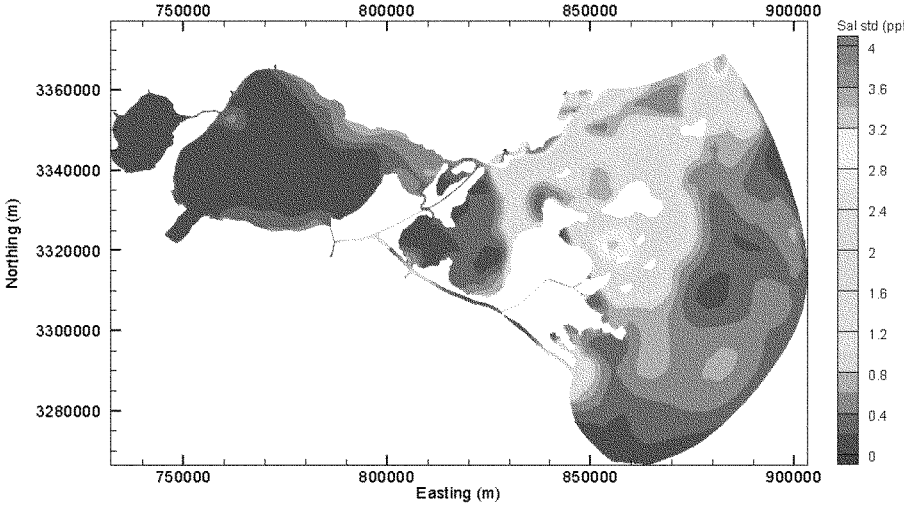


Figure 12 Model simulated depth-integrated standard deviation distribution for 5 days (case opt3; frontal wind).

Because in simulations opt1 and opt2 the Bayou Bienvenue closure of the MRGO was not implemented, in an attempt to investigate intermittent or transient conditions, another simulation was performed (opt3), which was similar to opt1 (i.e., with frontal actual winds, and other boundary conditions), except this time the second closure at the MRGO near Bienvenue gates was implemented. Figure 11 shows that the average depth-integrated salinity for this simulation looks identical to that of opt1. Moreover, the distribution of the standard deviation for scenario opt3, shown in Figure 12, very closely compares to that of the simulation without the closure. Some obvious and expcted differences exist between the two simulations and are largely in the MRGO itself, and as a result additional rather small difference in Breton Sound, and within the Biloxi Marshes. The differences however outside the navigation complex are rather small and insignificant.

A second set of simulations with and without winds wee conducted, this time however, with constructed and more persistent duration of the west and northwest winds during the post frontal phase of the storm. This wind pattern would have the tendency to push or force water seaward of the Basin, and in the process help spread and disperse the salinity. As a subsequent result, targets in Mississippi Sound, Biloxi Marshes and other areas of interest could be met faster than anticipated. These simulations, namely opt5, and opt6, have the same initial and boundary conditions as opt1-opt3, with the exception of the winds which are constructed as shown in Figure 6, rather than those in Figure 5. An additional difference between these simulations is that there is a diversion at Violet with a constant flow of 7,000 cfs throughout the simulation. These simulations are slightly longer and last for 10 days. Comparatively, Figures 13 and 14 look again very similar, with average depth-integrated salinities fairly similar through the computational domain. When inspect closely, we notice that there is small wind induced variability that shows even in the averaged salinity field. This can be seen in Lake Pontchartrain, where again the wind induced currents produce more mixing and hence more variability near the coast. Additional differences include small deviations in Mississippi and Chandeleur sounds, however when looking at the average salinity field these initially do not appear to be large.

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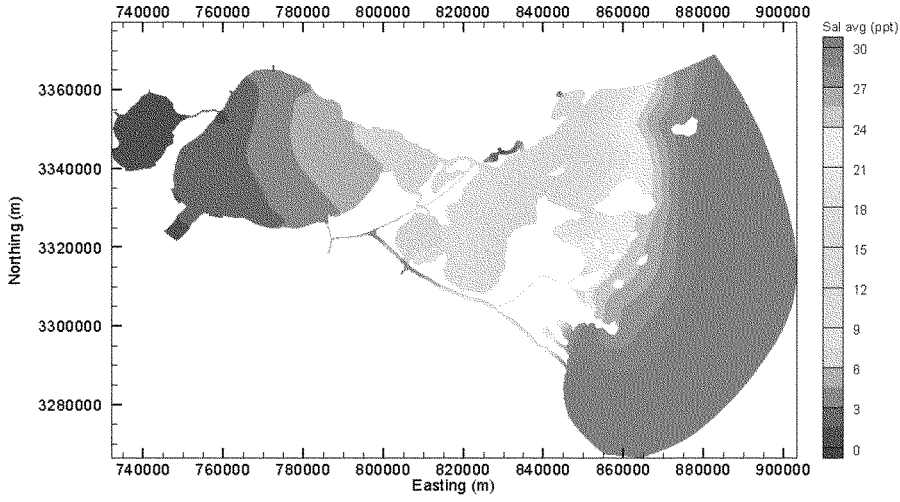


Figure 13 Model simulated depth-integrated salinity distribution averaged over 5 days (case opt5; frontal wind).

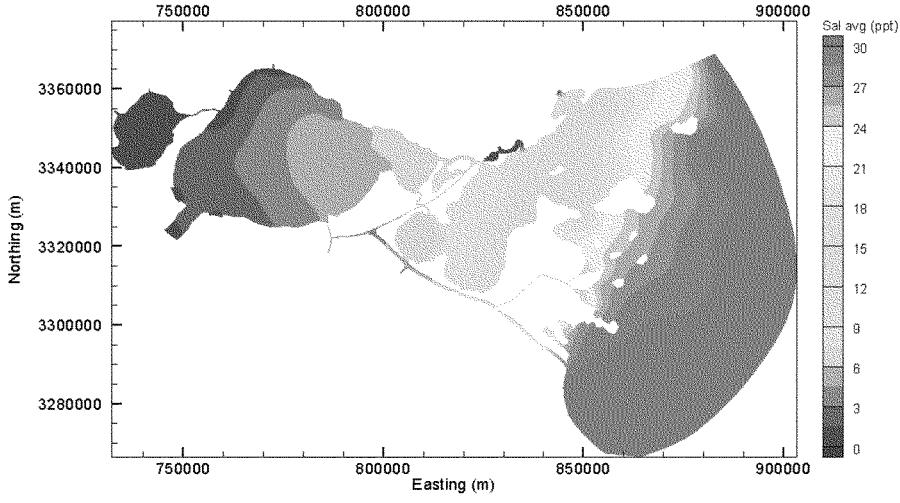


Figure 14 Model simulated depth-integrated salinity distribution averaged over 5 days (case opt6; no wind).

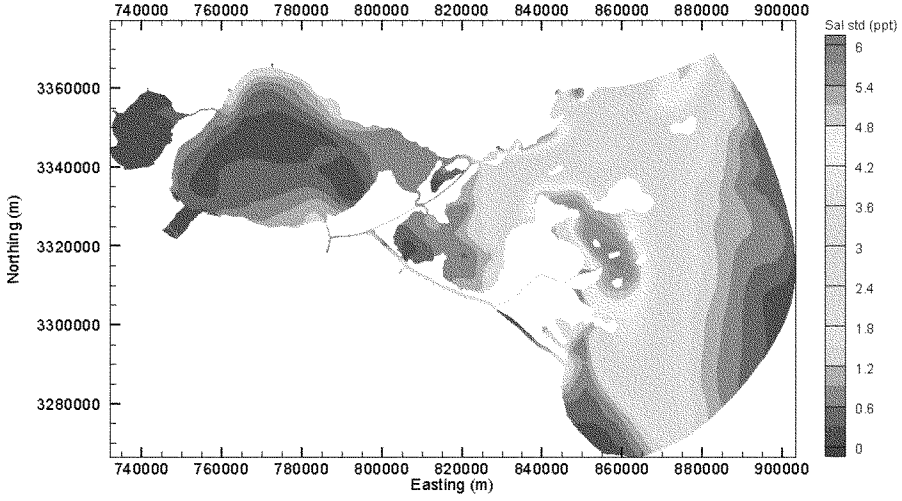


Figure 15 Model simulated depth-integrated standard deviation distribution for 5 days (case opt6; frontal wind).

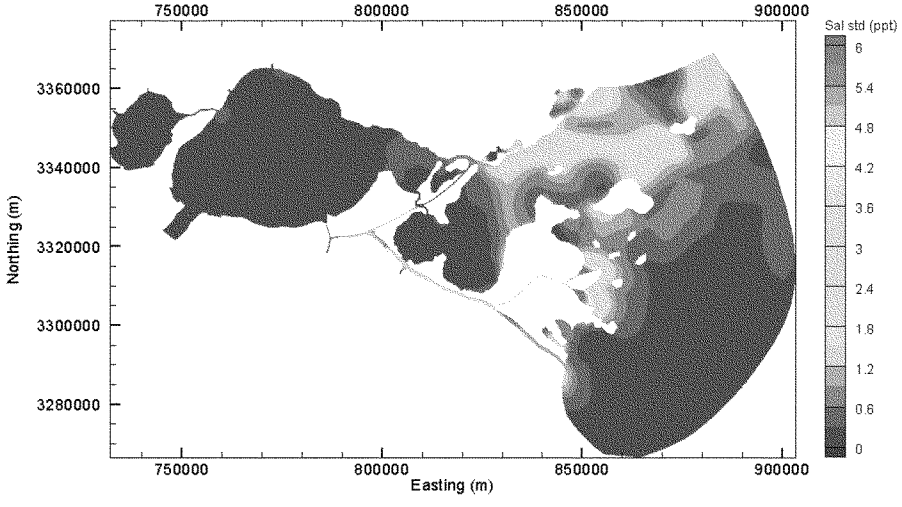


Figure 16 Model simulated depth-integrated standard deviation distribution for 5 days (case opt6; no wind).

When we examine the variance by looking at the standard deviation in time for every node (Figure 15 and 16), the variability due to wind stress is profound. Up-estuary, in Lake Pontchartrain there appears to be very small variability due to tidal forcing alone (Figure 16). Moreover, in Mississippi Sound standard deviations are of the order of 3 ppt, and are largely in areas where tidal range is high. In the area of interest, and within the Biloxi Marsh area, we see evident change, although most of this change can de attributed to freshwater input at Violet, which naturally flows seaward through bayou La Loutre. When we compare Figure 16 to Figure 16 (frontal constructed wind stress), we notice that there is additional variability explained only by high frequency response to wind stress. Wind incuded currents within Lake Pontchartrain cause as previously observed, to cause salinity to respond along the coastline. Furthermore, within the Biloxi Marsh area, the standard deviations appear to rise to 6 ppt or more. Similarly, Figure 15 also shows that open water bodies such as Breton, Chandeleur, and Mississippi Sound respond to wind stress rapidly. The areas, when compared to no wind simulations, showed double the variability in the present of wind stress.

Transient Salinity response to a Diversion

The second objective of the study was to investigate the transient response of the salinity field from the 1,000 cfs to the 7,000 cfs during spring, with three closures implemented; namely, (1) MRGO at Bayou La Loutre, (2) MRGO at Bayou Bienvenue, and (3) the connection between Lake Borgne and the MRGO. The same model was used for this simulation as well, with the exception of a variation from previous simulations (Table 1). For these two simulations, the first included the same boundary condition for salinity as the one used in all previous simulations which included Gaussian distribution mainly of marine salinity conditions, while another simulation with a open boundary obtained and forced from the link-node simulations during spring was used. The intention for this second simulation was to indirectly simulate a diversion within the Caernarvon basin which would ultimately bring water into Breton Sound. However, due to the fact that model domain does not cover the entire Breton Sound, or Caernarvon, the possible and expected reduction in salinity was forced at the boundary as simulated by the link-node model. This way, tidal constituents forced at the boundary are expected to advect this lower salinity water within the model domain. No wind was considered for this longer 45 day simulation.

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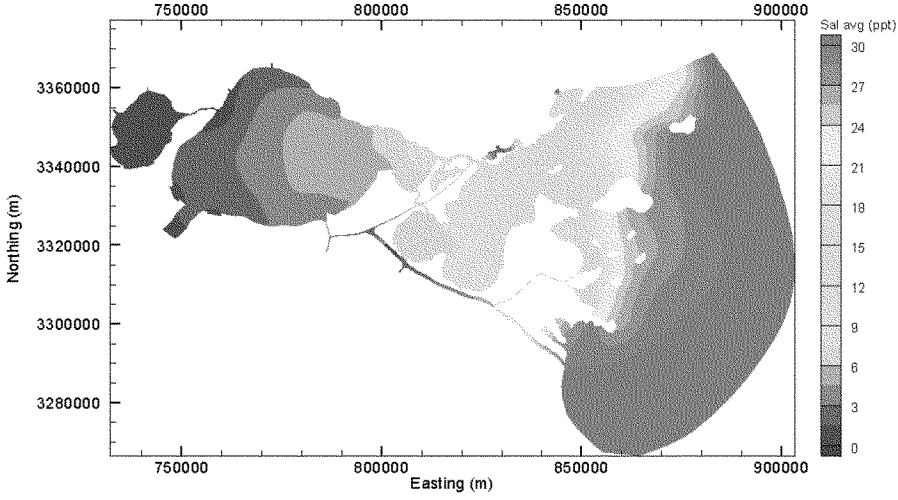


Figure 17 Model simulated depth-integrated distribution for 45 days (case opt7; no wind)

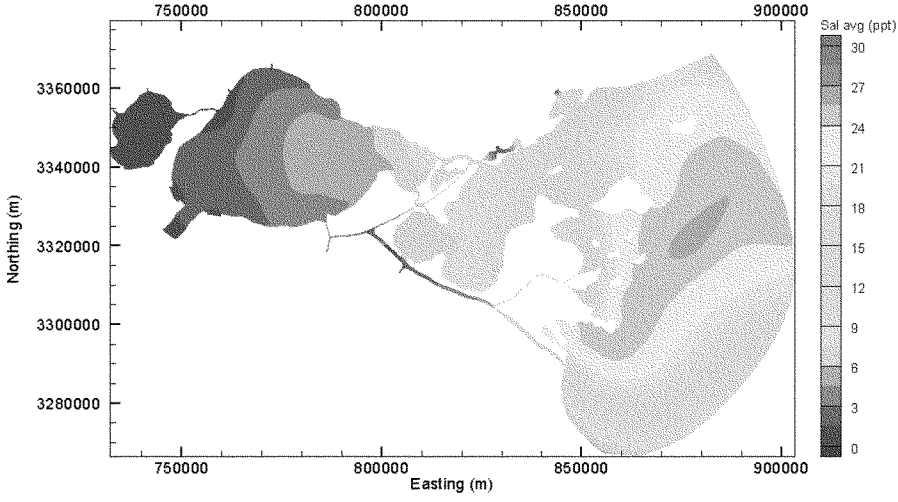


Figure 18 Model simulated depth-integrated distribution for 45 days (case optf; no wind)

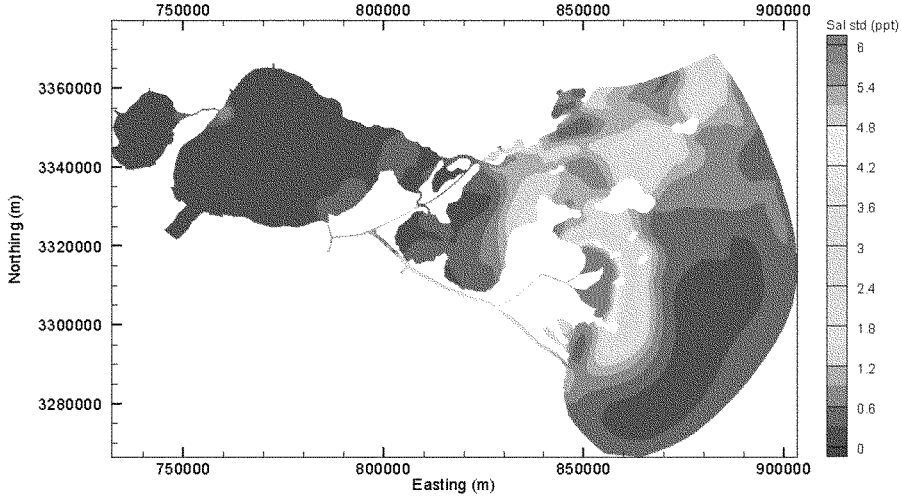


Figure 19 Model simulated depth-integrated standard deviation distribution for 45 days (case opt7; no wind).

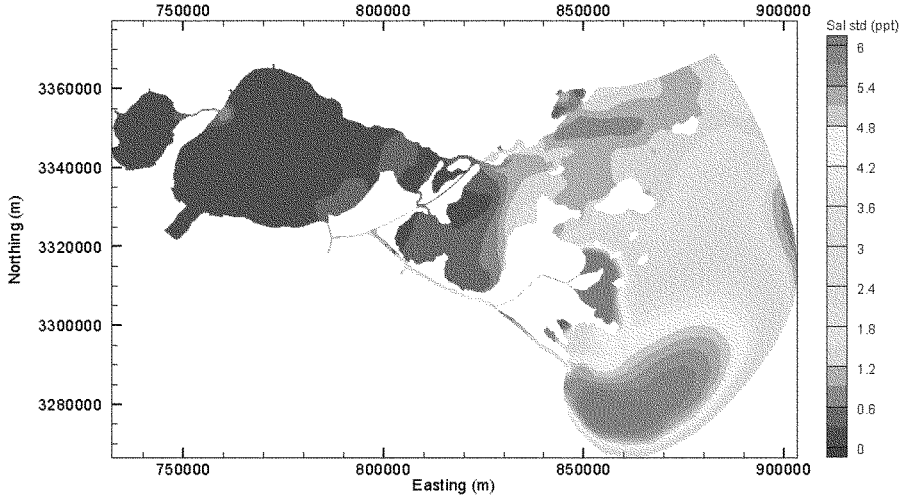


Figure 20 Model simulated depth-integrated standard deviation distribution for 45 days (case optf; no wind)

Figure 17 and Figure 18 show the average depth-integrated distribution of salinity over the period of the simulation (45 days). Similar to previous statistical estimated, the average value for every node (in time) is computed based on the hourly output. It is evident from the average salinity field that up-estuary (such as within Lake Pontchartrain), lower salinities in Breton Sound as a result of diversions in the Caernarvon Basin have little or no impact. This is the same for Lake Borgne and for parts of Biloxi Marsh and Mississippi Sound. Average salinities however start to be considerably different within Breton Sound (as expected), and within Chandeleur Sound and the eastern part of Mississippi Sound. Within the Biloxi Marsh however, the change is rather small, perhaps due to the short simulation period.

Looking at Figures 19 and 20, on the other hand, we see large differences in eh standard deviation, which can explain areas that are more dynamic. For instance, the small and rather insignificant change up-estuary as a result of diversion in Breton sound directly can be explained easily by direct comparison of Figure 19 and 20, where we see that these two images are very similar. Similarly, the freshwater diversion at Violet (through Bayou Dupre) shows to be unaffected by additional input into Breton Sound. This is explained by the similar standard deviation within the Biloxi Marsh area between Figure 19 and 20. Finally, as expected, and as shown to some extend in the average salinity field from the Figure 17 and 18, the eastern portion of Mississippi Sound, as well as Breton and Chandeleur Sound, and the eastern portion of the Biloxi Marsh, can be affected by lower salinity in Breton Sound as shown in Figure 20.

Although most of this change and variability can be explained by either tidal induced circulation, or freshwater induced circulation as a result of diversion, the large variation we see in Figure 20, can also be explained relative to the initial condition. Since the initial condition is somewhat higher in salt than the future and imposed boundary condition, this part of the domain responds to the forcing by rapidly mixing the forced salinity inside the domain. This maybe somewhat unrealistic, and will be largely a function of the initial condition. However, the model predicts that this area will respond to a lower salinity in Breton sound, and would in fact given sufficient time reach within the area of interest.

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Time-series results of the evolution of the salinity field during the longer simulation of 45 days, starting from 1,000 cfs and going through 7,000 cfs is shown in sequential plots in the Appendix as Figure 22 through Figure 27. The figures show the evolution of the salinity field as a function of time. Figure 21, on the other hand, shows the evolution of an instantaneous surface salinity at two locations, one in the MRGO channel upstream of Bayou La Loutre, and the other in the center of the Biloxi Marsh. The figure shows that initially, when the diversion in the system is of the order of 1,000 cfs using a 50/50 split between Bayou Bienvenue and Bayou Dupre, the instantaneous salinity at both locations is dominated by tidal induced circulation. Both signals respond to tidal forcing by showing diurnal oscillations. The salinity within the MRGO (green solid line) although small, shows some response to diurnal oscillation. Since this is so small and cannot be seen with the salinity time-series, we demonstrate this by showing the gradient term. This is demonstrated by the use of the time-derivative for salinity, DS/Dt, shown in the figure as blue solid line. As we can see, the gradient term does respond to diurnal oscillations during the low diversion flow but they are rather negligible. The gradient term however, shows a rather rapid response once the flow starts to rise to 7,000 cfs, and the majority of the flow at this point flows down this area. This rapid decline in the gradient term DS/Dt, is also reflected in the actually instantaneous salinity by a slow reduction to nearly freshwater values. The continuing slow reduction of salinity then makes this term smaller with time, to an eventual zero value when the salinity no longer changes when it reaches a 0.2 value. The absence of the diurnal oscillation in this term also deems this area now dominated by river-water rather than tides.

In the Biloxi Marshes however, despite the obvious decline in instantaneous salinity as a result of the diversion (black trend line, Figure 21), there seems to be a slightly different response. There is an obvious phase or lag in the system. For instance, during the early part of the simulation, the area is responding only to tidal forcing, as the local average or trend is rather a horizontal line up to hour 240 and above. By this time, the diversion has already been operating and is fully rampd to 7,000 cfs, but has not produced a measurable change in this area. Subsequently, and coinciding with a neap cycle, the system responds with a sudden reduction in the salinity, verifying the small dominance of river-induced circulation in the absence of strong tidal induced flow. By this time, the diversion flow is fully developed, and has reached this area, hence form this point onwards, the declining trend in the salinity appears to be linear in time.

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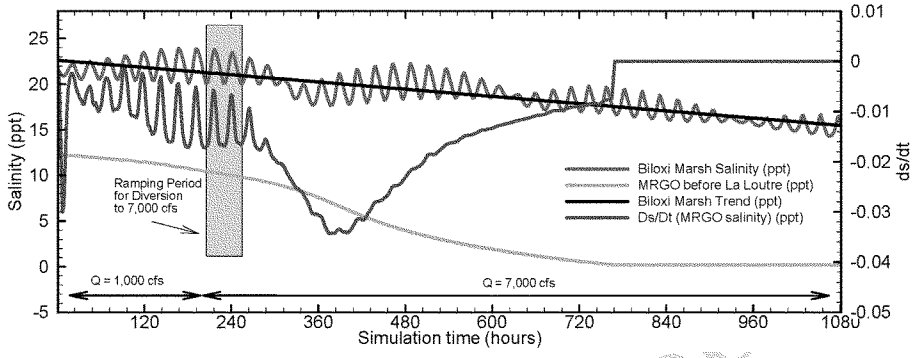


Figure 21 Instantaneous surface salinity for simulation optf, showing the salinity in the central Biloxi Marsh)red line) and within the MRGO channel upstream of Bayou La Loutre (green solid line).

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CONCLUDING REMARKS

The model simulations showed that wind stress resulting from frontal weather can produce high frequency variability in the Pontchartrain Basin within just three days of the application of the wind. In simulations of only 5 days with half a day of spin up time, the model predicted double the variability as measured by the standard deviation evaluated at each node based on the hourly model output. The model also predicted that when only using the averaged salinity field, one would tend to underestimate this variability and high frequency response, primarily because the response is rapid. The model also predicted that in longer simulations, the high frequency response would tend to be smaller due to the natural tendency of wind to cancel this response. This is largely a function of wind climate, basin geometry, duration and intensity of each event, and he relaxation scale of the basin.

Finally, a longer simulation of a diversion from 1,000 cfs to 7,000 cfs showed that the MRGO-La Loutre pathway is largely dominated by tidal currents when the flow is near the low 1,000 cfs magnitude, but when the flow is near the 7,000 cfs, the basin in this area is dominated by the diversion flow. Furthermore, the model predicted a lag time of the order 4-7 days for this flow to reach the Biloxi Marsh area through this direct route. It is emphasized that for this simulation the Lake Borgne connection to the MRGO was closed, which further ensures that the conveyance is maximum through this pathway. The model also showed that the Biloxi Marsh area is largely tidally influenced when the flow at Violet is near 1,000 cfs. Although tidal flows continue to cause strong siurnal oscillations in the salinity, when the flow reaches 7,000 cfs and dynamic equilibrium after the lag period, there is a steady decline in the salinity (Figure 21, solid black line).

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APPENDIX

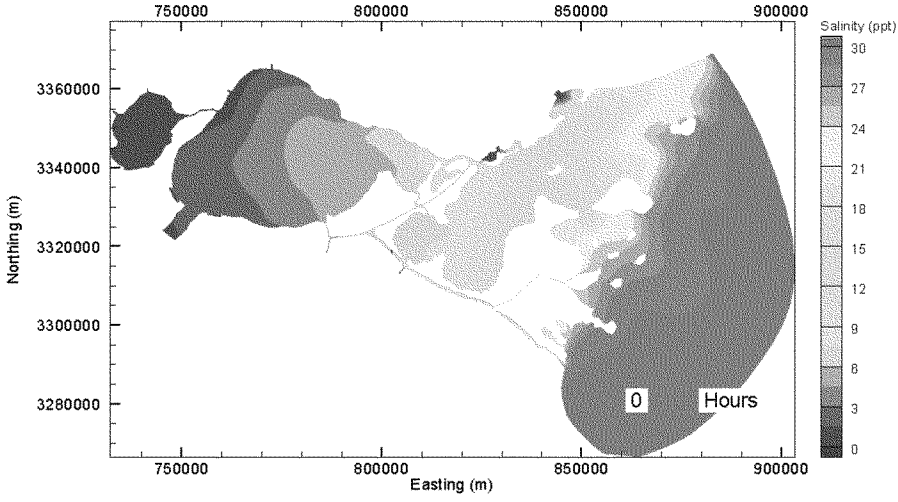


Figure 22 Model simulated depth-integrated salinity at day zero (case optf)

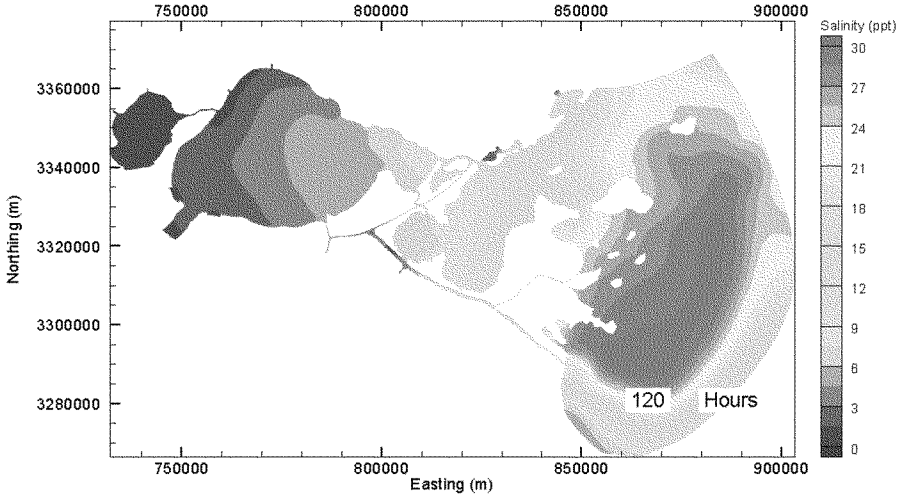


Figure 23 Model simulated depth-integrated salinity at day 10 (case optf)

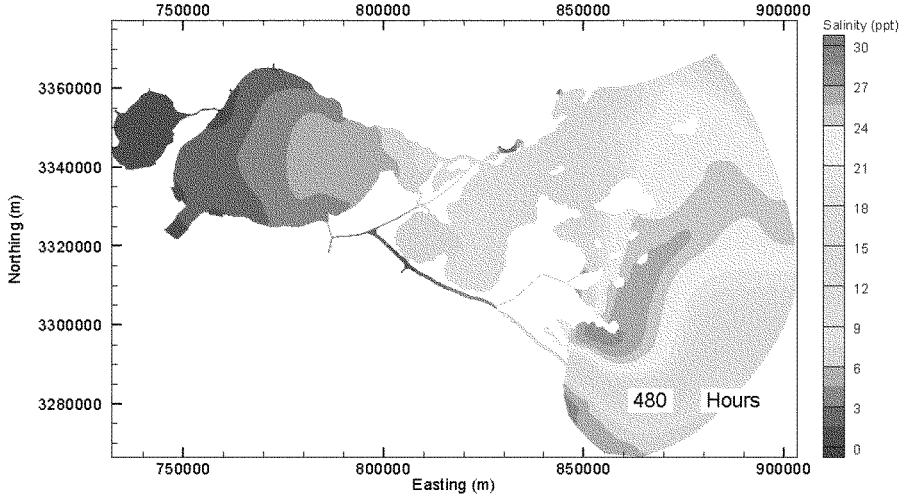


Figure 24 Model simulated depth-integrated salinity at day 20 (case optf)

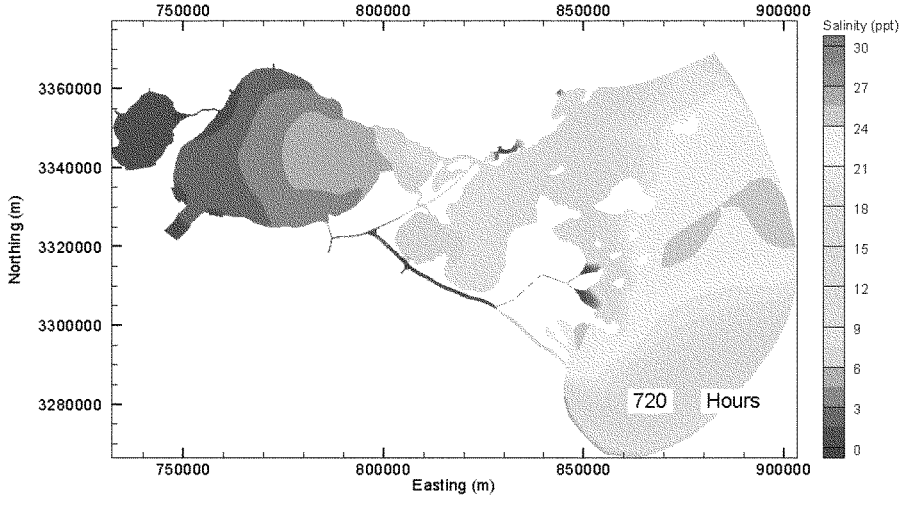


Figure 25 Model simulated depth-integrated salinity at day 30 (case optf)

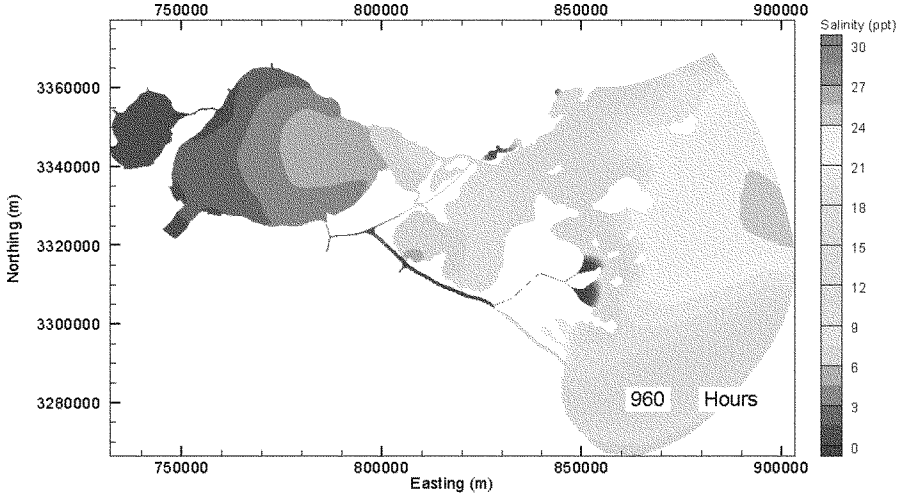


Figure 26 Model simulated depth-integrated salinity at day 40 (case optf)

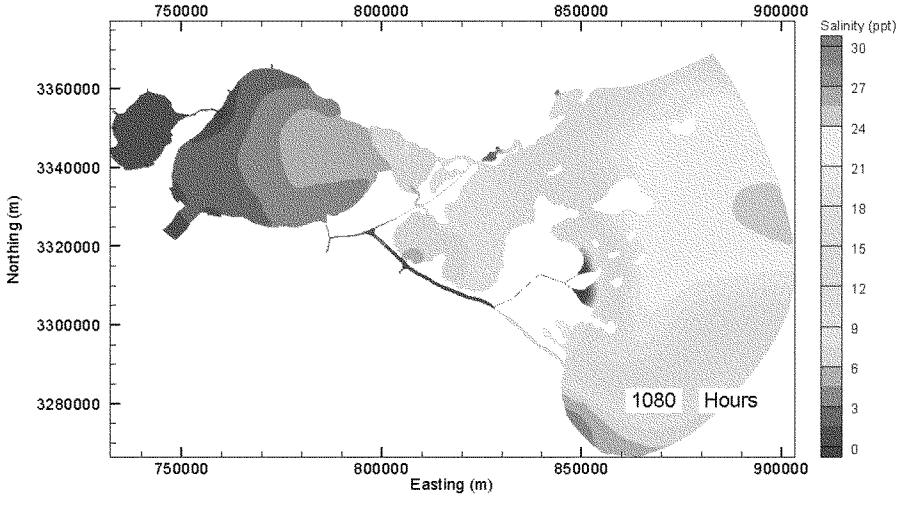


Figure 27 Model simulated depth-integrated salinity at day 45 (case optf).

Appendix I

Preliminary Design of Structures and Channel for Diversion near Violet

Preliminary Considerations and Design

In terms of channel configuration, diversions into and through the CWA will require four components. First, there must be a structure through the Mississippi River Levee; second, a sediment basin will trap particulates from the water; third, there must be sufficient conveyance through the CWA; and fourth, exit structures in the Chalmette levee must be capable of passing the diversion to the MRGO within acceptable impacts to the CWA and infrastructure. These four components will be addressed from the downstream end of the system.

There are two existing structures in the Chalmette levee adjacent to the MRGO. These are the Bayou Bienvenue Control Structure and the Bayou Dupre Control Structure. Both of these structures are 56 feet wide with a sill depth of 10 feet. The Violet Canal and Bayou Dupre connect the Violet Siphon location directly to the Bayou Dupre Control Structure. There is a small hydraulic connection via the back levee canal between Bayou Dupre and Bayou Bienvenue, such that some water introduced into the Violet Canal will make its way out the Bayou Bienvenue structure. Water in the Violet Canal can also migrate into small channels and low points in the CWA.

The size of the two control structures limits the amount of flow that can be diverted. A Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) study conducted by EA Engineering, Science, and Technology for the National Marine Fisheries Service (EA Engineering) showed that increased diversion amounts using the existing channels and openings in the Chalmette levee could raise stages in the CWA to where the marsh would be inundated and potentially impact infrastructure.

Preliminary calculations to understand the size of structure and canal necessary to move various flows through a near Violet Canal diversion were performed. A river stage of 5.35, which is the 25% exceedence stage value for this segment of the river, is assumed for the following calculations. Various marsh surface water elevations are provided to give a range of channel configuration and estimated structure requirements. For this estimate box culverts are used and the channel is estimated at 12 ft deep with 3:1 side slopes. Table 1 provides relative information on various configurations.

Table 1. Hydraulic Design Estimated Values.

River Stage = 5.35				
Flow (cfs)	**River Levee Culverts**	**Channel Width (ft)**	**Chalmette Levee Culverts**	**Marsh Surface Elevation**
5,000	3 – 12' x 12'	225	4 – 13' x 15'	1.8
5,000	3 – 13' x 13'	250	3 – 13' x 13'	2.8
6,000	4 – 11' x 13'	225	4 – 13' x 15'	2.0
6,000	4 – 12' x 13'	275	4 – 12' x 13'	2.8
7,000	4 – 12' x 13'	300	5 – 13' x 15'	2.0
7,000	4 – 13' x 14'	300	5 – 13' x 14'	2.8
10,000	6 – 15' x 15'	275	6 – 13' x 15'	1.0
10,000	6 – 15' x 15'	275	6 – 13' x 15'	2.4
15,000	9 – 15' x 15'	400	9 – 13' x 15'	2.4
20,000	12 – 15' x 15'	550	12 – 13' x 15'	2.4

Channel Design for 7,000 cfs Flow

The channel and structures for the diversion are designed to deliver 7,000 cfs during the months of April and May. This design uses a head elevation in the River that could be reasonably expected during those months. The 25% non- exceedence stage in the river is reasonable design criterion for preliminary design computations. This equates to the river stage being at or above that value 75% of the time. An analysis of the last fifty years of flow and stage data showed that the 25% non-exceedence value of the monthly average stage at the Algiers lock for the month of May was a value of 5.35 feet (NAVD88 2004.65). Assuming the marsh elevation outside of the back levee at the MRGO is plus one foot (NAVD88 2004.65), there is 4.35 feet of head loss presently available to drive the flow through the structures and channels.

There are numerous ways to route the design flow of 7,000 cfs through the Central Wetlands. As a first approximation, a straight channel with confined flow was investigated using the following assumptions: culverts at the river would be 500 feet in length (i.e. long enough so that the Mississippi River levee as well as the river road and the railroad could pass over them); the culverts under the back levee would be 200 feet in length (i.e. long enough to allow them to pass under the levee); and the length of the direct channel between the two culverts is approximately 21,000 feet. It is further assumed that the velocity head (energy) through the culverts is lost due to using a settling basin downstream of the culvert at the Mississippi River and again with the deep water of the MRGO downstream of the second set of culverts. The channel size was manipulated so as to maintain a velocity of two feet per second with a 7,000 cfs flow. The channel design is a twelve foot deep channel with one on three side slopes; a 250 foot bottom

width; and an almost imperceptible gradient of one foot over the 21,000 foot length of the channel. The five culverts at the River are sized as 13 feet by 13 feet gated concrete box culverts. The culverts at the east end of the channel will be five 13 feet by 12 feet gated culverts. The head loss through the MRGO culvert would be 1.58 feet.

This configuration will satisfy the need to route the proposed amount of water through the Central Wetlands. The channel dredging for this proposed configuration will involve the removal of an estimated 2.7 million cubic yards of material.

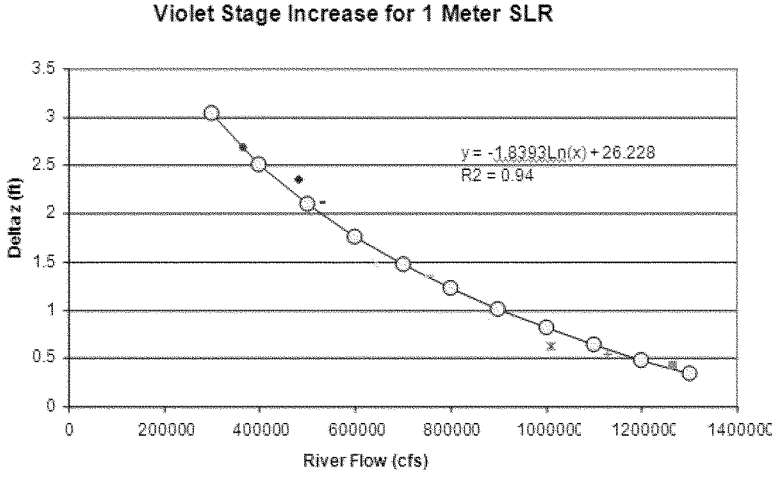
The design configuration given above uses a relatively small width channel so that the velocity for the 7,000 cfs would be slightly greater than 2 feet per second, thus reducing the potential for sedimentation. The calculations also assume a sedimentation basin at the head of the channel (i.e. the velocity head through the River culverts is entirely lost in the sedimentation basin). This channel could be constructed so that the 12 foot depth is below the marsh elevation and thus dikes confining the flow would not be required. By slightly throttling the exit culverts the water elevation in the channel could be adjusted to where it overflowed onto the marsh.

For the background flow of 1,000 cfs, the gates at the back would be adjusted (or totally closed) so that flow is forced to go overland toward the Bayou Dupre and Bayou Bienvenue structures. If all of the flow were forced to exit through these two structures there would be an average seaward flow of slightly less than one foot per second in the structures (56 feet wide by 10 foot deep).

Channel Design for 7,000 cfs Flow Considering Sea Level Rise

This section considers Sea-level rise as a component of the design. With one meter of relative sea level rise, the receiving waters' level in the Central Wetlands would increase by one meter. The stages in the Mississippi River at the diversion site would not increase by the same amount due to variations of the backwater response with different flow rates.

A HEC-RAS model of the river from Tarbert Landing to the Gulf including all of the passes was used to determine the increase in stage at the project site with a one meter increase in the Gulf of Mexico water level. Figure 1 shows the modeled increase in stage in the River at the project site as a function of river flow. To use this plot it is necessary to determine the flow that corresponds to a stage of 5.35 feet. Since a stage discharge rating curve is not available, the best option is to determine the 25% non-exceedence flow and make the assumption that this flow corresponds to the 25% non-exceedence stage. The month of May is the critical month since flows in the River are generally less in May than in April.



Using the DSSMATH statistical analysis package to analyze 50 years of river flow data from January 1, 1959 to December 31, 2008, the monthly average 25% non-exceedence flow for the month of May is 503,000 cfs. Using this flow value in the equation for the curve in Figure 1, the stage increase at the project site is 2.09 feet or a water level of 7.44 feet and the receiving waters are now 4.28 feet generating a head of 3.16.which is a 1.19 foot difference from the one meter increase in the receiving area outside of the Central Wetlands area. Thus, 3.16 feet of head is the design criteria to drive the 7,000 cfs flow in the month of May.

By considering sea level rise, the design for future conditions would be five 14 feet by 14 feet gated concrete box culverts at the River and seven 12 feet by 12 feet gated culverts under the MRGO levee.

Sediment Basin Design

Incorporating a sediment basin into the design of the conveyance channel reduces the velocity head and allows for deposition of sediments at a convenient location for removal and maintenance. This feature would decrease shoaling in the conveyance channel which could negatively impact flow. Sediment can be removed from the basin once filled. The design of a sediment basin balances the need for the basin to be large enough to reduce incoming velocities and the need to minimize the cost of construction.

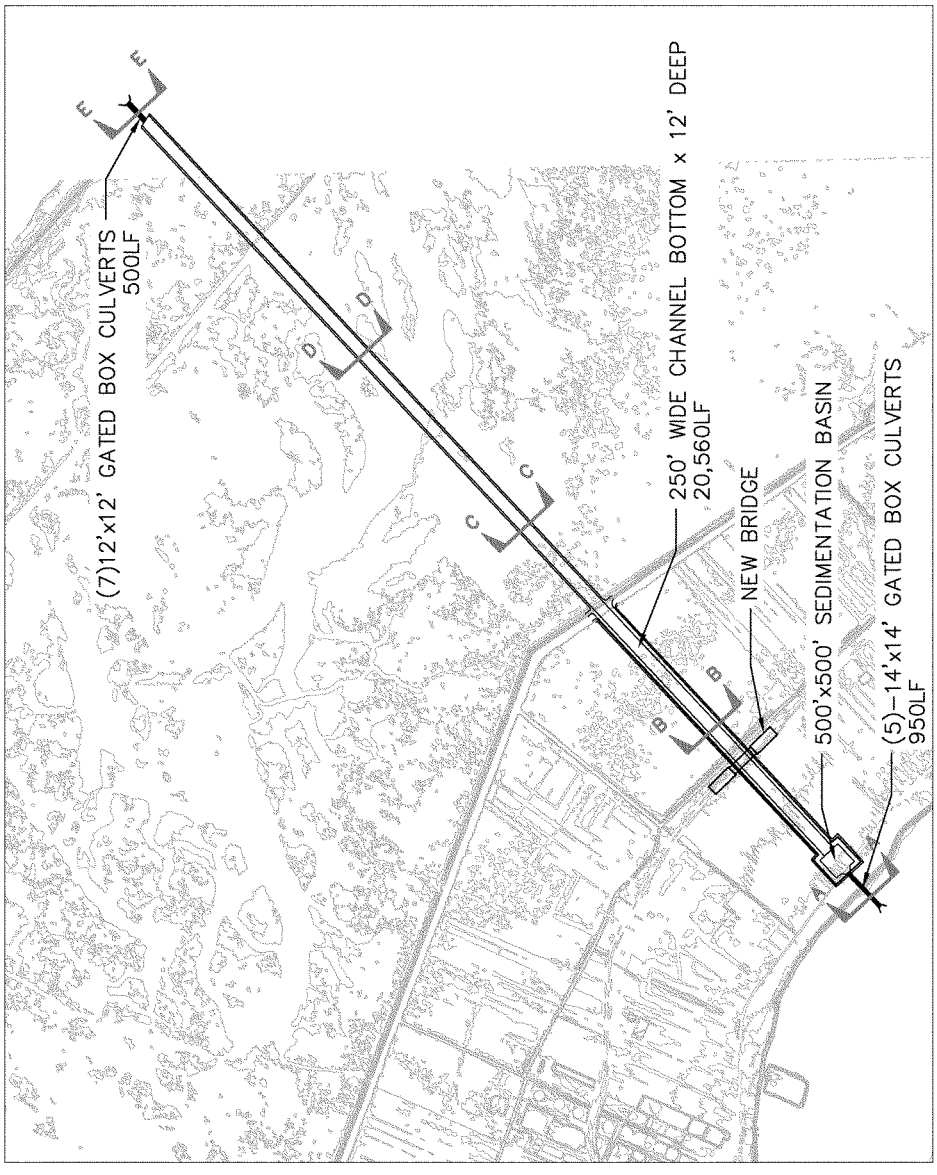
A sediment basin is planned immediately downstream from the culverts at the Mississippi River levee, with a short transition channel flaring out from the Culvert to the basin. As a first approximation, a basin width was chosen by doubling the conveyance channel bottom width of 250 ft. The basin length was selected to be equal to the width. The basin depth was selected as one foot deeper than the 12 ft deep conveyance channel. Thus the sedimentation basin dimensions are a 500 foot bottom width, 500 ft length, and 13 ft depth. Assuming one on three side slopes, the cross sectional area of the basin would be approximately 7,000 sq ft yielding a velocity nearly 1.0 ft/sec per second through the sediment basin. With a length of 500 ft, it would take 500 sec for the 7,000 cfs flow entering the basin to traverse the

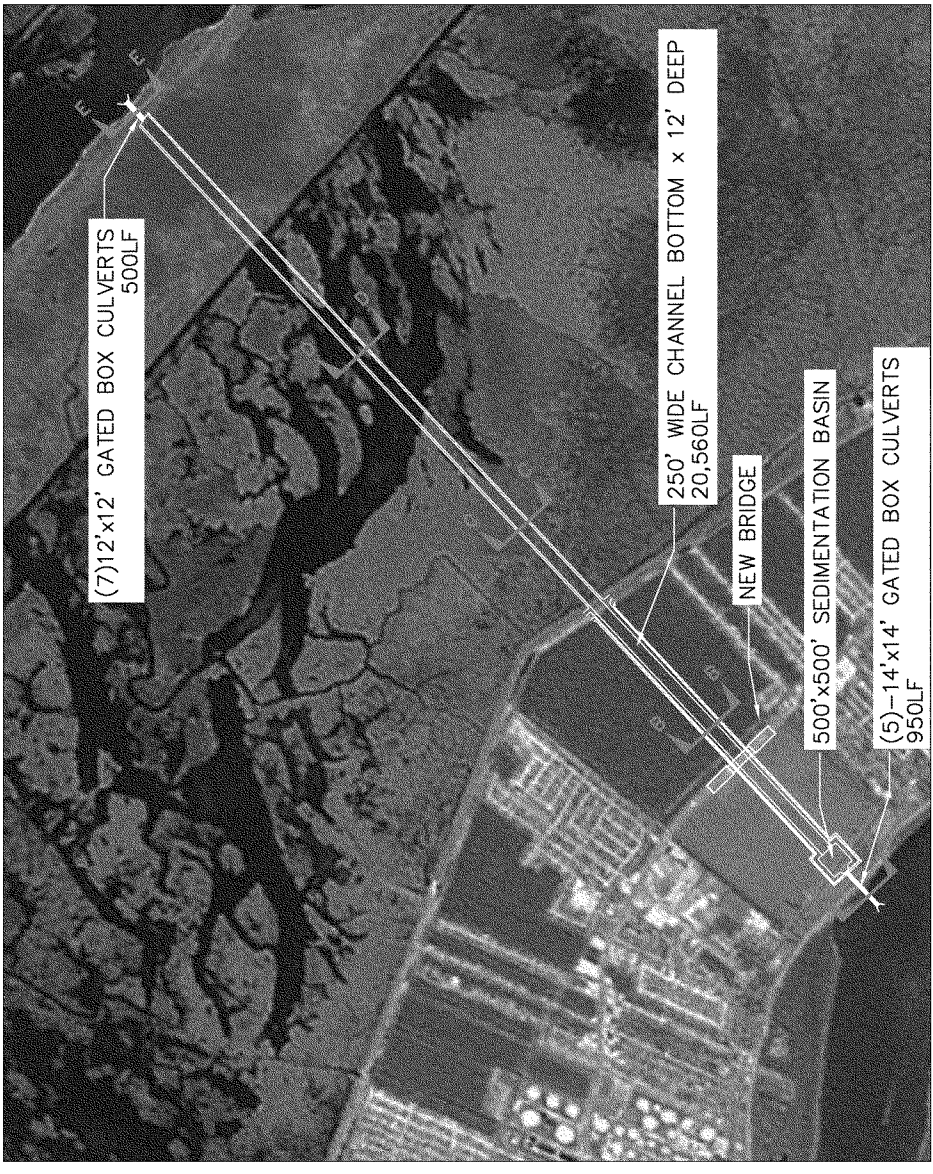
length of the basin and would allow for settling of particles with a diameter greater than 0.09 mm to 0.15 mm or those particles with a settling velocity greater than 0.8 cm/sec.

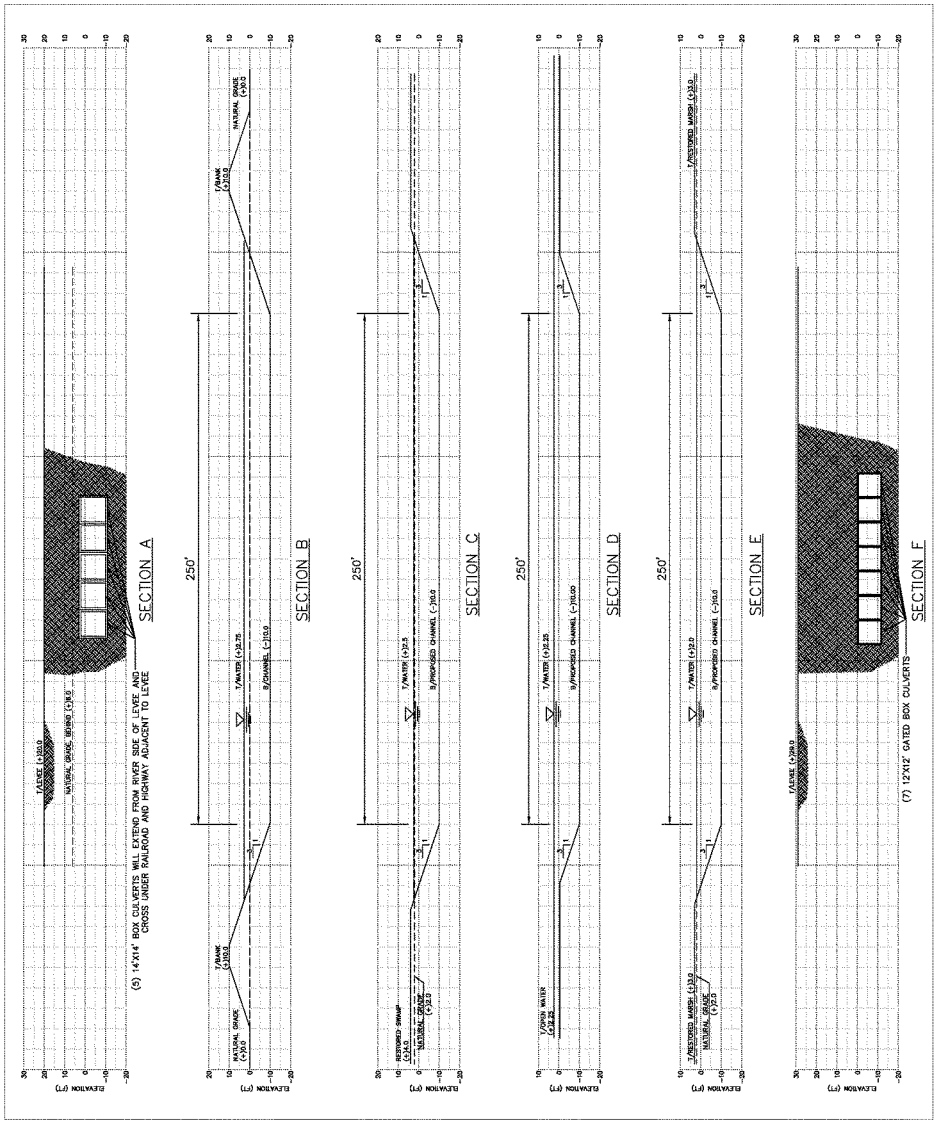
The UNO mass balance modeling effort indicates that approximately 600 tons of sand would be diverted per year. If this sand is assumed to be 108 pounds per cubic foot, then the 600 tons spread evenly over the 500 by 550 foot sedimentation basin would represent a deposition rate of 0.53 inches per year. At this rate, the basin would be filled in approximately 22.5 years.

Reference:

EM 1110-2-1100. Coastal Engineering Manual. U.S. Army Corps of Engineers. 2002.


(7)12'x12' GATED BOX CULVERTS
500LF
250' WIDE CHANNEL BOTTOM x 12' DEEP
20,560LF
NEW BRIDGE
500'x500' SEDIMENTATION BASIN
(5)-14'x14' GATED BOX CULVERTS
950LF
A
B
C
D
E


(7)12'x12' GATED BOX CULVERTS
500LF
250' WIDE CHANNEL BOTTOM x 12' DEEP
20,560LF
NEW BRIDGE
500'x500' SEDIMENTATION BASIN
(5)-14'x14' GATED BOX CULVERTS
950LF


T/LEVEE (+)10.0
NATURAL GRADE (+)4.0
(5) 14'X14' BOX CULVERTS WILL EXTEND FROM RIVER SIDE OF LEVEE AND CROSS UNDER RAILROAD AND HIGHWAY ADJACENT TO LEVEE
SECTION A
250'
T/BANK (+)10.0
NATURAL GRADE (+)4.0
T/WATER (+)2.25
B/CHANNEL (-)15.0
1'
1'
SECTION B
250'
RESTORED SWAMP (+)4.5
NATURAL GRADE (+)2.0
T/WATER (+)2.5
B/PROPOSED CHANNEL (-)16.0
3'
1'
SECTION C
250'
T/OPEN WATER (+)2.25
T/WATER (+)2.25
B/PROPOSED CHANNEL (-)16.00
1'
1'
SECTION D
250'
T/RESTORED MARSH (+)3.0
NATURAL GRADE (+)2.5
T/WATER (+)2.0
B/PROPOSED CHANNEL (-)16.0
3'
1'
SECTION E
T/LEVEE (+)28.0
(7) 12'X12' GATED BOX CULVERTS
SECTION F
ELEVATION (FT)

Appendix J

Impacts to Navigation and Potential for Shoaling

The MRGO Ecosystem Restoration Plan Feasibility Study is being conducted to comply with the Water Resources Development Act (WRDA) of 2007 (P.L. 110-114) Section 7013 to develop a plan to "restore the areas affected by the navigation channel" that considers "diversions of fresh water to restore the Lake Borgne ecosystem." Investigations under Section 7013 have identified that a freshwater diversion at or near Violet, Louisiana is needed to achieve ecosystem restoration goals. Section 3083 of the 2007 Water Resources Development Act (WRDA) authorizes the diversion of freshwater at or near the Violet Canal, Louisiana, for the purposes of reducing salinity in the western Mississippi Sound, enhancing oyster production, and promoting the sustainability of coastal wetlands. Section 3083 states that the freshwater diversion must be designed to meet, or maximize the ability to meet, the salinity levels identified by Chatry et. al, 1982. A Salinity Working Group for the MRGO Ecosystem Restoration Plan validated the use of the Chatry targets for ecosystem restoration in the study area. As part of the MRGO Restoration Feasibility Study, the potential of impacts to navigation and shoaling as a consequence of the proposed freshwater diversion in the vicinity of Violet, Louisiana were evaluated.

Impacts to Navigation

No impacts to the Mississippi River Deep Draft Navigation Channel are anticipated from the proposed diversion. The river is approximately 2,250 feet in width at the location of the proposed diversion. The authorized width of the navigation channel is 750 feet. Thus, 1500 feet of the river is outside of the authorized navigation channel. Assuming that the channel is twice as far from the inside of the bend as from the outside of the bend, the channel is at a minimum of 500 feet from the diversion location. When the diversion is operated at peak flow, currents would be expected on or near the batture but not in the deep draft navigation channel. Further assuming radial flow into the diversion structure and an average flow depth of 20 feet for out of channel locations, the average current contribution 500 feet from the structure would not exceed 0.2 feet per second. This current magnitude is insignificant in a river that has mean currents up to 7 or 8 feet per second. In addition, the peak flow proposed is slightly less than the peak flows for the Davis Pond and Caernarvon diversions. Neither of these two projects has reported impacts to the navigation channel.

Shoaling in the River

The concern is that by diverting flow, the flow in the main channel of the River will be reduced and thus the equilibrium cross-section in the River will become smaller to accommodate the smaller flow. This cross section adjustment could result in shoaling. To better assess the issue of flow reduction, fifty years of Tarbert Landing flow records were averaged for each day of the year and are presented in Figure 1 below.

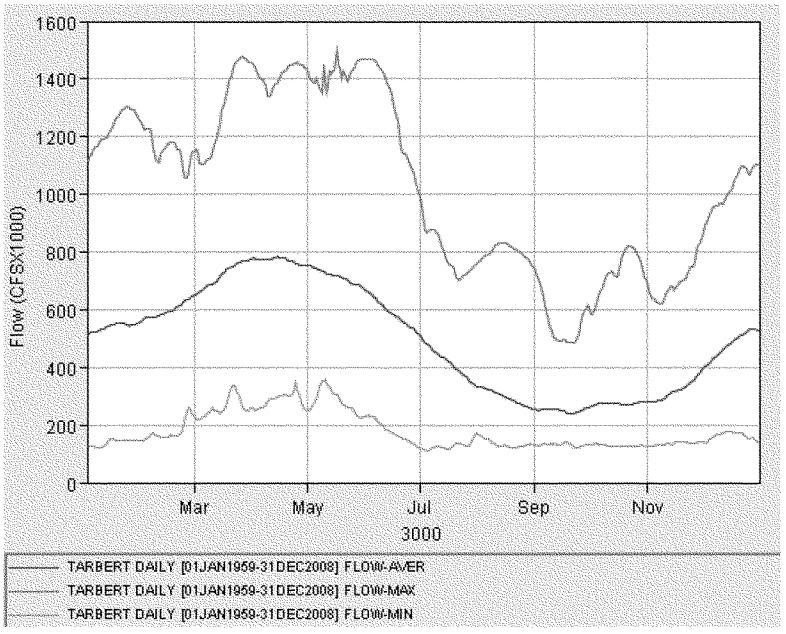


Figure 1: Average, maximum, and minimum flows in the lower Mississippi River from fifty years of daily flow data (Note that 3,000 is a dummy date)

The river cross section is generally shaped by extreme flows and the reduction in flow due to the diversion is extremely small. The proposed operation scheme selected to meet the salinity target in May is a diversion of 7000 cfs in the months of April and May. This proposed diversion flow is about one percent of the average river flow of 700 to 800 thousand cfs. However, diversion flow in the months of March and June immediately preceding and after the 7000 cfs flows will be 1000 cfs when the average flow in the river is around 600 thousand cfs. This represents less than 0.2% of the average river flow and is much less than the percentage error in the measurement of flow in the river.

The maximum flow for this proposed diversion is less than the maximum flows for the existing Davis Pond Diversion (10460 cfs) and the Caernarvon Diversion (8000 cfs). Neither of these projects has reported any perceived shoaling impacts due to their operation.

Based on the small percentage of river flow being diverted and the similarity with the existing Davis Pond and Caernarvon diversions, it is safe to conclude that there will be an imperceptible changes in the river cross section and minimal, in any, shoaling.

An Assessment of the Impacts of Borrow Pits Proposed in Lake Borgne on Local Wave Climate Using ADCIRC and SWAN Hydraulic Modeling

DRAFT

Max Agnew
DRAFT 1-24-2012

Executive Summary

A wave model of Lake Borgne was developed to determine the impact on wave climate due to the excavation of several borrow pits. The material dredged from the borrow pits is to be used for marsh and swamp restoration and nourishment for the MRGO Ecosystem Restoration Plan (USACE, 2011). An unstructured SWAN model was chosen to provide high resolution wave calculations in the area of interest. For the with and with-out borrow pit scenarios, simulations were performed for 24 wind directions, with 4 different windspeeds, and two water levels. This set of simulations is meant to provide an estimate of the impact for "normal" or "non-storm" conditions, where waves are locally generated by wind. A total of 120 simulations were performed for the with and without borrow pit scenarios.

Simulation Set	Wind Speed (mph)	24 Wind Directions (Nautical deg.)	Water Level (ft. NAVD88)	Number of Simulations
W20	20	[0:15:345]	0.92	24
W30	30	[0:15:345]	0.92	24
W40	40	[0:15:345]	0.92	24
W50	50	[0:15:345]	0.92	24
W30H	30	[0:15:345]	2.50	24

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An additional ADCIRC+SWAN simulation of Hurricane Gustav was conducted to show the impact of the borrow pits for a recent high impact storm. Gustav has been chosen due to the unprecedented amount of observational data, and strong validation of the modeling. Peak water level, water velocity, significant wave height were determined for the with and without project conditions.

Very little difference in significant wave height and mean wave period was attributed to the proposed borrow pits along the Lake Borgne shoreline for the simulated "non-storm" conditions. We have calculated a 0 to 4% increase in significant wave height, and a 0 to 3% increase in mean wave period along the shoreline. Within the borrow pits, there can be substantial increases: 3 to 39% increase to significant wave height and up to a 10% increase in mean wave period.

With the full-scale ADCIRC+SWAN simulation of hurricane Gustav, very little change in peak surge elevation was observed. The perturbation to the bottom bathymetry is not enough to significantly alter surge levels in the region of interest. However, the change in peak velocity surrounding the borrow pits is significant. We see a change of up to 0.7 ft/s at the Lake Borgne shoreline, which could be significant in terms of erosion and deposition patterns. The simulation of hurricane Gustav shows relatively large significant wave heights forming in Lake Borgne, at about 5.5 ft with a depth of about 18.0 ft. When we add the borrow pits and re-run the simulations, we see a relatively large increase in significant wave height within the borrow pit areas, at about 10 to 20%, or almost 1.0 ft higher. For this simulation, the larger waves that are developing within the borrow pit areas do not propagate far from the borrow pit areas, apparently due to depth limitation. The largest increase is about 0.2 ft, a 3% increase, at point LB15. Figure 2.6 displays the location of the model output locations.

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1 Introduction

1.1 Objective

The objective of the modeling is to determine impact of the Lake Borgne borrow pits on wave climate for normal and storm conditions.

2 Methodology

2.1 Models

To assess normal conditions (non-hurricane), the numerical model SWAN (Simulating WAves Nearshore) has been implemented. SWAN is the most widely used computer model to compute irregular waves in coastal environments, based on deep water wave conditions, wind, bottom topography, currents, and tides. SWAN explicitly accounts for all relevant processes of propagation, generation by wind, interactions between waves and decay by breaking and bottom friction. To assess normal conditions, we have assigned a static global mean water surface value, and assumed zero velocity throughout the domain. Twenty four different wind directions, 4 different wind-speeds, and two global water surface elevations have been modeled for the with and with-out project condition.

To access hurricane conditions, the coupled version of ADCIRC+SWAN has been implemented. The coupled version of ADCIRC+SWAN solves for the free surface water elevation, currents, and wave conditions. One ADCIRC+SWAN simulation of hurricane Gustav has been conducted to show the impact on surge and waves for a high impact storm. Gustav has been simulated with and without the proposed borrow pits. Gustav has been chosen due to the unprecedented amount of observational data, and strong validation of the ADCIRC+SWAN hindcast modeling (Dietrich, 2010).

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2.2 Bathymetry

The SL16 ADCIRC mesh was used as the base condition for the SWAN mesh. The bathymetric information in the SL16 mesh comes from a variety of sources, including USACE and NOAA surveys. Figure 2-1 displays the SL16 bathymetry for the entire mesh domain, which includes all of the Gulf of Mexico, Caribbean, and the Atlantic Ocean to longitude -60. With over 5 million nodes, SL16 is one of the more recent ADCIRC meshes developed at the University of Notre Dame for hurricane hindcasting.

Unstructured meshes allow high resolution in areas of interest, thereby decreasing the overall number of computational elements. Unstructured meshes also provide better representation of irregularly shaped boundaries than do conventional regular grids. Adcirc pre-processing software know as Gridscope was used to extract a mesh for the area of interest. This extracted mesh can also be interpreted by SWAN for simulation of waves only. Running SWAN on the extracted mesh improves efficiency because we are only modeling the area of interest. The extracted mesh covers all of Lake Borgne out to the Mississippi Sound. Figure 2-2 displays the SL16 bathymetry for the area of interest. The proposed borrow pit bathymetry was incorporated into the extracted mesh. Figure 2-3 displays the modified bathymetry that includes the proposed borrow pits. The borrow pits will be 12 to 17 feet below the existing condition mudline.

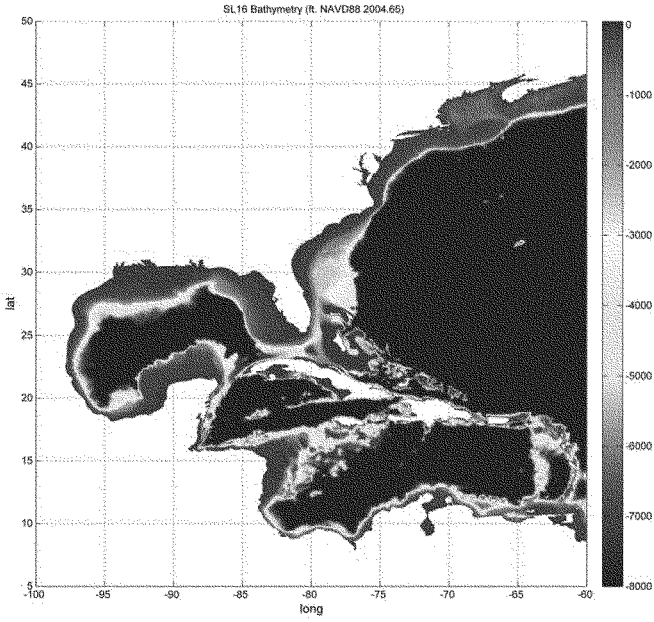


Figure 2-1 SL16 Full Scale Bathymetry (ft. NAVD88 2004.65)

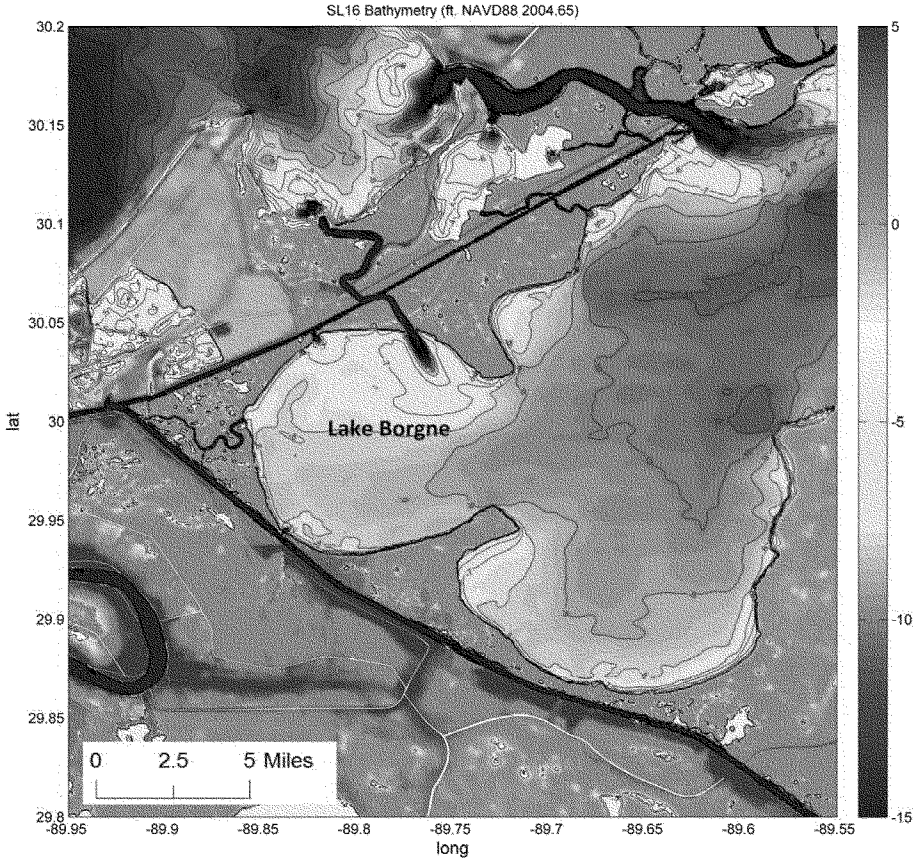


Figure 2-2 SL16 Bathymetry in Lake Borgne

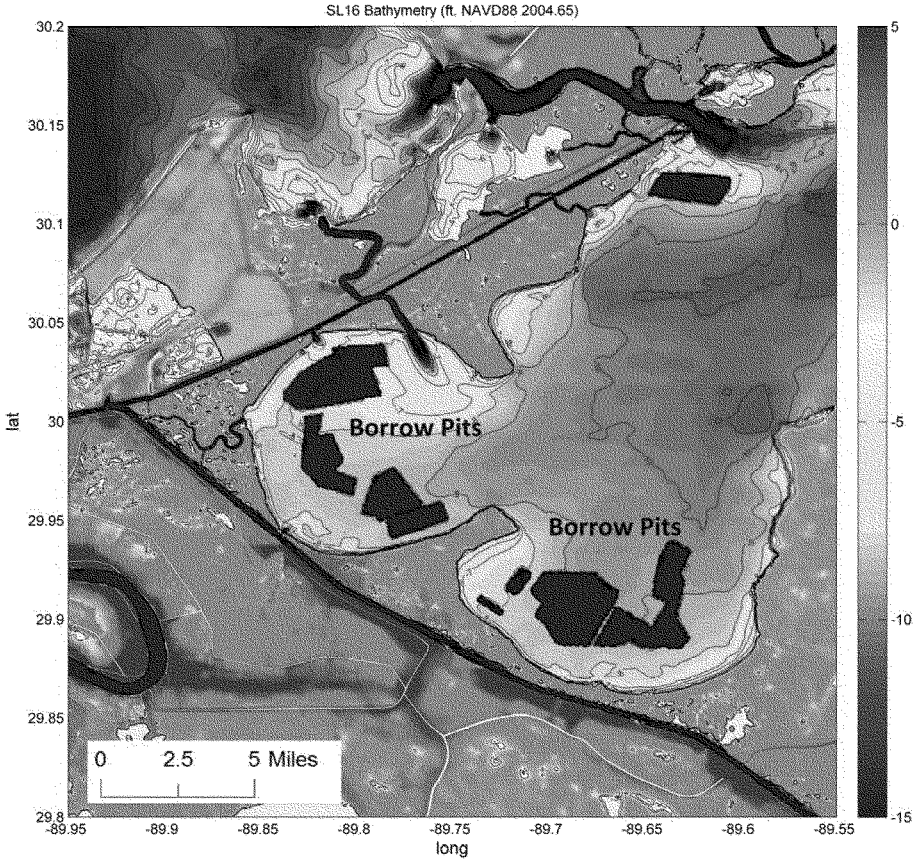


Figure 2-3 SL16 Bathymetry in Lake Borgne with Borrow Pits Bathymetry.

2.3 Boundary conditions

Boundary conditions were not applied to the extracted mesh because waves are assumed to develop locally during normal non-storm conditions.

2.4 Friction

Friction was not applied in the SWAN modeling for non-hurricane swan modeling. However, for the simulation of Hurricane Gustav, the coupled version of ADCIRC+SWAN utilizes friction from the ADCIRC fort.13 nodal attribute file.

2.5 Numerical settings

The solution of the equations in SWAN requires an iterative approach. The model was set to stop iterating when wave heights and peak wave periods in 98% of the active nodes do not change with more than 2%, when compared to the previous iteration. Due to time constraints, all simulations were set up to conduct a maximum of 25 iterations. However, the model runs met the stopping criterion before 25 iterations.

2.6 Points of Interest

SWAN allows the user to define a set of points within the mesh domain at which to record and tabulate detailed model output. Figure 2-4 shows the locations of the selected output locations. A series of points, designated LB1 to LB40, were assigned outside of the borrow pits along the Lake Borgne shoreline to capture the impact of waves that propagate out of the borrow pit areas. A separate series of points, designated as P41 to P66, were assigned to show the impact to wave climate within the borrow pits. Table 2-1 contains the longitude and latitude of each point, as well as the bathymetric elevation for the with and without-borrow pit scenarios.

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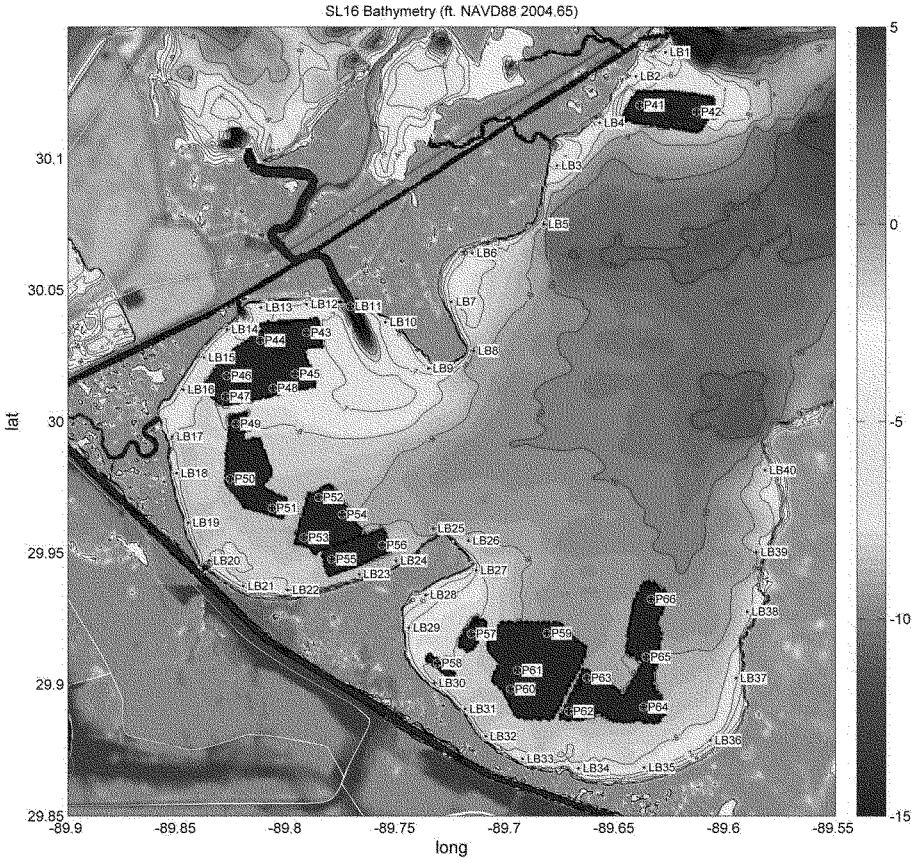


Figure 2-4 SWAN and ADCIRC+SWAN Model Output Locations

Point ID	Longitude	Latitude	Bathymetric Elevation (ft. NAVD88)	Bathymetric Elevation with Borrow Pits (ft. NAVD88)
LB1	-89.6276	30.14044	-6.73	-6.73
LB2	-89.6411	30.13132	-4.53	-4.53
LB3	-89.677	30.09734	-6.77	-6.77
LB4	-89.6576	30.11357	-7.17	-7.17
LB5	-89.683	30.07503	-9.22	-9.22
LB6	-89.7157	30.06412	-7.39	-7.39
LB7	-89.7252	30.04558	-7.56	-7.56
LB8	-89.7151	30.02692	-9.18	-9.18
LB9	-89.7357	30.02022	-6.13	-6.13
LB10	-89.7553	30.03782	-6.48	-6.48
LB11	-89.7712	30.04384	-34.35	-34.35
LB12	-89.7912	30.04465	-7.25	-7.25
LB13	-89.812	30.04338	-6.87	-6.87
LB14	-89.8276	30.03507	-6.66	-6.66
LB15	-89.8381	30.02439	-7.59	-7.59
LB16	-89.8475	30.01219	-7.41	-7.41
LB17	-89.8525	29.9943	-8.13	-8.13
LB18	-89.8506	29.98033	-7.60	-7.60
LB19	-89.8453	29.96157	-7.45	-7.45
LB20	-89.8358	29.94709	-8.82	-8.82
LB21	-89.8201	29.93744	-7.24	-7.24
LB22	-89.7998	29.93594	-8.10	-8.10
LB23	-89.7673	29.94199	-8.59	-8.59
LB24	-89.7504	29.94711	-8.70	-8.70
LB25	-89.7335	29.95933	-9.64	-9.64
LB26	-89.7175	29.95472	-8.69	-8.69
LB27	-89.7139	29.94343	-6.84	-6.84
LB28	-89.737	29.93411	-5.86	-5.86
LB29	-89.7447	29.92158	-6.97	-6.97
LB30	-89.733	29.90054	-7.58	-7.58
LB31	-89.719	29.89071	-7.94	-7.94
LB32	-89.7096	29.88031	-8.00	-8.00
LB33	-89.6928	29.87174	-7.27	-7.27
LB34	-89.6672	29.86816	-7.40	-7.40
LB35	-89.6373	29.86847	-7.53	-7.53
LB36	-89.6071	29.87878	-7.04	-7.04
LB37	-89.5955	29.90243	-7.19	-7.19
LB38	-89.5903	29.92771	-8.22	-8.22
LB39	-89.5861	29.95035	-8.92	-8.92
LB40	-89.5822	29.98147	-8.22	-8.22
P41	-89.6393	30.12032	-7.67	-19.67
P42	-89.6134	30.11773	-6.88	-18.88
P43	-89.7913	30.03384	-7.31	-19.31
P44	-89.8124	30.03087	-6.88	-23.88
P45	-89.7965	30.01814	-7.30	-19.30
P46	-89.8277	30.01744	-8.18	-25.18
P47	-89.8283	30.00959	-7.97	-24.97
P48	-89.8066	30.01271	-7.76	-19.76

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P49	-89.8235	29.99916	-7.82	-19.82
P50	-89.826	29.97823	-8.47	-20.47
P51	-89.807	29.96714	-8.74	-20.74
P52	-89.7858	29.97114	-8.90	-20.90
P53	-89.7924	29.95587	-8.85	-20.85
P54	-89.775	29.96465	-8.96	-20.96
P55	-89.7798	29.94767	-8.72	-15.22
P56	-89.7568	29.95301	-8.64	-15.14
P57	-89.716	29.91925	-8.05	-20.05
P58	-89.7316	29.90814	-8.15	-20.15
P59	-89.6816	29.91946	-9.50	-21.50
P60	-89.6983	29.89827	-8.70	-20.70
P61	-89.6951	29.90538	-8.95	-20.95
P62	-89.6717	29.88981	-8.94	-20.94
P63	-89.6635	29.9025	-9.27	-21.27
P64	-89.6376	29.89145	-8.85	-20.85
P65	-89.6364	29.91051	-8.92	-20.92
P66	-89.6341	29.93246	-9.61	-21.61

Table 2-1 Model Output Coordinates and Bathymetric Elevations

2.7 Modeling Scenarios

Table 2-2 displays the 5 different modeling scenarios evaluated for non-hurricane conditions. For each scenario, one wind-speed has been selected. Windspeeds of 20, 30, 40 and 50 mph were selected because these values roughly correspond to the 1YR, 5YR, 20YR and 100YR sustained windspeed statistics presented in Table 2-3 (USAF,2011).

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Simulation Set	Wind Speed (mph)	24 Wind Directions (Nautical deg.)	Water Level (ft. NAVD88)	Number of Simulations
W20	20	[0:15:345]	0.92	24
W30	30	[0:15:345]	0.92	24
W40	40	[0:15:345]	0.92	24
W50	50	[0:15:345]	0.92	24
W30H	30	[0:15:345]	2.50	24

Table 2-2 Modeling Scenarios for non-hurricane conditions

New Orleans Sustained Winds (mph)										
RETURN PERIOD (YRS)	1.1	1.25	2	5	10	20	50	100	1000	10000
North	20.5	21.6	25.0	30.3	33.9	37.4	41.9	45.3	56.0	66.6
Northeast	19.6	20.3	23.6	30.0	34.9	39.8	46.3	51.2	67.6	84.1
East	18.6	19.5	23.4	31.2	37.2	43.2	51.2	57.2	77.5	97.7
Southeast	19.8	21.2	24.5	29.0	31.7	34.3	37.4	39.7	46.8	53.5
South	21.8	22.3	25.2	32.0	37.5	43.2	50.9	56.8	76.6	96.8
Southwest	20.5	21.1	24.5	32.1	38.2	44.4	52.9	59.3	80.9	102.8
West	21.1	22.1	25.7	32.1	36.9	41.5	47.6	52.1	67.1	82.0
Northwest	20.6	21.6	24.7	29.5	32.8	36.0	40.1	43.2	53.1	62.7
Average	**20.3**	**21.2**	**24.5**	**30.8**	**35.6**	**40.3**	**46.6**	**51.4**	**67.1**	**82.8**

Table 2-3 New Orleans Sustained Windspeed Statistics

3 SWAN Results

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3.1 SWAN Results for Scenario W20

Table 6-1 presents the summary of impact to significant wave height and mean wave period. The WOP column is the "Without Project" or "existing condition". The WP column is the "With Project" or with borrow pit scenario. The WP column represents the maximum wave height /wave period calculated for the 24 different wind directions. We have modeled 24 different wind directions, and extracted the maximum value from these 24 simulations for the WOP and WP conditions.

The difference and % difference have been calculated for the change in significant wave height (Hs) and mean wave period (Tm10). Very little difference in Hs and Tm10, about 0 to 2%, is observed along the Lake Borgne shoreline LB points. However we see a 3 to 9% increase in Hs, and a 0 to 4% increase in Tm10, within the borrow pits themselves. Appendix A displays 2D results for the W20 scenario.

3.2 SWAN Results for Scenario W30

Table 6-2 presents the summary of impacts for the W30 scenario. Differences and percent differences have been calculated for significant wave height (Hs) and mean wave period (Tm10). We see a 0 to 4% increase in Hs, and a 0 to 3% increase in Tm10, along the Lake Borgne shoreline. A 4 to 16% increase in Hs, and a -1 to 7% change in Tm10, within the borrow pits themselves. Appendix A displays 2D results for the W30 scenario.

3.3 SWAN Results for Scenario W40

Table 6-3 presents the summary of impacts for the W40 scenario. Differences and percent differences have been calculated for significant wave height (Hs) and mean wave period (Tm10). We see a 0 to 4% increase in Hs, and a 0 to 3% increase in Tm10, along the Lake Borgne shoreline. A 9 to 24% increase in Hs, and a -2 to 7% change in Tm10, within the borrow pits themselves. Appendix A displays 2D results for the W40 scenario.

3.4 SWAN Results for Scenario W50

Table 6-4 presents the summary of impacts for the W50 scenario. Differences and percent differences have been calculated for significant wave height (Hs) and mean wave period (Tm10). We see a 0 to 2% increase in Hs, and a -1 to 3% change in Tm10, along the Lake Borgne shoreline. A 14 to 39% increase in Hs, and a -2 to 10% change in Tm10, within the borrow pits themselves. Appendix A displays 2D results for the W50 scenario.

3.5 SWAN Results for Scenario W30H

Table 6-5 presents the summary of impacts for the W30H scenario. Differences and percent differences have been calculated for significant wave height (Hs) and mean wave period (Tm10). We see a 0 to 3% increase in Hs, and a 0 to 2% increase in Tm10, along the Lake Borgne shoreline. A 4 to 13% increase in Hs, and a 0 to 7% increase in Tm10, within the borrow pits themselves. Appendix A displays 2D results for the W50 scenario.

4 ADCIRC+SWAN Simulation of Hurricane Gustav

Table 4-1 contains the summary of impacts of the borrow pits on peak surge and peak velocity for the full scale ADCIRC+SWAN simulation of Hurricane Gustav. Very little difference is observed in peak surge. A substantial decrease in velocity is observed within the borrow pits, and a substantial increase in velocity is observed immediately outside the borrow pits. Figure 4-1 displays the maximum surge velocity for the WOP condition. Figure 4-4 shows the difference in peak surge elevation between the WOP and WP conditions. The difference and percent difference have been labeled at the selected output locations. Figure 4-2 displays the maximum velocity for the WOP condition. Figure 4-5 displays the difference in maximum velocity. The difference and percent difference have been labeled at the selected output locations.

Table 4-2 presents the summary of impacts of the borrow pits on peak significant wave height for the full scale ADCIRC+SWAN Gustav simulation. As seen with the stationary simulations, very little difference in peak significant wave height is observed along the Lake Borgne shoreline. In general, we see about a 0 to 4% increase in significant wave height at the LB points along the Lake Borgne shoreline. Within the borrow pits, at locations P41-P66, we see a substantial increase in significant wave height, at about 5 to 20%. Figure 4-3 displays the peak significant wave height for the WOP condition. Figure 4-6 displays the difference between the WOP and WP condition, with the points of interest labeled with the actual and percent differences.

Mean wave periods were not extracted from the full scale Gustav simulation because ADCIRC+SWAN provides erroneous maximum mean wave period information. ADCIRC+SWAN is still being developed to correct the problems with wave period calculations.

Summary of Impacts for Hurricane Gustav								
Point ID	Peak Surge Elevation (ft. NAVD88)				Peak Velocity (ft/s)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (ft/s)	WP (ft/s)	Dif. (ft/s)	% Dif
LB1	10.23	10.23	-0.01	-0.06%	2.12	2.15	0.03	1.61%
LB2	10.30	10.29	-0.01	-0.10%	1.62	1.61	-0.01	-0.74%
LB3	10.33	10.33	-0.01	-0.07%	1.26	1.27	0.01	0.97%
LB4	10.33	10.32	-0.01	-0.07%	1.45	1.41	-0.04	-3.01%
LB5	10.27	10.26	-0.01	-0.11%	1.74	1.75	0.01	0.83%
LB6	10.37	10.35	-0.01	-0.13%	1.20	1.22	0.02	1.70%
LB7	10.32	10.30	-0.01	-0.11%	1.07	1.08	0.01	0.64%
LB8	10.18	10.17	-0.02	-0.18%	1.94	2.02	0.08	4.02%
LB9	10.21	10.19	-0.02	-0.21%	2.31	2.30	-0.02	-0.74%
LB10	10.32	10.29	-0.03	-0.31%	1.72	1.69	-0.03	-1.64%
LB11	10.34	10.30	-0.04	-0.35%	4.13	4.12	0.00	-0.05%
LB12	10.42	10.37	-0.05	-0.46%	1.43	1.61	0.18	12.63%
LB13	10.52	10.44	-0.07	-0.70%	1.03	1.38	0.35	34.40%
LB14	10.56	10.47	-0.09	-0.90%	0.69	1.19	0.51	73.76%
LB15	10.56	10.46	-0.11	-1.02%	0.47	1.18	0.71	151.63%
LB16	10.55	10.45	-0.09	-0.90%	0.51	0.89	0.39	75.75%
LB17	10.48	10.40	-0.08	-0.79%	0.56	0.74	0.18	32.03%
LB18	10.40	10.33	-0.07	-0.67%	0.68	0.92	0.24	35.18%
LB19	10.28	10.23	-0.05	-0.52%	0.76	1.03	0.27	36.32%
LB20	10.18	10.14	-0.04	-0.38%	1.28	1.43	0.16	12.23%
LB21	10.07	10.04	-0.03	-0.31%	0.70	0.94	0.23	33.22%
LB22	9.99	9.97	-0.02	-0.21%	0.81	1.15	0.34	42.61%
LB23	9.91	9.92	0.01	0.07%	1.06	1.54	0.47	44.78%
LB24	9.88	9.88	0.00	0.00%	1.14	1.26	0.13	11.14%
LB25	9.89	9.88	-0.01	-0.14%	2.01	2.01	0.00	-0.15%
LB26	9.82	9.80	-0.02	-0.22%	1.73	1.52	-0.20	-11.86%
LB27	9.76	9.73	-0.04	-0.36%	1.36	1.34	-0.02	-1.44%
LB28	9.81	9.77	-0.04	-0.41%	0.91	1.04	0.13	14.19%
LB29	9.78	9.74	-0.04	-0.38%	0.65	0.72	0.06	9.78%
LB30	9.63	9.60	-0.03	-0.28%	0.80	1.16	0.36	44.72%
LB31	9.54	9.52	-0.01	-0.15%	0.90	1.26	0.36	40.38%
LB32	9.46	9.46	0.00	0.03%	0.95	1.30	0.35	37.01%
LB33	9.36	9.38	0.02	0.23%	1.11	1.54	0.44	39.30%
LB34	9.26	9.30	0.04	0.38%	1.32	1.62	0.30	22.71%
LB35	9.17	9.21	0.04	0.48%	1.21	1.37	0.16	13.02%
LB36	9.11	9.16	0.04	0.48%	1.10	1.07	-0.03	-2.82%
LB37	9.19	9.22	0.03	0.36%	1.00	1.18	0.18	18.30%
LB38	9.28	9.29	0.01	0.12%	0.87	0.87	0.00	-0.38%

Table continued on following page

Summary of Impacts for Hurricane Gustav								
Point ID	Peak Surge Elevation (ft. NAVD88)				Peak Velocity (ft/s)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (ft/s)	WP (ft/s)	Dif. (ft/s)	% Dif
LB39	9.36	9.36	0.00	0.02%	1.10	1.02	-0.08	-7.02%
LB40	9.47	9.47	0.00	-0.01%	1.46	1.40	-0.06	-3.78%
P41	10.28	10.28	0.00	0.04%	1.53	0.96	-0.57	-37.12%
P42	10.18	10.20	0.02	0.22%	2.25	1.48	-0.78	-34.44%
P43	10.40	10.36	-0.04	-0.36%	1.35	1.39	0.04	3.07%
P44	10.48	10.40	-0.07	-0.71%	1.10	1.17	0.06	5.74%
P45	10.37	10.34	-0.03	-0.30%	1.22	0.69	-0.53	-43.37%
P46	10.49	10.41	-0.08	-0.78%	0.73	1.31	0.58	79.31%
P47	10.46	10.39	-0.06	-0.61%	0.75	0.88	0.13	17.03%
P48	10.39	10.34	-0.04	-0.40%	1.06	0.67	-0.39	-36.80%
P49	10.38	10.33	-0.06	-0.55%	0.85	1.43	0.58	68.14%
P50	10.29	10.25	-0.04	-0.43%	0.83	0.83	0.00	-0.58%
P51	10.17	10.21	0.04	0.43%	0.83	1.47	0.63	76.10%
P52	10.11	10.09	-0.03	-0.26%	1.05	0.62	-0.43	-40.66%
P53	10.07	10.05	-0.02	-0.17%	0.83	0.60	-0.23	-27.36%
P54	10.05	10.03	-0.02	-0.17%	1.13	0.81	-0.32	-28.49%
P55	9.98	9.98	0.00	0.01%	0.91	0.94	0.03	3.78%
P56	9.93	9.93	0.00	-0.02%	1.27	0.86	-0.41	-32.17%
P57	9.66	9.63	-0.04	-0.37%	0.74	0.79	0.06	7.56%
P58	9.66	9.63	-0.03	-0.28%	0.62	1.18	0.56	90.67%
P59	9.55	9.52	-0.03	-0.36%	0.92	0.61	-0.30	-33.18%
P60	9.51	9.51	0.00	-0.01%	0.90	0.48	-0.42	-46.41%
P61	9.53	9.52	-0.01	-0.14%	0.89	0.71	-0.18	-20.70%
P62	9.38	9.41	0.03	0.33%	1.00	0.72	-0.28	-27.58%
P63	9.42	9.42	0.01	0.06%	0.93	1.06	0.13	14.41%
P64	9.28	9.32	0.04	0.46%	0.95	1.06	0.11	11.45%
P65	9.36	9.38	0.01	0.15%	0.91	1.18	0.27	29.38%
P66	9.46	9.44	-0.01	-0.14%	0.84	0.96	0.12	13.97%

Table 4-1 Summary of impacts for Hurricane Gustav (Peak Surge and Velocity)

Summary of Impacts for Hurricane Gustav								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	5.49	5.56	0.07	1.36%	4.05	4.10	0.05	1.18%
LB2	5.26	5.25	-0.01	-0.11%	4.16	4.13	-0.02	-0.52%
LB3	5.59	5.60	0.01	0.23%	4.06	4.08	0.02	0.50%
LB4	5.54	5.45	-0.09	-1.71%	4.05	4.04	-0.01	-0.36%
LB5	6.00	6.02	0.02	0.37%	4.09	4.11	0.02	0.48%
LB6	5.50	5.50	0.00	0.05%	4.07	4.08	0.01	0.14%
LB7	5.51	5.51	0.00	0.01%	4.03	4.03	0.01	0.15%
LB8	5.88	5.91	0.03	0.49%	4.07	4.09	0.03	0.62%
LB9	5.18	5.19	0.01	0.18%	3.91	3.93	0.02	0.39%
LB10	4.27	4.32	0.06	1.30%	3.39	3.44	0.04	1.24%
LB11	3.62	3.65	0.02	0.69%	3.13	3.18	0.05	1.55%
LB12	5.18	5.22	0.04	0.77%	3.87	3.86	0.00	-0.12%
LB13	5.21	5.05	-0.16	-3.15%	3.90	3.83	-0.07	-1.72%
LB14	5.29	5.32	0.02	0.46%	3.93	4.01	0.08	2.11%
LB15	5.36	5.53	0.16	3.02%	3.92	4.10	0.18	4.48%
LB16	5.46	5.51	0.05	0.89%	3.94	4.05	0.11	2.66%
LB17	5.50	5.59	0.09	1.57%	3.94	3.99	0.05	1.27%
LB18	5.42	5.50	0.08	1.47%	3.90	3.97	0.07	1.91%
LB19	5.34	5.39	0.06	1.05%	3.89	3.94	0.05	1.41%
LB20	5.36	5.34	-0.02	-0.29%	3.95	3.95	0.00	-0.06%
LB21	4.79	4.80	0.02	0.38%	3.68	3.70	0.02	0.43%
LB22	4.68	4.73	0.06	1.21%	3.57	3.62	0.05	1.44%
LB23	4.26	4.19	-0.07	-1.72%	3.36	3.32	-0.04	-1.27%
LB24	3.86	3.89	0.03	0.87%	3.18	3.23	0.05	1.47%
LB25	4.90	4.96	0.06	1.14%	3.55	3.58	0.03	0.86%
LB26	5.48	5.56	0.08	1.50%	3.82	3.89	0.07	1.82%
LB27	5.38	5.42	0.04	0.73%	3.85	3.89	0.04	0.95%
LB28	4.94	5.03	0.09	1.73%	3.74	3.85	0.11	3.05%
LB29	5.01	5.11	0.10	2.00%	3.73	3.83	0.10	2.75%
LB30	5.04	5.00	-0.04	-0.70%	3.71	3.74	0.04	0.96%
LB31	4.99	5.05	0.06	1.28%	3.64	3.82	0.18	5.06%
LB32	4.74	4.73	-0.01	-0.12%	3.59	3.74	0.15	4.16%
LB33	4.36	4.38	0.03	0.63%	3.46	3.54	0.08	2.32%
LB34	4.10	4.35	0.25	6.08%	3.37	3.49	0.12	3.63%
LB35	3.59	3.73	0.14	3.98%	3.09	3.13	0.04	1.21%
LB36	3.18	3.22	0.03	1.08%	2.68	2.83	0.15	5.47%
LB37	2.95	3.00	0.05	1.63%	2.53	2.59	0.05	2.08%
LB38	2.92	2.93	0.02	0.58%	2.55	2.59	0.04	1.38%

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Summary of Impacts for Hurricane Gustav								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB39	3.34	3.35	0.01	0.21%	2.77	2.75	-0.02	-0.82%
LB40	3.79	3.80	0.01	0.15%	3.06	3.04	-0.02	-0.64%
P41	5.64	6.24	0.60	10.70%	4.06	4.13	0.08	1.88%
P42	5.62	6.19	0.57	10.09%	3.99	4.02	0.02	0.53%
P43	5.20	5.62	0.41	7.95%	3.84	3.89	0.05	1.21%
P44	5.30	6.06	0.75	14.18%	3.91	4.07	0.16	4.06%
P45	5.39	5.94	0.56	10.36%	3.88	4.00	0.12	3.14%
P46	5.36	6.25	0.89	16.65%	3.88	4.14	0.26	6.67%
P47	5.37	6.21	0.84	15.57%	3.86	4.03	0.16	4.23%
P48	5.41	5.61	0.19	3.58%	3.87	3.85	-0.03	-0.70%
P49	5.37	6.06	0.69	12.84%	3.83	3.94	0.11	2.94%
P50	5.42	6.20	0.78	14.30%	3.83	4.06	0.23	6.02%
P51	5.34	6.11	0.77	14.32%	3.81	4.05	0.24	6.25%
P52	5.27	5.77	0.50	9.47%	3.73	3.83	0.10	2.65%
P53	5.19	6.11	0.92	17.69%	3.73	4.03	0.31	8.20%
P54	5.23	5.61	0.37	7.10%	3.70	3.77	0.07	2.02%
P55	4.87	5.13	0.26	5.33%	3.61	3.67	0.07	1.84%
P56	4.77	5.09	0.32	6.68%	3.50	3.59	0.08	2.37%
P57	5.28	6.15	0.87	16.46%	3.78	4.13	0.35	9.14%
P58	5.15	5.84	0.69	13.42%	3.73	4.00	0.27	7.33%
P59	5.24	5.78	0.54	10.39%	3.63	3.88	0.25	6.76%
P60	5.06	5.98	0.92	18.13%	3.63	4.03	0.40	10.97%
P61	5.15	6.04	0.90	17.42%	3.65	4.06	0.41	11.27%
P62	4.67	5.55	0.89	18.98%	3.45	3.77	0.32	9.25%
P63	4.81	5.24	0.44	9.05%	3.43	3.75	0.33	9.53%
P64	4.21	4.87	0.66	15.71%	3.19	3.53	0.34	10.60%
P65	4.50	4.89	0.38	8.54%	3.24	3.58	0.34	10.59%
P66	4.70	5.12	0.42	9.03%	3.36	3.60	0.24	7.08%

Table 4-2 Summary of impacts for Hurricane Gustav (Significant Wave Height)

DRAFT

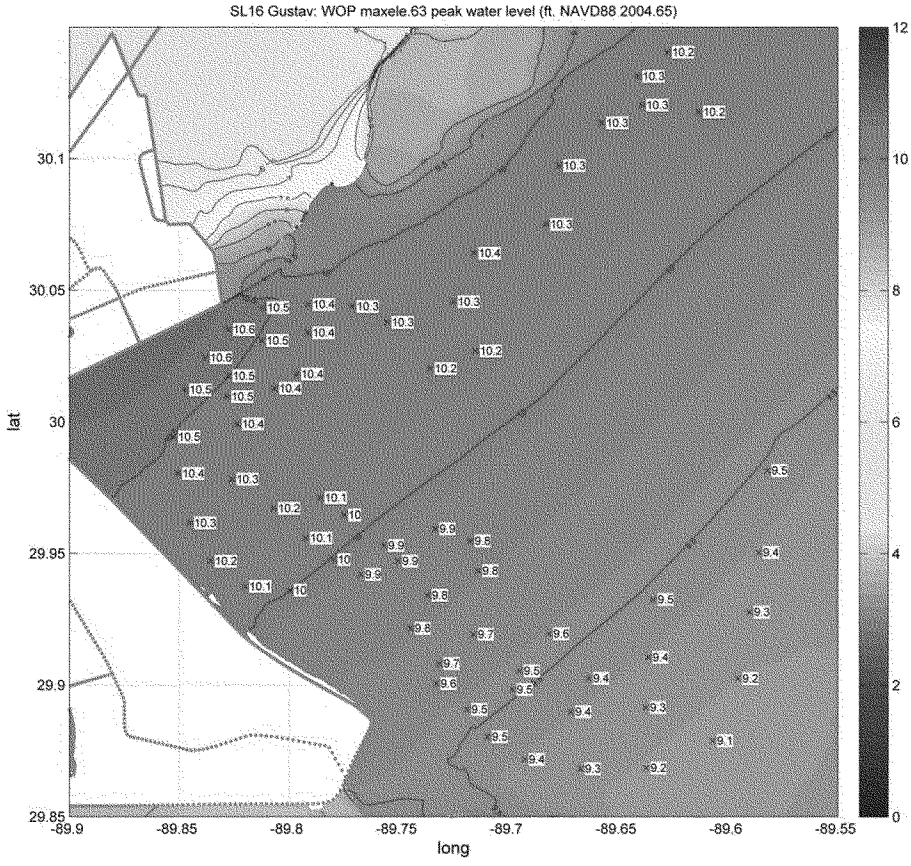


Figure 4-1 ADCIRC+SWAN Peak Surge Elevation for Hurricane Gustav

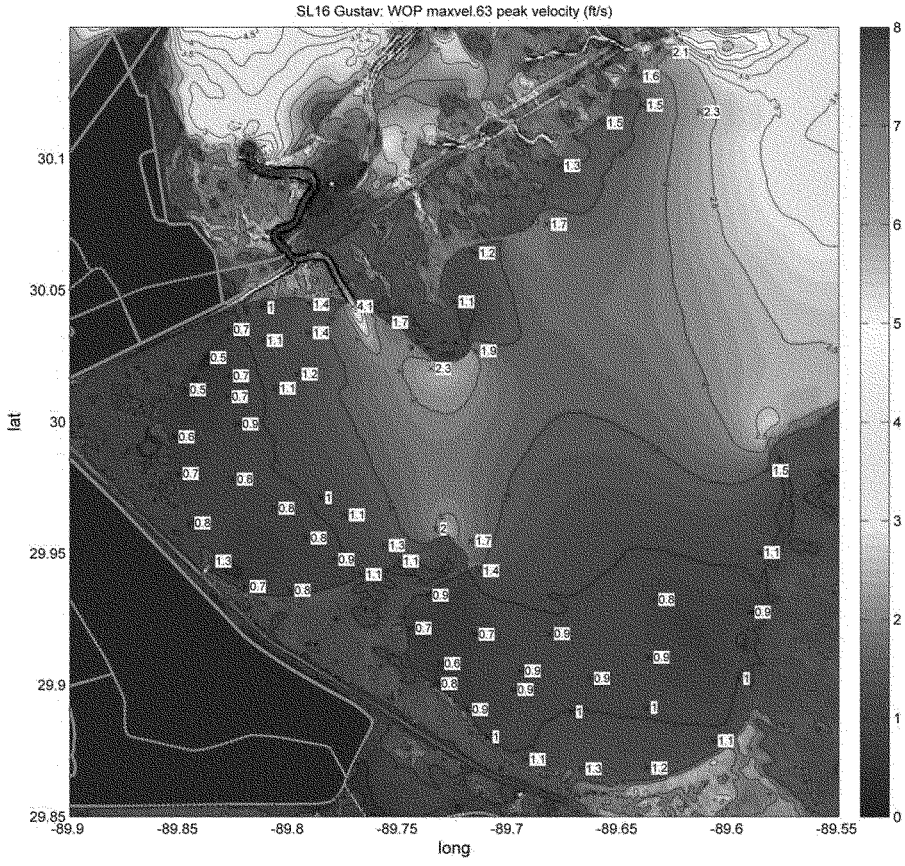


Figure 4-2 ADCIRC+SWAN Peak Velocity for Hurricane Gustav

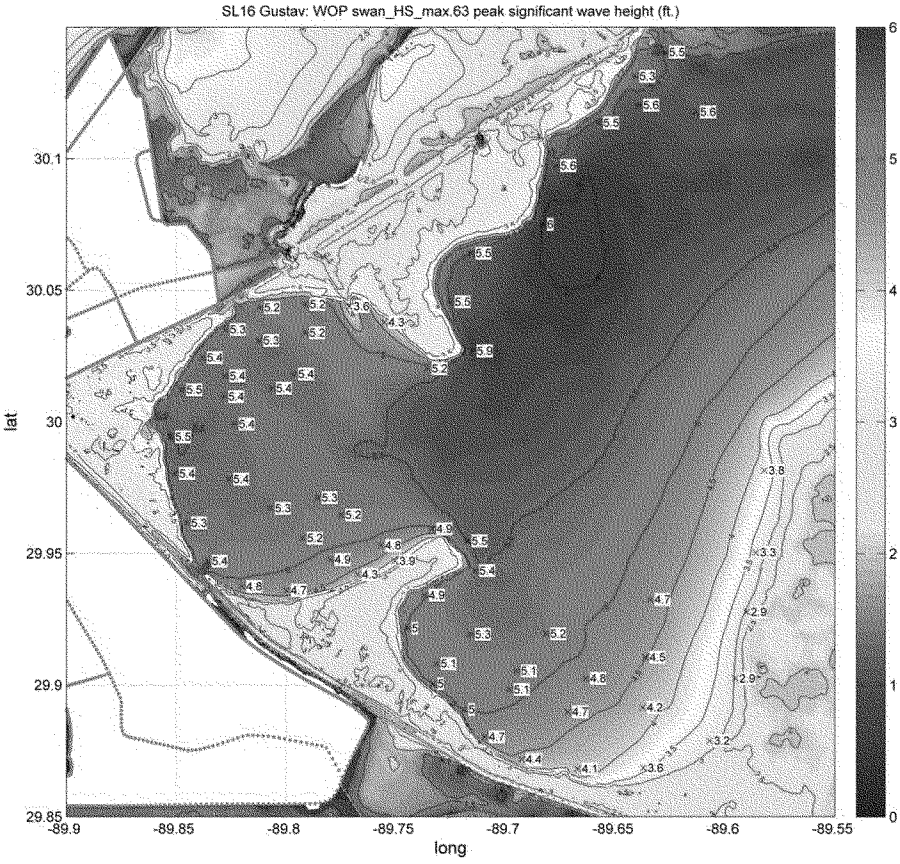


Figure 4-3 ADCIRC+SWAN Peak Significant Wave Height for Hurricane Gustav

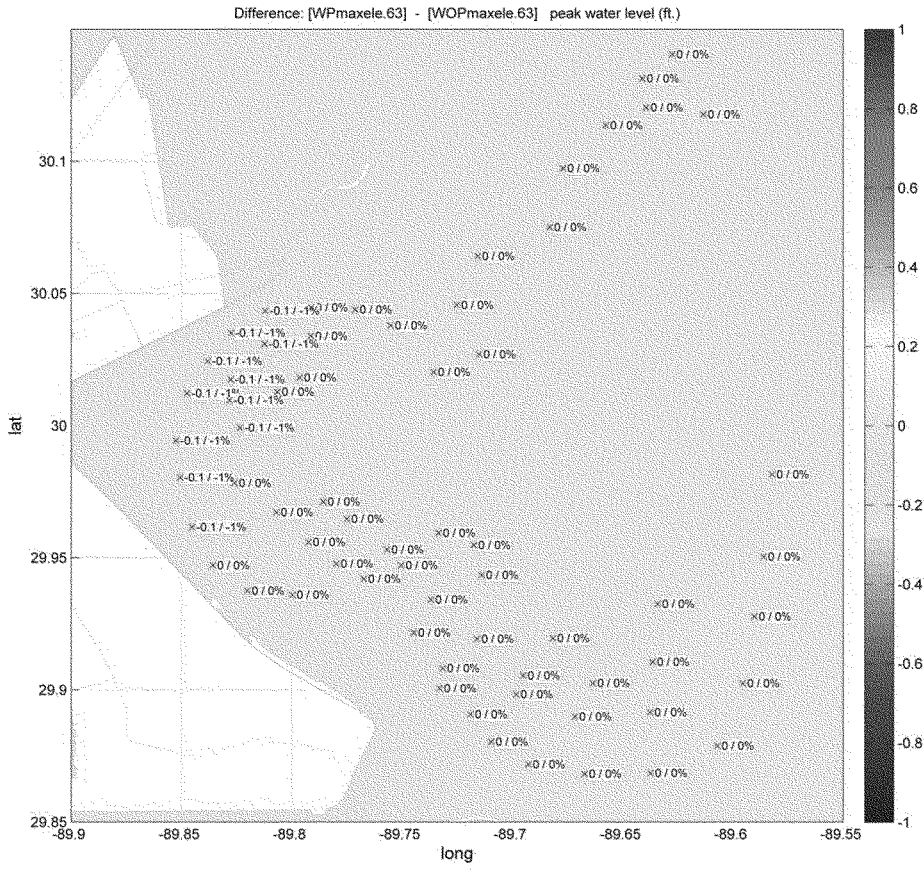


Figure 4-4 ADCIRC+SWAN Difference in Peak Surge Elevation

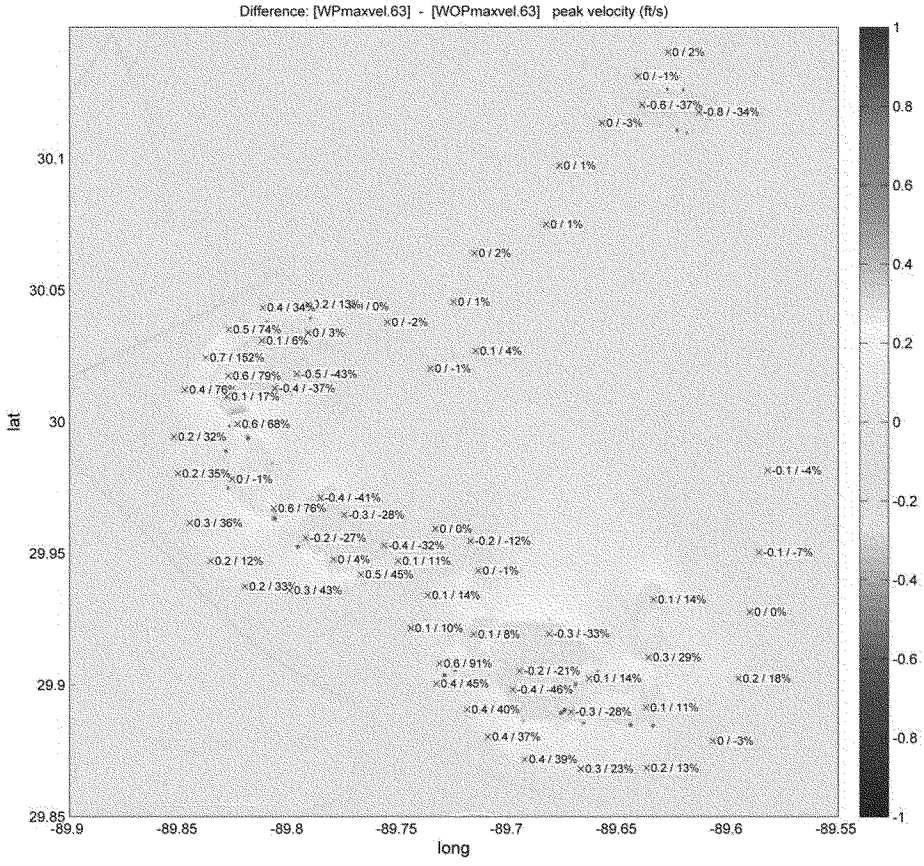


Figure 4-5 ADCIRC+SWAN Difference in Peak Velocity

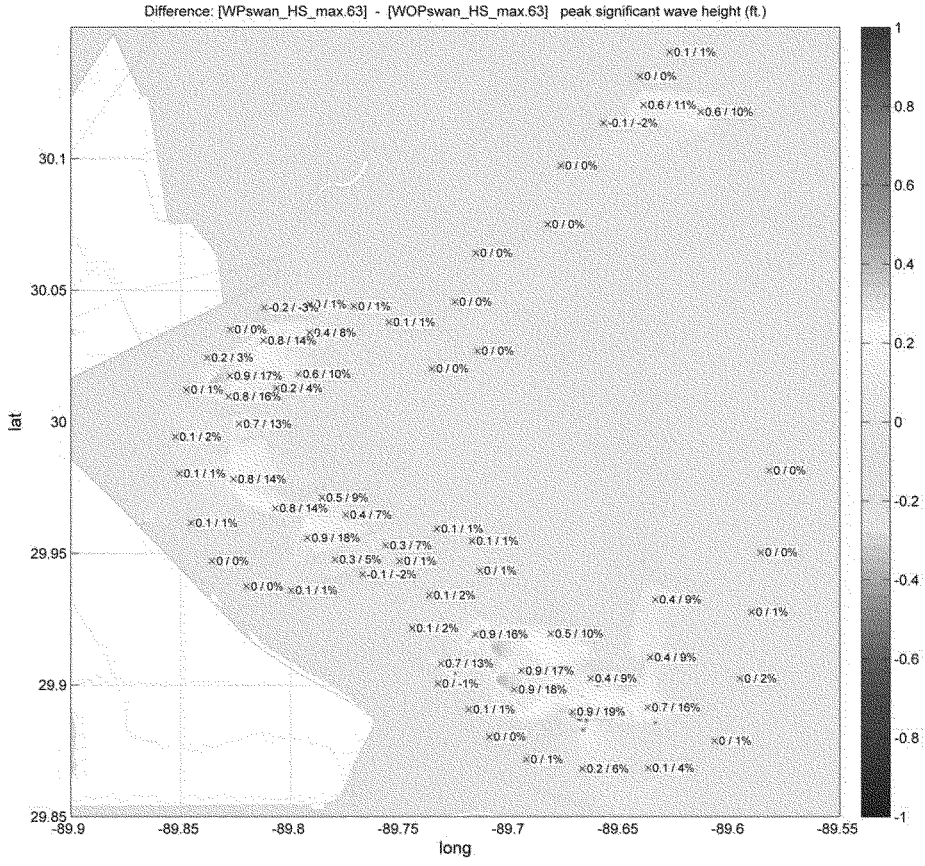


Figure 4-6 ADCIRC+SWAN Difference in Peak Significant Wave Height

5 Conclusions

Very little difference in significant wave height and mean wave period can be attributed to the proposed borrow pits along the Lake Borgne shoreline for the simulated "normal" or "non-storm" conditions. We have calculated a 0 to 4% increase in significant wave height, and a 0 to 3% increase in mean wave period along the shoreline. Within the borrow pits, there can be a substantial increases: 3 to 39% increase to significant wave height and up to a 10% increase in mean wave period. The model results show that much of the increased wave energy is not transferred out of the borrow pit areas. Once the larger waves exit the borrow pit areas, they appear to become depth limited rather quickly. With increased depths, perhaps larger waves developing within the borrow pit areas will propagate to the shoreline. With scenario W30H, we have increased the water lever to 2.5 ft NAVD88, which corresponds to a high tide in Lake Borgne. Even with the increased depth assigned in W30H, larger waves developing within the borrow pit areas do not propagate all the way to the shoreline because they appear to become depth limited.

The simulation of hurricane Gustav provides one example of what could happen during a high impact storm at the Lake Borgne area. Very little change in peak surge elevation was observed. The perturbation to the bottom bathymetry is not enough to significantly alter surge levels in the region of interest. However, the change in peak velocity surrounding the borrow pits is significant. We see a change of up to 0.7 ft/s at the Lake Borgne shoreline, which could be significant in terms of erosion and deposition patterns. The increase is velocity is suspected to occur because the increased depth at the borrow pits transitions suddenly to a shallower depth. As the water column becomes confined to a smaller depth, the velocity increases. For this analysis, we have chosen to use the 2D version of ADCIRC. Perhaps the increase in velocity can be attributed to the 2D nature of ADCIRC, and we could possibly see different results with 3D hydrodynamic modeling.

The simulation of hurricane Gustav shows relatively large significant wave heights forming in Lake Borgne, at about 5.5 ft with a depth of about 18.0 ft. When we add the borrow pits and re-run the simulations, we see a relatively large increase in significant wave height within the borrow pit areas, at about 10 to 20%, or almost 1.0 ft higher. For this simulation, the larger waves that are developing within the borrow pit areas to not propagate far from the borrow pit areas apparently due to depth limitation. The largest increase is about 0.2 ft or 3% at point LB15. Perhaps another storm, which produces greater surges and depths, would allow the larger wave that develop within the borrow pit areas to propagate to the shoreline. However, at a certain surge level, waves developing in Lake Borgne would not be depth limited, and the addition of the borrow pits would make no impact. It is important to note that we have modeled a single example of hurricane conditions in Lake Borgne. Other storms could perhaps draw significantly different conclusions.

6 Appendix A - Tabular Output

Summary of Impacts for Scenario W20								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	1.46	1.47	0.01	0.71%	2.16	2.17	0.01	0.39%
LB2	1.48	1.48	0.00	0.29%	2.25	2.26	0.01	0.27%
LB3	1.68	1.68	0.00	0.00%	2.37	2.37	0.00	0.02%
LB4	1.78	1.78	0.00	0.01%	2.43	2.43	0.00	0.02%
LB5	1.81	1.82	0.01	0.36%	2.40	2.40	0.00	0.18%
LB6	1.41	1.41	0.00	0.09%	2.13	2.13	0.00	0.06%
LB7	1.78	1.78	0.00	0.06%	2.42	2.42	0.00	0.07%
LB8	2.05	2.05	0.00	0.12%	2.62	2.62	0.00	0.10%
LB9	1.45	1.45	0.00	0.11%	2.22	2.22	0.00	0.01%
LB10	1.45	1.45	0.00	0.05%	2.12	2.12	0.00	0.02%
LB11	1.59	1.59	0.00	0.01%	2.21	2.21	0.00	0.01%
LB12	1.53	1.54	0.01	0.46%	2.18	2.19	0.01	0.41%
LB13	1.32	1.34	0.02	1.68%	1.98	2.00	0.03	1.40%
LB14	1.31	1.33	0.02	1.23%	1.96	1.98	0.02	1.07%
LB15	1.33	1.34	0.01	0.83%	1.96	1.99	0.03	1.68%
LB16	1.42	1.43	0.01	1.01%	2.09	2.11	0.02	1.00%
LB17	1.60	1.63	0.03	1.67%	2.21	2.23	0.02	1.05%
LB18	1.69	1.72	0.03	1.58%	2.33	2.35	0.03	1.16%
LB19	1.82	1.85	0.02	1.27%	2.46	2.48	0.02	0.87%
LB20	1.82	1.83	0.01	0.79%	2.44	2.46	0.02	0.68%
LB21	1.62	1.63	0.01	0.69%	2.30	2.31	0.01	0.50%
LB22	1.74	1.76	0.01	0.67%	2.40	2.41	0.01	0.54%
LB23	1.90	1.91	0.01	0.30%	2.56	2.56	0.00	0.17%
LB24	1.87	1.87	0.00	0.13%	2.56	2.56	0.00	-0.08%
LB25	2.14	2.14	0.00	0.03%	2.70	2.70	0.00	-0.03%
LB26	2.13	2.13	0.00	0.06%	2.68	2.68	0.00	0.06%
LB27	1.99	2.00	0.00	0.09%	2.61	2.61	0.00	0.02%
LB28	1.76	1.78	0.02	1.25%	2.43	2.45	0.02	0.86%
LB29	1.87	1.88	0.02	0.88%	2.49	2.51	0.02	0.85%
LB30	1.90	1.92	0.02	1.02%	2.50	2.52	0.02	0.89%
LB31	1.86	1.89	0.03	1.52%	2.46	2.49	0.03	1.38%
LB32	1.62	1.64	0.03	1.55%	2.25	2.28	0.02	1.04%
LB33	1.56	1.57	0.02	1.00%	2.21	2.22	0.01	0.64%
LB34	1.50	1.51	0.00	0.29%	2.16	2.17	0.01	0.31%
LB35	1.61	1.61	0.01	0.36%	2.26	2.26	0.00	0.15%
LB36	1.59	1.61	0.02	1.23%	2.24	2.26	0.02	1.02%

Table continued on following page

Summary of Impacts for Scenario W20								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB37	1.74	1.76	0.02	1.10%	2.37	2.39	0.02	0.98%
LB38	1.83	1.84	0.01	0.82%	2.43	2.44	0.01	0.59%
LB39	1.76	1.77	0.01	0.53%	2.37	2.38	0.01	0.32%
LB40	1.75	1.76	0.01	0.30%	2.37	2.37	0.00	0.16%
P41	1.65	1.78	0.13	8.10%	2.28	2.36	0.08	3.53%
P42	1.60	1.75	0.14	8.96%	2.26	2.34	0.08	3.43%
P43	1.47	1.54	0.08	5.13%	2.12	2.17	0.05	2.37%
P44	1.24	1.34	0.10	8.04%	1.90	1.99	0.08	4.44%
P45	1.40	1.48	0.08	5.57%	2.06	2.11	0.06	2.76%
P46	1.47	1.59	0.12	7.95%	2.12	2.21	0.09	4.25%
P47	1.56	1.67	0.11	7.03%	2.20	2.27	0.07	3.36%
P48	1.45	1.52	0.07	4.88%	2.09	2.14	0.05	2.20%
P49	1.57	1.66	0.10	6.35%	2.21	2.27	0.06	2.80%
P50	1.65	1.79	0.13	8.01%	2.29	2.38	0.09	4.01%
P51	1.81	1.91	0.10	5.74%	2.43	2.49	0.05	2.22%
P52	1.78	1.88	0.10	5.45%	2.41	2.46	0.05	2.02%
P53	1.93	2.06	0.13	6.58%	2.56	2.61	0.06	2.16%
P54	2.01	2.11	0.10	5.07%	2.61	2.63	0.03	0.99%
P55	2.04	2.14	0.10	4.71%	2.64	2.67	0.03	1.26%
P56	2.04	2.11	0.07	3.35%	2.66	2.67	0.01	0.23%
P57	1.80	1.90	0.10	5.65%	2.40	2.45	0.05	2.09%
P58	1.87	1.98	0.11	6.01%	2.46	2.50	0.04	1.77%
P59	1.95	2.04	0.09	4.60%	2.53	2.56	0.03	1.24%
P60	1.80	1.95	0.15	8.38%	2.43	2.52	0.09	3.71%
P61	1.92	2.01	0.10	5.13%	2.52	2.56	0.04	1.71%
P62	1.63	1.76	0.13	7.96%	2.29	2.38	0.09	3.92%
P63	1.88	1.98	0.10	5.43%	2.48	2.52	0.05	1.83%
P64	1.67	1.75	0.08	4.59%	2.27	2.32	0.05	2.13%
P65	1.83	1.93	0.10	5.36%	2.45	2.50	0.05	2.19%
P66	1.91	2.00	0.08	4.42%	2.50	2.53	0.04	1.42%

Table 6-1 Summary of Impacts for Scenario W20

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Summary of Impacts for Scenario W30								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	2.06	2.07	0.02	0.73%	2.45	2.47	0.01	0.60%
LB2	1.92	1.92	0.00	0.15%	2.54	2.55	0.01	0.24%
LB3	2.44	2.44	0.00	-0.01%	2.72	2.72	0.00	0.02%
LB4	2.54	2.54	0.00	0.02%	2.81	2.81	0.00	0.05%
LB5	2.62	2.65	0.03	0.96%	2.75	2.76	0.02	0.62%
LB6	2.07	2.07	0.00	0.00%	2.46	2.46	0.00	0.10%
LB7	2.52	2.53	0.01	0.25%	2.75	2.76	0.01	0.24%
LB8	2.90	2.91	0.01	0.28%	2.97	2.98	0.00	0.15%
LB9	2.14	2.14	0.00	0.17%	2.51	2.51	0.00	0.00%
LB10	2.12	2.12	0.00	0.10%	2.47	2.47	0.00	0.02%
LB11	2.52	2.52	0.00	0.07%	2.61	2.61	0.00	0.02%
LB12	2.31	2.35	0.03	1.48%	2.57	2.59	0.02	0.74%
LB13	1.93	2.01	0.08	4.14%	2.28	2.35	0.07	2.96%
LB14	1.89	1.93	0.04	2.31%	2.25	2.29	0.04	1.89%
LB15	1.95	1.98	0.03	1.68%	2.26	2.32	0.06	2.47%
LB16	2.03	2.09	0.06	2.72%	2.38	2.43	0.05	2.20%
LB17	2.36	2.44	0.08	3.48%	2.55	2.61	0.06	2.23%
LB18	2.49	2.56	0.07	2.84%	2.68	2.74	0.06	2.16%
LB19	2.65	2.71	0.06	2.19%	2.83	2.88	0.05	1.60%
LB20	2.63	2.67	0.04	1.37%	2.81	2.84	0.03	0.95%
LB21	2.32	2.34	0.02	0.82%	2.66	2.68	0.02	0.60%
LB22	2.51	2.53	0.02	0.87%	2.78	2.79	0.02	0.55%
LB23	2.73	2.75	0.01	0.47%	2.94	2.95	0.00	0.17%
LB24	2.74	2.74	0.00	0.08%	2.95	2.94	0.00	-0.07%
LB25	3.08	3.08	0.00	0.01%	3.08	3.08	0.00	0.02%
LB26	3.01	3.01	0.00	0.04%	3.05	3.05	0.00	0.04%
LB27	2.74	2.74	0.00	0.02%	2.98	2.98	0.00	0.05%
LB28	2.37	2.41	0.03	1.43%	2.77	2.84	0.07	2.62%
LB29	2.62	2.66	0.04	1.58%	2.86	2.91	0.05	1.82%
LB30	2.72	2.80	0.08	2.92%	2.88	2.96	0.07	2.57%
LB31	2.65	2.74	0.09	3.26%	2.81	2.89	0.08	2.72%
LB32	2.28	2.35	0.07	3.11%	2.55	2.61	0.06	2.40%
LB33	2.23	2.28	0.04	1.98%	2.52	2.55	0.04	1.47%
LB34	2.19	2.21	0.02	0.99%	2.49	2.51	0.02	0.67%
LB35	2.39	2.41	0.02	1.00%	2.63	2.64	0.01	0.40%
LB36	2.27	2.34	0.07	3.23%	2.55	2.62	0.07	2.56%
LB37	2.49	2.58	0.09	3.57%	2.72	2.80	0.08	2.96%
LB38	2.62	2.67	0.05	1.94%	2.77	2.81	0.04	1.54%

Table continued on following page

Summary of Impacts for Scenario W30								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB39	2.58	2.61	0.03	1.17%	2.73	2.76	0.02	0.84%
LB40	2.64	2.65	0.01	0.37%	2.78	2.79	0.01	0.33%
P41	2.37	2.69	0.32	13.55%	2.61	2.72	0.11	4.30%
P42	2.31	2.63	0.32	13.90%	2.61	2.70	0.09	3.51%
P43	2.21	2.37	0.17	7.54%	2.48	2.53	0.05	1.91%
P44	1.79	2.07	0.28	15.61%	2.19	2.35	0.15	7.01%
P45	2.04	2.27	0.24	11.53%	2.37	2.47	0.09	3.82%
P46	2.13	2.46	0.33	15.74%	2.42	2.59	0.16	6.68%
P47	2.27	2.55	0.28	12.30%	2.53	2.64	0.11	4.34%
P48	2.12	2.29	0.17	7.97%	2.42	2.48	0.06	2.49%
P49	2.34	2.56	0.22	9.25%	2.57	2.64	0.07	2.80%
P50	2.41	2.74	0.32	13.44%	2.64	2.77	0.13	4.90%
P51	2.61	2.84	0.23	8.70%	2.80	2.85	0.05	1.89%
P52	2.59	2.81	0.23	8.84%	2.77	2.83	0.05	1.94%
P53	2.78	3.14	0.36	13.01%	2.93	3.02	0.09	3.13%
P54	2.88	3.05	0.18	6.08%	2.97	2.97	0.00	-0.04%
P55	2.89	3.17	0.28	9.77%	3.01	3.06	0.05	1.73%
P56	2.92	3.04	0.12	4.12%	3.04	3.02	-0.02	-0.79%
P57	2.72	3.00	0.28	10.13%	2.83	2.90	0.07	2.39%
P58	2.74	2.98	0.24	8.70%	2.86	2.92	0.05	1.91%
P59	2.91	3.10	0.19	6.60%	2.96	2.97	0.01	0.45%
P60	2.69	3.01	0.33	12.12%	2.80	2.93	0.14	4.85%
P61	2.80	3.14	0.34	12.08%	2.92	3.00	0.08	2.89%
P62	2.40	2.68	0.27	11.28%	2.65	2.76	0.11	4.04%
P63	2.70	2.90	0.20	7.40%	2.83	2.87	0.04	1.34%
P64	2.56	2.82	0.26	10.17%	2.69	2.80	0.11	3.98%
P65	2.62	2.93	0.31	11.88%	2.79	2.89	0.10	3.56%
P66	2.84	3.07	0.23	7.93%	2.92	2.95	0.03	1.08%

Table 6-2 Summary of Impacts for Scenario W30

Summary of Impacts for Scenario W40								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	2.22	2.24	0.02	0.77%	2.54	2.55	0.01	0.51%
LB2	2.21	2.22	0.01	0.36%	2.63	2.64	0.01	0.27%
LB3	2.58	2.58	0.00	0.01%	2.78	2.78	0.00	0.01%
LB4	2.70	2.71	0.00	0.03%	2.87	2.87	0.00	0.05%
LB5	2.77	2.79	0.02	0.67%	2.81	2.82	0.01	0.44%
LB6	2.19	2.19	0.00	0.00%	2.51	2.52	0.00	0.08%
LB7	2.67	2.67	0.00	0.16%	2.81	2.82	0.01	0.18%
LB8	3.06	3.07	0.01	0.17%	3.04	3.04	0.00	0.15%
LB9	2.27	2.27	0.00	0.18%	2.59	2.59	0.00	0.01%
LB10	2.25	2.25	0.00	0.06%	2.53	2.53	0.00	0.04%
LB11	2.60	2.60	0.00	0.05%	2.66	2.66	0.00	0.02%
LB12	2.43	2.46	0.03	1.14%	2.61	2.63	0.02	0.60%
LB13	2.04	2.11	0.06	3.11%	2.35	2.40	0.05	2.23%
LB14	2.01	2.05	0.03	1.73%	2.32	2.36	0.03	1.48%
LB15	2.06	2.08	0.03	1.24%	2.33	2.36	0.03	1.33%
LB16	2.14	2.19	0.05	2.18%	2.44	2.48	0.04	1.61%
LB17	2.48	2.54	0.07	2.63%	2.60	2.64	0.04	1.60%
LB18	2.62	2.68	0.06	2.31%	2.73	2.78	0.05	1.74%
LB19	2.80	2.85	0.06	1.99%	2.88	2.92	0.04	1.36%
LB20	2.77	2.80	0.04	1.31%	2.86	2.89	0.03	0.93%
LB21	2.44	2.46	0.02	0.78%	2.70	2.71	0.02	0.56%
LB22	2.62	2.65	0.02	0.85%	2.82	2.83	0.01	0.50%
LB23	2.87	2.88	0.01	0.36%	2.99	3.00	0.01	0.22%
LB24	2.88	2.88	0.00	0.10%	3.01	3.01	0.00	0.00%
LB25	3.23	3.23	0.00	0.04%	3.14	3.15	0.00	0.04%
LB26	3.19	3.19	0.00	0.05%	3.12	3.12	0.00	0.04%
LB27	2.97	2.98	0.00	0.06%	3.04	3.04	0.00	0.03%
LB28	2.68	2.73	0.06	2.14%	2.88	2.93	0.06	1.93%
LB29	2.87	2.92	0.06	2.02%	2.96	3.02	0.06	1.89%
LB30	2.92	3.00	0.08	2.67%	2.97	3.04	0.07	2.23%
LB31	2.84	2.92	0.07	2.55%	2.90	2.96	0.07	2.33%
LB32	2.45	2.51	0.06	2.25%	2.64	2.69	0.05	1.76%
LB33	2.40	2.43	0.03	1.34%	2.61	2.63	0.03	0.98%
LB34	2.33	2.35	0.02	0.81%	2.56	2.57	0.01	0.54%
LB35	2.51	2.53	0.02	0.69%	2.69	2.70	0.01	0.34%
LB36	2.42	2.48	0.06	2.34%	2.63	2.68	0.05	1.97%
LB37	2.66	2.74	0.08	2.99%	2.80	2.86	0.06	2.31%
LB38	2.77	2.82	0.05	1.80%	2.84	2.88	0.04	1.29%

Table continued on following page

Summary of Impacts for Scenario W40								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB39	2.71	2.74	0.03	1.02%	2.79	2.81	0.02	0.71%
LB40	2.77	2.78	0.01	0.28%	2.83	2.84	0.01	0.27%
P41	2.51	2.81	0.29	11.57%	2.68	2.79	0.11	4.01%
P42	2.42	2.70	0.28	11.47%	2.65	2.75	0.09	3.57%
P43	2.30	2.45	0.15	6.34%	2.52	2.58	0.05	2.02%
P44	1.89	2.12	0.23	12.14%	2.25	2.40	0.15	6.86%
P45	2.17	2.39	0.22	10.32%	2.42	2.53	0.10	4.23%
P46	2.23	2.51	0.29	12.80%	2.47	2.62	0.14	5.73%
P47	2.39	2.63	0.24	10.08%	2.59	2.69	0.10	3.98%
P48	2.22	2.37	0.15	6.91%	2.47	2.53	0.06	2.39%
P49	2.45	2.65	0.20	8.07%	2.62	2.69	0.08	2.87%
P50	2.52	2.81	0.28	11.27%	2.68	2.81	0.13	4.71%
P51	2.73	2.93	0.20	7.49%	2.84	2.90	0.06	2.19%
P52	2.70	2.91	0.21	7.79%	2.82	2.88	0.06	2.06%
P53	2.92	3.24	0.32	10.82%	2.99	3.08	0.09	3.03%
P54	3.04	3.20	0.16	5.36%	3.04	3.05	0.01	0.32%
P55	3.05	3.30	0.24	7.97%	3.07	3.13	0.06	1.80%
P56	3.08	3.19	0.11	3.52%	3.10	3.09	-0.01	-0.32%
P57	2.89	3.13	0.24	8.20%	2.91	2.97	0.06	2.03%
P58	2.93	3.16	0.23	7.85%	2.95	3.01	0.06	1.96%
P59	3.05	3.23	0.17	5.69%	3.02	3.04	0.02	0.71%
P60	2.84	3.13	0.29	10.20%	2.87	2.99	0.12	4.06%
P61	2.95	3.24	0.29	10.01%	2.98	3.06	0.08	2.75%
P62	2.53	2.77	0.25	9.71%	2.71	2.81	0.10	3.84%
P63	2.84	3.03	0.19	6.63%	2.90	2.94	0.04	1.49%
P64	2.71	2.93	0.22	8.00%	2.76	2.85	0.09	3.33%
P65	2.78	3.06	0.28	9.95%	2.87	2.96	0.09	3.11%
P66	2.97	3.17	0.19	6.55%	2.97	3.01	0.03	1.05%

Table 6-3 Summary of Impacts for Scenario W40

DRAFT

Summary of Impacts for Scenario W50								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	2.47	2.49	0.02	0.88%	2.62	2.63	0.01	0.22%
LB2	2.05	2.05	0.00	0.11%	2.73	2.73	0.00	0.11%
LB3	2.82	2.82	0.00	0.01%	2.96	2.96	0.00	0.02%
LB4	2.97	2.97	0.00	0.00%	3.05	3.05	0.00	-0.01%
LB5	3.32	3.35	0.03	0.94%	3.04	3.06	0.02	0.76%
LB6	2.68	2.68	0.00	0.00%	2.80	2.80	0.00	0.03%
LB7	3.02	3.02	0.00	0.02%	3.02	3.02	0.00	0.09%
LB8	3.42	3.42	0.00	0.09%	3.17	3.17	0.00	0.09%
LB9	2.59	2.60	0.00	0.16%	2.73	2.74	0.01	0.40%
LB10	2.55	2.55	0.00	0.04%	2.66	2.66	0.00	0.05%
LB11	3.24	3.25	0.01	0.16%	2.85	2.85	0.00	0.01%
LB12	2.79	2.84	0.04	1.59%	2.76	2.81	0.05	1.77%
LB13	2.47	2.56	0.09	3.85%	2.52	2.60	0.08	3.36%
LB14	2.42	2.49	0.07	2.90%	2.49	2.55	0.07	2.64%
LB15	2.52	2.60	0.08	3.02%	2.54	2.61	0.07	2.74%
LB16	2.58	2.65	0.07	2.73%	2.63	2.69	0.06	2.35%
LB17	2.94	3.02	0.08	2.75%	2.80	2.86	0.06	2.19%
LB18	3.04	3.08	0.04	1.26%	2.95	3.00	0.05	1.85%
LB19	3.11	3.13	0.02	0.52%	3.08	3.11	0.03	0.90%
LB20	3.12	3.12	0.01	0.30%	2.99	3.00	0.01	0.21%
LB21	2.92	2.92	0.00	0.06%	3.05	3.04	-0.01	-0.21%
LB22	3.11	3.12	0.01	0.46%	3.12	3.14	0.02	0.50%
LB23	3.28	3.31	0.03	1.05%	3.20	3.22	0.02	0.49%
LB24	3.28	3.28	0.01	0.18%	3.19	3.18	-0.01	-0.22%
LB25	3.62	3.62	0.00	-0.06%	3.30	3.30	0.00	-0.08%
LB26	3.43	3.43	0.00	0.01%	3.27	3.27	0.00	-0.05%
LB27	3.00	3.00	0.00	0.00%	3.22	3.22	0.00	-0.01%
LB28	2.54	2.55	0.01	0.56%	2.86	2.93	0.07	2.48%
LB29	2.86	2.88	0.01	0.43%	2.97	3.01	0.04	1.48%
LB30	3.08	3.12	0.04	1.26%	3.04	3.11	0.06	2.13%
LB31	3.13	3.17	0.04	1.28%	3.03	3.10	0.07	2.28%
LB32	2.91	2.96	0.05	1.85%	2.85	2.89	0.05	1.60%
LB33	2.80	2.83	0.04	1.38%	2.76	2.80	0.04	1.48%
LB34	2.76	2.79	0.03	0.95%	2.75	2.77	0.02	0.66%
LB35	2.95	2.97	0.02	0.66%	2.90	2.91	0.01	0.34%
LB36	2.76	2.81	0.04	1.62%	2.78	2.84	0.06	2.27%
LB37	2.94	2.98	0.03	1.17%	2.95	3.03	0.08	2.71%
LB38	3.20	3.23	0.03	0.97%	3.04	3.09	0.04	1.42%

Table continued on following page

Summary of Impacts for Scenario W50								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB39	3.25	3.28	0.03	0.96%	3.02	3.04	0.03	0.89%
LB40	3.18	3.19	0.01	0.18%	3.03	3.04	0.01	0.33%
P41	2.92	3.54	0.63	21.51%	2.88	3.01	0.13	4.46%
P42	2.82	3.50	0.68	23.90%	2.96	3.02	0.07	2.24%
P43	2.75	3.11	0.36	13.00%	2.73	2.79	0.06	2.20%
P44	2.33	2.79	0.46	19.62%	2.45	2.63	0.18	7.35%
P45	2.63	3.06	0.43	16.46%	2.65	2.73	0.08	3.07%
P46	2.73	3.30	0.57	21.06%	2.69	2.88	0.19	7.19%
P47	2.85	3.34	0.49	17.07%	2.78	2.91	0.13	4.67%
P48	2.75	3.02	0.27	9.70%	2.71	2.75	0.04	1.55%
P49	2.95	3.32	0.37	12.49%	2.84	2.90	0.06	2.08%
P50	3.09	3.66	0.56	18.26%	2.93	3.09	0.15	5.28%
P51	3.27	3.66	0.39	12.05%	3.10	3.13	0.03	0.87%
P52	3.25	3.65	0.40	12.23%	3.08	3.10	0.02	0.71%
P53	3.35	4.06	0.71	21.04%	3.17	3.29	0.12	3.67%
P54	3.39	3.71	0.32	9.34%	3.19	3.14	-0.05	-1.54%
P55	3.33	3.95	0.62	18.69%	3.20	3.29	0.09	2.77%
P56	3.34	3.62	0.29	8.67%	3.23	3.17	-0.05	-1.69%
P57	3.14	3.69	0.55	17.51%	3.03	3.11	0.08	2.64%
P58	3.12	3.45	0.33	10.75%	3.01	3.03	0.02	0.70%
P59	3.50	3.84	0.34	9.70%	3.18	3.18	0.00	-0.07%
P60	3.28	4.02	0.74	22.64%	3.07	3.25	0.17	5.63%
P61	3.37	4.11	0.74	21.82%	3.15	3.29	0.14	4.41%
P62	3.14	3.58	0.44	14.02%	3.00	3.08	0.08	2.75%
P63	3.35	3.65	0.30	9.00%	3.09	3.10	0.01	0.29%
P64	3.25	3.80	0.56	17.10%	2.98	3.14	0.15	5.18%
P65	3.25	3.79	0.54	16.69%	3.04	3.16	0.12	4.01%
P66	3.50	3.93	0.42	12.02%	3.19	3.22	0.03	0.91%

Table 6-4 Summary of Impacts for Scenario W50

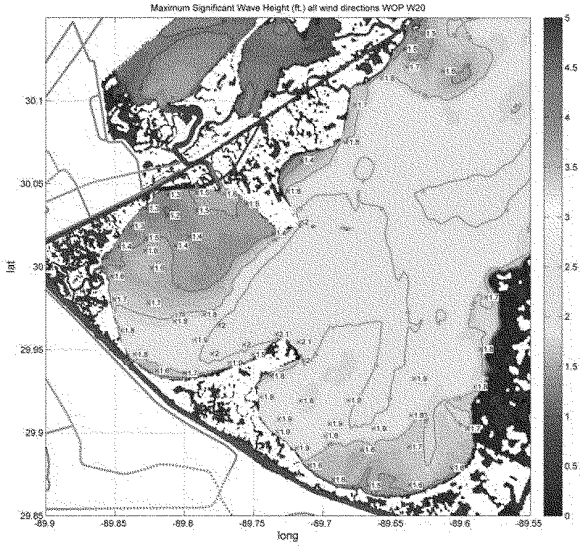
Summary of Impacts for Scenario W30H								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB1	2.68	2.70	0.02	0.76%	2.63	2.65	0.02	0.74%
LB2	2.12	2.12	0.00	0.16%	2.80	2.80	0.00	0.13%
LB3	2.92	2.93	0.00	0.13%	3.06	3.06	0.00	0.02%
LB4	3.10	3.10	0.00	-0.02%	3.16	3.16	0.00	0.02%
LB5	3.77	3.78	0.01	0.29%	3.34	3.35	0.01	0.38%
LB6	2.99	2.99	0.00	-0.04%	2.98	2.98	0.00	-0.13%
LB7	3.16	3.16	0.00	0.00%	3.10	3.10	0.00	-0.08%
LB8	3.64	3.64	0.00	-0.02%	3.28	3.27	-0.01	-0.18%
LB9	2.72	2.72	0.00	0.03%	2.85	2.85	0.00	0.14%
LB10	2.68	2.70	0.02	0.59%	2.72	2.72	0.00	0.12%
LB11	3.58	3.62	0.03	0.94%	2.93	2.94	0.01	0.33%
LB12	2.98	3.02	0.04	1.29%	2.83	2.91	0.07	2.57%
LB13	2.73	2.77	0.04	1.44%	2.64	2.69	0.05	1.86%
LB14	2.74	2.80	0.06	2.17%	2.65	2.72	0.07	2.73%
LB15	2.96	3.02	0.06	1.99%	2.76	2.83	0.06	2.35%
LB16	2.94	2.97	0.02	0.84%	2.79	2.81	0.02	0.74%
LB17	3.23	3.26	0.03	1.07%	2.94	2.98	0.04	1.29%
LB18	3.20	3.21	0.01	0.36%	3.04	3.06	0.02	0.69%
LB19	3.23	3.24	0.00	0.12%	3.11	3.13	0.01	0.48%
LB20	3.29	3.29	0.00	0.01%	2.97	2.97	-0.01	-0.26%
LB21	3.04	3.04	0.00	0.07%	3.07	3.04	-0.03	-0.85%
LB22	3.25	3.27	0.02	0.60%	3.21	3.22	0.01	0.31%
LB23	3.44	3.49	0.05	1.44%	3.29	3.30	0.01	0.43%
LB24	3.46	3.48	0.02	0.54%	3.25	3.24	-0.01	-0.23%
LB25	3.80	3.80	0.00	0.03%	3.36	3.36	0.00	-0.14%
LB26	3.54	3.54	0.00	0.04%	3.30	3.30	0.00	-0.12%
LB27	3.07	3.07	0.00	0.00%	3.34	3.34	-0.01	-0.16%
LB28	2.61	2.62	0.00	0.08%	2.91	2.91	0.00	-0.04%
LB29	2.97	2.97	0.00	0.00%	3.01	3.00	-0.01	-0.18%
LB30	3.22	3.24	0.01	0.35%	3.12	3.13	0.01	0.47%
LB31	3.31	3.32	0.01	0.36%	3.14	3.17	0.03	0.86%
LB32	3.23	3.27	0.04	1.12%	2.98	3.03	0.05	1.57%
LB33	3.01	3.03	0.02	0.57%	2.88	2.90	0.02	0.64%
LB34	2.96	2.98	0.02	0.81%	2.79	2.83	0.04	1.48%
LB35	3.11	3.12	0.01	0.38%	2.95	3.00	0.05	1.68%
LB36	2.95	2.95	0.00	-0.09%	2.93	2.91	-0.02	-0.62%
LB37	3.09	3.09	0.01	0.16%	3.07	3.10	0.03	0.83%
LB38	3.39	3.40	0.01	0.22%	3.15	3.16	0.02	0.53%

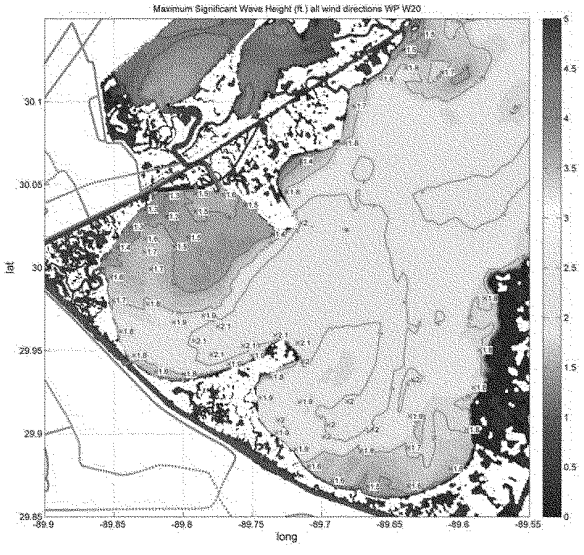
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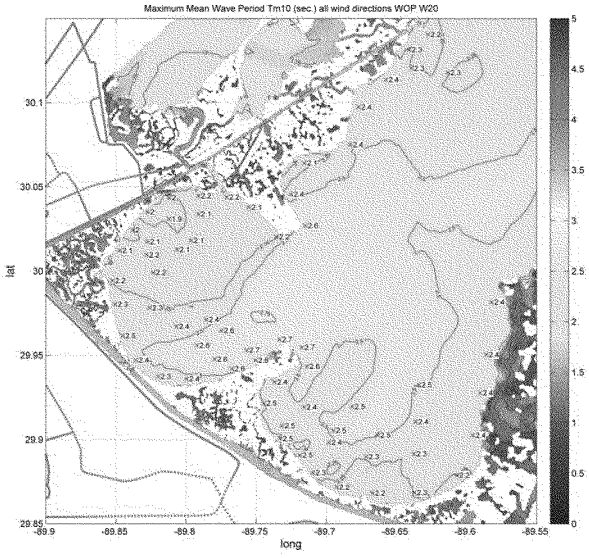
Summary of Impacts for Scenario W30H								
Point ID	Significant Wave Height Hs (ft.)				Mean Wave Period Tm10 (sec.)			
	WOP (ft)	WP (ft)	Dif. (ft)	% Dif	WOP (sec)	WP (sec)	Dif. (sec)	% Dif
LB39	3.55	3.56	0.01	0.15%	3.18	3.18	0.01	0.21%
LB40	3.35	3.36	0.01	0.28%	3.10	3.11	0.01	0.44%
P41	3.14	4.27	1.13	36.07%	3.08	3.23	0.14	4.67%
P42	2.95	4.11	1.15	38.94%	3.05	3.20	0.16	5.16%
P43	2.95	3.66	0.71	23.94%	2.79	2.97	0.18	6.32%
P44	2.73	3.48	0.75	27.53%	2.65	2.86	0.21	7.88%
P45	2.93	3.76	0.83	28.23%	2.77	2.96	0.19	6.89%
P46	3.09	4.02	0.93	30.11%	2.82	3.09	0.27	9.66%
P47	3.10	3.96	0.85	27.54%	2.84	3.04	0.20	6.89%
P48	3.08	3.57	0.49	15.81%	2.87	2.90	0.03	1.01%
P49	3.15	3.82	0.68	21.49%	2.91	3.01	0.10	3.52%
P50	3.33	4.34	1.01	30.23%	2.99	3.24	0.25	8.37%
P51	3.47	4.11	0.64	18.37%	3.17	3.20	0.03	0.90%
P52	3.51	4.19	0.68	19.36%	3.18	3.21	0.02	0.78%
P53	3.52	4.66	1.14	32.55%	3.22	3.41	0.19	5.92%
P54	3.54	4.14	0.60	17.07%	3.20	3.14	-0.06	-1.76%
P55	3.48	4.42	0.94	27.09%	3.25	3.38	0.13	4.03%
P56	3.48	4.07	0.60	17.17%	3.27	3.20	-0.06	-1.94%
P57	3.29	4.11	0.82	24.90%	3.10	3.21	0.11	3.55%
P58	3.27	3.74	0.47	14.37%	3.06	3.05	-0.02	-0.58%
P59	3.70	4.45	0.75	20.30%	3.24	3.26	0.02	0.53%
P60	3.50	4.84	1.34	38.11%	3.24	3.46	0.23	6.98%
P61	3.56	4.88	1.32	36.98%	3.22	3.44	0.22	6.81%
P62	3.46	4.31	0.84	24.30%	3.06	3.23	0.17	5.62%
P63	3.65	4.14	0.49	13.51%	3.30	3.25	-0.06	-1.73%
P64	3.51	4.61	1.10	31.36%	3.12	3.37	0.25	8.11%
P65	3.54	4.30	0.76	21.54%	3.20	3.31	0.11	3.44%
P66	3.73	4.39	0.66	17.64%	3.25	3.30	0.04	1.38%

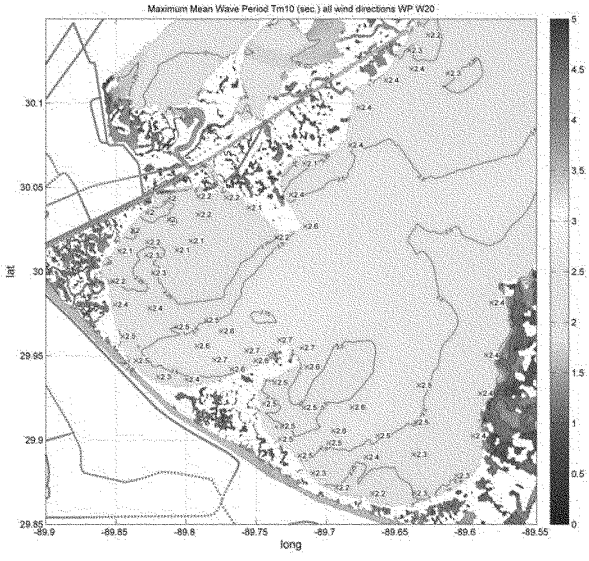
Table 6-5 Summary of Impacts for Scenario W30H

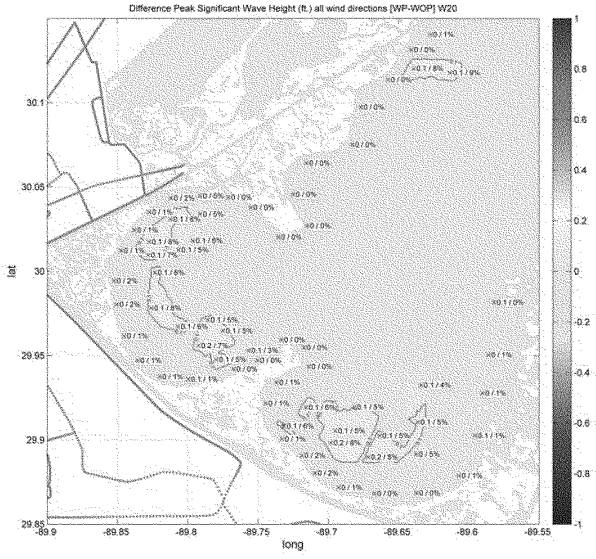
7 Appendix B - 2D SWAN Output

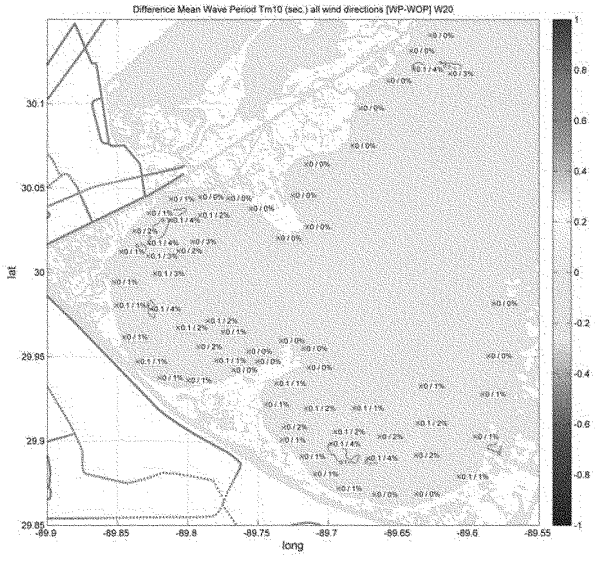


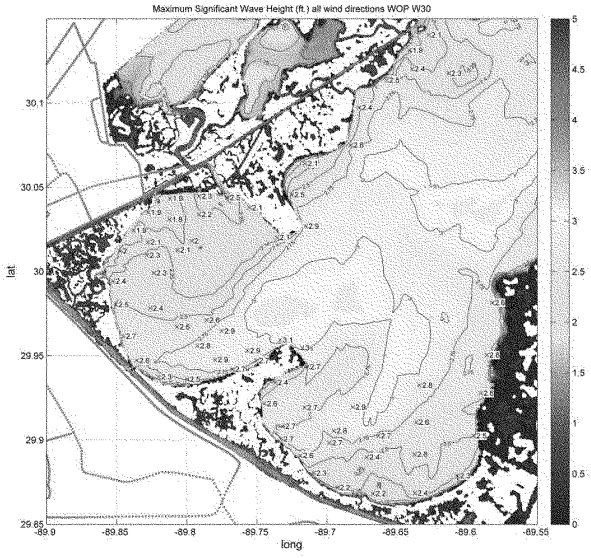


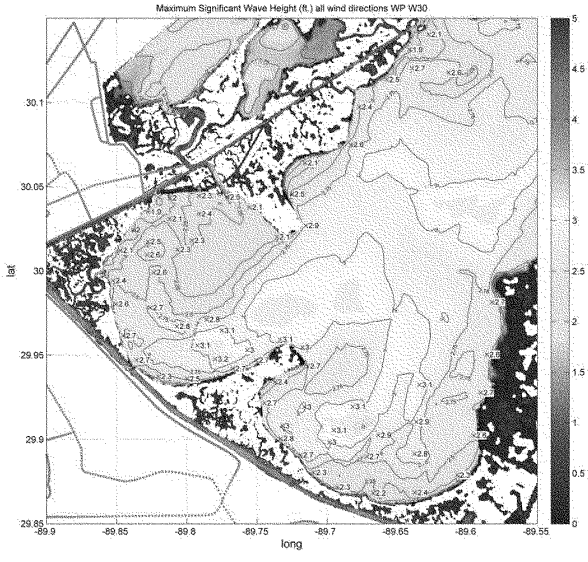

Maximum Mean Wave Period Tm10 (sec.) all wind directions WOP W20
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

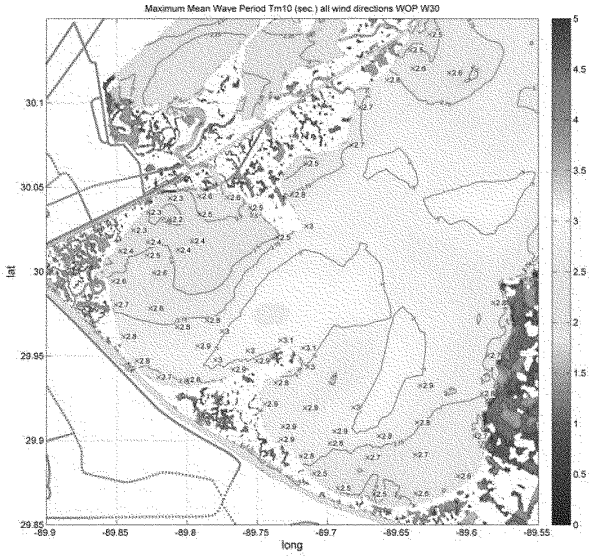

Maximum Mean Wave Period Tm10 (sec.) all wind directions WP W20
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

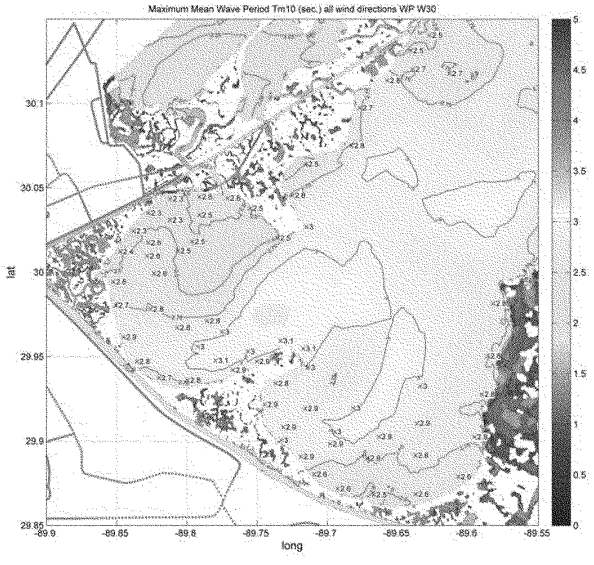

Difference Peak Significant Wave Height (ft.) all wind directions [WP-WOP] W20
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

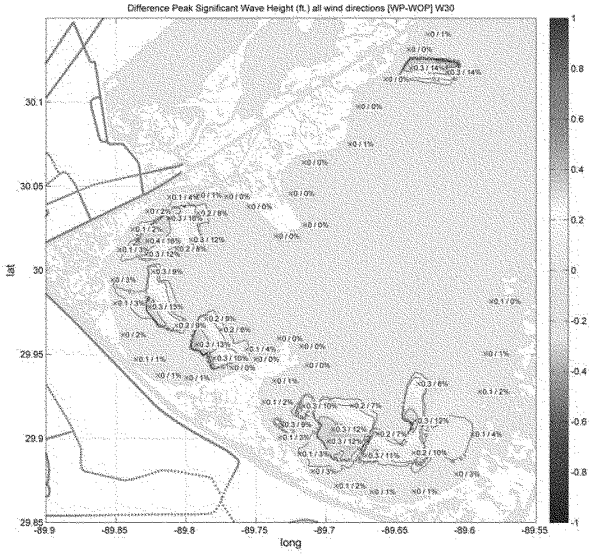

Difference Mean Wave Period Tm10 (sec.) all wind directions [WP-WOP] W20
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
1
0.8
0.6
0.4
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0
-0.2
-0.4
-0.6
-0.8
-1

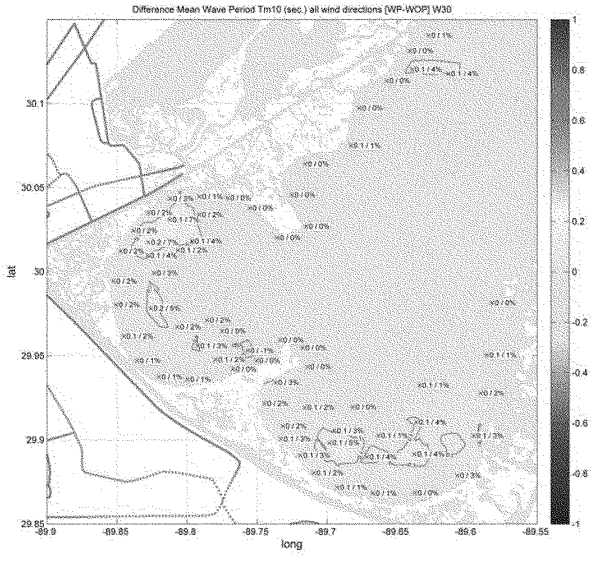

Maximum Significant Wave Height (ft.) all wind directions WOP W30
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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4.5
4
3.5
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2.5
2
1.5
1
0.5
0

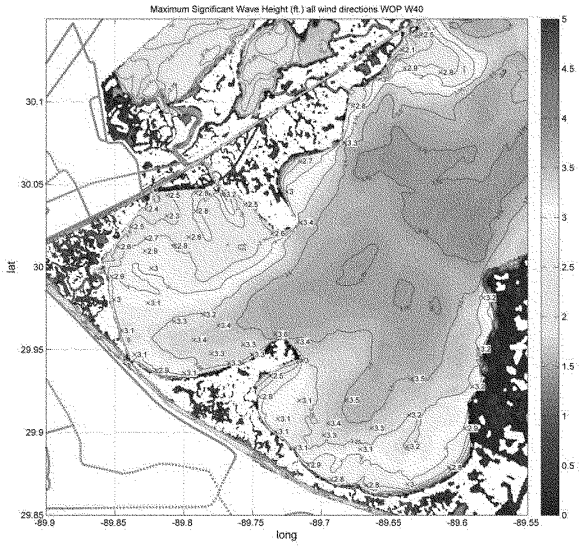

Maximum Significant Wave Height (ft.) all wind directions WP W30
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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3.5
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1.5
1
0.5
0

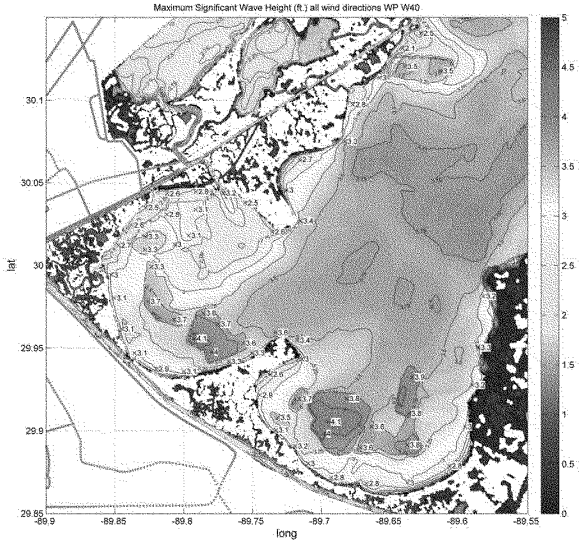

Maximum Mean Wave Period Tm10 (sec.) all wind directions WOP W30
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
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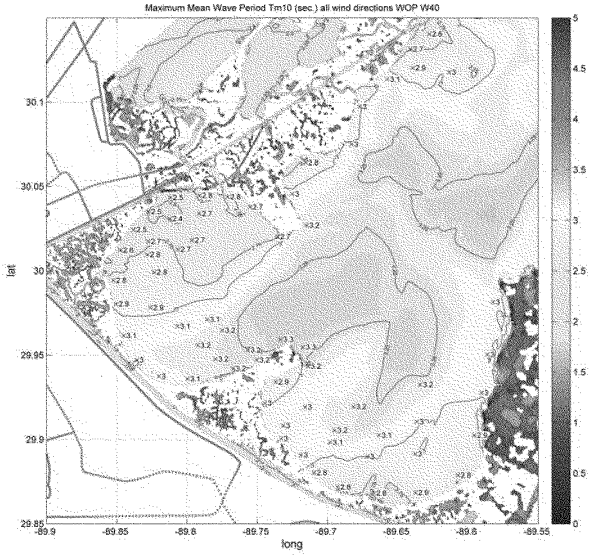

Maximum Mean Wave Period Tm10 (sec.) all wind directions WP W30
lat
long
30.1
30.05
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29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
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-89.6
-89.55
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3.5
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1
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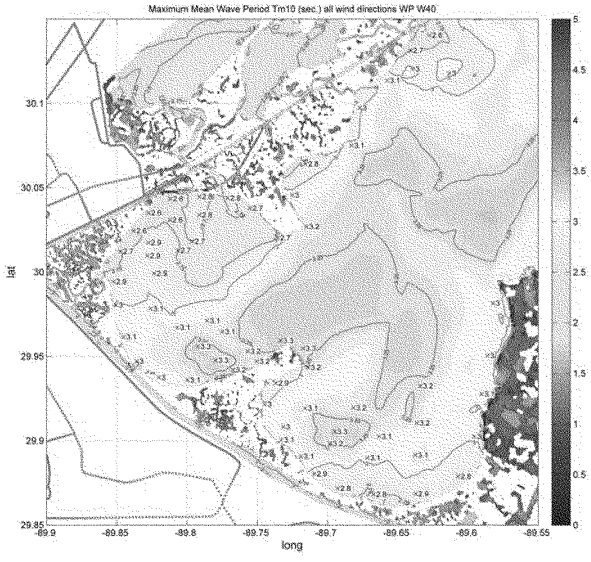

Difference Peak Significant Wave Height (ft.) all wind directions [WP-WOP] W30
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

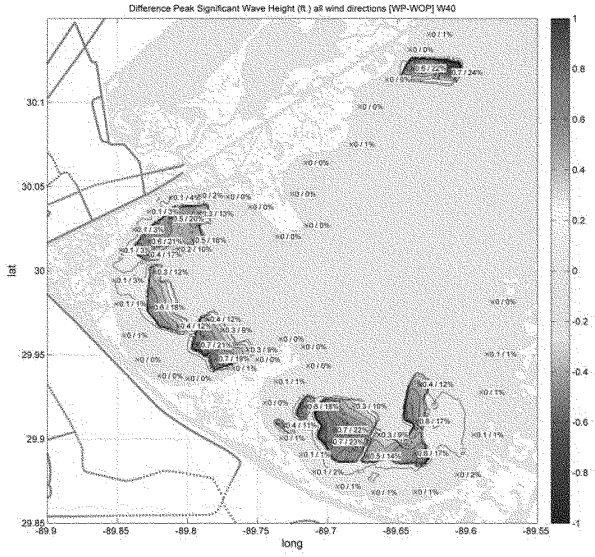

Difference Mean Wave Period Tm10 (sec.) all wind directions [WP-WOP] W30
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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-0.2
-0.4
-0.6
-0.8
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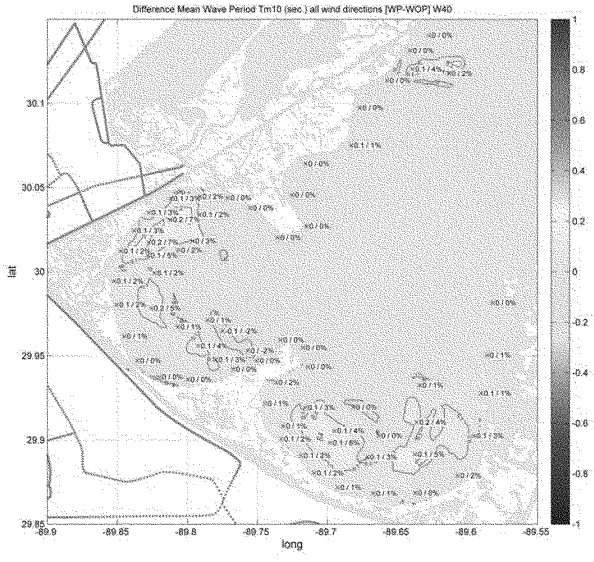

Maximum Significant Wave Height (ft.) all wind directions WOP W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

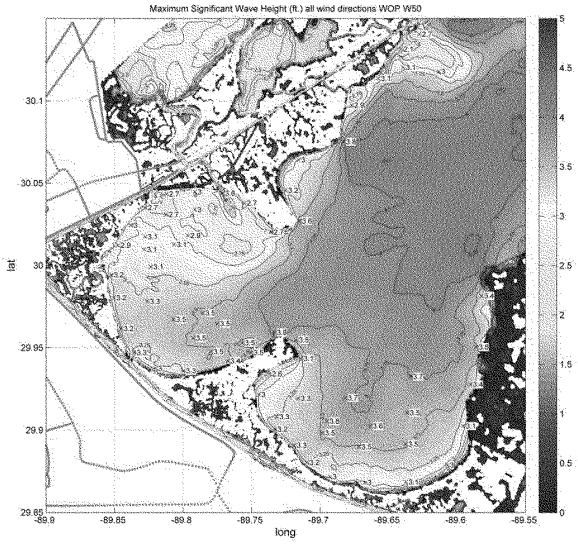

Maximum Significant Wave Height (ft.) all wind directions WP W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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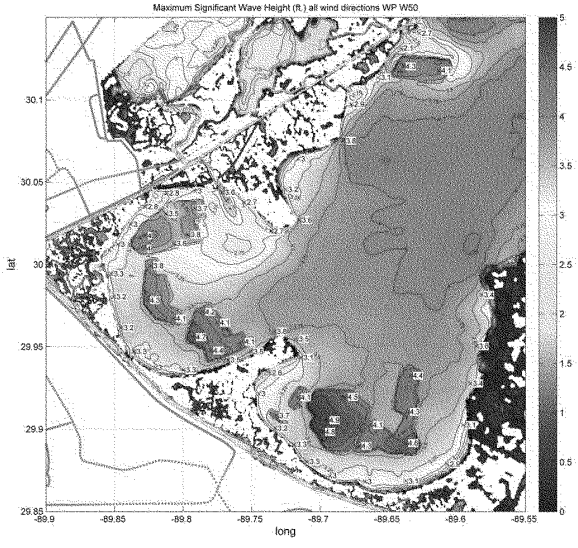

Maximum Mean Wave Period Tm10 (sec.) all wind directions WOP W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
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4
3.5
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1.5
1
0.5
0

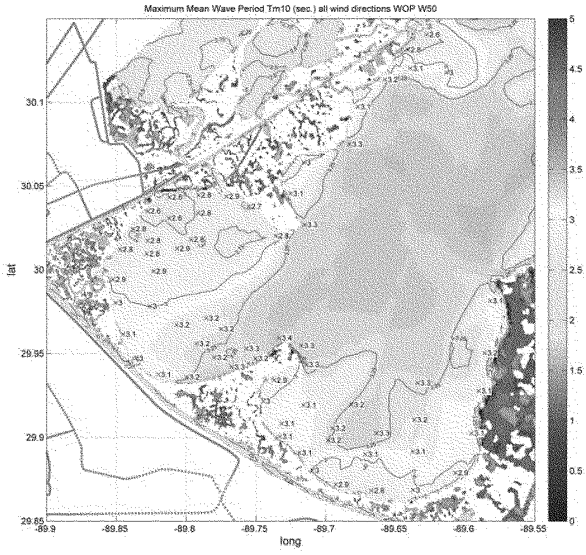

Maximum Mean Wave Period Tm10 (sec.) all wind directions WP W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
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-89.8
-89.75
-89.7
-89.65
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-89.55
5
4.5
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3.5
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2.5
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1.5
1
0.5
0

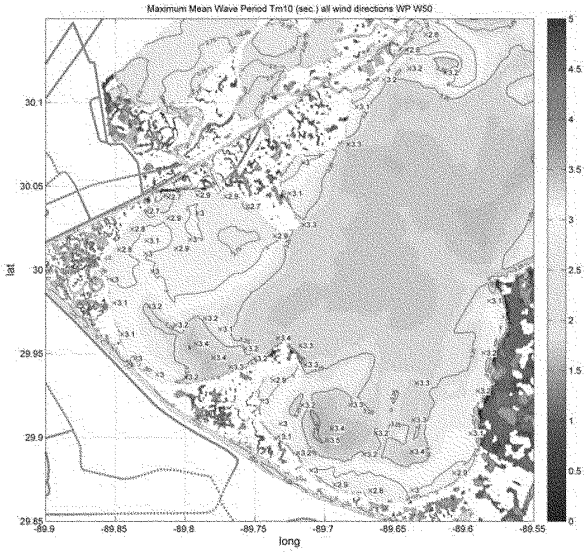

Difference Peak Significant Wave Height (ft.) all wind directions [WP-WOP] W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

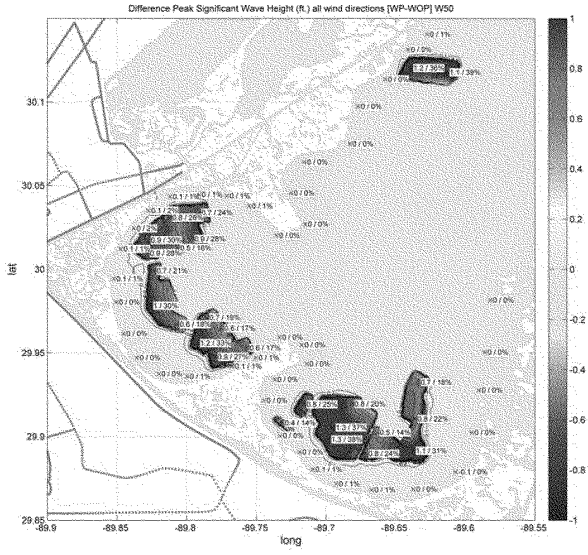

Difference Mean Wave Period Tm10 (sec.) all wind directions [WP-WOP] W40
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
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0.6
0.4
0.2
0
-0.2
-0.4
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-0.8
-1

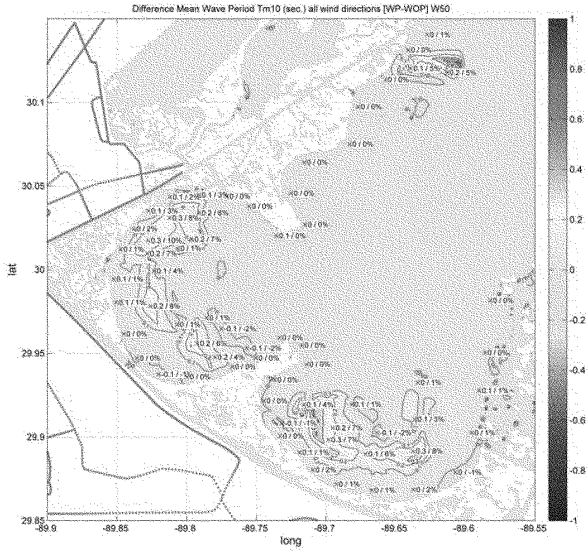

Maximum Significant Wave Height (ft.) all wind directions WOP W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

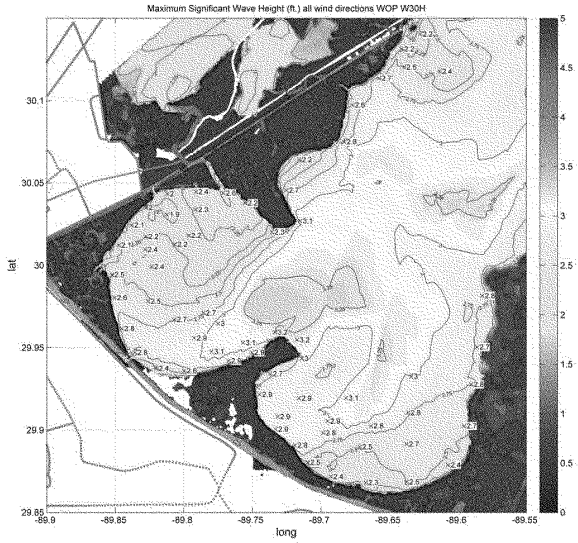

Maximum Significant Wave Height (ft.) all wind directions WP W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

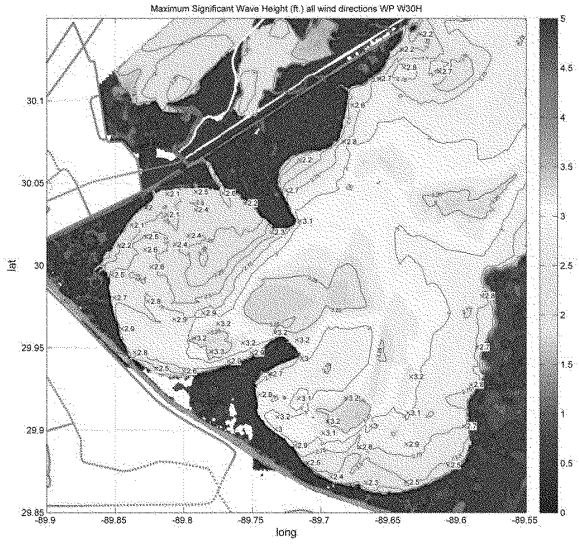

Maximum Mean Wave Period Tm10 (sec.) all wind directions WOP W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
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2.5
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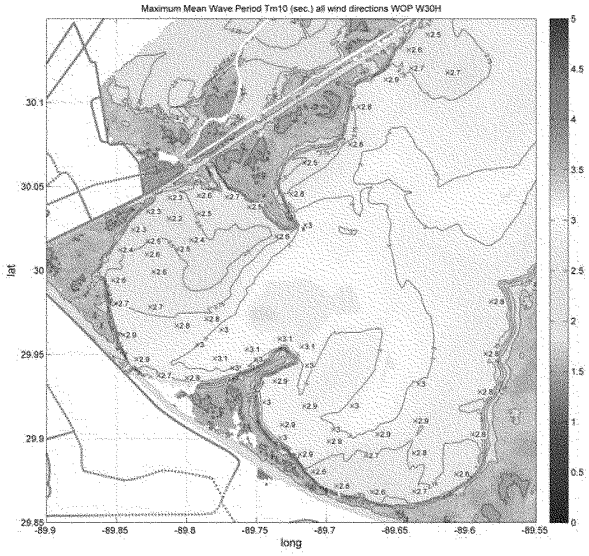

Maximum Mean Wave Period Tm10 (sec.) all wind directions WP W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0

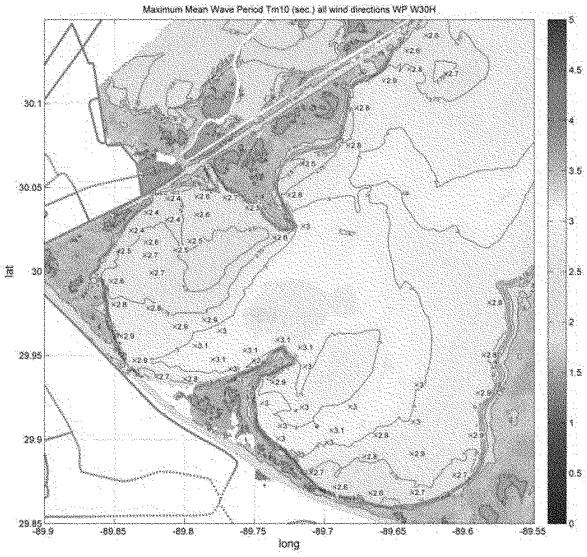

Difference Peak Significant Wave Height (ft.) all wind directions [WP-WOP] W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

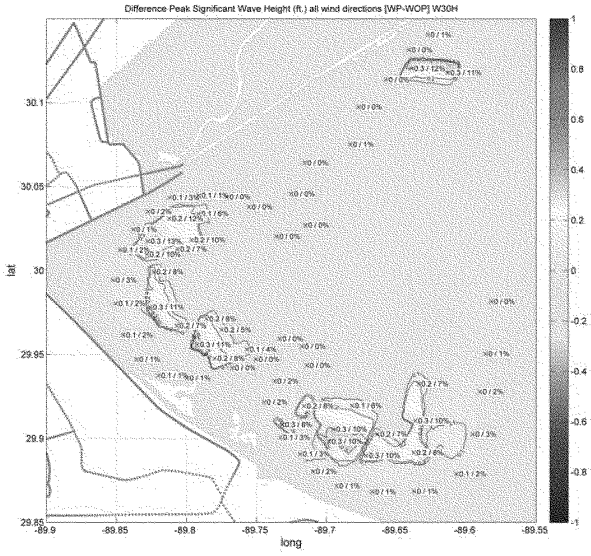

Difference Mean Wave Period Tm10 (sec.) all wind directions [WP-WOP] W50
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
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-0.4
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-1

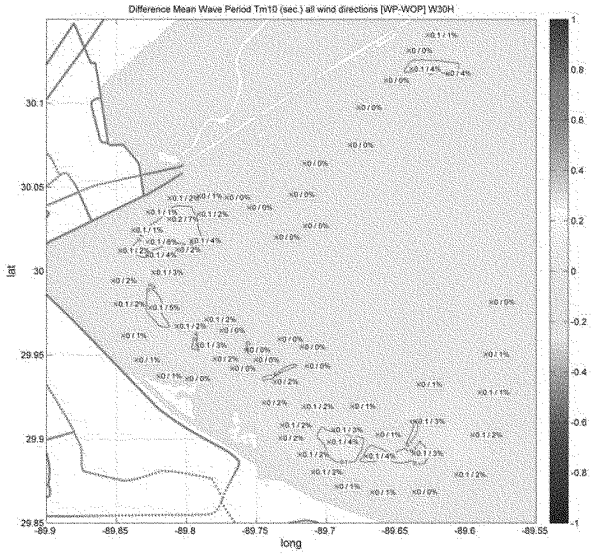

Maximum Significant Wave Height (ft.) all wind directions WOP W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0


Maximum Significant Wave Height (ft.) all wind directions WP W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0


Maximum Mean Wave Period Tm10 (sec.) all wind directions WOP W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0


Maximum Mean Wave Period Tm10 (sec.) all wind directions WP W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0


Difference Peak Significant Wave Height (ft.) all wind directions [WP-WOP] W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1


Difference Mean Wave Period Tm10 (sec.) all wind directions [WP-WOP] W30H
lat
long
30.1
30.05
30
29.95
29.9
29.85
-89.9
-89.85
-89.8
-89.75
-89.7
-89.65
-89.6
-89.55
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

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APPENDIX
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Additional study is needed to improve decisions about where, when, and how to divert Mississippi River flows in a systems context. Therefore, the final recommendations for the MRGO Ecosystem Restoration Plan include additional analysis, design and implementation of the Violet Freshwater Diversion as authorized by WRDA 2007 Section 3083.

The yearly operational scheme of the Violet diversion to benefit cypress swamp and marsh restoration as part of the MRGO ecosystem restoration feasibility study is based on the required hydroperiod and depth constraints of bald cypress (*Taxodium distichum* L.) phenology and seasonal water levels based on the Mississippi River stage. Because of the specific requirements of bald cypress, it was used as an indicator of conditions conductive to swamp tupelo (*Nyssa aquatica* L.) and other constituents of forested wetland. In addition, maiden cane (*Panicum hemitomon*) and bull tongue (*Sagittaria lancifolia*) are dominant species of fresh/intermediate marsh and marsh-hay cordgrass (*Spartina patens*) of brackish marsh. These species are often used as indicators of ecosystem health and restoration success.

The Mississippi River follows a general sinusoidal pattern of rise and fall by season in both wet and dry years. Bald cypress and swamp tupelo are adapted to the historical, seasonal changes in hydroperiod due to the River and are able to exploit the natural conditions presented to insure

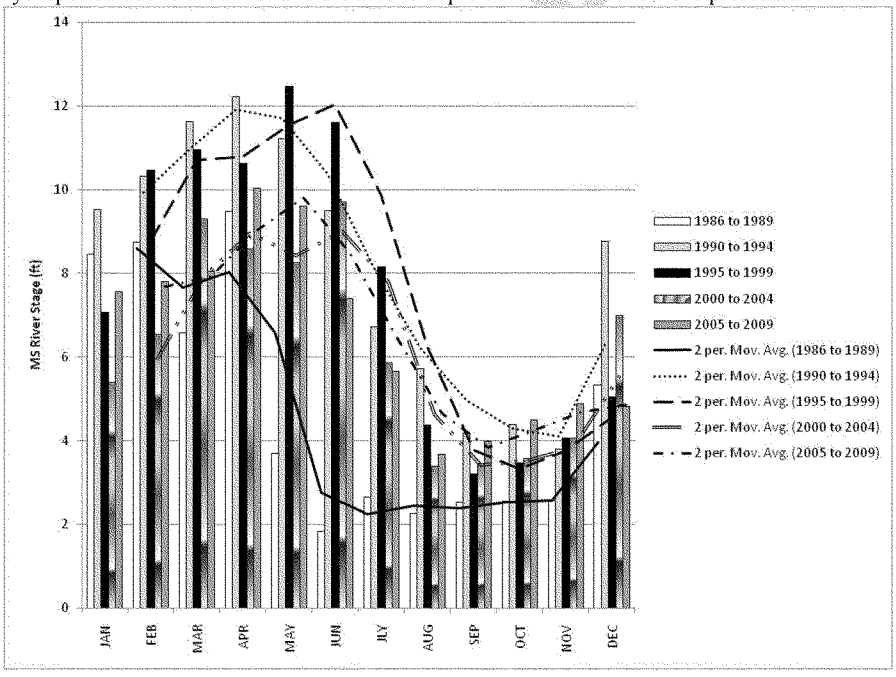


Figure 1. River stage (ft) by month of 5yr average time periods illustrating predictable rise and fall from 1986 to 2009. This pattern holds prior to 1986. Data from the Mississippi River at New Orleans, Carrollton, Gage #01300, gage zero at 0ft. NGVD29, river mile 102.8.

survival. The critical environmental factor for successful cypress seedling germination and establishment is the periodic flooding and drying of the forested wetland consisting of fresh to low-salinity water. Changes in the traditional hydrologic regime due to anthropogenic and natural forces have impacted the ability of southeastern swamps to reproduce successfully.

The Violet diversion presents the opportunity to aid in reestablishment of natural hydrologic cycles conducive to bald cypress and tupelo establishment, growth, and reproduction. The Coastal Wetland Forest Conservation and Use Science Working Group (CWFCU-SWG) was commissioned by the Governor of Louisiana with the mission "to provide information and guidelines for the long-term utilization, conservation, and protection of Louisiana's coastal wetland forest ecosystem, from both environmental and economic perspectives" (CWFCU-SWG 2005). The subsequent research, findings, and recommendations are invaluable tools when determining conditions needed for establishment, growth, and reproduction of bald cypress swamp and were incorporated in determining the operational scheme.

The Violet diversion is designed so that management of the estimated base flow of 1,000 cfs or greater can provide conditions favorable to bald cypress germination, growth, and reproduction by controlling depth and duration of inundation and salinity levels. Although an estimated 7,000 cfs diversion rate is needed to achieve required salinity levels in May in the Biloxi marsh target area, management of the diversion control structures will allow maintenance of favorable conditions for forested wetlands.

Studies have shown that primary productivity is higher in forested wetlands that are open to flow and have a more "pulsing" hydrologic regime following a seasonal pattern (Figure 1) than a stagnant, continually flooded regime. This also reduces competition from less flood-tolerant species. Bald cypress is tolerant of long flood durations and relatively deep flooding coupled with low salinity levels (< 2ppt) except during germination and seedling growth. Fluctuating water levels within the root zone will aid in preventing constant anoxic conditions. From greenhouse and field studies, it appears that a periodic drawdown of approximately -15 cm is sufficient to periodically aerate the wetland soils. In addition, flow should be maintained at a level as not to become stagnant for an extended period of time leading to low dissolved oxygen levels in both the soil and water. Tidal exchange and base flow rate should be adequate to prevent widespread stagnation. This base level coupled with the seasonal hydroperiod developed for bald cypress should be sufficient, if not advantageous, to restore and maintain swamp and marsh. Bald cypress and swamp tupelo are stimulated by water level and benefit from the lack of competition from less flood-tolerant trees, scrub/shrub, and plants.

General operations scheme

Initially it is advisable to operate the diversion at a reduced level for the first two to three years after swamp plantings to allow for establishment and habitat switching. This scheme presents general depth and duration of flooding and is not dependent upon cyclic climatic events. Wet and dry years should be incorporated into the operations scheme as indicated by river stage. Every 3 to 5 years, a drawdown should be initiated in March (after seed fall and dispersal) to approximately 4 to 6 inches below swamp surface. The drawdown should continue through the growing season until November to aid in reestablishment. An adaptive management plan will further insure sustainability.

The diversion should be operated to achieve a salinity level conducive to fresh swamp and marsh conditions during the growing season with a maximum not to exceed of 2 ppt.

January: low sheet-flow rate and flooding depth <1ft above marsh surface for seed dispersal.

February: begin drawdown to approximately 4 to 6 inches below marsh surface to provide aerobic conditions needed for germination and initial growth

March: continue drawdown to aid in germination and initial growth.

April: continue drawdown to aid in germination and initial growth. Gradually increase water level at or near surface elevation to stimulate seedling growth.

May: although the full diversion scenario of 7,000 cfs will be in effect, the water level in the CWA to be maintained at or near surface elevation.

June: maintain water level near surface and some sheet flow to prevent establishment of undesirable and less flood-tolerant plants that are able to out-compete target species under drier conditions

July: manipulate background flow of 1,000 cfs to maintain water level near surface to prevent establishment of undesirable and less flood-tolerant plants that are able to out-compete and shade bald cypress and swamp tupelo under drier conditions.

August: same as July

September: same as July

October: begin low flow for seed dispersal <1ft above marsh surface. Cypress seedlings are estimated to grow at least 8 inches in one year. Flood level should not overtop seedlings ideally for more than two weeks or at the most one and a half months

November: low flow for seed dispersal above marsh surface (≤ 1ft)

December: low flow for seed dispersal above marsh surface (≤ 1ft)

Effects of the operation scheme on fresh and intermediate marsh restoration

As with bald cypress and tupelo, many fresh and intermediate marsh plants are adapted to the seasonal hydroperiod of the Mississippi River. Increased flooding depths during the growing season have been shown to stimulate growth in many fresh/intermediate marsh plants and some brackish plants with the exception species like marsh-hay cordgrass. In addition, marsh plants benefit from the lack of competition from less flood-tolerant plants and less fluctuating, lower, salinity levels. Optimal flooding for fresh and intermediate marshes is assumed to occur at 50% inundation per year, whereas optimal flooding for brackish marsh was assumed to occur at 40% (Habitat Switching module). The assumptions of the Habitat Switching Module are well within flood tolerance ranges of fresh and intermediate marsh plants such as maidencane and bull-tongue, as well as brackish marsh plants such as marsh-hay cordgrass. Thus, the operational scheme developed for bald cypress should be sufficient, if not advantageous, to restore and maintain wetland marsh.

Coastal Wetland Forest Conservation and Use Science Working Group (SWG). *Conservation, Protection and Utilization of Louisiana's Coastal Wetland Forests*. 03 April 2005. 121p.

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http://www.coastalforestswg.lsu.edu/

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MRGO Ecosystem Restoration Plan Feasibility Study
Salinity Working Group Report

Introduction:

The Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan Feasibility Study is being developed to provide a comprehensive ecosystem restoration plan for the Lake Borgne ecosystem and adjacent areas affected by the MRGO channel (MRGO Fact Sheet, 2009). Among the many issues and opportunities being addressed by the study is the potential for diversion of freshwater into the system, including a proposed diversion in the vicinity of Violet, Louisiana (Figure 1). Increasing freshwater input is being considered as a mechanism to counteract saltwater intrusion, increase oyster productivity, and enhance the growth of salt marsh plants. Previously, a diversion had been proposed for the Bonnet Carrè outlet into Lake Pontchartrain and many of the same issues and concerns relating to appropriate goals and potential environmental impacts were discussed in the project feasibility report (USACE 1984). A Salinity Working Group (SWG) was organized in the fall of 2008 to review the appropriateness of applying the target salinities and general conclusions reached during the Bonnet Carrè study to the proposed Violet diversion. The group consists of representatives from the U.S. Army Corps of Engineers, federal and state agencies, universities, private industry and nongovernmental organizations (Table 1). To date, three meetings of the SWG have been held: November 14, 2008 (USACE New Orleans), December 1, 2008 (Mississippi Department of Marine Resources, Biloxi, MS), and April 20, 2009 (USACE New Orleans). In this report, conclusions reached by the SWG to date are discussed, the results of subsequent modeling efforts recommended by the group described, and additional information relevant to objectives of the SWG presented.

Bonnet Carrè Freshwater Diversion Feasibility Study (USACE 1984).

The Bonnet Carrè Freshwater Diversion Feasibility Study (USACE 1984) was developed to address questions relating to what salinity levels would be most appropriate to achieve, over what spatial extent of the salinity reduction should occur, and what impacts might result to other biological resources from a diversion at the outlet of the Bonnet Carrè diversion structure into Lake Pontchartrain. The consensus of the group producing the feasibility report was that the salinity goals or targets should mimic those optimal for oyster production on the premise that oysters are the dominant species in the area and that most other species would respond in a similar manner.

Target salinities for oyster production were derived from Chatry et al. (19983), an empirical study of optimal conditions for production of seed oysters in Louisiana (Figure 2). The greatest production was reported when salinities averaged less than 15 from February to July with values between 7 and 9 ppt in April and May; maximum salinities were around 15 ppt. The preference for salinities less than 15 ppt is based on oyster survival; at salinities above 15 oyster survival is reduced due to increased predation and incidence of diseases such as *Perkinsis marinus* ("Dermo"). Cake (1983) has summarized conditions on many Gulf of Mexico oyster beds and indicated that in salinities averaging 10 ppt (range 0-15) beds tend to be sparse with low spatfall, and relatively slow growth, but good spat survival whereas, optimal densities, high spatfall and

spat survival, and moderate growth is realized at a mean salinity of 15 (range = 10-20). At salinities averaging 25 ppt or above, although growth is rapid, population densities, spatfall, and spat survival are generally moderate to low.

The target area for salinity reduction was delimited by the so-called Ford and Palmisano lines (Figure 3). These are not strict geographic locations but rather represent projected optimal positions of the 15 ppt isohaline (i.e., where salinities average 15 ppt over the period of a tidal cycle). The Ford line represents where the isohaline should be between April and September to enhance fisheries productivity, especially oyster production, while the Palmisano line marks the optimal position from October to March to increase production of furbearing wildlife. The lines were not meant to demarcate precise locations or constant salinity conditions but rather an average position where salinities fluctuate around the specified isohaline. The Ford line in particular, was intended to mimic conditions of river overflow as occurred prior to levee construction. Although neither line extended into Mississippi waters due to jurisdictional issues, it was assumed that freshening would occur beyond the Louisiana state boundary. While achieving these isohalines was expected to increase fisheries productivity, it was also expected to improve conditions for nearby salt marshes. It was assumed that marsh loss in the Biloxi Marsh area was related to slow growth resulting from salinity encroachment.

Some negative impacts resulting from a freshwater diversion were also postulated for both oyster and non-oyster fisheries. Specifically, a diversion would probably reduce salinities to 5 ppt or less in Lake Borgne, eliminating this area as a viable commercial oyster producing site. Oysters are killed by exposure to salinities of 2 or less and reproduction is reduced at salinities less than 6. They also pointed out that Mississippi River water is 6-8 °C cooler than Mississippi Sound waters from January through April and this could negatively affect brown shrimp (*Farfantepenaeus aztecus*) populations. Brown shrimp experience both peak spawning and maximum larval abundance between March and May (Turner and Brody 1983) and production is generally reduced at salinities less than 20 and temperatures below 10 °C. In contrast, production of white shrimp (*Litopenaeus setiferus*), which reproduce later in the year and are somewhat more tolerant of lower salinities, might be enhanced.

In their final work session the Bonnet Carrè diversion team concluded that it would be desirable to reestablish salinity conditions in the Biloxi Marshes as long as these were similar to historical conditions when over-bank flooding of the Mississippi River occurred. The structure should not be operated continuously but, only when a ten percent or greater drought occurred. They estimated that such conditions only occurred in four or five years of a ten year period. It was assumed that continuous operation had a high probability of creating salinities too low for optimal oyster production. The team assumed that other fisheries species would be displaced seaward during operation and would experience decreased production during these periods. Introduction of nutrients to the system following a diversion was expected to enhance long-term productivity of the system.

MRGO Salinity Working Group

The MRGO Salinity Working Group (SWG) was established to review the salinity goals (targets) of Bonnet Carrè Freshwater Diversion Feasibility Study, determine if these targets were

still valid, decide if the conclusions reached by the Bonnet Carrè team were applicable to the Violet Diversion study, and examine any additional relevant information that has become available since the 1984 report. The initial meeting was convened on November 14, 2008 at the U.S. Army Engineer District, New Orleans during which the MRGO Ecosystem Restoration Feasibility Study and the proposed Violet Diversion were described, the results and conclusions of the Bonnet Carrè study briefly discussed, and the Chatry et al (1983) study described (Attachment 1).

A consensus was reached that the original salinity targets, i.e. the criteria set down in Chatry et al. (1983), were still valid especially if a lower limit of 5 ppt was incorporated. It was also noted that the Bonnet Carrè team's conclusion that oyster beds in Lake Borgne would no longer be viable due to salinity reduction was very likely true. Subsequent discussions focused on the limitations of the 1984 study and the need to incorporate more recent information in interpreting where and when the salinity targets might to be realized. Specifically, plans to close the MRGO and changes in the landscape of the Biloxi Marshes since 19984 could result in substantive changes in how water moves through the system and thus alter the isohaline positions. It was concluded that additional information on historic conditions should be gathered and projections made based on the altered landscape. Such considerations should include the entire MRGO ecosystem, including Mississippi Sound waters excluded during the 1984 study, and the effects of other potential engineering projects within the system.

The opinion was expressed that the effects of the diversion on non-oyster resources as well as the potential for eutrophication resulting from introduction of nutrient rich river waters should be evaluated on an equal basis with effects on oysters. This view, in essence, questioned the original assumption that creating conditions conducive to oyster production would also improve conditions for both marshes and non-oyster fisheries. It was also pointed out that a diversion by itself would be unlikely to improve conditions for marsh growth since the sediment necessary in increase marsh elevation would not be supplied. Alternate diversion plans or additional efforts conducted as part of the larger MRGO restoration program such as targeted beneficial uses of dredged material could rectify this situation.

A second meeting was held on December 1, 2008 at the Mississippi Department of Marine Resources in Biloxi, Mississippi during which the previous discussions were briefly reviewed and historic data on the positions of isohaline and commercial oyster beds in Mississippi Sound presented (Attachment 2). In the discussions following these presentations it was concluded that salinity and other water quality data from state and federal agencies should be amassed. It was agreed that information on three specific conditions needed to be evaluated: 1) baseline (historic) conditions, 2) conditions following closure of the MRGO, and 3) conditions if other engineering projects were realized without the Violet Diversion (Future without Project or FWOP).

The third meeting was held once more at the New Orleans District offices on April 20, 2009. The results of modeling efforts by Dr. Alex McCorquodale (University of New Orleans) of water quality in Lake Pontchartrain and Lake Borgne and modeling of a floodgate on the Gulf Intracoastal Waterway at Bienvenue by Keith Martin (ERDC) were presented. Conclusions from the McCorquodale study suggested that closure of the MRGO alone could result in reduced salinity in Lake Borgne and the Biloxi Marshes however the effects of other proposed diversions

such as at Lake Maurepas still needed to be incorporated. Following these presentations a compendium of existing data sources from state and federal agencies was described. Significant difficulties had been encountered with regard to differences in the timing, position and reporting characteristics of the data and additional efforts would be required to produce a useful tool. It was concluded at the end of this meeting that additional modeling was required. The importance of understanding existing conditions and therefore whether or not a diversion was necessary was stressed by a number of participants. It was also determined that the position of the Ford and Palmisano lines need not be a central concern but, that conditions in the project area in general be the focus.

MRGO Draft Hydrodynamic and Hydraulic Modeling Report

Following the April SWG meeting the MRGO Restoration Study team initiated a series of modeling efforts which covered the entire restoration project area. The first effort was to meet the requirements of the SWG and included consideration of baseline, MRGO closure, and FWOP conditions. The study utilized the University of New Orleans Mass Balance Model, a tool for performing first-order approximations for mass transfer of input such as salinity, water flow, and water level. The areas modeled (boxes) are presented in Figure 4 and the results presented in two forms. The first (Attachment 3) is the form of maps describing average conditions by month including measures of variability, for each modeled box while the second (Attachment 4) reports conditions for the "salinity target line" a hypothetical line described in the design memorandum for the Bonnet Carre diversion (USACE 1990) located approximately midway between the Ford and Palmisano lines (Figure 2).

Monthly Modeling Results

Average values from the monthly model runs are summarized in Tables 3 and 4 along with those of modeling of two diversion scenarios requested by the MRGO Restoration Study team. The two scenarios assume a continuous release of 1,000 cubic feet per second (cfs) between June and March with increased volume (6,000 and 7,000 cfs respectively) in April and May. The continuous 1,000 cfs flow was incorporated to insure adequate hydration of the Central Wetlands Area or CWA (Figure 5).

Discussion of the monthly results for the entire modeled area will not be attempted here but, only a summary of results for Lake Borgne, the Biloxi Marshes, and Mississippi Sound. Results are presented in two parts; those describing conditions in Lake Borgne alone (the logic for which will soon be obvious) and those describing conditions in Biloxi Marshes, and Mississippi Sound.

The results of monthly modeling indicate, as reported in the 1984 report and suggested in discussions by the SWG, that salinity conditions in Lake Borgne will no longer be conducive to commercial oyster beds. Baseline conditions are already poor in the eastern end of the lake and closure of the MRGO and Future without Project projections indicate that average salinities in the western portion (site of most commercial beds) will fall below 5 ppt for 5 and 7 months of the year respectively (Table 2). If variability, as presented in the maps, is also considered the potential time period below 5 ppt is increased. Needless to say, both of the modeled diversion

scenarios resulted in further declines in conditions for maintaining productive oyster reefs in Lake Borgne.

Results of monthly salinity modeling for the Biloxi Marshes and Mississippi Sound suggest that while baseline conditions in the Biloxi Marshes seldom exactly match the optimal criteria for oysters many areas are already within the proper range for maintenance of oyster populations during much of the year (Tables 3 and 4). The area covered by model Box 73 (western Biloxi Marshes) generally falls within the optimal range in the critical months of April and May and Box 13 (eastern Biloxi Marshes) is usually less than 15 ppt between February and June (Figure 4; Table 4). Conditions in Boxes 74 and 78 (Southern Biloxi Marshes and Southeastern Biloxi Marshes respectively) are usually on the high end of the range during the February to June time period. Closure of the MRGO by itself reduces salinities by 0.5- 1 ppt in the Biloxi Marshes resulting in an overall improvement in conditions (Tables 3 and 5). Salinities in Box 13 are projected to fall precisely within the optimal range of values in April. Projections of FWOP suggest mixed results with salinities being marginally lower in some time periods and slightly higher in others (Tables 3 and 6). Predicted salinities for the two diversion scenarios result in a degradation of conditions in Box 73 in March and April (average salinities less than 5 ppt) while conditions are improved in Boxes 78 and 74 in April. Otherwise, the diversions result in an approximate 1 ppt drop in most areas.

Projections for Mississippi Sound suggest that baseline conditions are generally not optimal for oyster production, closure of the MRGO will actually increase salinities by 0.5 ppt however, FWOP would reduce slightly salinity values (less than 1ppt). Neither of the diversion scenarios resulted in a significant improvement in conditions for raising oysters in the Sound.

Overall Modeling Results

The overall salinity modeling effort (Attachment 4) examined a number of different diversion scenarios including multiple potential releases over the base flow of 1,000 cfs in April and May of 5,000, 6,000, 7,000, and 20,000 cfs. Model runs were also performed assuming that the MRGO/Lake Borgne connection was either open or closed. These results were compared for historic (pre-MRGO closure), baseline (post-MRGO closure), FWOP, and FWP (Forward with Project) conditions to determine the releases necessary to achieve the Chatry et al. (1983) salinity conditions along the Salinity Target Line (USACE 1990). Each run included an estimate of the variability of salinity values for both the Chatry conditions and the projected diversion conditions (model uncertainties were estimated at 17% of the modeled salinity).

Under historic conditions salinities are within or below the Chatry optimum range during most of the year (January, February, March, August, September, November and December) and somewhat above these limits in June July, and October. However, during the critical months of April and May salinities are significantly higher than the target range, achieving the optima only 24% and 4% of the time, respectively. These rates are far less than the 40% (four of ten years) assumed to be necessary to maintain commercial oyster beds. With the MRGO closed (baseline) the salinity goals are met for all months except May when the Chatry goals are met only 6% of the time. Future Without Project improved these results with conditions in May achieving the optimal range 28% of the time. To routinely achieve optimal conditions for all months, model

runs with project indicate that at a minimum, a 7,000 cfs release in April and May is required. Modeling also suggests that closure of the MRGO/Lake Borgne connection could significantly reduce the volume of water required to reduce salinities by increasing the probability of achieving the salinity goals for any given model run by 2%. In the case of the 7,000 cfs release conditions in May would improve from meeting the optima 38% of the time to 40% of the time.

Examination of the model results also indicates that the likelihood of creating salinities unfavorable to oyster populations (less than 5 ppt) during the twenty years of modeled data varies among the different scenarios. Under baseline (MRGO-closed) conditions salinities of 5 ppt or less would have been experienced only once (Attachment 4, Figure 2) while under FWOP conditions they would have occurred twice (Attachment 4, Figure 4). Modeled diversions increased this likelihood to 3 or 4 of the 20 modeled years (Attachment 4, Figure 6). Obviously, it is not desirable to divert water in all years and conditions for permitting a release need to be determined. The relationship between river flow, local rainfall, and salinity levels in Lake Borgne and the Biloxi Marshes should be examined for determining reliable leading indicators of when diversions might be contemplated.

Marsh Grass Optimal Growth Conditions

One of the key assumptions of the 1984 report was that lowering salinity would enhance salt marsh grass growth and thus partially reverse marsh loss. Marshes in this area are dominated by smooth cordgrass *Spartina alterniflora* *Spartina* tolerates a wide range of salinities (0-36) but, grows best in the range of 0-20 ppt (e.g., Adams 1963, Haines and Dunn 1971, Linthurst and Seneca 1981). Mooring et al. (1971) and Parrondo et al. (1978) have shown that germination and seedling growth, respectively are highest towards the lower end of this range. Measuring *Spartina* germination at salinities of 0. 5. 10. 20. and 40 ppt, Mooring et al. (1971) reported the highest average dry weight and height per seedling at 5 ppt. Parrondo et al. (1978) found that the growth of *Spartina* was highest from 0-8 ppt and lower at higher salinities.

Examination of the current (baseline) salinities indicates that conditions in the Lake Borgne and Biloxi Marsh area is in the mid range for best growth but slightly high for best germination in all sites except those bordering Gulf waters (Boxes 74 and 78) where late summer (August-September) salinities may exceed 20 ppt. MRGO closure alone and FWOP should slightly improve conditions for germination by dropping average salinities by around 1 ppt particularly in those areas immediately bordering Lake Borgne. By lowering the salinity a further 1-2 ppt the diversion scenarios could increase this effect. Whether or not lowering salinity by 2-3 ppt would enhance marsh growth sufficiently to counteract subsidence and marsh loss is uncertain and the suggestion by the SWG that additional efforts (e.g. beneficial use of dredged material) would be necessary seems appropriate.

MRGO Mass Balance of Flow, Nutrients, and Suspended Sediments

Another modeling effort supported by the MRGO Restoration Study team was an evaluation of potential effects of the diversion scenarios on flow, dissolved inorganic nitrogen (DIN), and total suspended sediments (TSS) performed by Dr. McCorquodale of the University of New Orleans (Attachment 4). Two scenarios were evaluated; 1) continuous diversion of 1,000 cfs except for

April and May when 5,000-7,000 cfs would be diverted assuming the gap between MRGO and Lake Borgne is left open and 2) the same conditions assuming the gap is blocked. Both scenarios were evaluated with flows up to 2,000 and 6,000 cfs. The results indicate that with the gap open most of the flow, DIN and TSS is delivered to the southern portion of Lake Borgne whereas with the gap filled a greater proportion reaches the Biloxi Marshes. A key question that appears to remain unanswered is whether or not the supply of sediment to the marshes would be adequate to counteract erosion and subsidence. Likewise it is not certain what the effect of the added sediments and nutrients would do to Lake Borgne proper. Increased nutrient levels could eventually result in eutrophic conditions and decreased oxygen levels especially during the summer months.

Information on Fish and Invertebrate Species

The Bonnet Carrè feasibility study examined potential impacts to non-oyster fisheries for a limited number of species: brown and white shrimp, blue crab (*Callinectes sapidus*), Atlantic menhaden (*Brevortia patronus*), Atlantic croaker (*Micropogonias undulates*), spotted seatrout (*Cynoscion nebulosus*), and red drum (*Sciaenops ocellata*) (USACE 1984). From their limited data they concluded that brown shrimp and white shrimp populations may be affected by the diversion of freshwater into Lake Borgne but, most other species would be displaced seaward. Information concerning the salinity and temperature tolerances of the common fish and invertebrate species in the Gulf of was limited at this time and dispersed within the scientific literature. Subsequent studies and literature reviews have added substantially to our understanding of their distribution. In particular, the National Marine Fisheries Service has summarized information on life histories and distribution of the most common fish and macroinvertebrate species as part of their Estuarine Living Marine Resources Program (Nelson et al. 1997 and Patillo et al. 1997). Although the SWG has not had the opportunity to fully discuss this information a summary of it as published in Nelson et al. (1997) and Patillo et al. (1997) is provided in Tables 7-9. Table 7 lists the temporal distribution of species commonly collected in Lake Borgne; Table 8 summarizes known salinity tolerances, and Table 9 summarizes thermal tolerances. Documentation for the data presented is found in the two NMFS publications along with more detailed descriptions of species life histories and general biology. Information is also available in these documents for Mississippi Sound and other major estuaries along the Gulf coast.

The dominant invertebrate and fish species resident in Lake Borgne include adults and juveniles of American oyster, blue crab, white shrimp, grass shrimp (*Palaemonetes pugio*), common rangia (*Rangia cuneata*), bay squid (*Lolliguncula brevis*), gizzard shad (*Dorosoma cepidinum*), bay anchovy (*Anchoa mitchilli*), sheepshead minnow (*Cyprinodon variegatus*), gulf killifish (*Fundulus grandis*), silversides (*Menidia* spp.), striped mullet (*Mugil cephalus*), hardhead cat fish (*Arius felis*), and southern flounder (*Paralichtys lethostigma*) (Table 7). These species tend to be euryhaline in nature and with some exceptions (e.g. sedentary organisms) will simply migrate if they encounter unfavorable conditions. It would seem unlikely that salinity changes in the range of those due to closure of the MRGO or FWOP (~0.5-1 ppt) would greatly affect their abundances. As pointed out in USACE (1984) the exception to this may be the case of white shrimp and brown shrimp. Although both species have similar life histories and similar salinity tolerances (Table 8) they differ in the time of year when larvae migrate into the estuary; brown

shrimp larvae are most common in the spring while white shrimp larvae are most abundant in the summer. Likewise, white shrimp appear to be abundant in lower salinities than brown shrimp (Turner and Brody 1983).

Many other species also utilize Lake Borgne but primarily as larvae or juveniles. These include Atlantic menhaden, spotted seatrout, Atlantic croaker, red drum, sheepshead (*Archosargus probatocephalus*), pinfish (*Lagodon rhomboides*), Gulf spot (*Leiostomus xanthurus*), silver perch (*Bairdiella chrysoura*) and black drum (*Pogias cromis*). These species are far less euryhaline in nature and their distributions are more likely to be affected by the altered salinity conditions. Once again, these species are all mobile and presumably will redistribute themselves seaward as suggested by USACE (1984).

Diversion of freshwater into Lake Borgne may also affect the distribution of benthic invertebrates, an important food source for fish, shrimp, and crabs. Studies of the lake's benthos have shown that the dominant fauna include the polychaetes *Mediomastus ambiseta, Parandalia americana Streblospio* sp., *Sigambra bassi, Glycinde solitaria, Nereis (Neanthes) succinea, Pectinaria gouldii,* and *Capitella* sp., the amphipods *Ampelisca abdita* and *Ameroculodes* (sp. A) *miltoni,* and *Cerapus benthophilus*, and the molluscs *Acetocina canaliculata, Macoma mitchelli,* and *Mulinia* spp (Table 10). All of these taxa are associated with oligo-mesohaline salinities (5 - 18 ppt). Reduction of salinities by a diversion would most likely result in a decline in the importance of these taxa and an increase in species such as the polychaete *Hobsonia florida*, oligochaetes, and the bivalve *Rangia cuneata*. All of these species are present in the existing lake assemblage but at relatively low densities. The precise effect that such a change in species composition may have on the forage base for consumer species is uncertain.

Unresolved Issues

During SWG discussions concerns were expressed regarding the potential for freshwater diversions to create eutrophic conditions in the receiving waters. This has been the case upon occasion in Lake Pontchartrain following openings of the Bonnet Carrè diversion structure resulting in low dissolved oxygen levels and fish kills. The results of modeling by McCorquodale (Attachment 4) suggest that most of the nutrients from the diversion scenarios will be deposited in the southern end of Lake Borgne. These results make it desirable to have a formal evaluation of the potential for development of eutrophic conditions in Lake Borgne in order to prevent unsatisfactory water quality conditions for oysters and other fisheries.

Conclusions:

The preliminary conclusions of the SWG can be summarized as follows:

1) The salinity targets set by USACE (1984) are valid and applicable to assessment of a potential freshwater diversion at Violet, Louisiana.
2) The position of the Ford and Palmisano lines need not be a central concern
3) While the area targeted for freshening, the Biloxi Marshes, is appropriate, impacts throughout the MRGO restoration area and Mississippi Sound need to be taken into consideration

4) Modeling indicates that conditions following closure of the MRGO and/or FWOP will most likely result in loss of commercially viable oyster beds in Lake Borgne.
5) Conditions following closure of the MRGO and FWOP alone should result in some improvement in oyster production in the Biloxi Marshes
6) Neither closure of the MRGO nor FWOP will result in improved conditions in Mississippi Sound oyster beds
7) Diversion of freshwater, as modeled, may result in a degradation of oyster growing conditions in the Biloxi Marshes while providing little or no significant improvement in Mississippi Sound beds
8) Improved marsh growth of marshes may be realized by MRGO closure, FWOP, or either of the modeled diversions but will most likely require supplemental efforts such as beneficial uses of dredged material to counteract subsidence.
9) Modeling results suggest a 7,000 cfs release in the months of April and May could achieve desired salinity levels for oyster populations over large portions of the Biloxi Marshes especially if the connection between the MRGO and Lake Borgne is closed.
10) If diversions are to be implemented they should be targeted for drought conditions as set forth by USACE (1984) to avoid reducing salinity in the Biloxi Marshes to undesirable levels especially during periods of high river flow
11) Conditions for initiating a diversion (e.g. low river flow, low local rainfall) need to be determined.
12) If diversions are to be implemented modeling will be required to determine if the increased sediment and nutrient concentrations in the diverted water will lead to eutrophication in Lake Borgne.
13) Impacts on euryhaline fish and invertebrates resources are uncertain but, the conclusions of USACE (1984) that most marine fish and invertebrate species will redistribute themselves seaward seems likely.

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Table 1. Agencies Participating in Salinity Working Group.

Federal Agencies

- U.S. Army Engineer District, New Orleans
- U.S. Army Engineer District, Mobile
- U.S. Army Engineer Research and Development Center
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. National Marine Fisheries Service
- U.S. Geological Survey

State of Louisiana

- OCPR
- Wildlife and Fisheries

State of Mississippi

- MS Department of Marine Resources

Universities

- Louisiana State University
- University of New Orleans

Private Industry and NGO's

- ARCADIS

Others?

Table 2. Modeling Results: Optimal and Average Projected Salinities for Lake Borgne

	Optimal Salinity*				Lake Borgne	
Month	-1SE	Mean	+1SE	**Condition**	**West (2)**	**East (1)**
January	15.36	16.40	17.44	Baseline	9.32	5.48
				Closure Only	6.65	4.96
				FWOP	6.21	4.44
				Alt 2 - 6K	4.70	3.85
				Alt 2 -7K	4.68	3.83
February	13.61	14.40	15.19	Baseline	8.07	3.31
				Closure Only	5.35	2.84
				FWOP	4.86	2.44
				Alt 2 - 6K	3.57	2.13
				Alt 2 -7K	3.55	2.12
March	10.58	11.60	12.62	Baseline	6.90	2.91
				Closure Only	4.31	2.47
				FWOP	3.80	2.15
				Alt 2 - 6K	2.74	1.92
				Alt 2 -7K	2.73	1.92
April	6.73	8.00	9.27	Baseline	6.40	3.40
				Closure Only	3.81	2.95
				FWOP	3.24	2.53
				Alt 2 - 6K	1.88	1.85
				Alt 2 -7K	1.79	1.77
May	6.08	7.00	7.92	Baseline	6.45	5.03
				Closure Only	3.91	4.65
				FWOP	3.27	4.04
				Alt 2 - 6K	1.25	2.66
				Alt 2 -7K	1.10	2.47
June	11.70	12.50	13.30	Baseline	6.93	6.13
				Closure Only	4.43	5.72
				FWOP	3.76	4.98
				Alt 2 - 6K	1.66	3.86
				Alt 2 -7K	1.48	3.71
July	12.13	12.70	13.27	Baseline	7.40	7.13
				Closure Only	4.93	6.68
				FWOP	4.27	5.90
				Alt 2 - 6K	2.48	5.00
				Alt 2 -7K	2.35	4.92

All Salinity values are averages and expressed as ppt. Numbers in parentheses are Model Box numbers (See Figure 4).

Values <5 ppt in Red indicating lethal conditions

Table 2. Modeling Results: Optimal and Average Projected Salinities for Lake Borgne (Cont).

	Optimal Salinity*				Lake Borgne	
Month	-1SE	Mean	+1SE	**Condition**	**West (2)**	**East (1)**
August	14.90	15.70	16.50	Baseline	8.10	8.49
				Closure Only	5.68	7.98
				FWOP	5.04	7.20
				Alt 2 - 6K	3.36	6.29
				Alt 2 -7K	3.27	6.24
September	15.94	17.00	18.06	Baseline	8.81	9.00
				Closure Only	6.39	8.47
				FWOP	5.81	7.74
				Alt 2 - 6K	4.14	6.83
				Alt 2 -7K	4.07	6.79
October	15.93	16.80	17.67	Baseline	9.51	9.78
				Closure Only	7.08	9.31
				FWOP	6.56	8.61
				Alt 2 - 6K	4.84	7.70
				Alt 2 -7K	4.80	7.67
November	15.28	16.10	16.92	Baseline	10.02	9.42
				Closure Only	7.52	8.98
				FWOP	7.05	8.30
				Alt 2 - 6K	5.28	7.39
				Alt 2 -7K	5.25	7.36
December	15.18	15.70	16.22	Baseline	9.97	7.84
				Closure Only	7.36	7.36
				FWOP	6.89	6.70
				Alt 2 - 6K	5.15	5.89
				Alt 2 -7K	5.12	5.87

All Salinity values are averages and expressed as ppt. Numbers in parentheses are Model Box numbers (See Figure 4).

Values <5 ppt in Red indicate potentially lethal conditions

Table 3. Modeling Results: Optimal and Average Projected Salinities for the Biloxi Marshes and Mississippi Sound

	Optimal Salinity*			Site	Biloxi Marshes				MS Sound
Month	-1SE	Mean	+1SE	**Condition**	**W (73)**	**E (13)**	**SE (78)**	**S (74)**	**(14)**
January	15.36	16.40	17.44	Baseline	10.04	11.08	**16.93**	13.50	**17.40**
				Closure Only	8.89	9.99	**16.36**	12.01	17.86
				FWOP	8.42	9.35	12.57	11.17	**16.94**
				Alt 2 - 6K	7.79	8.98	12.73	11.05	**16.75**
				Alt 2 -7K	7.76	8.96	12.72	11.04	**16.75**
February	13.61	14.40	15.19	Baseline	7.57	8.23	**14.62**	9.99	**14.65**
				Closure Only	6.53	6.93	**13.92**	8.32	**14.82**
				FWOP	6.07	6.37	9.99	7.62	**13.87**
				Alt 2 - 6K	5.64	6.14	10.02	7.54	**13.68**
				Alt 2 -7K	5.62	6.14	10.02	7.54	**13.68**
March	10.58	11.60	12.62	Baseline	6.81	7.73	13.61	9.90	13.87
				Closure Only	5.76	6.52	12.88	8.33	14.30
				FWOP	5.18	5.94	8.68	7.57	13.49
				Alt 2 - 6K	4.83	5.74	8.52	7.47	13.27
				Alt 2 -7K	4.82	5.73	8.52	7.47	13.27
April	6.73	8.00	9.27	Baseline	**7.50**	**8.72**	13.88	11.39	15.90
				Closure Only	6.28	**7.61**	13.15	10.00	16.31
				FWOP	5.46	**6.82**	**8.30**	**8.95**	15.34
				Alt 2 - 6K	4.94	6.40	**7.96**	**8.69**	14.71
				Alt 2 -7K	4.90	6.36	**7.94**	**8.67**	14.62
May	6.08	7.00	7.92	Baseline	8.90	10.67	14.70	14.36	17.65
				Closure Only	**7.61**	9.88	14.07	13.43	18.16
				FWOP	**6.41**	8.78	8.91	12.03	17.20
				Alt 2 - 6K	5.36	**7.87**	8.33	11.50	16.41
				Alt 2 -7K	5.24	**7.76**	8.30	11.44	16.29
June	11.70	12.50	13.30	Baseline	9.94	**11.93**	15.29	15.58	19.32
				Closure Only	8.66	11.29	14.77	14.83	19.85
				FWOP	7.40	10.09	9.66	**13.33**	18.93
				Alt 2 - 6K	6.23	9.21	9.12	**12.84**	18.49
				Alt 2 -7K	6.10	9.10	9.09	**12.78**	18.44

All Salinity values are averages and expressed as ppt. Numbers in parentheses are Model Box numbers (See Figure 4). Cells filled in Yellow are months when salinities should be less than 15 ppt; Cells filled in green are months when salinities can be $\geq$ 15 ppt. Values <5 ppt in Red indicate potentially lethal conditions; Values in **Bold** indicate salinity matches optimal condition

Table 3. Modeling Results: Optimal and Average Projected Salinities for the Biloxi Marshes and Mississippi Sound (Cont.)

	Optimal Salinity*			Site	Biloxi Marshes				MS Sound
Month	-1SE	Mean	+1SE	**Condition**	**W (73)**	**E (13)**	**SE (78)**	**S (74)**	**(14)**
July	12.13	12.70	13.27	Baseline	10.65	**12.66**	15.96	16.32	20.10
				Closure Only	9.28	11.98	15.52	15.56	20.49
				FWOP	8.12	10.86	10.94	14.23	19.65
				Alt 2 - 6K	7.15	10.19	10.62	13.88	19.36
				Alt 2 -7K	7.07	10.13	10.60	13.85	19.34
August	14.90	15.70	16.50	Baseline	12.03	14.17	17.79	18.08	21.23
				Closure Only	10.54	13.53	17.48	17.44	21.68
				FWOP	9.57	12.54	13.69	16.32	21.00
				Alt 2 - 6K	8.60	11.88	13.44	**15.97**	20.74
				Alt 2 -7K	8.54	11.84	13.43	**15.95**	20.73
September	15.94	17.00	18.06	Baseline	12.69	14.74	19.09	18.60	21.66
				Closure Only	11.21	14.08	18.83	**17.92**	22.16
				FWOP	10.48	13.26	15.72	**17.01**	21.59
				Alt 2 - 6K	9.49	12.59	15.52	**16.67**	21.31
				Alt 2 -7K	9.43	12.56	15.50	**16.65**	21.29
October	15.93	16.80	17.67	Baseline	13.70	15.75	20.50	19.70	22.44
				Closure Only	12.20	15.12	20.25	19.04	22.99
				FWOP	11.58	14.37	**17.38**	18.18	22.43
				Alt 2 - 6K	10.55	13.69	**17.26**	**17.86**	22.14
				Alt 2 -7K	10.50	13.66	**17.25**	**17.84**	22.13
November	15.28	16.10	16.92	Baseline	13.59	**15.50**	20.68	19.31	22.32
				Closure Only	12.14	14.77	20.36	18.44	22.81
				FWOP	11.63	14.08	17.48	17.61	22.15
				Alt 2 - 6K	10.62	13.42	17.49	17.33	21.89
				Alt 2 -7K	10.58	13.40	17.48	17.32	21.88
December	15.18	15.70	16.22	Baseline	12.47	13.93	19.66	16.96	21.04
				Closure Only	11.08	12.96	19.19	**15.69**	21.37
				FWOP	10.66	12.28	**15.88**	14.82	20.48
				Alt 2 - 6K	9.76	11.72	**16.02**	14.63	20.27
				Alt 2 -7K	9.72	11.70	**16.01**	14.62	20.26

All Salinity values are averages and expressed as ppt. Numbers in parentheses are Model Box numbers (See Figure 4). Cells filled in Yellow are months when salinities should be less than 15 ppt; Cells filled in green are months when salinities can be $\geq$ 15 ppt. Values <5 ppt in Red indicate potentially lethal conditions; Values in **Bold** indicate salinity matches optimal condition

Table 4. Optimal Salinities and Range of Baseline Conditions for the Biloxi Marshes and Mississippi Sound.

	Optimal Salinity*			Biloxi Marshes				MS Sound
Month	-1SE	Mean	+1SE	73**	13	74	78	14
January	15.36	16.40	17.44	8-12	9-13	14-20	11-16	14-21
February	13.61	14.40	15.19	6-9	9-10	12-17	8-12	12-17
March	10.58	11.60	12.62	5-8	6-9	11-16	8-12	11-17
April	6.73	8.00	9.27	6-9	7-10	11-16	9-14	13-19
May	6.08	7.00	7.92	7-11	9-13	12-17	12-17	14-21
June	11.70	12.50	13.30	8-12	10-14	12-18	13-19	16-23
July	12.13	12.70	13.27	9-13	10-15	13-19	13-19	16-24
August	14.90	15.70	16.50	10-14	12-17	15-21	15-21	17-25
September	15.94	17.00	18.06	10-15	12-18	16-23	15-22	18-26
October	15.93	16.80	17.67	11-16	15-19	17-24	16-23	18-27
November	15.28	16.10	16.92	11-16	15-18	17-24	16-23	18-26
December	15.18	15.70	16.22	10-15	11-17	16-23	14-29	17-25

*From Chatry et al. (1983)
** Box Number from Model Run (See Figure 4)
Yellow fill indicates months when optimal salinity for oysters should be below 15 ppt
Green fill indicates months when salinity for oysters can rise above 15 ppt

Table 5. Optimal Salinities and Range of Conditions with MRGO Closure for the Biloxi Marshes and Mississippi Sound.

	Optimal Salinity*			Biloxi Marshes				MS Sound
Month	-1SE	Mean	+1SE	73*	13	74	78	14
January	15.36	16.40	17.44	7-11	8-12	13-19	10-14	14-21
February	13.61	14.40	15.19	5-8	5-8	11-17	6-10	12-18
March	10.58	11.60	12.62	5-8	5-8	10-15	7-10	11-17
April	6.73	8.00	9.27	5-8	6-9	11-16	8-12	13-19
May	6.08	7.00	7.92	6-9	8-12	11-17	11-16	15-22
June	11.70	12.50	13.30	7-10	9-14	12-18	12-18	16-24
July	12.13	12.70	13.27	7-11	10-14	13-18	13-19	17-24
August	14.90	15.70	16.50	8-13	11-16	14-21	14-21	18-26
September	15.94	17.00	18.06	9-13	11-17	15-22	15-21	18-26
October	15.93	16.80	17.67	10-14	12-16	17-24	16-23	19-27
November	15.28	16.10	16.92	10-14	12-15	17-24	15-22	19-27
December	15.18	15.70	16.22	9-13	10-15	16-23	13-19	17-25

From Chatry et al. (1983)
** Box Number from Model Run (See Figure 4)
Yellow fill indicates months when optimal salinity for oysters should be below 15 ppt
Green fill indicates months when salinity for oysters can rise above 15 ppt

Table 6. Optimal Salinities and Range of Conditions for Future Without Project (FWOP) for the Biloxi Marshes and Mississippi Sound.

	Optimal Salinity*			Biloxi Marshes				MS Sound
Month	-1SE	Mean	+1SE	73*	13	74	78	14
January	15.36	16.40	17.44	8-12	9-13	14-20	11-16	14-21
February	13.61	14.40	15.19	6-9	9-10	12-17	8-12	12-17
March	10.58	11.60	12.62	5-8	6-9	11-16	8-12	11-17
April	6.73	8.00	9.27	6-9	7-10	11-16	9-14	13-19
May	6.08	7.00	7.92	7-11	9-13	12-17	12-17	14-21
June	11.70	12.50	13.30	8-12	10-14	12-18	13-19	16-23
July	12.13	12.70	13.27	9-13	10-15	13-19	13-19	16-24
August	14.90	15.70	16.50	10-14	12-17	15-21	15-21	17-25
September	15.94	17.00	18.06	10-15	12-18	16-23	15-22	18-26
October	15.93	16.80	17.67	11-16	15-19	17-24	16-23	18-27
November	15.28	16.10	16.92	11-16	15-18	17-24	16-23	18-26
December	15.18	15.70	16.22	10-15	11-17	16-23	14-29	17-25

From Chatry et al. (1983)
** Box Number from Model Run (See Figure 4)
Yellow fill indicates months when optimal salinity for oysters should be below 15 ppt
Green fill indicates months when salinity for oysters can rise above 15 ppt

Table 7. Abundance patterns of dominant fish and macroinvertebrate species*

Taxa	Life History Stage	Salinity		Month											
		T	M	J	F	M	A	M	J	J	A	S	O	N	D
American oyster	**A**	r	C	C	C	C	C	C	C	C	C	C	C	C	C
	S		C			C	C	C	C	C	C	C	C		
	J	r	C	C	C	C	C	C	C	C	C	C	C	C	C
	L	r	C			C	C	C	C	C	C	C	C		
	E		C			C	C	C	C	C	C	C			
Common rangia	**A**	r	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
	S	r	**A**				**A**	**A**	**A**	**A**	**A**	**A**	**A**		
	J	r	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
	L	r	**A**				**A**								
	E	r	**A**				**A**								
Brown shrimp	**A**	r	r				r	r	r	r	r	r			
	S														
	J	C	A			A	A	A	A	A	A	C	C	C	
	L		A			A	A								
	E														
White shrimp	**A**	A	**A**		C	C	r	r	C	C	**A**	**A**	**A**	**A**	A
	S														
	J	**A**	**A**				**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
	L		**A**				**A**	**A**	**A**						
	E														
Grass shrimp	**A**	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
	S	A	**A**	A	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	A
	J	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
	L	A	**A**	A	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	A
	E	A	**A**	A	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	A
Blue crab	**A**	**A**	**A**	C	A	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	C
	S	A	A			A	A	A	A	A	A	A	A	A	
	J	A	A	C	A	A	A	A	A	A	A	A	A	C	C
	L		A			A	A	A	A	A	A	A	A	A	
	E														
Gulf menhaden	**A**	C	C									C	C	C	
	S														
	J	**A**	**A**	C	C	C	C	C	**A**	**A**	**A**	A	A	A	C
	L														
	E														
Gizzard shad	**A**	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	S														
	J														
	L														
	E														

Life History Stage: A= Adult, S = Spawning Adult, J=Juvenile, L= Larvae, E= Eggs
Salinity: T= Tidal Freshwater, M= Mixing Zone
Abundance : r=Rare, C=Common, A=Abundant, **A**=Highly Abundant
*Modified from Nelson et al. (1997)

Table 7. Abundance patterns of dominant fish and macroinvertebrate species (Cont.)

Taxa	Life History Stage	Salinity		Month											
		T	M	J	F	M	A	M	J	J	A	S	O	N	D
Bay anchovy	**A**	A	A	C	C	A	A	A	A	A	A	A	C	C	C
	S		C			C	C	C	C	C	C	C	C	C	
	J	A	A	C	C	A	A	A	A	A	A	A	A	A	C
	L	C	C			C	C	C	C	C	C	C	C	C	
	E		C			C	C	C	C	C	C	C	C	C	
Hardhead catfish	**A**	r	C			C	C	C	C	C	C	C	C	C	
	S		C					C	C	C	C	C			
	J	r	C							C	C	C	C	C	
	L		C					C	C	C	C	C	C		
	E		C					C	C	C	C	C	C		
Sheepshead minnow	**A**	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	S	A	A		A	A	A	A	A	A	A	A	A		
	J	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	L	A	A		A	A	A	A	A	A	A	A	A	A	
	E	A	A		A	A	A	A	A	A	A	A	A		
Gulf killifish	**A**	C	A	A	A	A	A	A	A	A	A	A	A	A	A
	S		A			A	A	A	A	A	A	A			
	J	C	A	A	A	A	A	A	A	A	A	A	A	A	A
	L	r	A			A	A	A	A	A	A	A	A		
	E		A			A	A	A	A	A	A	A			
Silversides	**A**	C	A	A	A	A	A	A	A	A	A	A	A	A	A
	S	C	A			A	A	A	A	A	A	A			
	J	C	A	A	A	A	A	A	A	A	A	A	A	A	A
	L	C	A			A	A	A	A	A	A	A			
	E	C	A			A	A	A	A	A	A	A			
Sheepshead	**A**	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														
Pinfish	**A**														
	S														
	J	C	C			C	C	C	C	C	C	C	C	C	
	L														
	E														
Silver perch	**A**	C	C	r	r	r	r	r	C	C	C	r	r	r	r
	S														
	J	r	r	r	r	r	r	r	r	r	r	r	r	r	r
	L														
	E														

Life History Stage: A= Adult, S = Spawning Adult, J=Juvenile, L= Larvae, E= Eggs
Salinity: T= Tidal Freshwater, M= Mixing Zone
Abundance : r=Rare, C=Common, A=Abundant, **A**=Highly Abundant

Table 7. Abundance patterns of dominant fish and macroinvertebrate species (Cont.)

Taxa	Life History Stage	Salinity		Month											
		T	M	J	F	M	A	M	J	J	A	S	O	N	D
Spotted seatrout	**A**	r	r	r	r	r	r	r	r	r	r	r	r	r	r
	S		r				r	r	r	r	r	r	r	r	
	J	C	C	r	r	r	r	r	r	r	r	C	C	C	r
	L	C	r	C	C	C	C	C	C	C	C	C	C	C	C
	E		r				r	r	r	r	r	r	r	r	
Spot	**A**	A	A	r	r	r	r	r	r	r	r	A	C	C	r
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														
Atlantic croaker	**A**	A	A	r	r	r	r	r	r	r	r	A	A	A	C
	S														
	J	C	A	A	A	A	A	A	A	A	A	A	A	A	A
	L														
	E														
Black drum	**A**		r	r	r	r	r	r	r	r	r	r	r	r	r
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														
Red drum	**A**	r	r	r	r	r	r	r	r	r	r	r	r	r	r
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														
Striped mullet	**A**	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														
Bay Squid	**A**		A	C	C	A	A	A	A	A	A	A	A	A	A
	S														
	J		A	C	C	A	A	A	A	A	A	A	A	A	A
	L														
	E														
Southern flounder	**A**	**A**	**A**	C	C	r	r	C	C	C	C	C	**A**	**A**	A
	S														
	J	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	L														
	E														

Life History Stage: A= Adult, S = Spawning Adult, J=Juvenile, L= Larvae, E= Eggs
Salinity: T= Tidal Freshwater, M= Mixing Zone
Abundance : r=Rare, C=Common, A=Abundant, **A**=Highly Abundant

Table 8. Fish and macroinvertebrate salinity tolerances (all values in ppt)*

Taxa	Stage	Abundance	Range	Growth	Reproduction	Development	Feeding
American oyster	**Adult**	C	0-40; lethal <2	Depressed <5	Depressed <5		Depressed <5
	Spawning	C					
	Juvenile	C	2-45	Depressed <5	Depressed <5		Depressed <5
	Larvae	C		slow if below 7-10		Varies*	
	Eggs	C					
Common rangia	**Adult**	A	0-25				
	Spawning	A	2-14				
	Juvenile	A					
	Larvae	A	0-20	10-20			
	Eggs	A					
Brown shrimp	**Juvenile**	A	0.8-45 lowered<20°C	24-38.9			
White shrimp	**Adult**	C	0.3-41.3				
	Juvenile	A	0.3-41.3				
Grass shrimp	**Adult**	A	0-55				
	Spawning	A					
	Juvenile	A	0-55	17-27 poor <15		20-25 optimal	
	Larvae	A					
	Eggs	A					
Blue crab	**Adult**	A	2-21				
	Spawning	A			23-33		
	Juvenile	A	2-21			11.5-35.5	
Gulf menhaden	**Adult**	C	20-25				
	Juvenile	A	5-30				
Gizzard shad	**Adult**	C	0-41 prefer <15				
Bay anchovy	**Adult**	A	0.5-32				
	Spawning	C					
	Juvenile	A					
	Larvae	C	3-7				
	Eggs	C					
Hardhead catfish	**Adult**	C	15-30 prefer <15				
	Spawning	C					
	Juvenile	C	0-56 prefer <10				
	Larvae	C					
	Eggs	C	1.8-36.4				

*Modified from Patillo et al. (1997)

Table 8. Fish and macroinvertebrate salinity tolerances (all values in ppt) (Cont.)

Taxa	Stage	Abundance	Range	Growth	Reproduction	Development	Feeding
Sheepshead minnow	**Adult**	A	0->45 prefer 10-30				
	Spawning	A					
	Juvenile	A	0>45 prefer 10-30				
	Larvae	A					
	Eggs	A					
Gulf killifish	**Adult**	A	0-76				
	Spawning	A					
	Juvenile	A	0-76				
	Larvae	A	5-40 prefer 5-18.3				
	Eggs	A	0-80				
Silversides	**Adult**	A	0-34.5				
	Spawning	A	0-34.5				
	Juvenile	A	0-30				
	Larvae	A					
	Eggs	A	0-31.5				
Sheepshead	**Adult**	C	0-45				
	Juvenile	C	0.3-43.8				
Pinfish	**Juvenile**	C	0-43.8				
Silver perch	**Adult**	C	0-48 prefer >20				
Spotted seatrout	**Juvenile**	C	8-48 prefer 8-25				
	Larvae	C	8-40 prefer 20-35				
Spot	**Juvenile**	A	0-36				
Atlantic croaker	**Juvenile**	C	0-36.7 prefer <15				
Black drum	**Juvenile**	C	0-80 prefer 9-26				
Red drum	**Juvenile**	C	0-45 prefer 20-40	Best ~35			
Striped mullet	**Adult**	C	0-75 prefer ~26				
	Juvenile	C	0-75 prefer 20-28				
Bay squid	**Adult**	A	≥17.5; 20-37				
Southern flounder	**Adult**	A	0-60 prefer 20-30				
	Juvenile	C	2-60 prefer 2-37				

Table 9. Fish and macroinvertebrate temperature tolerances (all values in degrees C)*

Taxa	Stage	Abundance	Range	Growth	Reproduction	Development	Feeding
American oyster	**Adult**	C	-2 to 34				Stop < 6-7
	Spawning	C					
	Juvenile	C		10-30			
	Larvae	C			16-25		
	Eggs	C					
Common rangia	**Adult**	A					
	Spawning	A			10-16		
	Juvenile	A					
	Larvae	A	8-32, 35 lethal			19-29	
	Eggs	A					
Brown shrimp	**Juvenile**	A	4-36	~26, no growth <16			
White shrimp	**Adult**	C	7-38	15-30 low growth			
	Juvenile	A	6.5-39	<15			
Grass shrimp	**Adult**	A	5-38 18-25 optimal				
	Spawning	A		25-32 low growth	17-38		
	Juvenile	A	5-38 18-25 optimal	<14		20-27	
	Larvae	A					
	Eggs	A					
Blue crab	**Adult**	A	3-35 burrow at 5				Stop <10.8
	Spawning	A					
	Juvenile	A	3-35	24-31			
Gulf menhaden	**Adult**	C	2.5-35.5				
	Juvenile	A	2.5-35.5				
Gizzard shad	**Adult**	C	5-34.4 lethal <2.2				
Bay anchovy	**Adult**	A	4.5-39.8				
	Spawning	C	22-32				
	Juvenile	A					
	Larvae	C					
	Eggs	C					
Hardhead catfish	**Adult**	C	5-39 prefer 19-25				
	Spawning	C					
	Juvenile	C	5-39 prefer 19-25				
	Larvae	C					
	Eggs	C	15-34.9				

*Modified from Patillo et al. (1997)

Table 9. Fish and macroinvertebrate temperature tolerances (All values in degrees C) (Cont.)

Taxa	Stage	Abundance	Range	Growth	Reproduction	Development	Feeding
Sheepshead minnow	**Adult**	A	8.8-35 burrows 7-9				
	Spawning	A					
	Juvenile	A					
	Larvae	A					
	Eggs	A	17.4-27.5	22.8-28.9 optimal			
Gulf killifish	**Adult**	A	2-34.9				
	Spawning	A					
	Juvenile	A	2-34.9				
	Larvae	A					
	Eggs	A	4-33				
Silversides	**Adult**	A	5-34.9				
	Spawning	A					
	Juvenile	A	5-33				
	Larvae	A	21-30				
	Eggs	A	13.2-34.2	20-25 optimal			
Sheepshead	**Adult**	C	8-29.6				
	Juvenile	C	5-35.1				
Pinfish	**Juvenile**	C	3.4-37.5				
Silver perch	**Adult**	C	10-34.5				
Spotted seatrout	**Juvenile**	C	5-36 prefer 20-30				
	Larvae	C	5-36 prefer 20-30				
Spot	**Juvenile**	A	1.2-36.7				
Atlantic croaker	**Juvenile**	C	0.4-38 prefer 6-20	12.8-28.4			
Black drum	**Juvenile**	C	3-35				
Red drum	**Juvenile**	C	2-34.9 prefer 10-30				
Striped mullet	**Adult**	C	5.9-37 prefer 16-30				
	Juvenile	C	5.9-37 prefer 20-30				
Bay squid	**Adult &Juvenile**	A	11-33				
Southern flounder	**Adult**	A	7-32 prefer 14-22				
	Juvenile	C	2-31.2				

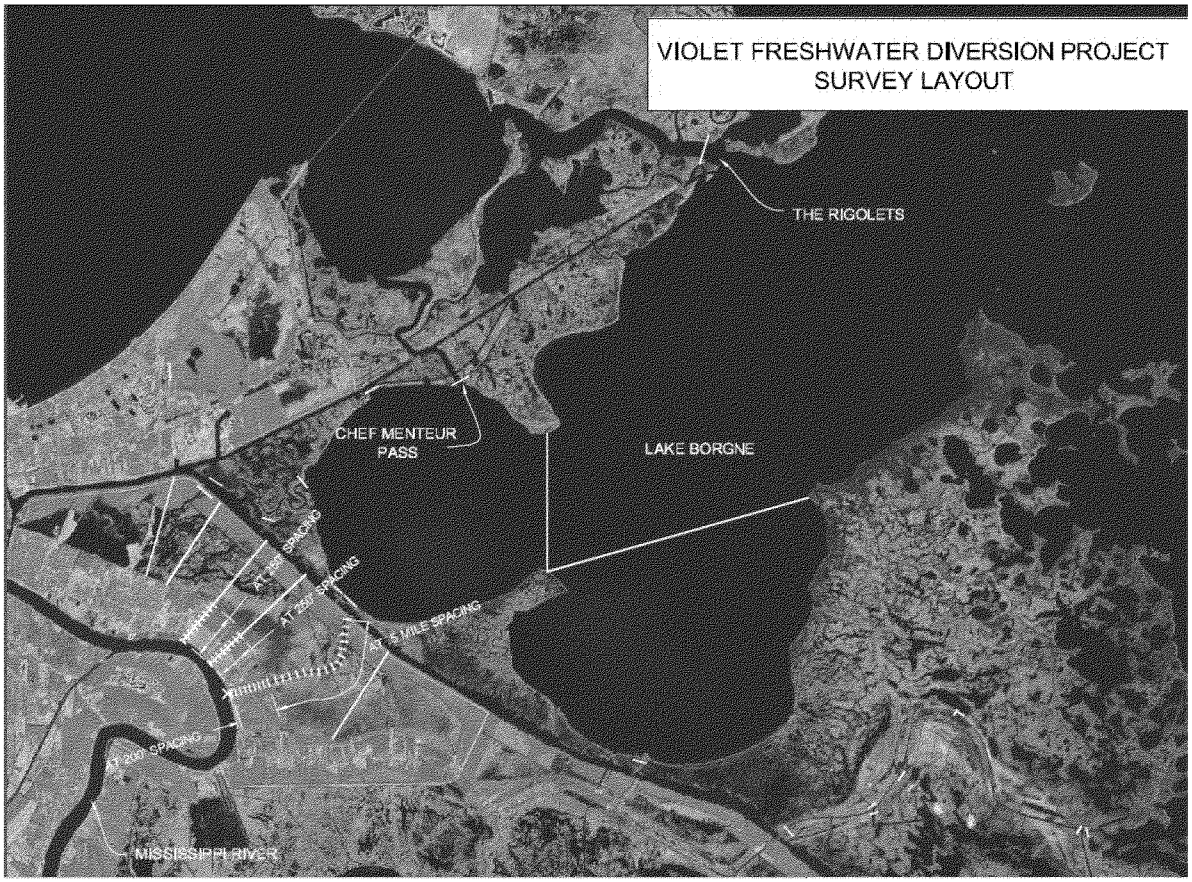
Table 10. Dominant Benthic Invertebrate Taxa of Lake Borgne.

Taxa	Ray 2006	EPA 1991	EPA 1992	EPA 1993	EPA 1994
Mediomastus sp.	28.96	6.43	32.98	3.72	42.03
Streblospio benedicti	7.04	40.49	21.38	0.00	3.86
Parandalia sp.	8.50	0.00	4.32	11.74	6.76
Hobsonia florida	0.43	14.67	0.99	0.59	15.46
Mulinia lateralis	3.57	1.36	4.15	1.37	0.00
Mulinia pontchartrainensis	3.79	0.36	1.77	0.59	3.38
Nemertea	2.58	0.09	1.56	0.00	1.93
Rangia cuneata	*	6.43	0.04	3.52	6.28

Ray 2007

Species	Group	Total	Percent
Mediomastus ambiseta	Polychaete	3397	28.96
Parandalia americana	Polychaete	997	8.50
Ampelisca abdita	Amphipod	953	8.13
Streblospio benedicti	Polychaete	826	7.04
Sigambra bassi	Polychaete	742	6.33
Acetocina canaliculata	Gastropod	711	6.06
Macoma mitchelli	Bivalve	668	5.70
Glycinde solitaria	Polychaete	586	5.00
Mulinia pontchartrainensis	Bivalve	444	3.79
Mulinia lateralis	Bivalve	419	3.57
Ameroculodes sp. A	Amphipod	208	1.77
Nemertea 1	Nemertean	175	1.49
Nereis succinea	Polychaete	169	1.44
Pectinaria gouldii	Polychaete	149	1.27
Cerapus benthophilus	Amphipod	148	1.26
Tubificoides (LPIL)	Oligochaete	131	1.12
Capitella (LPIL)	Polychaete	130	1.11
Nemertea 2	Nemertean	128	1.09

Figure 1. Violet Freshwater Diversion Site Map.



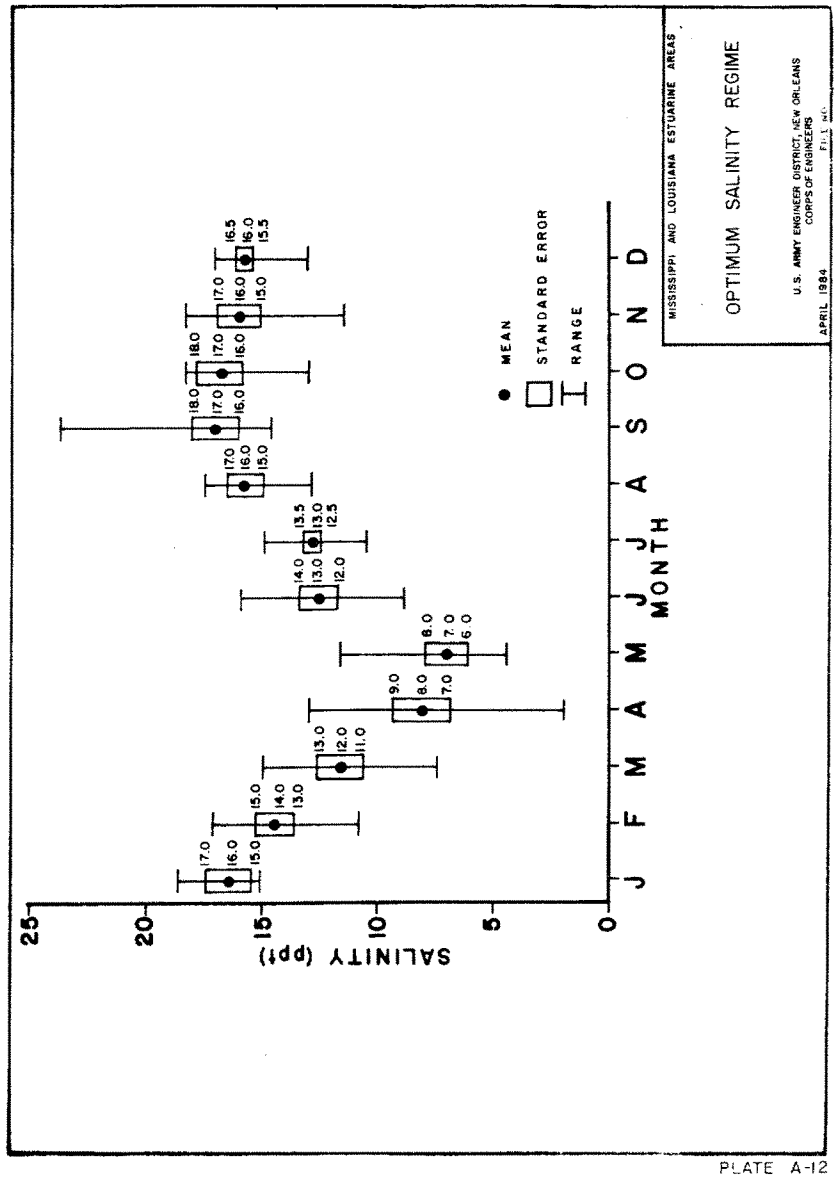
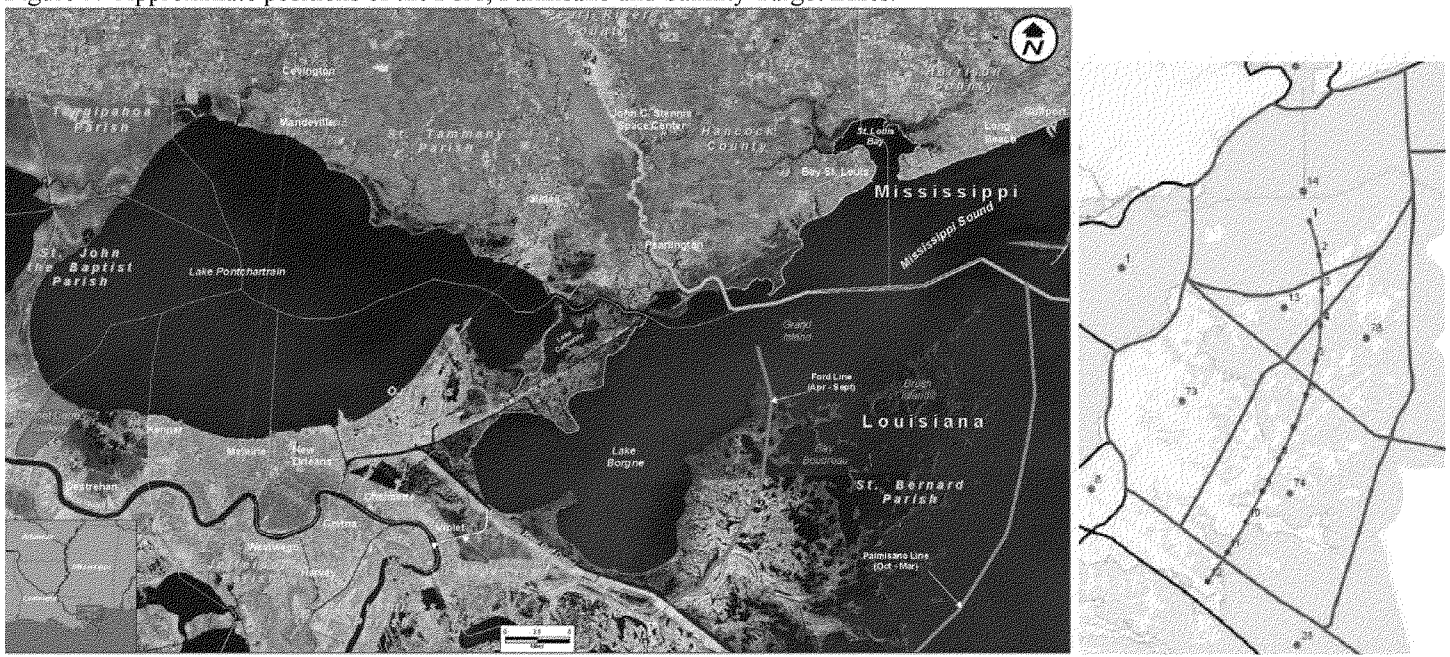


Figure 2. Chatry et al. (1983) Salinity Optima for Production of Seed Oysters in Louisiana*.

*From USACE (1984)

Figure 3. Approximate positions of the Ford, Palmisano and Salinity Target Lines.



Purple Line – Ford Line (April-September); Red Line-Palmisano Line (October-March). Green line on Inset – Salinity Target Line

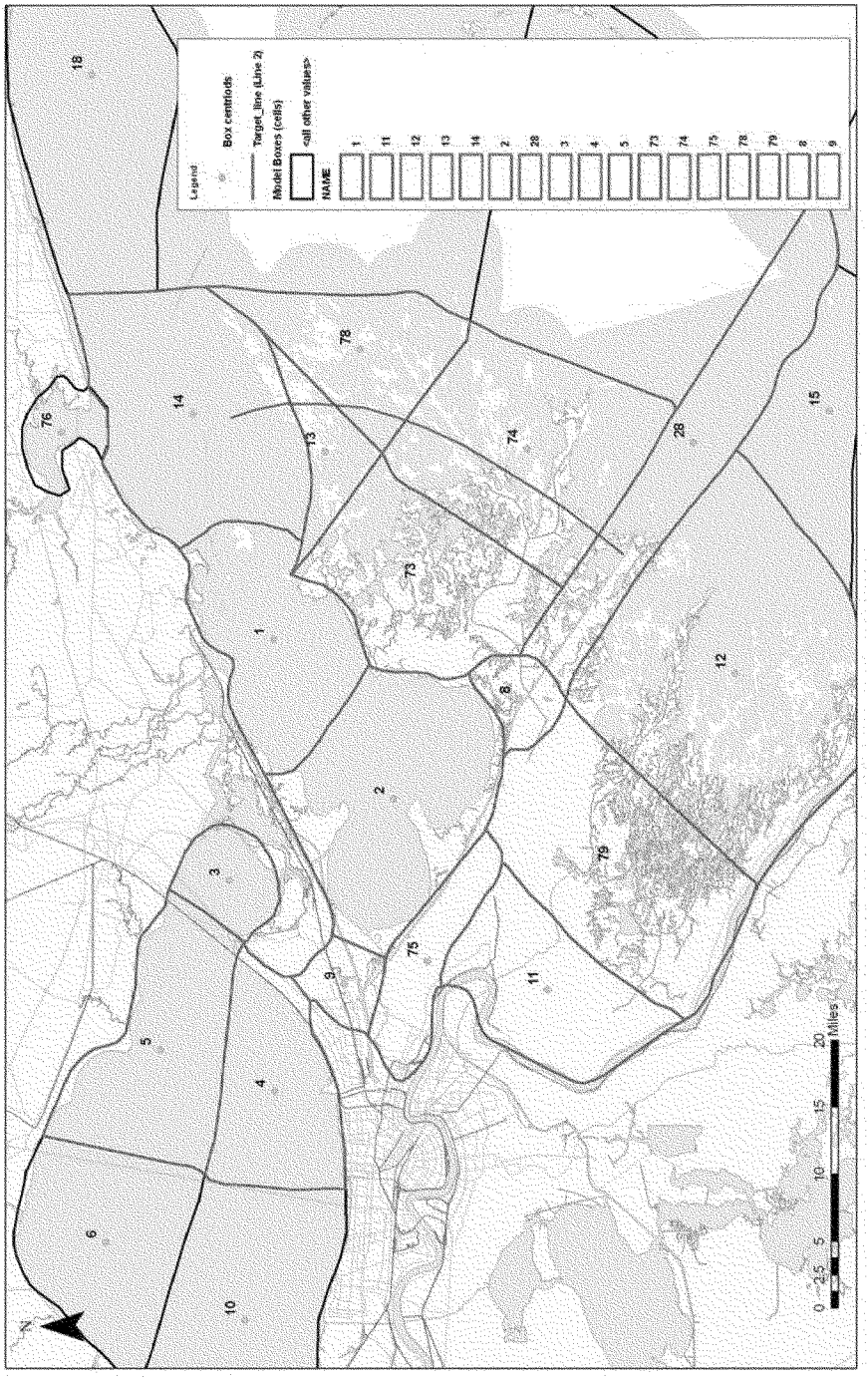
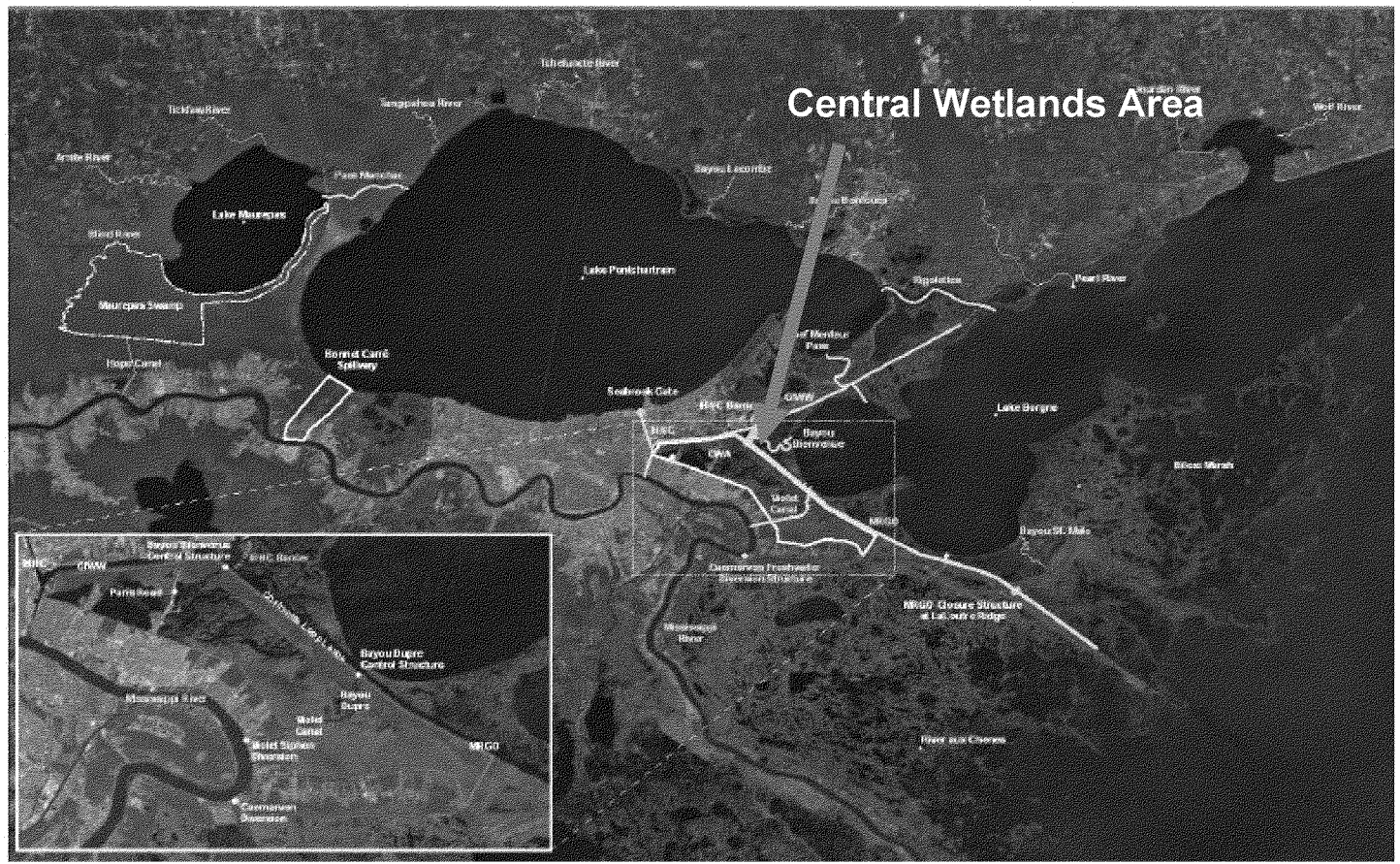


Figure 4. Model boxes for MRGO salinity modeling effort.

Figure 5. Location of Central Wetlands Area



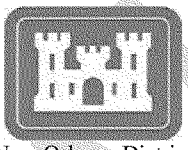
MISSISSIPPI RIVER – GULF OUTLET (MRGO)
ECOSYSTEM RESTORATION STUDY
LOUISIANA AND MISSISSIPPI

HYDRAULICS AND HYDROLOGY

Preliminary Hydrodynamic and Hydraulic Modeling for a Proposed Freshwater Diversion in the Vicinity of Violet, Louisiana

DRAFT SUMMARY DOCUMENT

Submitted: October 9, 2009
Updated: November 16, 2009



New Orleans District

The MRGO Ecosystem Restoration Plan Feasibility Study is being conducted to comply with the Water Resources Development Act (WRDA) of 2007 (P.L. 110-114) Section 7013 to develop a plan to "restore the areas affected by the navigation channel" that considers "diversions of fresh water to restore the Lake Borgne ecosystem." Investigations under Section 7013 have identified that a freshwater diversion at or near Violet, Louisiana is needed to achieve ecosystem restoration goals.

Section 3083 of the 2007 Water Resources Development Act (WRDA) authorizes the diversion of freshwater at or near the Violet Canal, Louisiana, for the purposes of reducing salinity in the western Mississippi Sound, enhancing oyster production, and promoting the sustainability of coastal wetlands. Section 3083 states that the freshwater diversion must be designed to meet, or maximize the ability to meet, the salinity levels identified by Chatry et. al, 1982. A Salinity Working Group for the MRGO Ecosystem Restoration Plan validated the use of the Chatry targets for ecosystem restoration in the study area.

Experience of the Louisiana Department of Wildlife and Fisheries (LDWF) marine biologists indicate that an appropriate salinity regime will be conducive to good seed oyster production. There is the potential that a diversion near Violet Canal could be designed to allow freshwater flow to establish a suitable salinity regime 4 or 5 years in 10 or at least 40% of the time.

The study outlined here provides a planning level examination of the potential impacts of diversions of the Mississippi River near Violet Canal on the estuarine areas of Biloxi Marsh. Results from a mass balance model developed for this project tell resource managers a number of things that are useful in understanding the salinity regime in the Biloxi Marsh. Historically, data and model results demonstrate that the Biloxi Marsh region is at or fresher than salinities required for oyster seed production as

recommended by Chatry for the winter months. Late spring and summer, April, May and June are presently saltier than the optimum salinity ranges (Figure 1).

The MRGO closure, the construction of the IHNC barrier, and the Seabrook gate will have an immediate and positive (lower salinity) impact in Biloxi Marsh relative to these three key months. The model captures this scenario, the baseline condition representing current conditions, demonstrating that these structures appear to mitigate the long-term impact of salinity intrusion by freshening the system over historic conditions in all months on the order of 1 to 2 ppt. Figure 2 indicates that in May, the month of the year the fishery requires the greatest freshwater enrichment, the baseline condition now meets the Chatry target 6% of the time, which is up from the historic 4%.

The USACE, the State of Louisiana, and others have studied and are implementing a number of planned freshwater diversions. The future without project (FWOP) condition builds upon the baseline condition by acknowledging these new inputs to the system. These diversions have a significant effect on the year round salinity in Biloxi Marsh with reductions around 2 to 3 ppt (Figure 3). More importantly there is a considerable reduction in the salinity in May, as seen in Figure 4, and the data from the model indicates that salinity would decrease below the upper Chatry range 28% of the time.

It should be noted that with these diversions most months now exhibit lower salinity in the Biloxi Marsh than the upper optimum Chatry range. This study did not look at ways to alter (reduce) diversions in those months when there is an over-freshening.

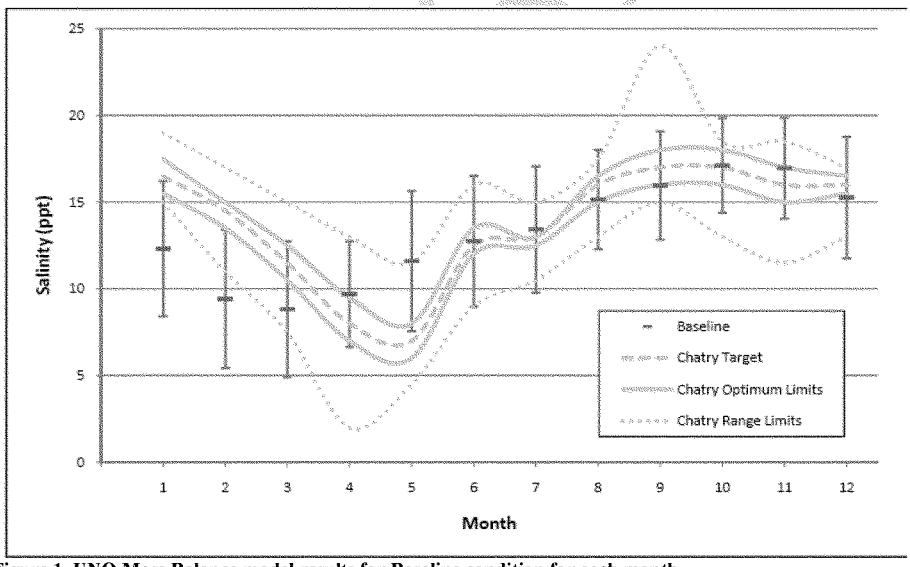


Figure 1. UNO Mass Balance model results for Baseline condition for each month

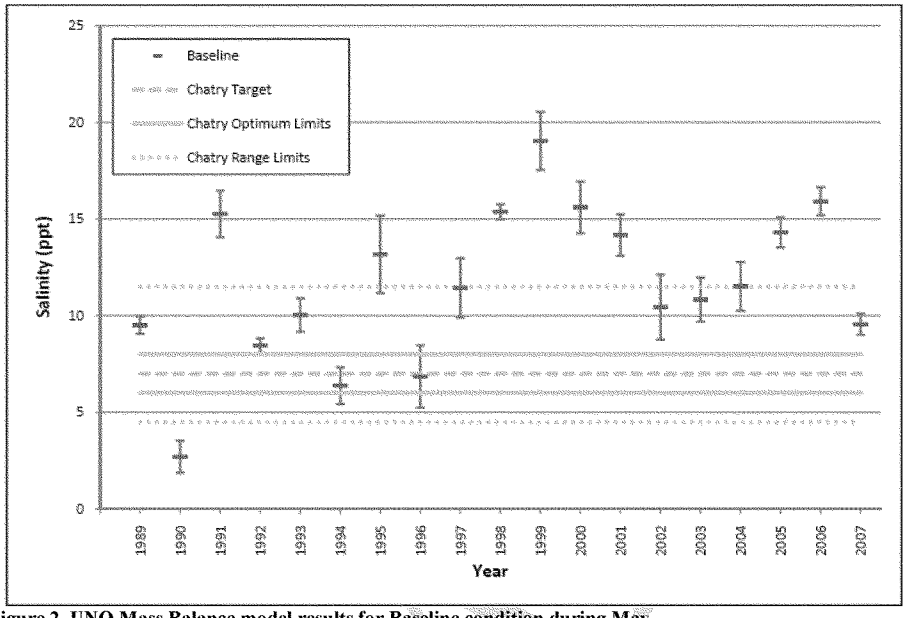


Figure 2. UNO Mass Balance model results for Baseline condition during May

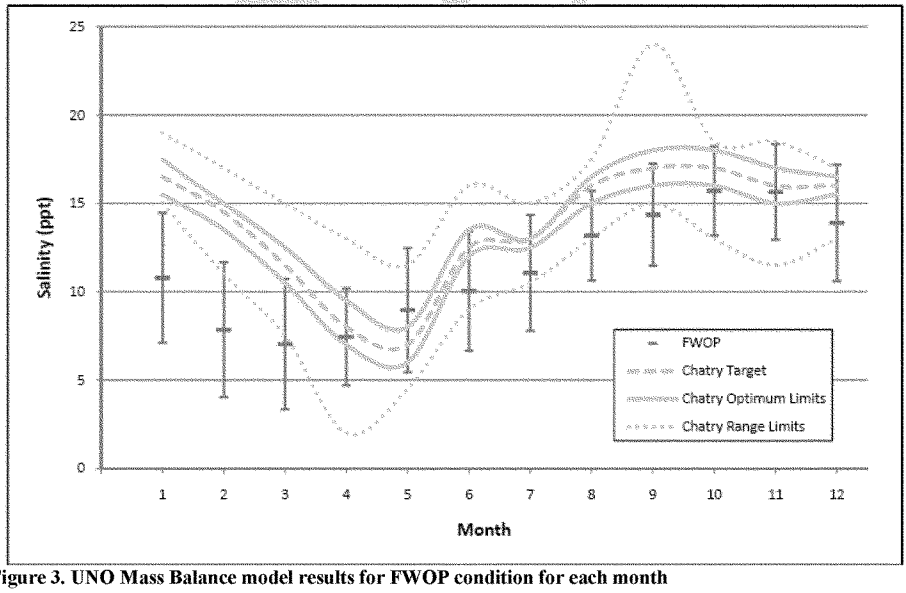


Figure 3. UNO Mass Balance model results for FWOP condition for each month

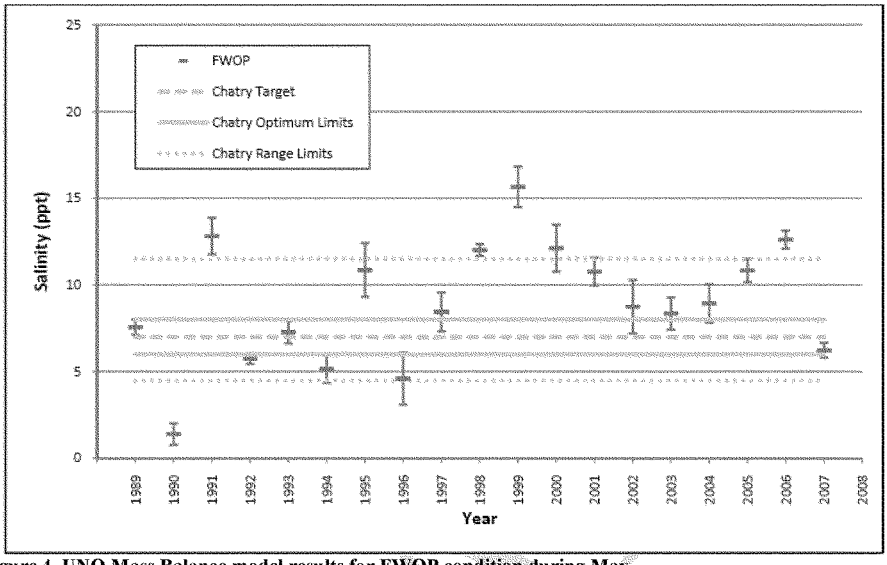


Figure 4. UNO Mass Balance model results for FWOP condition during May

Additional diversions near Violet Canal have been tested to see if supplementary freshwater will continue to drive salinity down in the Biloxi Marsh in May. A number of alternatives were modeled beginning at 1,000 cfs up to 20,000 cfs. The 1,000 cfs, 5,000 cfs, 6,000 cfs, 7,000 cfs and 20,000 cfs alternative diversions looked at a 1,000 cfs base flow condition year round with an increased pulse in April and May. The increased rate was added to the base flow on April 1st and turned off May 31st. Diversions of 10,000 cfs, 15,000 cfs, and 20,000 cfs were tested as a constant flow through the system during all months. Because of the monthly time scale of the model results and the global salinity targets, there was little effort in fine tuning the results of the various diversion alternatives.

As the level of freshwater is increased into the system through this diversion, the percent of time the salinity target was met in the Biloxi Marsh is increased. This relationship is near linear above 1,000 cfs with an increase of approximately 1.4% for every 1,000 cfs added to the system. The modeled diversion scenarios demonstrate that it would take approximately 7,000 cfs to meet the Chatry target in May 40% of the time and 20,000 cfs will freshen the system over 50% of the time as modeled over the 19 years of record. Figures 5 and 6 show the results of these model runs.

To improve the efficiency of delivery of freshwater another set of diversion alternatives was modeled with the channel between the MRGO and Lake Borgne closed by incorporating a barrier. This forced the freshwater north and south through existing natural channels but more importantly it forced additional water south through Bayou LaLoutre. This created a more direct connection with the Biloxi Marsh than when flows are directed through Lake Borgne and then to Biloxi Marsh.

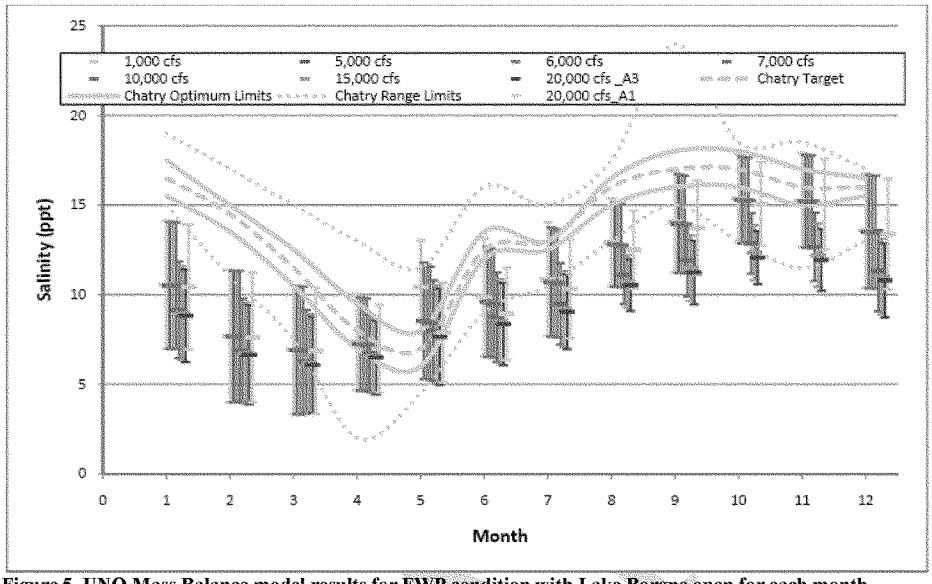


Figure 5. UNO Mass Balance model results for FWP condition with Lake Borgne open for each month

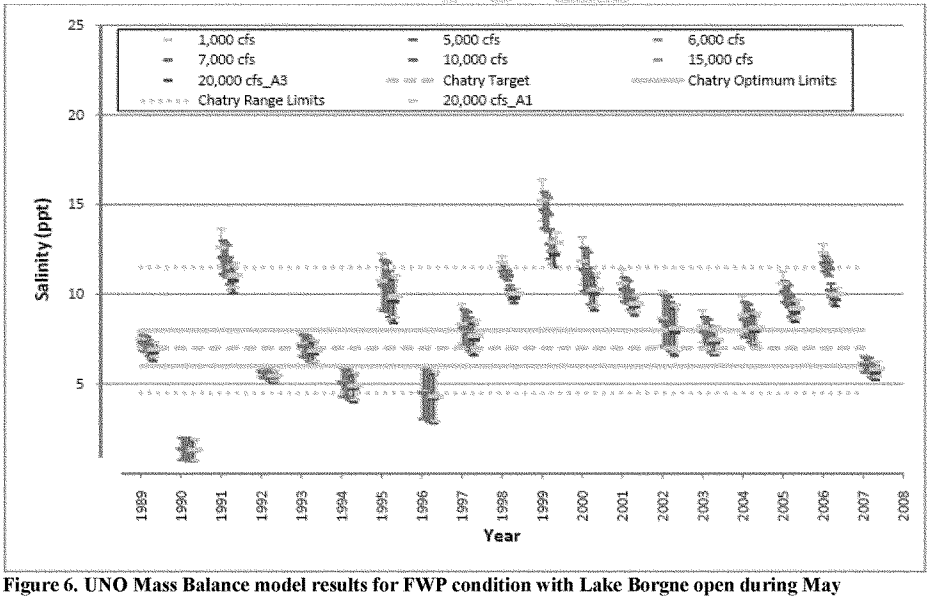


Figure 6. UNO Mass Balance model results for FWP condition with Lake Borgne open during May

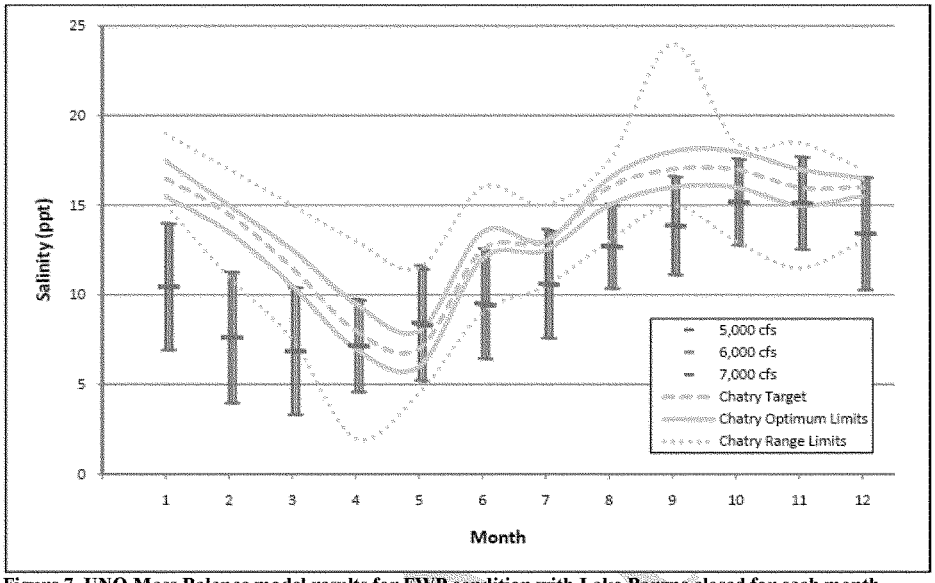


Figure 7. UNO Mass Balance model results for FWP condition with Lake Borgne closed for each month

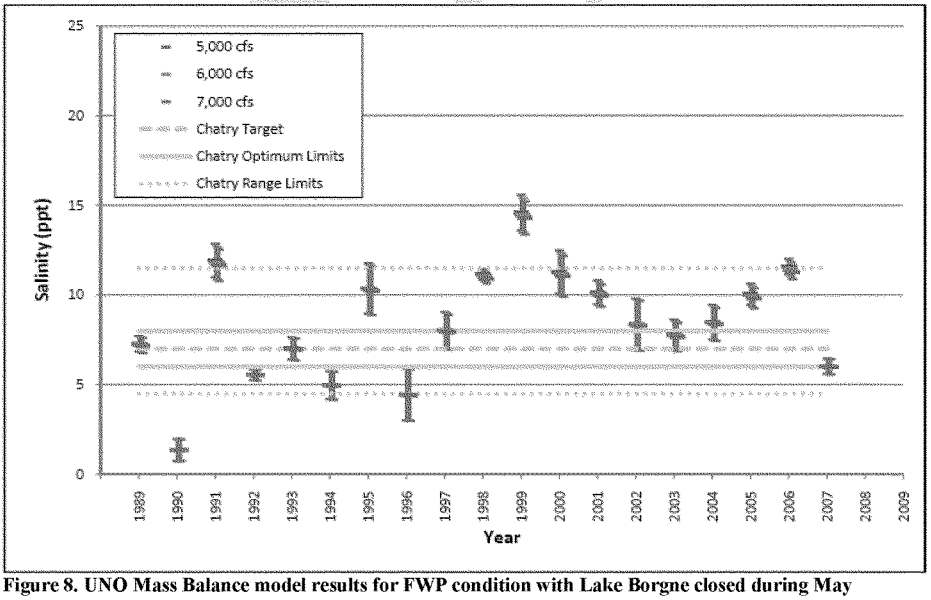


Figure 8. UNO Mass Balance model results for FWP condition with Lake Borgne closed during May

With the Lake Borgne channel closed, less water is required to meet the target for May as seen in Figures 7 and 8. Quantitatively, this structure would allow a 2% increase in the percent of time that a flow regime would meet the upper Chatry optimum value. For example, if 7,000 cfs meets the criteria 38% of the time with Lake Borgne open then, with Lake Borgne closed, the criteria would be met 40% of the time. From a flow perspective, with Lake Borgne open we estimate it will take approximately 9,000 cfs versus a flow of 6,500 cfs with the barrier in place to meet the 40% criteria.

Figure 9 represents the averages of salinity in all Mays in the Biloxi Marsh for each alternative modeled. From 1,000 cfs to 20,000 cfs, the net reduction in salinity over FWOP conditions is on the order of 2 to 3 additional ppt. From a historic perspective this is a total reduction of 5 to 7 ppt. Freshwater continues to modify the conditions in Biloxi Marsh and will bring the system within the Chatry limits in May if the ambient salinity is below 12 ppt prior to the diversion. Year round diversions can improve conditions such that the Chatry limits are met in May an additional 5% of the time. This management technique would continue to freshen the area in all other months that are already lower than the minimum Chatry limit.

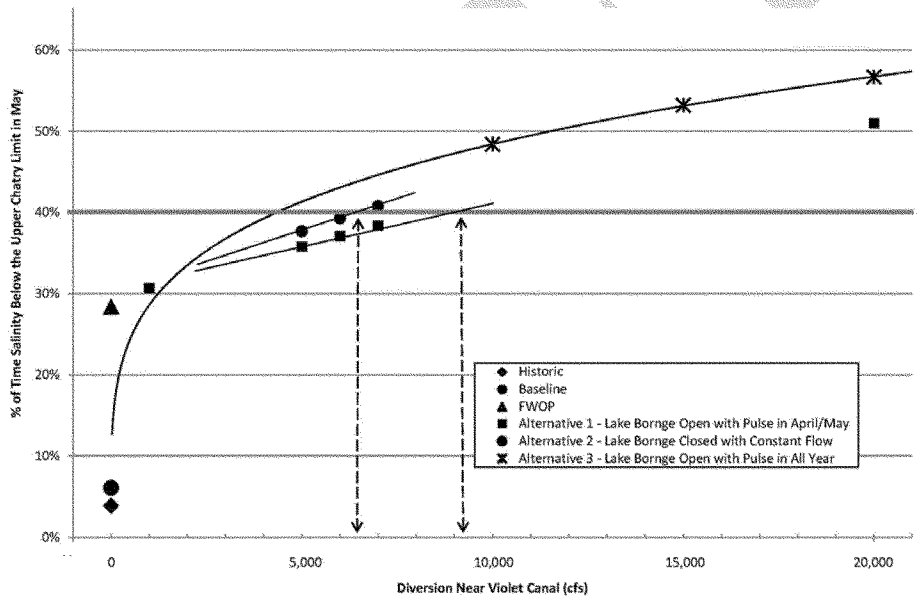


Figure 9. Comparison of alternatives with reduction of salinity.

Flows in the Pearl control the ambient salinity in the Biloxi Marsh system. In 1999 and 2000, lower than normal flows corresponded to high salinities (20 ppt and 17 ppt respectively) in May of those years. The existing and proposed diversions will modify this condition during low Pearl River flows but not enough to bring the salinity in May, and probably other months of those years, into compliance with the Chatry limits.

The UNO Mass Balance model is very coarse in its definition of the flow regime through the Central Wetlands area (CWA) and a MIKE 21 modeling effort is underway to determine the specifics of flows in the CWA, MRGO, and to establish the value of a Lake Borgne closure. The flow distributions outlined in this report are an estimate of the distribution through the system and into the Lake Borgne/Biloxi Marsh basin.

A 1,000 cfs base flow was run as a management condition throughout the year. The 1,000 cfs was a condition that appears to provide the CWA sufficient freshwater to maintain the system as a cypress swamp. The salinity goal to meet proposed ecological conditions in the CWA is to maintain the salinity at all times below 2.6 ppt. The mass balance model is not of the resolution to describe the dynamics and other fine details of flow through the CWA but is sufficient to demonstrate that the 1,000 cfs base flow is an appropriate order of magnitude estimate to meet the salinity goals in the CWA. Higher resolution modeling with MIKE 21 will take this question beyond the conclusions reached during the mass balance modeling.

Reference:

Chatry, M., Dugas, R.J., and Easley, K.A., 1983. Optimum Salinity Regime for Oyster Production on Louisiana's State Seed Grounds. *Contributions in Marine Science*. Vol. 26: 81-94.

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APPENDIX
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MRGO Ecosystem Restoration Study

SCREENING TABLES

Riverine Diversion Measures

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect
R1, R2, R3, R4, and R5 denote different discharge rates.

MEASURES RETAINED FOR FURTHER STUDY				
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2	COMMENTS
d12	Violet Diversion	Yes	Yes	Four alternative locations are being considered.

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2			
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2
d16	American/California Bay Diversion	No	No
d18	Bohemia Mississippi River Reintroduction	No	No
d17	Delta Building Diversion N. of Fort St. Phillip	No	No
d23	Fort Jackson Sediment Diversion	No	No
d01	Grand Bay Diversion R1 and R2	No	No
d13	Bayou Lamoque Diversion R1, R2, R3, R4, and R5	No	No
d10	White Ditch Diversion R3 and R5	No	No
d06	Benney's Bay Diversion R3 and R4	No	No
001 002 003	Adaptive Management through Maintenance of Existing Crevasses and Construction of New Crevasses	No	No

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
d07	Diversion at Hope Canal R1, R2, R3, R4, and R5	Yes	Yes	CFS size within LCA authorized project limits has been determined to be sufficient in engineering and design.
d08	Diversion at Blind River or Convent/Blind R1, R2, R3, R4, and R5	Yes	Yes	CFS size within LCA authorized project limits has been determined to be sufficient in engineering and design.
d05	Bayou Bienvenue Diversion R1 and R2	Yes	Yes	Concerns associated with the maximum discharge of this location in terms of effectiveness, constructability, and impacts to fisheries.
d03	Bayou La Loutre Diversion R1 and R2	Yes	Yes	Concerns regarding efficiency, constructability, potential impacts to development, and the potential to influence the targeted areas.

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
d11	Caernarvon Diversion Modification R1 and R2	Yes	Yes	Will be addressed in the two existing Caernarvon Diversion projects.
d09	Bonnet Carre Freshwater/Sediment Introduction or Opportunistic use of Bonnet Carre Spillway	Yes	Yes	Deferred—can be pursued if deemed necessary to achieve the restoration targets of the project.
d04	LaBranche Diversion R1 and R2	Yes	Yes	State of Louisiana is opposed to a large diversion of freshwater into Lake Pontchartrain.
d02	Bayou Terre aux Boeufs Diversion R1 and R2	Yes	Yes	Concerns regarding efficiency, constructability, and potential impacts to development. Target influence area could be served more efficiently and cost effectively through modifications to the existing Caernarvon Diversion.
117	Violet Spillway	Yes	Yes	An uncontrolled diversion was ruled out because of the need to control flows at different times of the year in order to meet salinity targets, support cypress growth, avoid flooding, adaptively manage, etc.
106	Effluent from Waste Water Treatment Plant	Yes	Yes	Addressed by CIAP project.

Channel/Canal Filling Measures

NOTES:

Criterion 1 = Addresses restoration of Lake Borgne ecosystem

Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES RETAINED FOR FURTHER STUDY				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	COMMENTS
030 031	Fill in MRGO to Marsh Elevation - A (Bienvenue to Dupre)	Yes	Yes	Contract duration and access are major concerns
034 035 084 085 177 178	Fill in MRGO to Marsh Elevation - C (Dupre to end of Levee Reach)	Yes	Yes	Contract duration and access are major concerns
017	Fill In MRGO to Marsh Elevation - I (Bayou LaLoutre to Lake Athanasio)	Yes	Yes	Contract duration and access are major concerns; Large open water areas increase cost

MEASURES RETAINED FOR FURTHER STUDY				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	COMMENTS
037	Fill in MRGO to Marsh Elevation - G (Bayou Yscloskey to Bayou Doulluts)	Yes	Yes	Contract duration and access are major concerns; This small reach (approx 8000') would require 2 retaining structures; perhaps Doullut's can be blocked to obtain a longer reach
036	Fill in MRGO to Marsh Elevation - F (End of Leveed Reach to Bayou Yscloskey)	Yes	Yes	Contract duration and access are major concerns
038	Fill in MRGO to Marsh Elevation - H (Bayou Doulluts to Bayou LaLoutre)	Yes	Yes	Contract duration and access are major concerns; Large open water areas increase cost

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
182	Fill parallel canal to Marsh Elevation (Back Canal Bienvenue to Dupre)	Yes	Yes	Impacts to fisheries and access.
181	Fill parallel canal to Marsh Elevation (Back Canal Between Dupre and Verret Levee)	Yes	Yes	Impacts to fisheries and access.
180	Fill parallel canal to Marsh Elevation (Back Canal Between HPL at Verret to Yscloskey)	Yes	Yes	Impacts to fisheries and access. Access over pipelines is an issue.
179	Fill parallel canal to Marsh Elevation (Back Canal Between Bayous Yscloskey and La Loutre)	Yes	Yes	Impacts to fisheries and access. Does not include Lena Lagoon.
106	Fill parallel canal to Marsh Elevation (Back Canal Between Bayous Yscloskey and La Loutre)	Yes	Yes	Impacts to fisheries and access. NOTE: Approx 1360' of canal, in vicinity of MRGO mile 41.6, is filled in and does not require any further fill.
086 176 175 018 174	Fill in MRGO to Bay Bottom (Between barrier islands to Mile 27)	Yes	Yes	Natural fill occurring; no land created.

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
107	Fill parallel canal to Marsh Elevation (Bayou La Loutre to terminus)	Yes	Yes	Impacts to fisheries and access. One of only two remaining vessel access points to Bayou La Loutre bypassing MRGO Closure at Hopedale.
032 033	Fill in MRGO to Marsh Elevation (GIWW to Bienvenue)	Yes	Yes	Impractical: Three containment structures would be required in addition to proposed IHNC surge barrier in distance of approx. 7000'.
104	Fill parallel canal to Marsh Elevation (Bayou Bienvenue to Bayou Dupre inside levee)	Yes	Yes	Already filled in by previous MRGO O&M dredge disposal.
105	Fill parallel canal to Marsh Elevation (Bayou Dupre to Levee at Verret inside levee)	Yes	Yes	Already filled in by previous MRGO O&M dredge disposal.
192	Florissant Fill and Plant with Trees	Yes	Yes	Not consistent with historic habitat.
193	Hopedale Fill and Plant with Trees	Yes	Yes	Not consistent with historic habitat.
194	Florissant Historic - Re-grade from ridge to marsh at edge of MRGO	Yes	Yes	Degrading spoil banks not seen as desirable by agencies because upland scrub-shrub provides habitat for migrating birds.
052	Hopedale Historic - Re-grade ridge to marsh at edge of MRGO	Yes	Yes	Degrading spoil banks not seen as desirable by agencies because upland scrub-shrub provides habitat for migrating birds.

Water Control Measures

NOTES:

Criterion 1 = Addresses restoration of Lake Borgne ecosystem

Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2			
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2
116	Alabama Bayou Closure	No	No
122	Identify sustainable methods to benefit Bayou St. John water quality, habitat mgt, recreational access, and educational opportunities	No	No
118	South Slough Hydrologic Restoration	No	No

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2			
119 120			
015	Lock Replacement	No	No
113 114 115	Multiple Closures in MRGO	No	No

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 4 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
013	Sediment Delivery by Pipeline at Central Wetlands	Yes	Yes	Deferred as dependent on other measures.
014	Sediment Delivery by Pipeline at Golden Triangle	Yes	Yes	Deferred as dependent on other measures.
102 103 104 105 107 108 109 110 111 112	Bayou La Loutre Water Control Features	Maybe	Maybe	Deferred as dependent on other measures.
125 126 127	Create Channel (Bayou Restoration)	No	Maybe	Concerns about increasing saltwater intrusion and tidal scour.
121	Constrict opening between Lake Borgne and MRGO	Yes	Yes	Addressed by shore protection measures along south shore of Lake Borgne and north bank of MRGO.
101	MRGO Sill (Water Control Structure - 1)	Yes	Yes	Channel filling in naturally.

Marsh Creation and Swamp Restoration Measures

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect
#191 is mutually exclusive with #188 and Fill #194 and Fill #192
#190 is mutually exclusive with #189 and Fill #052 and Fill #193
#189 is mutually exclusive with #190 and Fill #052 and Fill #193
#188 is mutually exclusive with #191 and Fill #194 and Fill #192
Measures retained for further study area dependent on shoreline protection features.

MEASURES RETAINED FOR FURTHER STUDY			
MAP 1 ID	MEASURE NAME	CRITERION 1	CRITERION 2
002	Bayou Terre aux Boeufs Marsh Creation - B	Yes	Yes
007	Maintain critical marsh shoreline and ridges of East Orleans Landbridge - B-C	Yes	Yes

MEASURES RETAINED FOR FURTHER STUDY			
MAP 1 ID	MEASURE NAME	CRITERION 1	CRITERION 2
009	Maintain critical marsh shoreline and ridges of East Orleans Landbridge - A	Yes	Yes
010	Maintain critical marsh shoreline and ridges of East Orleans Landbridge - E	Yes	No
011	Maintain critical marsh shoreline and ridges of East Orleans Landbridge - F	Yes	No
014	Golden Triangle Marsh Creation - East	Yes	Yes
015	Maintain Lake Borgne Landbridge including Landbridge Shoreline Protection	Yes	Yes
020	Maintain and Restore Biloxi Landbridge and Barrier Reefs South C	Yes	Maybe
025 026 027	Central Wetlands Marsh and/or Cypress Swamp Restoration	Yes	Yes
028	Golden Triangle Marsh Creation - West	Yes	Yes
042	Biloxi Marshes - Marsh Creation Interior - D	Yes	Maybe
081	Biloxi Marshes Marsh Nourishment	Yes	Yes
087	Morgan Harbor Marsh Creation	Yes	Yes
241	Marsh Creation east of Lake Calebass	Yes	Yes
242	Marsh Creation near St. Helena Bay	Yes	Yes
243	Marsh Creation West of Lake Jean Louis Robin	Yes	Yes
244	Marsh Creation West of Lake Calebass	Yes	Yes
245	Bayou Terre aux Boeufs marsh creation	Yes	Yes
190	Hopedale Marsh Creation	Yes	Yes
191	Florissant Marsh Creation	Yes	Yes

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2			
MAP 1 ID	MEASURE NAME	CRITERION 1	CRITERION 2
080	Grand Bay Marsh Creation	No	No
003	Caernarvon Area Marsh Creation - South	No	No
016 118	Labranche Wetlands Marsh Creation & LPBF MC	No	No
079	Fort St. Phillip Marsh Creation	No	No
039	St. Tammany Marsh Restoration and Shoreline Protection	No	No
115	Jefferson Parish fringe marsh buffer	No	No
116	Small Marsh Creation at Outfall Canals (create 250ac)	No	No
022	Bayou Terre aux Boeufs Marsh Creation - C	No	No
023	Maintain Breton Landbridge - South	No	No
024	Caernarvon Area Marsh Creation - North	No	No
078	North Lake Lery Marsh Creation	No	No
013	Bayou Terre aux Boeufs Marsh Creation - A	No	No
240	Marsh Creation South of Lake Lery	No	No

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 1 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
001	Maintain Breton Landbridge - North	Yes	Yes	
089 through 098	Breton Sound Marsh Creation	Yes	Yes	Marsh intact based on 1956 map.
004	Maintain and Restore Biloxi Landbridge and Barrier Reefs North B	Yes	No	Marsh intact based on 1956 map.
005	Maintain and Restore Biloxi Landbridge and Barrier Reefs South A	Yes	No	Marsh intact based on 1956 map.
006	Maintain and Restore Biloxi Landbridge and Barrier Reefs South B	Yes	Maybe	Marsh intact based on 1956 map.
008	Maintain critical marsh shoreline and ridges of East Orleans Landbridge - D	Yes	Yes	Screened out as unnecessary due to existing dredge material disposal.
012	Maintain and Restore Biloxi Landbridge and Barrier Reefs North A	Yes	No	Marsh intact based on 1956 map.
021	Biloxi Marshes - Marsh Creation Interior - C	Yes	Maybe	Marsh intact based on 1956 map.
040	Biloxi Marshes - Marsh Creation Interior - B	Yes	No	Marsh intact based on 1956 map.
041	Biloxi Marshes - Marsh Creation Interior - A	Yes	No	Marsh intact based on 1956 map.
043	Biloxi Marshes - Marsh Creation Interior - E	Yes	Maybe	Marsh intact based on 1956 map.
076	Biloxi Marshes Marsh Creation and Shoreline Protection - A	Yes	No	Marsh intact based on 1956 map.
077	Eloi Bay Marsh Creation/Nourishment	Yes	Yes	Marsh intact based on 1956 map.
082	Biloxi Marshes Marsh Creation and Shoreline Protection - B	Yes	No	Marsh intact based on 1956 map.
083	Skiff Lake Marsh Creation	Yes	Maybe	Marsh intact based on 1956 map.
189	Hopedale Cypress Swamp Creation	Yes	Yes	#189 is mutually exclusive with #190 and Fill #052 and Fill #193
188	Florissant Cypress Swamp Restoration	Yes	Yes	#188 is mutually exclusive with #191 and Fill #194 and Fill #192
195	Biloxi Marshes Marsh Creation - Lake Athanasio	Yes	Yes	Marsh intact based on 1956 map.

Shoreline Protection Measures

NOTES:

Criterion 1 = Addresses restoration of Lake Borgne ecosystem

Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES RETAINED FOR FURTHER STUDY					
MAP 3 ID	MEASURE NAME	FEATURE TYPE	CRITERION 1	CRITERION 2	COMMENTS
007	Maintain Shoreline East Orleans Landbridge - C	Shoreline Protection	Yes	Yes	
017	Biloxi Marshes Shore Protection - South C	Shoreline Protection	Yes	Maybe	
005	Maintain Shoreline East Orleans Landbridge - A	Shoreline Protection	Yes	Yes	
090	Shoreline Protection (Potential Creation of SAV Habitat)	Shoreline Protection	Yes	Yes	
006	Maintain Shoreline East Orleans Landbridge - B	Shoreline Protection	Yes	Yes	
013	Lake Borgne Shoreline Protection - C	Shoreline Protection	Yes	Yes	
014	Biloxi Marshes Shore Protection - North A	Shoreline Protection	Yes	No	
104	MRGO North Bank (MRGO Mile 33.8-32.6) O&M	Shoreline Protection O&M	Yes	Yes	
081	Morgan Harbor Shoreline Protection	Shoreline Protection	Yes	Yes	
087	MRGO Shoreline Protection - H O&M	Shoreline Protection O&M	Yes	Yes	
027	MRGO Shoreline Protection - G	Shoreline Protection	Yes	Yes	
029	Eloi Bay Shoreline Protection	Shoreline Protection	Yes	Yes	
098	Oyster Reef Development in Biloxi Marshes C (Foreshore Dike with 35 ' Berm for Reef)	Oyster Reef/ Shoreline Protection	Yes	No	
022	MRGO Shoreline Protection - C O&M	Shoreline Protection O&M	Yes	Yes	
025	MRGO Shoreline Protection - D O&M	Shoreline Protection O&M	Yes	Yes	
021	MRGO Shoreline Protection - F O&M	Shoreline Protection O&M	Yes	Yes	
024	MRGO Shoreline Protection - B	Shoreline Protection	Yes	Yes	
008	Maintain Lake Borgne Shoreline - A	Shoreline Protection	Yes	Yes	
026	MRGO Shoreline	Shoreline	Yes	Yes	

MEASURES RETAINED FOR FURTHER STUDY					
MAP 3 ID	MEASURE NAME	FEATURE TYPE	CRITERION 1	CRITERION 2	COMMENTS
	Protection - E	Protection			
028	Jean Louis Robin Shoreline Protection	Shoreline Protection	Yes	Yes	
107	Reformulated features in the interior Biloxi marshes.				
110	Shoreline protection along Bayou La Loutre	Shoreline Protection	Yes	Yes	Developed to protect against increased erosion on the shoreline following the de-authorization of the MRGO.
111	Reformulated features in the interior Biloxi marshes.				

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2					
MAP 3 ID	MEASURE NAME	FEATURE TYPE	CRITERION 1	CRITERION 2	COMMENTS
079	LaBranche Wetlands Shoreline Protection	Shoreline Protection	No	No	Dependency with Marsh Creation #016 & #118
089	Sink Ships for Breakwater/Artificial Reef	Artificial Reef/Breakwater	No	No	
091	Lake Maurepas Shoreline Protection - A	Shoreline Protection	No	No	
092	Lake Maurepas Shoreline Protection - B	Shoreline Protection	No	No	
093	St. Tammany Shoreline Protection	Beach Creation	No	No	Dependency with Marsh Creation #039
015	Biloxi Marshes Shore Protection - North B	Shoreline Protection	No	No	
016	Biloxi Marshes Shore Protection - South B	Shoreline Protection	No	No	

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA					
MAP 3 ID	MEASURE NAME	FEATURE TYPE	CRITERION 1	CRITERION 2	OTHER CRITERIA
002	Biloxi Marshes Shore Protection Interior B	Shoreline Protection	Yes	No	Off-shore protection deemed less effective than near shore protection for erosion prevention.
003	Biloxi Marshes Shore Protection Interior C	Shoreline Protection	Yes	Maybe	Off-shore protection deemed less effective than near shore protection for erosion prevention.
004	Biloxi Marshes Shore Protection Interior A	Shoreline Protection	Yes	No	Off-shore protection deemed less effective

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA					
					than near shore protection for erosion prevention.
009	Golden Triangle Shoreline Protection	Shoreline Protection	Yes	Yes	Covered by CIAP project.
018	Maurepas Shoreline Protection - East	Shoreline Protection	Yes	Yes	Marsh looks healthy and has not changed significantly since 1956.
019	Maurepas Shoreline Protection - West	Shoreline Protection	Yes	Yes	Removed due to low benefit numbers from initial WVA and high cost.
020	MRGO Shoreline Protection - A		Yes	Yes	In authorized part of the GIWW channel, O&M covered.
023	Biloxi Marshes Shore Protection - South A	Shoreline Protection	Yes	No	Determined to be infeasible, would only protect a small area at a high cost.
078	Biloxi Marshes Shoreline Protection - A	Shoreline Protection	Yes	No	Determined to be infeasible; would only protect a small area at a high cost.
080	Biloxi Marshes Shoreline Protection - Offshore Artificial Reef	Shoreline Protection	Yes	Yes	Not as cost effective as nearshore shoreline protection measures
082	West Lake Lery Shoreline Protection		Yes	Maybe	Covered by other projects.
083	South Lake Lery Shoreline Restoration		Yes	Maybe	Covered by other projects.
084	Biloxi Marshes Shoreline Protection - B	Shoreline Protection	Yes	No	Determined to be infeasible, would only protect a small area at a high cost.
085	Skiff Lake Shoreline Protection	Shoreline Protection	Yes	Maybe	Determined to be infeasible, would only protect a small area at a high cost.
086	Bay Boudreau Shoreline Protection	Shoreline Protection	Yes	No	Duplicative with #98 Shoreline Protection
088	Breakwaters along Lake Borgne Shoreline	Breakwater	Yes	Yes	Not as cost effective as nearshore shoreline protection measures
095	West of Shell Beach Shoreline Protection	Shoreline Protection	Yes	Yes	Covered by another project.
096	Bayou Dupre/Lake Borgne Shoreline Protection	Shoreline Protection	Yes	Yes	Covered by another project.
098	Oyster Reef Development in Biloxi Marshes A (Via Crushed	Oyster Reef	Yes	No	Not as effective for shoreline protection purpose as measure

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA					
	Stone) and B (Bio-Engineered Reef)				#98 - Oyster Reef Development in Biloxi Marshes C (Foreshore Dike with 35' Berm for Reef)
099	MRGO South Bank (MRGO Mile 60-59) O&M	Shoreline Protection O&M	Yes	Yes	Screened out because WVA assigned essentially zero benefits.
100	MRGO South Bank (MRGO Mile 59-47) O&M	Shoreline Protection O&M	Yes	Yes	Screened out because WVA assigned essentially zero benefits.
101	MRGO South Bank (MRGO Mile 38.9-38.5) O&M	Shoreline Protection O&M	Yes	Yes	Existing ACM in good shape.
102	MRGO South Bank (MRGO Mile 37.3-36.5) O&M	Shoreline Protection O&M	Yes	Yes	Existing ACM in good shape.
103	MRGO South Bank (MRGO Mile 23.2-20.8) O&M	Shoreline Protection O&M	Yes	Yes	Removed as inefficient. Wouldn't really protect any land, could prevent natural filling in the channel.
105	MRGO North Bank (MRGO Mile 23.2-20.8) O&M	Shoreline Protection O&M	Yes	Yes	Removed as inefficient. Wouldn't really protect any land, could prevent natural filling in the channel.
030	Maintain Lake Borgne Shoreline - B	Shoreline Protection	Yes	Yes	State will build with surplus funds. Part of FWOP.
010	Lake Borgne Shoreline Protection - A	Shoreline Protection	Yes	Yes	State will build with surplus funds. Part of FWOP.
011	Lake Borgne Shoreline Protection - B	Shoreline Protection	Yes	Yes	State will build with surplus funds. Part of FWOP.

Ridge Restoration Measures

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES RETAINED FOR FURTHER STUDY			
MAP x ID	MEASURE NAME	CRITERION 1	CRITERION 2
133	Bayou La Loutre Ridge Restoration East - South Bank A	Yes	Yes

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA

MAP x ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
119 through 123	Bayou La Loutre Ridge Restoration East - North Bank A	Yes	Yes	Removed due to potential negative impacts to existing vegetation and marsh.
124 through 128	Bayou La Loutre Ridge Restoration East - North Bank B	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
129 through 132	Bayou La Loutre Ridge Restoration East - South Bank A	Yes	Yes	Only the 200 ft width measure (133) was carried forward for refinement.
134 through 138	Bayou La Loutre Ridge Restoration East - South Bank B	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
139 through 143	Bayou La Loutre Ridge Restoration West - North Bank A	Yes	Yes	Removed due to potential negative impacts to existing vegetation and marsh.
144 through 148	Bayou La Loutre Ridge Restoration West - South Bank A	Yes	Yes	Removed due to potential negative impacts to existing vegetation and marsh.
149 through 153	Bayou Terre aux Boeufs West Ridge Restoration A	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
154 through 158	Bayou Terre aux Boeufs West Ridge Restoration B	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
159 through 163	Bayou Terre aux Boeufs East Ridge Restoration A	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
164 through 168	Bayou Terre aux Boeufs West Ridge Restoration C	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.
169 Through 173	Bayou Terre aux Boeufs East Ridge Restoration B	Yes	No	Removed due to potential negative impacts to existing vegetation and marsh.

Vegetative Planting Measures

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA

MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
184 through 187	Plant Trees on North Bank of MRGO	Yes	Yes	Inconsistent with historic habitat and existing conditions.
183	Plant Trees in Front of Levee (Mile 59 – 47)	Yes	Yes	Would violate maintenance criteria for levees.
109 through 114	Plant Trees on Spoil Bank	Yes	Yes	Disposal areas are already well vegetated and will likely develop into mature stands that could serve basically the same function as more desirable tree species.

Barrier Island Restoration Measures.

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES RETAINED FOR FURTHER STUDY				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	COMMENTS
029	Breton Island Restoration	Yes	Yes	Sediment transport disrupted to Breton Island by deepening the natural channel between Grand Gossier and Breton Island

MEASURES REMOVED FROM FURTHER STUDY BASED ON CRITERIA 1 AND 2			
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2
019	Chandeleur Islands (excluding Breton Island)	No	No

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 5 ID	FEATURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
075	Cat Island Restoration	Yes	No	Already addressed by MsCIP.

SAV Demonstration Projects

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 5 ID	FEATURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
117	Louisiana SAV DEMO	Yes	Maybe	Replaced with breakwater to provide calming to allow expansion of established SAV on south shore of Lake Pontchartrain (see measure 090 under Shoreline Protection features).
NOT MAPPED	Mississippi SAV DEMO	Yes	No	Already addressed by MsCIP.

Artificial Oyster Reef Measures

NOTES:
Criterion 1 = Addresses restoration of Lake Borgne ecosystem
Criterion 2 = Addresses a MRGO ecosystem effect

MEASURES REMOVED FROM FURTHER STUDY BASED ON OTHER CRITERIA				
MAP 5 ID	MEASURE NAME	CRITERION 1	CRITERION 2	OTHER CRITERIA
108	Oyster reef development in Biloxi Marsh	Yes	No	Area identified already in acceptable condition regarding oysters

ATTACHMENT B: IWR Plan Results

Codes used for initial geographic area runs:

IWR GROUP NAME	SOLUTION LABEL	IWR CODE	FEATURE TYPE
Biloxi Marsh	081	A	Marsh Creation
Biloxi Marsh	042	B	Marsh Creation
Biloxi Marsh	020	C	Marsh Creation
Biloxi Marsh	013sp	F	Shoreline Protection
Biloxi Marsh	014sp	G	Shoreline Protection
Biloxi Marsh	98asp	H	Shoreline Protection
Biloxi Marsh	98bsp	I	Shoreline Protection
Biloxi Marsh	111sp	J	Shoreline Protection
Biloxi Marsh	017sp	K	Shoreline Protection
Biloxi Marsh	107sp	L	Shoreline Protection
Biloxi Marsh	029asp	M	Shoreline Protection
Biloxi Marsh	110sp	N	Shoreline Protection
Biloxi Marsh	81sp	P	Shoreline Protection
Biloxi Marsh	87	Q	Marsh Creation
E. Orleans/S. Lake Borgne	010a	A	Marsh Creation
E. Orleans/S. Lake Borgne	010b	B	Marsh Creation
E. Orleans/S. Lake Borgne	011	C	Marsh Creation
E. Orleans/S. Lake Borgne	007	D	Marsh Creation
E. Orleans/S. Lake Borgne	009	E	Marsh Creation
E. Orleans/S. Lake Borgne	005sp	F	Shoreline Protection
E. Orleans/S. Lake Borgne	006sp	G	Shoreline Protection
E. Orleans/S. Lake Borgne	007sp	H	Shoreline Protection
E. Orleans/S. Lake Borgne	090	I	Breakwater for SAV
E. Orleans/S. Lake Borgne	028	J	Marsh Creation
E. Orleans/S. Lake Borgne	014	K	Marsh Creation
E. Orleans/S. Lake Borgne	015a	L	Marsh Creation
E. Orleans/S. Lake Borgne	008sp	M	Shoreline Protection
E. Orleans/S. Lake Borgne	015c	N	Marsh Creation
MRGO Channel	024	A	Channel Narrowing Marsh Creation
MRGO Channel	021	B	O&M Shoreline Protection
MRGO Channel	022	C	O&M Shoreline Protection
MRGO Channel	025	D	O&M Shoreline Protection
MRGO Channel	027	E	Channel Narrowing Shoreline Protection
MRGO Channel	026	F	Channel Narrowing Shoreline Protection
MRGO Channel	087	G	Shoreline Protection
MRGO Channel	104	H	O&M Shoreline Protection
Terre aux Boeufs/Hopedale	002a	A	Marsh Creation
Terre aux Boeufs/Hopedale	002b	B	Marsh Creation
Terre aux Boeufs/Hopedale	002c	C	Marsh Creation
Terre aux Boeufs/Hopedale	245	D	Marsh Creation
Terre aux Boeufs/Hopedale	243	E	Marsh Creation
Terre aux Boeufs/Hopedale	244	F	Marsh Creation
Terre aux Boeufs/Hopedale	241	G	Marsh Creation

IWR GROUP NAME	SOLUTION LABEL	IWR CODE	FEATURE TYPE
Terre aux Boeufs/Hopedale	242	H	Marsh Creation
Terre aux Boeufs/Hopedale	190	I	Marsh Creation
Terre aux Boeufs/Hopedale	029bsp + 028	J	Shoreline Protection

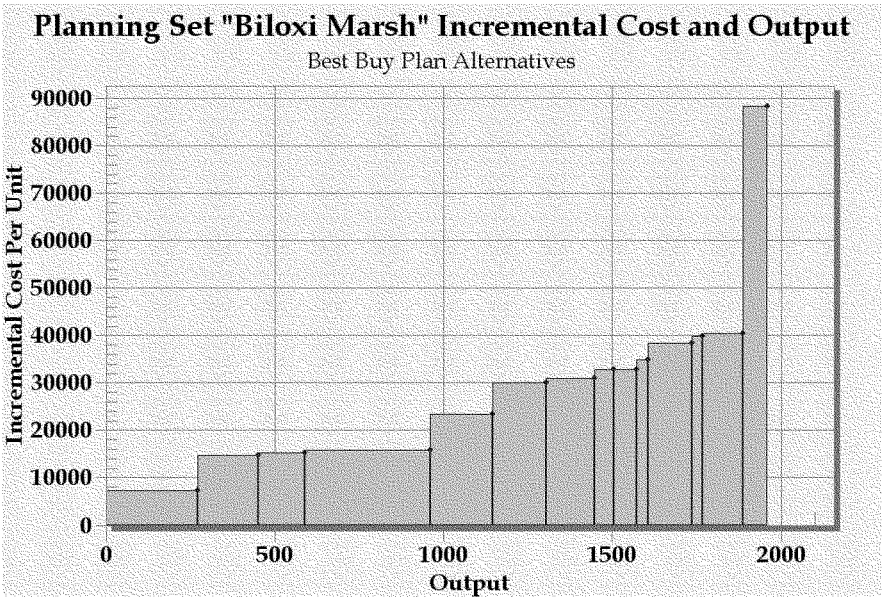
Note: Biloxi measures 010sp, 011sp, and 030sp (IWR codes D, E, and O) were eliminated because the State of Louisiana plans to build those features with surplus funds.

Codes and scales used for final run:

Code	Geographic Run Name	Scale Code in IWR	Scale	Measures
B	Biloxi Marsh	B1	Best Buy 5	MC 081, 087 (BM1, BM2) SP 013, 029a (BS1, BS 2)
		B2	Best Buy 6	MC 081, 087(BM1, BM2) SP 013, 029a, 81(BS1, BS2, BS3)
		B3	Best Buy 14	MC 081, 087, 020 SP 013, 029a, 81, 014, 111, 98a, 107, 110, 017, 98b
		B4	Best Buy 15	MC 081, 087, 020, 042 SP 013, 029a, 81, 014, 111, 98a, 107, 110, 017, 98b
M	MRGO Channel	M1	Best Buy 3	21, 22 (MS1, MS2)
		M2	Best Buy 5	21, 22, 25, 104
		M3	Best Buy 6	21, 22, 25, 104, 27
		M4	Best Buy 8	21, 22, 25, 104, 27, 87, 24
		M5	Best Buy 9	21, 22, 25, 104, 27, 87, 24, 26
E	East Orleans/Lake Borgne	E1	Best Buy 5	MC 009, 011, 015a, 015c
		E2	Best Buy 6	MC 009, 011, 015a, 015c, 014 (EM1, EM2, LM1, LM2, LM3)
		E3	Best Buy 10	MC 009, 011, 015a, 015c, 014, 010a, 010b SP 005, 006
		E4	Best Buy 13	MC 009, 011, 015a, 015c, 014, 010a, 010b, 028 (EM1, EM2, EM3, EM4, LM1, LM2, LM3, LM4) SP 005, 006, 007, 008 (ES1, ES2, ES3, LS1)
		E5	Best Buy 15	MC 009, 011, 015a, 015c, 014, 010a, 010b, 028, 007 (EM1, EM2, EM3, EM4, EM5, LM1, LM2, LM3, LM4) SP 005, 006, 007, 008 (ES1, ES2, ES3, LS1) SAV 090 (EV1)
T	Terre aux Boeufs/ Hopedale/Jetty	T1	Best Buy 4	MC 245, 243, 242
		T2	Best Buy 6	MC 245, 243, 242, 244, 241,
		T3	Best Buy 8	MC 245, 243, 242, 244, 241, 002a (TM1, TM2, TM3, TM4, TM5, TM6) SP 029b, 028 (JS1)
		T4	Best Buy 11	MC 245, 243, 242, 244, 241, 002a, 002b, 002c, 190 (TM1, TM2, TM3, TM4, TM5, TM6, HM1) SP 029b, 028 (JS1)
C	Central Wetlands	C1	Swamp only	Swamp 025a, 025b, 026a, 026e, 027a, 027b (CC1, CC2, CC3, CC4, CC5, CC6)
		C2	Swamp + marsh	Swamp 025a, 025b, 026a, 026e, 027a, 027b (CC1, CC2, CC3, CC4, CC5, CC6) MC 026b, 026c, 025b, 027b, 026d (CM1, CM2, CM3, CM4, CM5)
R	Ridge	R1	Partial ridge	Ridge 133a (BR1)
		R2	Entire ridge	Ridge 133a + 133b
F	Florissant	F1	Florissant	MC 191

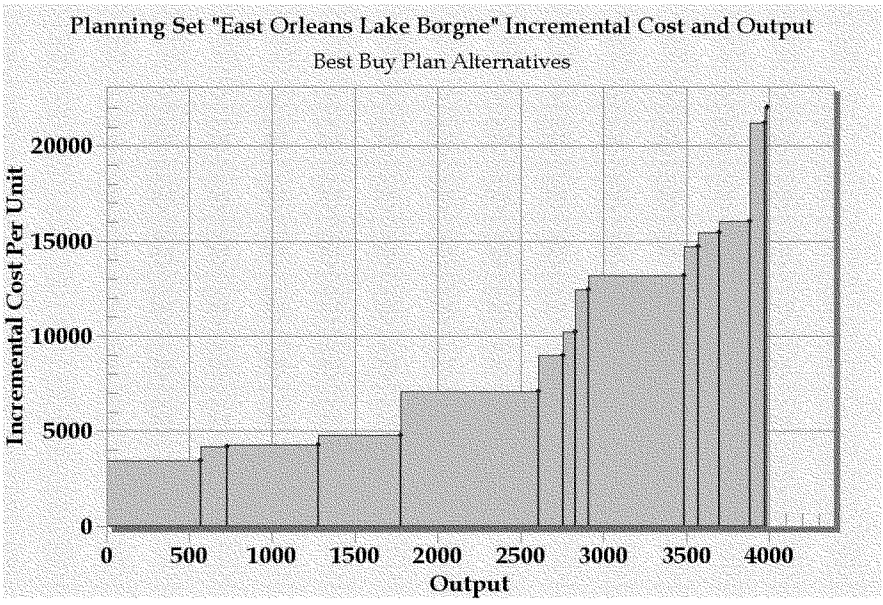
Biloxi Marsh Best Buy Plan Alternatives:

Component in Combined Run		Name	Output (AAHU)	Cost ($Annual)	Average Cost
	1	No Action Plan	0	0	
	2	A0B0C0F0G0H0I0J0K0L0M0N0P0Q1	272	1,964,187	7,221.28
	3	A0B0C0F1G0H0I0J0K0L0M0N0P0Q1	451	4,603,887	10,208.18
	4	A0B0C0F1G0H0I0J0K0L0M1N0P0Q1	588	6,688,567	11,375.11
B1	5	A1B0C0F1G0H0I0J0K0L0M1N0P0Q1	961	12,561,792	13,071.58
B2	6	A1B0C0F1G0H0I0J0K0L0M1N0P1Q1	1,146	16,897,231	14,744.53
	7	A1B0C1F1G0H0I0J0K0L0M1N0P1Q1	1,305	21,693,587	16,623.44
	8	A1B0C1F1G1H0I0J0K0L0M1N0P1Q1	1,447	26,108,051	18,042.88
	9	A1B0C1F1G1H0I0J1K0L0M1N0P1Q1	1,505	28,009,096	18,610.70
	10	A1B0C1F1G1H1I0J1K0L0M1N0P1Q1	1,571	30,180,369	19,210.93
	11	A1B0C1F1G1H1I0J1K0L1M1N0P1Q1	1,606	31,404,274	19,554.34
	12	A1B0C1F1G1H1I0J1K0L1M1N1P1Q1	1,736	36,399,078	20,967.21
	13	A1B0C1F1G1H1I0J1K1L1M1N1P1Q1	1,767	37,638,230	21,300.64
B3	14	A1B0C1F1G1H1I1J1K1L1M1N1P1Q1	1,887	42,501,627	22,523.38
B4	15	A1B1C1F1G1H1I1J1K1L1M1N1P1Q1	1,960	48,948,231	24,973.59



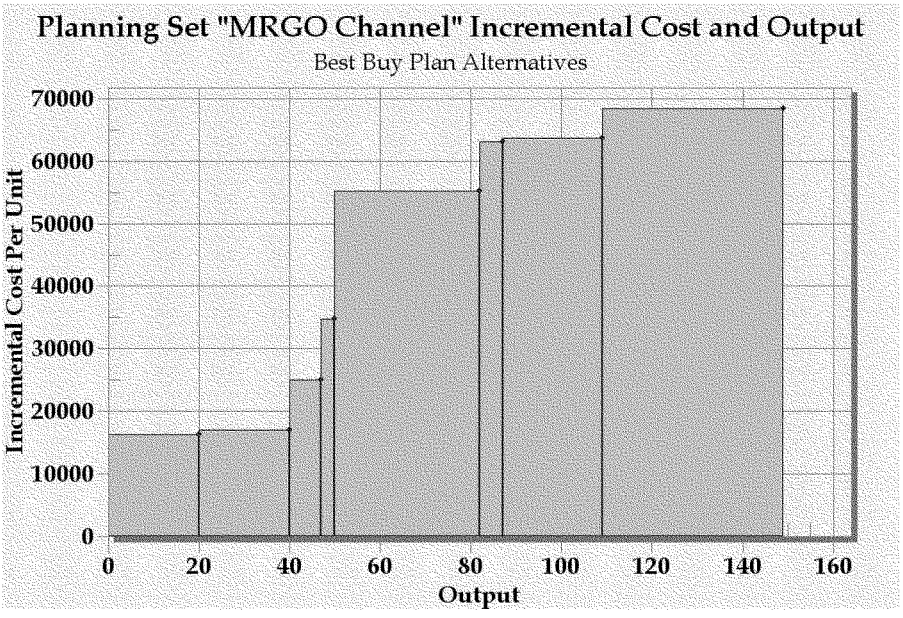
E. Orleans/S. Lake Borgne Best Buy Plan Alternatives:

Component in Combined Run		Name	Output (AAHU)	Cost ($Annual)	Average Cost
	1	No Action Plan	0	0	
	2	A0B0C0D0E0F0G0H0I0J0K0L0M0N1	569	1,965,753	3,454.75
	3	A0B0C1D0E0F0G0H0I0J0K0L0M0N1	725	2,614,496	3,606.20
	4	A0B0C1D0E0F0G0H0I0J0K0L1M0N1	1,276	4,963,140	3,889.61
E1	5	A0B0C1D0E1F0G0H0I0J0K0L1M0N1	1,776	7,348,597	4,137.72
E2	6	A0B0C1D0E1F0G0H0I0J0K1L1M0N1	2,608	13,259,700	5,084.24
	7	A1B0C1D0E1F0G0H0I0J0K1L1M0N1	2,755	14,578,485	5,291.65
	8	A1B0C1D0E1F1G0H0I0J0K1L1M0N1	2,829	15,336,686	5,421.24
	9	A1B0C1D0E1F1G1H0I0J0K1L1M0N1	2,906	16,295,630	5,607.58
E3	10	A1B1C1D0E1F1G1H0I0J0K1L1M0N1	3,484	23,906,172	6,861.70
	11	A1B1C1D0E1F1G1H0I0J1K1L1M0N1	3,568	25,142,688	7,046.72
	12	A1B1C1D0E1F1G1H0I0J1K1L1M1N1	3,696	27,122,285	7,338.28
E4	13	A1B1C1D0E1F1G1H1I0J1K1L1M1N1	3,884	30,135,256	7,758.82
	14	A1B1C1D1E1F1G1H1I0J1K1L1M1N1	3,973	32,024,544	8,060.54
E5	15	A1B1C1D1E1F1G1H1I1J1K1L1M1N1	3,988	32,355,008	8,113.09



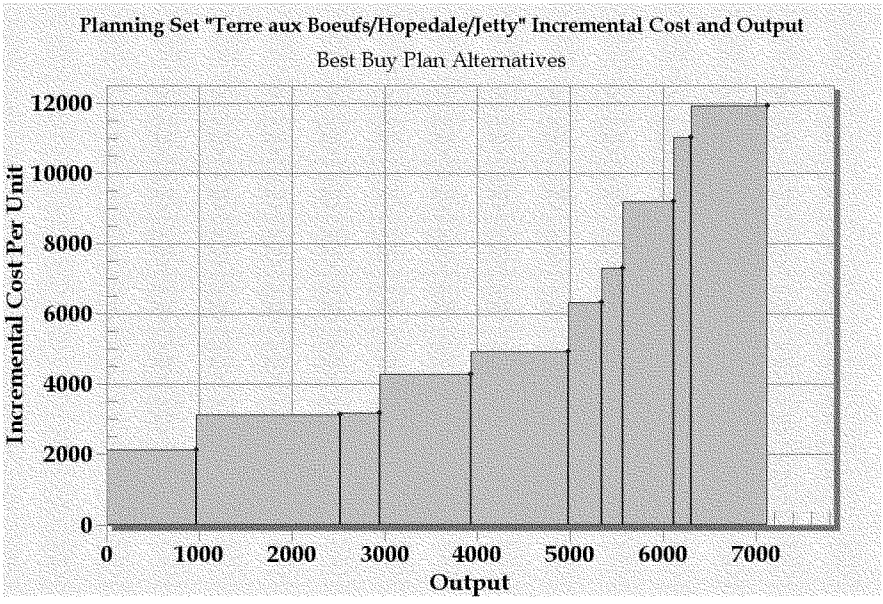
MRGO Channel Best Buy Plan Alternatives:

Component in Combined Run		Name	Output (AAHU)	Cost ($Annual)	Average Cost
	1	No Action Plan	0	0	
	2	A0B0C1D0E0F0G0H0	20	326,590	16,329.50
M1	3	A0B1C1D0E0F0G0H0	40	666,896	16,672.40
	4	A0B1C1D1E0F0G0H0	47	842,457	17,924.62
M2	5	A0B1C1D1E0F0G0H1	50	946,940	18,938.80
M3	6	A0B1C1D1E1F0G0H1	82	2,716,959	33,133.65
	7	A0B1C1D1E1F0G1H1	87	3,033,057	34,862.72
M4	8	A1B1C1D1E1F0G1H1	109	4,433,780	40,676.88
M5	9	A1B1C1D1E1F1G1H1	149	7,170,008	48,120.86



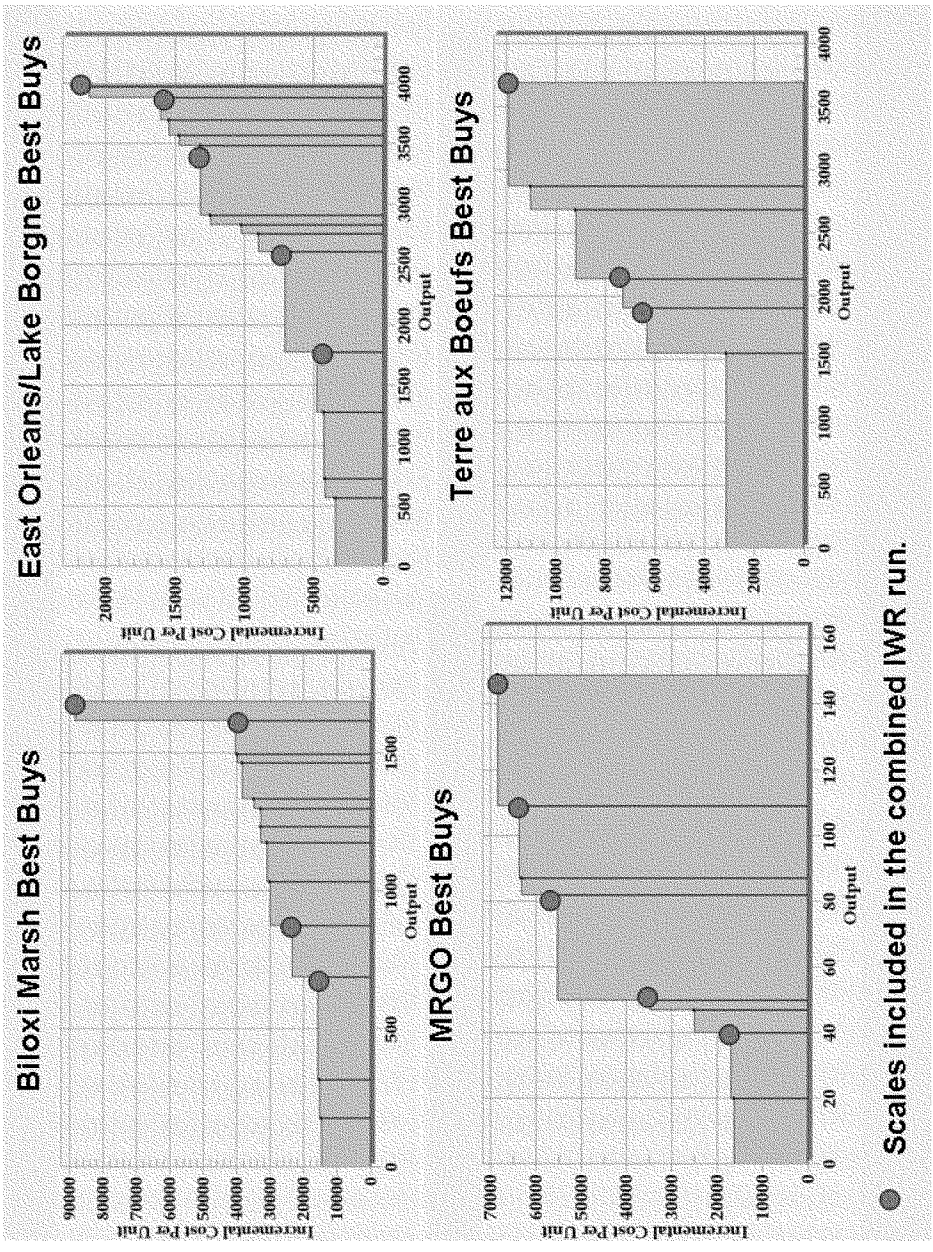
Terre aux Boeufs/Hopedale/Jetty Best Buy Plan Alternatives:

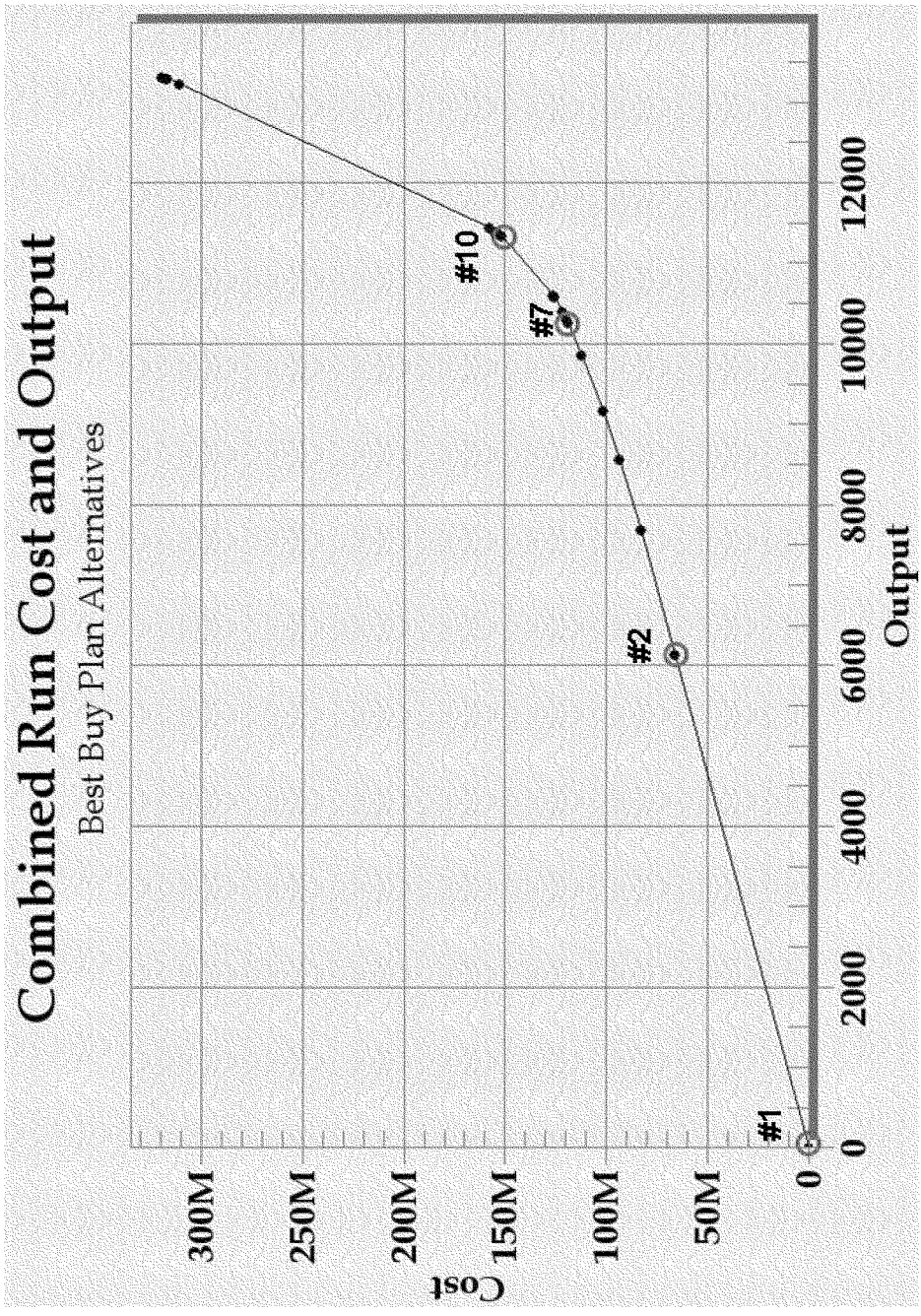
Component in Combined Run		Name	Output (AAHU)	Cost ($Annual)	Average Cost
	1	No Action Plan	0	0	
	2	A0B0C0D0E0F0G0H1I0J0	972	2,066,854.00	2,126.39
	3	A0B0C0D1E0F0G0H1I0J0	2,517	6,896,482.00	2,739.96
T1	4	A0B0C0D1E1F0G0H1I0J0	2,942	8,251,101.00	2,804.59
	5	A0B0C0D1E1F1G0H1I0J0	3,926	12,468,213.00	3,175.81
T2	6	A0B0C0D1E1F1G1H1I0J0	4,977	17,654,889.00	3,547.30
	7	A1B0C0D1E1F1G1H1I0J0	5,335	19,921,726.00	3,734.16
T3	8	A1B0C0D1E1F1G1H1I0J1	5,567	21,618,000.67	3,883.24
	9	A1B0C1D1E1F1G1H1I0J1	6,119	26,705,244.67	4,364.32
	10	A1B0C1D1E1F1G1H1I1J1	6,305	28,759,709.67	4,561.41
T4	11	A1B1C1D1E1F1G1H1I1J1	7,128	38,574,966.67	5,411.75

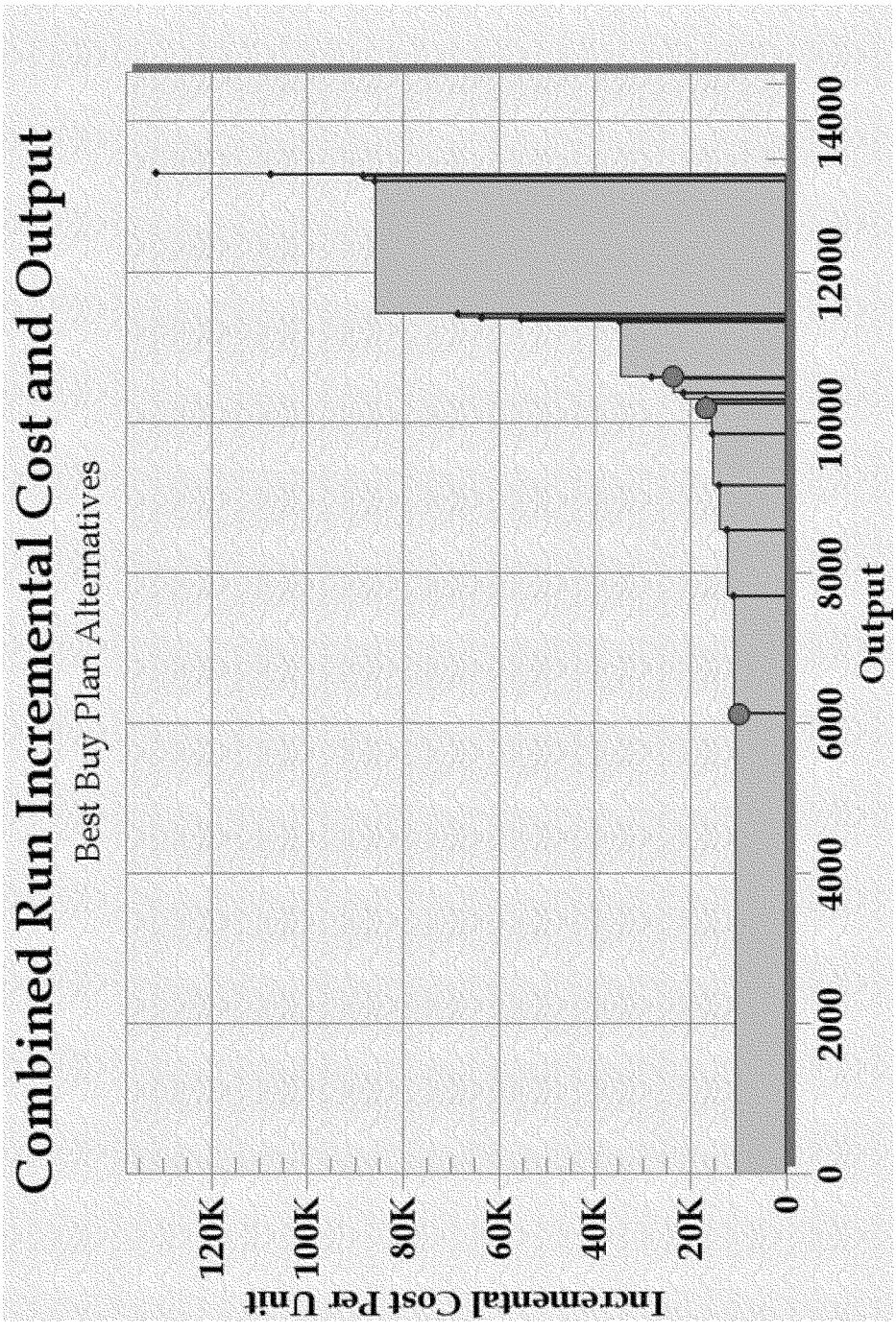


Combined Run Best Buy Plan Alternatives:

	Name	Output (AAHU)	Cost ($Annual)	Average Cost
1	No Action Plan	0.00	0.00	
2	B0M0C1E2T3R1F0	9,564.00	78,485,348.00	8,206.33
3	B0M0C1E2T4R1F0	11,125.00	95,442,314.00	8,579.08
4	B0M0C1E3T4R1F0	12,001.00	106,088,786.00	8,840.00
5	B1M0C1E3T4R1F0	12,962.00	118,650,578.00	9,153.72
6	B1M0C2E3T4R1F0	13,566.00	127,057,238.00	9,365.86
7	B1M0C2E4T4R1F0	13,966.00	133,286,322.00	9,543.63
8	B1M1C2E4T4R1F0	14,006.00	133,953,218.00	9,563.99
9	B1M1C2E5T4R1F0	14,110.00	136,172,970.00	9,650.81
10	B2M1C2E5T4R1F0	14,295.00	140,508,409.00	9,829.20
11	B2M2C2E5T4R1F0	14,305.00	140,788,453.00	9,841.91
12	B3M2C2E5T4R1F0	15,046.00	166,392,849.00	11,058.94
13	B3M3C2E5T4R1F0	15,078.00	168,162,868.00	11,152.86
14	B3M4C2E5T4R1F0	15,105.00	169,879,689.00	11,246.59
15	B3M5C2E5T4R1F0	15,145.00	172,615,917.00	11,397.55
16	B3M6C2E5T4R1F0	16,928.00	325,441,473.00	19,225.04
17	B4M6C2E5T4R1F0	17,001.00	331,888,077.00	19,521.68
18	B4M6C2E5T4R2F0	17,007.00	332,533,512.00	19,552.74
19	B4M6C2E5T4R2F1	17,019.00	334,109,922.00	19,631.58


Biloxi Marsh Best Buys
East Orleans/Lake Borgne Best Buys
MRGO Best Buys
Terre aux Boeufs Best Buys
Incremental Cost Per Unit
Output
Scales included in the combined IWR run.


Combined Run Cost and Output
Best Buy Plan Alternatives
Cost
300M
250M
200M
150M
100M
50M
0
0
2000
4000
6000
8000
10000
12000
Output
#1
#2
#7
#10


Combined Run Incremental Cost and Output
Best Buy Plan Alternatives
Incremental Cost Per Unit
120K
100K
80K
60K
40K
20K
0
0
2000
4000
6000
8000
10000
12000
14000
Output

APPENDIX
P

Basis for Analysis

Following the identification of the tentatively selected plan (TSP), a construction sequence was developed. Assumptions factoring into the construction sequence include production rates for building rock projects, dredge equipment availability, land loss rates, and the limitation of alternating dredging cycles in the lobes of Lake Borgne. The Agency coordination for the MRGO plan was based on this construction sequence and without the incorporation of Operation and maintenance (O&M). However, due to uncertainties associated with the timing and availability of funding for the plan, only those features that are sustainable without the implementation of any other feature (such as a diversion) are recommended for construction at this time. A tiered implementation approach has been developed for the TSP (Table 2-28 of EIS) based on these uncertainties. In addition, O&M has been included in the TSP. The benefits have been recalculated by tier utilizing the previously developed construction sequence and without O&M. Due to the uncertainty of when each feature will be implemented, analysis may require updating in later phases of the project. The USACE will continue to coordinate with the agencies throughout the project study and implementation.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 1	
LS1	47,000 linear feet (8.9 miles) of shoreline protection beginning at the terminus of the Bayou Dupre supplemental shoreline project, extending around Proctor Point to the West of Shell Beach supplemental funding shoreline protection.
MRGO1	3,850 feet of new foreshore protection between MRGO miles 56.6 and 57.4. This stone protection feature is embedded within the limits of MRGO7.
MRGO6	8,132 linear feet of new, non-continuous foreshore protection between MRGO miles 36.0 and 34.2, immediately east of the existing stone closure of the MRGO. MRGO6 ties into an existing foreshore dike immediately downstream.
LM1	3,240 acres of marsh restoration from open water and nourishment of 777 adjacent acres in the Golden Triangle, south of the IHNC Surge Barrier. Approximately 12.8 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 6.
LM4	289 acres of marsh restoration and nourishment of 95 adjacent acres of marsh in the portion of the Golden Triangle bordered by the GIWW, the IHNC Surge Barrier, and the MRGO. Approximately 1.4 million cubic yards of borrow material would be obtained from Lake Borgne Area 6.
LM2	422 acres of marsh restoration and 2,523 acres of marsh nourishment in the area between Proctor Point and the MRGO. Approximately 4.9 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 3.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 2	
BS1	Approximately 51,000 linear feet (9.7 miles) of shoreline protection along the southeast shore of Lake Borgne. This feature begins at the northern terminus of the Biloxi Marsh Shoreline Protection Project (PO-72) south of Point aux Marchettes and extends north to Malheureax Point.
BS2	Approximately 39,600 linear feet (7.5 miles) of artificial oyster reef development on the Chandeleur Sound side of the Biloxi Marsh between Eloi Point and the mouth of Bayou La Loutre.
CC4-A	420 acres of cypress restoration in the Bienvenue Triangle. Approximately 2.9 million cubic yards of material to be obtained from the Mississippi River.
BR1	Approximately 48 acres of ridge restoration on the south bank of Bayou La Loutre. 425,000 cubic yards of silty sand material to be obtained from the Mississippi River.
CM2	795 acres of marsh restoration and 190 acres of marsh nourishment north of Paris Road. 3.3 million cubic yards of material are required, 2.6 million cubic yards of which can be obtained from the adjacent reach of the GIWW. The remaining material would be obtained from the Michoud Canal.
Construction Year 3	
ES1	24,000 linear feet (4.6 miles) of shoreline protection from the south shore of Lake Pontchartrain to the terminus of the existing Bayou Chevee shoreline protection feature.
ES2	30,750 linear feet of shoreline protection in Lake Pontchartrain between Chef Menteur Pass and The Rigolets.
ES3	70,000 feet of foreshore protection along Lake Borgne between Alligator Point and The Rigolets.
Construction Year 4	
HM1	757 acres of marsh restoration and the nourishment of 973 acres of adjacent marsh, located in the Hopedale area bordered by MRGO to the northeast. 4.1 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 2.
TM1	760 acres of marsh restoration and 223 acres of marsh nourishment, requiring approximately 3.2 million cubic yards of material to be obtained from Lake Borgne Borrow Site 2.
TM2	770 acres of marsh restoration and 3,400 acres of marsh nourishment in the vicinity of Lake Ameda. Approximately 7.4 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 2.
MRGO5	188 acres of marsh would be restored behind 14,485 linear feet of vinyl sheet pile wall to establish the shoreline. 2.7 million cubic yards of material would be obtained from Lake Borgne.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO8	200 acres of marsh restoration adjacent to approximately 20,640 linear feet of bank reclamation constructed using vinyl sheet pile wall. 3.2 million cubic yards of material would be obtained from Lake Borgne. Approximately 13,572 linear feet of new foreshore protection would also be included between approximate channel miles 51.0 and 48.3
Construction Year 5	
MRGO7	91 acres of marsh restoration adjacent to approximately 9,700 linear feet of bankline reclamation, consisting of 9,700 linear feet of vinyl sheet pile wall. 1.3 million cubic yards of material would be obtained from Lake Borgne.
EM1	1,175 acres of marsh restoration and nourishment of 2,830 acres of surrounding marsh in the area bounded by the Lake Pontchartrain shoreline, Chef Menteur Pass, and the levee. Approximately 8.1 million cubic yards of material would be obtained from Lake Borgne Borrow Area 6.
Construction Year 6	
LM3	911 acres of marsh creation and 950 acres of marsh nourishment in South Lake Borgne north of Lena Lagoon in the area bounded by the lake, Bayou St. Malo, MRGO, and Doulets Canal. Approximately 4.6 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 2.
BM1	8,295 acres of marsh nourishment along the south shore of Lake Borgne. 10.8 million cubic yards of material would be obtained from Lake Borgne Borrow Area 2.
Construction Year 7	
CM1	1,240 acres of marsh nourishment south of Paris Road between cypress restoration feature CC3 and the Chalmette Loop Levee. Approximately 3.0 million cubic yards of material would be dredged from Lake Borgne Borrow Area 5 for this feature.
CM3	300 acres of marsh restoration and 215 acres of marsh nourishment in the area north of Bayou Dupre and south of MRGO. 1.9 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 5.
CM4	98 acres of marsh restoration and 129 acres of marsh nourishment south of Bayou Dupre. 900,000 cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 4.
CM5	245 acres of marsh restoration and 70 acres of marsh nourishment in the area north of Bayou Bienvenue and Paris Road. 1.2 million cubic yards of material would be obtained from Lake Borgne Borrow Area 4.
Construction Year 8	
TM7	2,255 acres of marsh restoration and up to 3,338 acres of adjacent marsh nourishment on the east side of Bayou Terre aux Boeufs. 11.5 million cubic yards of material would be obtained from Lake Lery if available, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
TM8	1,511 acres of marsh restoration on the east side of Bayou Terre aux Boeufs in the vicinity of Delacroix. 5.5 million cubic yards of material would be dredged from Lake Lery if possible, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.
EM2	1,095 acres of marsh nourishment on Hog Island, located between the west and east mouth of the West Pearl River. Approximately 2.2 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM3	861 acres of marsh restoration and 180 acres of adjacent marsh nourishment in the area bounded by Highway 433, Little Lagoon, Salt Bayou and Highway 90. Approximately 3.5 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM4	2,625 acres of marsh restoration and 1,455 acres of adjacent marsh nourishment in the area bounded by Salt Bayou to the north, the West Pearl River to the east, the Rigolets to the south and Highway 80 to the north. Approximately 10.6 million cubic yards of material would be obtained from Lake Borgne Borrow Area 8.
Construction Year 9	
CC1	1,020 acres of cypress swamp restoration and 953 acres of cypress swamp nourishment in the area north of the existing Violet Canal along the Forty Arpent levee. 8.5 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC2	250 acres of cypress swamp restoration and 250 acres of swamp nourishment to the northeast of CC1. 2.4 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC3	370 acres of cypress swamp restoration and 790 acres of swamp nourishment along the Forty Arpent Levee south of Paris Road. Approximately 5.3 million cubic yards of material to be obtained from Lake Borgne Borrow Area 5.
CC4	1,465 acres of cypress swamp restoration in the open water areas adjacent to the Forty Arpent Levee north of Paris Road, including the Bienvenue Triangle area in Orleans Parish. 11.3 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 6.
Construction Year 10	
CC5	1,120 acres of swamp restoration and 1,645 acres of swamp nourishment south of the Violet Canal along the Forty Arpent Levee and the Chalmette Loop Levee. 9.6 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 4.
CC6	1,028 acres of swamp restoration and 1,540 acres of swamp nourishment in the southwest corner of the Central Wetlands. 11.2 million cubic yards of borrow material would be obtained Lake Borgne Borrow Area 4.
Maintenance As Needed	

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO2	Repair and maintenance of approximately 15,070 linear feet (2.85 miles) of foreshore protection between Mile 44.4 and 39.9 of the MRGO.
MRGO3	Repair and maintenance of existing approximately 10,420 linear feet (1.97 miles) of foreshore protection between approximately Mile 56 to 51 of the MRGO.
MRGO4	Repair and maintenance of approximately 6,690 linear feet (1.27 miles) of existing retention dike MRGO Miles 36.6 to 37.1 and MRGO Miles 33.9 to 32.9.

From: Stiles, Sandra E MVN
To: Gilmore, Tammy H MVN
Subject: Fw: DEQ SOV 101220/2695 USACE - Misissippi River Gulf Outlet Ecosystem Restoration
Date: Tuesday, January 11, 2011 1:18:08 PM
Attachments: image001.png

Message sent via my BlackBerry Wireless Device

From: Beth Altazan-Dixon <Beth.Dixon@LA.GOV>
To: Stiles, Sandra E MVN
Sent: Tue Jan 11 09:43:14 2011
Subject: DEQ SOV 101220/2695 USACE - Misissippi River Gulf Outlet Ecosystem Restoration

January 11, 2011

Joan M. Exnicios, Chief

USACE Environ.Planning Branch

P.O. Box 60267

New Orleans, LA 70160-0267

sandra.e.stiles@usace.army.mil <mailto:sandra.e.stiles@usace.army.mil>

RE: 101220/2695

USACE - Misissippi River Gulf Outlet Ecosystem Restoration

Draft EIS and Feasibility Study

St. Bernard Parish

Dear Ms. Exnicios:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you

should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

· Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

* If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
* If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
* All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-3181 to determine if your proposed project requires a permit.

· If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit application or Notice of Intent must be submitted no later than June 1, 2011. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx <http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx> or by contacting the LDEQ Water Permits Division at (225) 219- 3181.

* If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
* All precautions should be observed to protect the groundwater of the region.
* Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
* Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
* If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, St. Bernard Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3958 or by email at beth.dixon@la.gov <mailto:beth.dixon@la.gov> .

Sincerely,

Beth Altazan-Dixon

Performance Management

LDEQ/Business and Community Outreach Division
Office of the Secretary

P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301
Phone: 225-219-3958
Fx: 225-325-8148

Email: beth.dixon@la.gov

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

MARCH 28, 2012

REPLY TO
ATTENTION OF

Regional Planning and
Environmental Division, South
Environmental Planning Branch

Beth Altazan-Dixon
LDEQ/Business and Community Outreach Division
Office of the Secretary
P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301

Dear Ms. Dixon:

Please reference your email dated January 11, 2011 providing comments on the Mississippi River Gulf Outlet Ecosystem Restoration Draft Environmental Impact Statement (DEIS) and Feasibility Study and the U.S. Army Corps of Engineers Regional Division South New Orleans District (CEMVN) preliminary response letter dated December 12, 2011.

The CEMVN appreciates your input and has addressed your comments. Please see attached the LDEQ comments and CEMVN responses.

If you have any questions or require additional information please contact Ms. Tammy Gilmore at U.S. Army Corps of Engineers; Regional Planning and Environmental Division South; Environmental Planning Branch; CEMVN-PDN-CEP; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Ms. Gilmore can also be reached at (504) 862-1002 or by email at tammy.h.gilmore@usace.army.mil.

Sincerely,

Joan Exnicios

Joan M. Exnicios
Chief, Environmental Planning Branch

Enclosure

LDEQ comments on and CEMVN responses to
The MRGO Ecosystem Restoration Project

LDEQ Comment #1: Please take any necessary steps to obtain and/or update all necessary approvals and Environmental permits regarding this proposed project.

CEMVN Response **#1:** all necessary approvals and environmental permits would be obtained.

LDEQ Comment #2: If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

CEMVN Response #2: Concur. All necessary permits and approval would be obtained.

LDEQ Comment #3: If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.

CEMVN Response #3: Not applicable. This project would not result in a discharge of wastewater.

LDEQ Comment #4: All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has storm water general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-3181 to determine if your proposed project requires a permit.

CEMVN Response #4: A Storm Water Pollution Prevention Plan would be part of the construction contract.

LDEQ Comment #5: If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit application or Notice of Intent must be submitted no later than June 1, 2011. Additional information may be obtained on the LDEQ website at <http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx> or by contacting the LDEQ Water Permits Division at (225) 219- 3181.

CEMVN Response #5: Not applicable. This project would not include a sanitary wastewater treatment facility.

LDEQ Comment #6: If any ofthe proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.

CEMVN Response #6: this is a U.S. Army Corps of Engineers project, therefore a permit would not be required, however a 404 (b)(1) evaluation has been prepared and has gone out for public review. A Water Quality Certification has been obtained from LDEQ.

LDEQ Comment #7: All precautions should be observed to protect the groundwater of the region.

CEMVN Response #7: Concur. All precautions would be taken to protect the groundwater of the region.

LDEQ Comment #8: Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

CEMVN Response #8: Not applicable. this project does not include the use of water softeners.

LDEQ Comment #9: Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.

CEMVN Response #9: Not applicable

LDEQ Comment #10: If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

CEMVN Response #10: LDEQ's SPOC would be notified if any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project. Precautions would be taken to protect workers from these hazardous constituents.

LDEQ Comment #11: Currently, St. Bernard Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

CEMVN Response #11: Concur

APPENDIX
Q

February 1, 2010
PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

Mississippi River Gulf Outlet Ecosystem Restoration

Prepared by:



U.S. ARMY CORPS OF ENGINEERS
NEW ORLEANS DISTRICT
P.O. BOX 60267
NEW ORLEANS, LA 70160

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT
Mississippi River Gulf Outlet Ecosystem Restoration
Eastern Louisiana

Approval Page



USACE MVN Environmental Professional, PE

USACE MVN Project Manager

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Acronym List

ACM	Asbestos – Containing Material
AOC	Area of Concern
APIS	Aerial Photography Index System
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
CORRACTS-TSD	Treatment Storage Disposal: Facilities subject to Corrective Action under RCRA
EAA	Environmental Assessment Association
EPA	United States Environmental Protection Agency
EPCRA	Emergency Planning and Community Right To Know Act
ERNS	Emergency Response Notification System
FEMA	Federal Emergency Management Agency
FINDS	Facility Index System
FOIA	Freedom of Information Act
FR	Federal Register
HAZCOM	Hazard Communication
LBP	Lead – Based Paint
LDEQ	Louisiana Department of Environmental Quality
LQG	Large Quantity Generator
LUST	Leaking Underground Storage Tank
HIST	Historical
NFRAP	Former CERCLIS sites where No Further Remedial Action Is Planned under CERCLIS
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
PI-ESA	Phase I – Environmental Site Assessment
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition (per ASTM PI-ESA standard)
SHWS	State Hazardous Waste Site
SPCC	Spill Prevention Control and Countermeasure
SRM	Standard Reference Material
SQG	Small Quantity Generator
TSDF	Hazardous Waste Treatment, Storage or Disposal Facility
USACE-MVN	United States Army Corps of Engineers – New Orleans District
USGS	United States Geological Survey
UST	Underground Storage Tank

1.0 Executive Summary

The United States Army Corps of Engineers, New Orleans District (USACE MVN) is performing a Phase I Environmental Site Assessment (Phase I ESA) in accordance with the scope and limitations of the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, E 1527-05, for the Subject Site defined as:

> Mississippi River Gulf Outlet and surrounding areas of Lake Borgne, Orleans, St. Tammany, St. Bernard and Plaquemines Parishes.

MRGO is comprised of a southeast trending canal that is located approximately one-mile east of the Paris Road and Gulf Intracoastal Waterway (GIWW) intersection and extends to the Gulf of Mexico. This waterway was de-authorized and the surrounding areas will be used for marsh and swamp restoration/creation and other possible flood control measures for protection of eastern Louisiana (**Appendix A**).

The records search showed numerous areas of significance. Eastern Orleans Parish is heavily populated with various industries generating and handling large quantities of hazardous substances and wastes. Most of these locations are one mile or more from the closest project area borders. There are few records of significant accidents, spills, and violations in the area that could possibly suggest a release into the project areas. A few facilities lie on project borders or within the designated project areas; however, these location did not present records suggesting a significant release of hazardous materials.

St. Bernard and Plaquemines Parishes are generally less developed than Orleans Parish; however, there are several notable petroleum and natural gas facilities in the area. There are no records indicating a significant release into the project areas and the distance of the majority of the facilities from the project areas suggest these facilities are of minimal concern. A few facilities of interest lie in close proximity to the project borders or within the designated project areas; however, these locations did not present records suggesting a significant release of hazardous materials.

In the areas of St. Tammany Parish investigated there are no significant areas of concern.

Past Phase I and Phase II ESAs have been performed throughout the current project areas. During the de-authorization of MRGO in 2007, a Phase I ESA was performed by BEM Systems Inc. on the MRGO area. The report did not present

any documentation of significant release of hazardous materials in the project areas. The report notes the concern of the presence of the petroleum industry throughout the area. The report noted the likelihood of petroleum releases in the area that were unreported from pipelines and gas/oil wells which are ubiquitous throughout the areas (**Appendix E**). Another general concern noted in the 2007 Phase I ESA is contamination transport due to past flooding. There are nearby areas of development with facilities of environmental significance which may have contributed indirectly to hazardous materials reaching project areas through significant area flooding. A specific site of concern was noted; the former Shell Beach Anti-Aircraft Training Center, one-half mile north of MRGO Mile Marker 42 on the east side of Lake Borgne (**Appendix G**). This area should be handled with extreme caution in the case on encountering ammunition. The report suggested full soil and sediment chemical analysis to ensure proper handling of dredged material. It is assumed that this recommendation was not based on records, interviews, prior knowledge or site reconnaissance results but on a conservative judgment based on the land/water usage of the area. No reports were found indicating this suggestion was implemented by USACE.

Several Phase II ESAs have been performed in the vicinity of the project areas. Between the years 2007-2009, there has been no analytical data showing elevated levels of chemicals of concern (COCs) surpassing RECAP screening standards.

Site reconnaissance was limited due to the size of the project areas and remoteness. Facilities of interest could not be closely investigated since they are private properties and access was not granted. However, there is no documentation to suggest that there has been a significant release from the facilities investigated into the project areas. Several levees that bordered project areas were driven by vehicle in search of possible recognized environmental concerns (RECs), of which, none were found.

It is suggested by the Environmental Team ED-F that further investigation, possibly analytical testing, be explored for project areas in the vicinity of developed areas. The project areas are heavily used by the petroleum industry. The nature of surrounding land usage is very suspect despite the lack of reported incidents, lack of significant findings in past Phase I ESAs, and insignificant analytical data from past Phase II ESAs. North of the MRGO in eastern Orleans Parish is very industrial. Petroleum companies are also located throughout St. Bernard Parish. Industrial land usage can be of concern due to contaminant transport to project areas by flooding. Caution is advised in all areas of petroleum exploration, including wells and pipelines. The historical Shell Beach Anti-Aircraft facility just north of Mile Marker 42 of the MRGO could present issues of unspent ammunitions which should be handled with extreme caution. Unexpectedly encountered environmental issues should be handled appropriately, and as project areas approach developed areas, more caution is advised.

2.0 Introduction

The United States Army Corps of Engineers, New Orleans District (USACE MVN) performed a Phase I Environmental Site Assessment (Phase I ESA) as a part of the effort to create and restore wetland ecosystems for the protection of the Louisiana coasts. In the areas of Lake Borgne and the Mississippi River Gulf Outlet, several restoration projects are to be undertaken (**Appendix A**).

The New Orleans District is developing an ecosystem restoration plan for the areas affected by the MRGO navigation channel. Continuing a collaborative planning approach, the district is working with stakeholders to evaluate and recommend coastal restoration measures. To date more than 300 possible projects have been evaluated in developing the plan. Potential plan features may include marsh create, shoreline protection, barrier island restoration, ridge rebuilding, oyster reef creation and Mississippi River freshwater diversions. A draft plan is scheduled to undergo technical review in early 2010 and be released for public comment in 2010. Development of the plan is authorized under Section 7013 of WRDA 2007 and is being prepared at 100 percent federal expense. Upon completion, the plan will be submitted by the Assistant Secretary of the Army (CW) to the Congress.

2.1 Purpose

The purpose of this ESA is to investigate the site for potential contamination within the scope of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as well as, for petroleum product contaminants. As a result, this Phase I ESA may satisfy one of the requirements to qualify for the innocent landowner defense to CERCLA liability. USACE MVN conducted this ESA on the property to support the wastewater project authorized by Section 7013 of WRDA 2007.

2.2 Scope of Services

This ESA was completed following the general Phase I Environmental Site Assessment requirements of the American Society for Testing and Materials (ASTM) Designation: E 1527-05 to identify "*recognized environmental conditions*" at the *site*. *Recognized Environmental Conditions (RECs)* are defined by ASTM as:

> *"The presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.*

The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

For detailed definitions of the terms used in this report, refer to Section 3, Terminology in ASTM E 1527-05.

The methodology utilized to execute the project included:

1) Gathering pertinent environmental data, interviewing appropriate representatives about the property and land uses, and conducting a site visit;
2) Conducting a review of the federal and state regulatory agency records identifying known or suspected environmental concerns for the subject property and the surrounding area;
3) Preparing a report summarizing the findings of the investigation in accordance with the American Society for Testing and Materials (ASTM) Standard Practice for Environmental Site Assessments.

2.3 Significant Assumptions

Initial assumptions made while preparing this assessment included:

- The area of interest is so large that a purchased records search would have been well over an acceptable budget. To perform the bulk of the records search, the Right-to-Know network (RTK) was utilized. The online network provides free access to numerous databases and resources on the environment. The information provided can be used to identify specific facilities and their environmental significance; find permits issued under environmental statutes; and identify civil cases filed. Right-To-Know was started in 1989 in support of the Emergency Planning and Community Right to Know Act (EPCRA). The searches in this network were done by zip codes under which the proposed footprints lie (**Appendix B**). Another search for records was conducted by zip code using the EPA Enforcement & Compliance History Online (ECHO) (**Appendix C**).

2.4 Limitations and Exceptions

USACE MVN's professional judgment regarding the potential for environmental impacts is based on limited data; therefore, this assessment is not intended to be a definitive investigation of contamination at the site. A site walkthrough, by nature, is limited in its ability to fully assess potential environmental liabilities or

concerns associated with a property. Further investigation would be required to identify potential environmental liabilities that may be present at the site, but are beyond detection based on the scope of this Phase I ESA. USACE MVN does not warrant or guarantee the *site* suitable for any particular purpose, or certify the *site* as clean or free of contamination. As with any assessment, it is possible that past or existing contamination remains undiscovered. The professional opinions set forth in this report are based solely upon and limited to USACE MVN's field observations of the *site* and the immediate *site* vicinity, and upon USACE MVN's interpretations of the available historical information, interviews, and other readily available information. Consequently, this report is complete and accurate only to the extent that cited records, agency information, and recollections of persons interviewed are complete and accurate.

The opinions and recommendations in this report apply to site conditions and features that existed at the time of USACE MVN's investigation. Changes in any of these factors may alter the findings and conclusions expressed by USACE MVN. USACE MVN's opinions and recommendations cannot necessarily apply to conditions and features of which USACE is unaware and has not had the opportunity to evaluate. Future regulatory modifications, agency interpretations, and/or policy changes may also affect the compliance status of the subject property. Laws and regulations, if referenced in this report, are provided for information purposes and should not be construed as legal opinion or recommendation.

2.5 Special Terms and Conditions

This ESA was prepared for the sole and exclusive use of USACE MVN, the only intended beneficiary of this work. This Report is intended exclusively for the purpose outlined herein and is to be used in its entirety. No excerpts from the report may be taken to be representative of the findings of this assessment.

2.6 User Reliance

The scope of services performed in execution of this investigation may not be appropriate to satisfy other users, and any use or reuse of this document or its findings, conclusions or recommendations presented herein is at the sole risk of the user.

3.0 Property Description

3.1 Location and Legal Description

3.1.1 Location

The proposed areas are in southeastern Louisiana (**Appendix A**).

3.1.2 Legal Description

There is no physical address for the proposed ecosystem restoration. The general areas lie in largely undeveloped areas of St. Tammany, St. Bernard, Plaquemines and Orleans Parishes.

3.2 Subject Property and Vicinity General Characteristics

The proposed sites lie in the vicinity of the Mississippi River Gulf Outlet, and in and around Lake Borgne. Other areas lie further south in the wetlands and undeveloped areas in the southeastern areas of St. Bernard Parish and Plaquemines Parish and another small area of the southeastern most part of Slidell (**Appendix A**).

Photographs of the *site* and adjacent properties have been provided in **Appendix D**.

3.3 Current Use of the Property

Currently the land proposed for ecosystem restoration is largely undeveloped. However, the areas have in the past and currently are being used for the petroleum industry. The area is heavily populated with oil/gas wells, and the area canals are used for various purposes including fishing, drainage and navigation. MRGO was de-authorized in June 2008.

3.4 Description of Structures, Roads and Other Improvements on the Property

3.4.1 Structures

The project footprints likely do not have significant structures currently on them as they are undeveloped wetlands. If a structure were to exist it would most likely be very minor, related to fishing, hunting or minor boating. The presence of oil and gas wells and pipelines may also be of concern to the project footprints.

Diversion Alternatives 1 and 3 run through Violet, LA. The alternatives run on what appears to be largely undeveloped areas, connecting the Mississippi River to the MRGO; however, it is possible that there are structures/infrastructure within or very close to the Diversion Alternative footprints.

3.4.2 Roads

The majority of the project footprints are within undeveloped wetlands and should not overlay any major roads. Diversion Alternatives 1 and 3 run through Violet, LA. The alternative footprints appear to overlap with major and minor roads including but not limited to; HWY 39 and HWY 46.

3.4.3 Other improvements

Currently operations are underway for the construction of the IHNC Surge Barrier as well as several upcoming and current levee maintenances; LPV 101-111 and LPV 149-144.

3.5 Current Uses of Adjoining Properties

The proposed sites are located in St. Bernard, Plaquemines, St. Tammany and Orleans Parishes. The footprints are in undeveloped areas but these undeveloped areas are adjacent in some locations to various commercial, residential and industrial developments. North of the MRGO, in eastern Orleans Parish are heavy industrial operations. Lying between MRGO and the Mississippi River in Chalmette, Braithwaite, Violet, Meraux, Arabi, St. Bernard and New Orleans are residential, commercial and industrial facilities.

4.0 User Provided Information

The purpose of the information provided in this section is to present background information for the Phase I ESA. The Client/Owner typically provides the information below in order to help reduce the overall cost of the Phase I ESA. The provided information is used to ascertain whether past activities have contributed to the creation of *RECs*.

4.1 Title Records

Title records were not provided. These records were neither researched nor sought from the Parish Clerk of Courts Office. Title search would not be expected to provide any significant additional information relevant to this assessment, and the absence of which should not affect the findings or conclusions of this assessment.

4.2 Environmental Liens or Activity and Use Limitations

Environmental liens on the surrounding properties were not investigated due to the expected lack of significance. Past and present usage does not warrant the need for environmental lien inquiries past the interview questionnaire, which is presented later.

4.3 Specialized Knowledge

USACE MVN conducted research to locate and obtain historical information concerning the *site*. USACE MVN conducted a limited investigation of the area, by searching LDEQ and EPA websites and the Right-to-Know online network.

4.4 Owner, Property Manager, and Occupant Information

Orleans, Plaquemines, St. Tammany and St. Bernard Parishes own the properties proposed for ecosystem restoration.

4.5 Reason for Performing Phase I ESA

This Phase I Environmental Site Assessment is required by the property owners, Orleans, Plaquemines, St. Tammany and St. Bernard Parishes, which are also the non-Federal sponsors. The Federal sponsor for this project is USACE. Operations in the project area could cause a disturbance in current conditions; therefore, possible environmental concerns are to be investigated to ensure worker safety, as well as, avoid possible complications and environmental problems that may arise during or after operational activities.

5.0 Records Review

The purpose of the records review is to obtain and review records that will help identify *RECs* (Recognized Environmental Concerns) in connection with the subject property and property vicinity. This section presents: (1) the results of a search of state and federal environmental databases; (2) a review of available historical information; and; (3) previous Phase I ESAs, Phase II ESAs and other pertinent environmental reports. Accuracy and completeness of record information varies among information sources, including government sources. USACE MVN has made every effort to compensate for obvious mistakes or insufficiencies in information reviewed based on other information of which the environmental professional has actual knowledge.

5.1 Standard Environmental Record Sources

ASTM E1527-05 requires that Federal and State record sources be reviewed based on stated approximate minimum search distances. Due the large area of study, a commercially purchased database search of federal and state records was not feasible. This section presents the records found by the Right-To-Know Network. The online network provides free access to numerous databases and resources on the environment and access to several government databases. The information provided can be used to identify specific factories and their environmental effects; find permits issued under environmental statutes; and identify civil cases filed. Right-To-Know was started in 1989 in support of the Emergency Planning and Community Right to Know Act (EPCRA).

The purpose of using Right-To-Know was to help identify major environmental issues and areas of concern in the vicinity of the proposed project areas. The databases helped identify waste handlers and generators in the areas searched.

The databases also present basic information concerning spills, releases, accidents and violations which is beneficial in determining possible releases of hazardous materials to the surrounding areas. The website records present the locations of these incidents and facilities of environmental significance.

By searching the databases by the zip codes incorporated within the MRGO Ecosystem Restoration project areas, the USACE MVN Environmental Team was able to identify and map (1) significant facilities of concern; (2) recent violations; (3) and significant environmental incidents. Developed areas have various businesses of environmental concern including but not limited to; gas stations, automotive repair shops, drycleaners, industrial complexes etc. Only significant facilities, violations, and releases have been addressed and mapped within this records review for project management consideration as possibly impacting project footprint areas. During project development, it is suggested that if project operations begin to approach developed areas, a city directory be analyzed for possible facilities of significance regardless of reported incidents and significant records.

The RTK site is updated as soon as information is made available but should not be considered to be "real-time" information. Accuracy and completeness of record information varies among information sources, including government sources. USACE MVN has made every effort to compensate for obvious mistakes or insufficiencies in information reviewed based on other information of which the environmental professional has actual knowledge.

ENVIRONMENTAL RECORDS

- **Toxic Releases (TRI) Database - RTK**
  The Toxic Release Inventory (TRI) is a database of information about releases and transfers of toxic chemicals from facilities in certain industrial sectors, including manufacturing, waste handling, mining, and electricity generation. Facilities must also report the total amount of toxic chemicals in waste that they produce. A release constitutes emissions including on-site releases to air, water, land, and underground, off-site transfers to disposal, and Form A midpoint release estimates. Total wastes include production-related waste recycled, treated, released, or disposed of, non-production-related waste released, and Form A midpoint waste estimates.

- **Emergency Response Notification System (ERNS) - RTK**
  The Spills and Accidents database contains data on toxic chemical spills and other accidents reported to the National Response Center. This database used to be called ERNS, the Emergency Response Notification System, and is still refereed to as ERNS in many situations. The database presents data from 1982-2007 and severity ranges from an oil-sheen to thousands of gallons. Incidents include

chemical spills, accidents involving chemicals (such as fires or explosions), oil spills, transportation accidents that involve oil or chemicals, release of radioactive materials, sightings of oil sheens on bodies of water, terrorist incidents involving chemicals, and incidents where illegally dumped chemicals have been found.

- **Hazardous Waste (Biennial Reporting System- BRS) - RTK**
  The Biennial Reporting System (BRS) data base contains data on the generation, shipment, and receipt of hazardous wastes. BRS contains information from the Hazardous Waste Reports that must be filed every two years under the Resource Conservation and Recovery Act (RCRA), the Federal statute that regulates the generation, treatment, storage, disposal, or recycling of solid and hazardous wastes.

- **Risk Management (RMP) - RTK**
  Federal law requires industrial facilities that use large amounts of extremely hazardous substances to file a Risk Management Plan (RMP) with the EPA. RMP data is intended to save lives, protect property, and prevent pollution. In particular, some industrial facilities are switching to safer and more secure chemicals that reduce the danger to employees and surrounding communities.

- **Hazardous Waste – Violations and Permits (RCRIS) - RTK**
  The Resource Conservation and Recovery Act Information System (RCRIS) database contains data on hazardous waste handler permits, types of wastes and corrective action areas. The database lists Large Quantity Generators (LQG), Small Quantity Generators (SQG), Conditional Exempt Small Quantity Generators and other facilities of concern. This database is a continuous database last updated on RTK in July 2008

5.1.1 Property

The searches were performed by zip codes. The properties in question are located in several zip codes: 70085-St. Bernard, 70075-Meraux, 70040-Braithwaite, 70092-Violet, 70117-New Orleans, 70126-New Orleans, 70129-New Orleans, 70043-Chalmette, 70032-Arabi, 70461-Slidell (**Appendix A**).

5.1.2 Adjoining Properties

The zip codes that were searched encompassed a much larger area than the proposed ecosystem restoration sites. All records from the zip codes were analyzed for significant issues and then compared to project footprints.

Mapped Sites

All TRI facilities were mapped. All ERNS records were mapped that reported damages. All BRS and RMP facilities were mapped. RCRIS records were

mapped for sites reporting incidents since 1999. All other records were considered to be insignificant and were not mapped or further reviewed.

The following sections present the significant records found within each zip code searched and mapped to depict their relative distance from the general footprints of the ecosystem restorations borders. The overall project footprint for the entire area can be found in **Appendix A**.

5.1.2.1 70085 St. Bernard

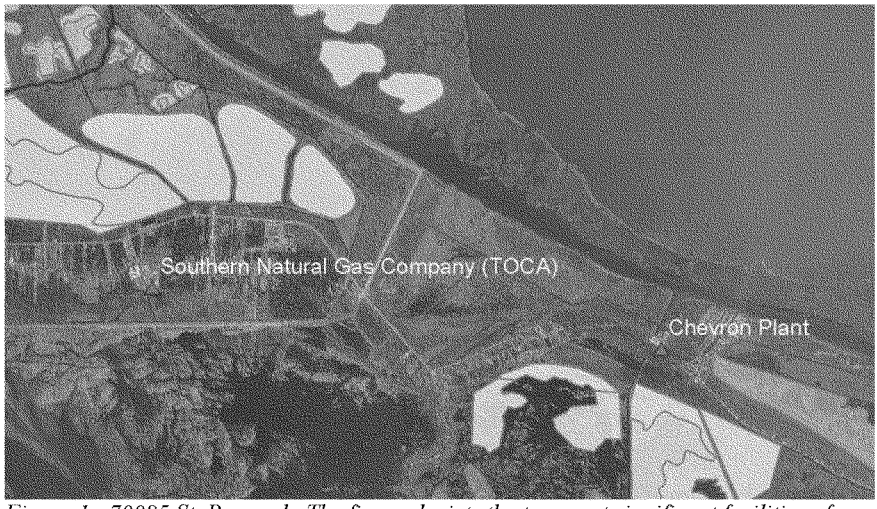


Figure 1: 70085 St. Bernard. The figure depicts the two most significant facilities of concern within the St. Bernard area.

Toxic Releases (TRI) Database

Only one facility is listed in the St. Bernard area as a TRI facility. Crescent Acres Landfill is listed in St. Bernard but in reality it should be listed under New Orleans (70126). There are no actual TRI facilities within the St. Bernard area (70085).

Emergency Response Notification System (ERNS)

Between 1990 and 2007, 68 incidents were reported in the St. Bernard area, none of which reported damages. The majority of the incidents reported are oil platform incidents located off the coast. These types of records indicate that there have been releases of various degrees of petroleum products from pipelines, vessels and platforms all within the waters systems and possibly in the vicinity of project areas; however, none reported damages.

There are several incidents listed at the same location; however, using various names for the responsible party. The repeated address listed for these incidents is currently Cheveron Oil Yscloskey Gas Processing Plant. The responsible parties of incidents at this location include Warren Petroleum Company, Yscloskey Plant, Targa Resources, and Dynergy Midstream Services. None of the incidents by this responsible party reported damages.

There are no records of concern in St. Bernard. The Chevron Plant is a location of concern due to the nature of the facility; however, there are no records to indicate a significant release.

Hazardous Waste (BRS)

Only one facility is listed in this database; Southern Natural Gas (Toca). This facility is a large quantity generator of various wastes and is located approximately handles/generates several types of hazardous wastes and is located approximately 0.5 miles south of project borders.

Risk Management (RMP)

Three RMP facilities were presented by the RTK database.

Yscloskey Plant (Chevron Plant) is listed as having submitted their five year update to their plan in 2005.

Toca Gas Plant (Southern Natural Gas), located between two project area borders, updated their plan in 2005. The Toca Nature Gas Processing Plant deregistered in 2004.

Facilities required to maintain a RMP are of concern by nature to surrounding areas. The plans do not suggest actual release of hazardous materials; only note the plan of action in the case of a release.

Hazardous Waste – Violations and Permits (RCRIS)

In the St. Bernard area there were 20 facilities reporting incidents, none of which reporting violations since 1999. There are few CESQG, LQG, and SQG sites within the St Bernard area but the lack or reported violations indicates these facilities are of concern solely due to their nature.

5.1.2.2 70032 Arabi

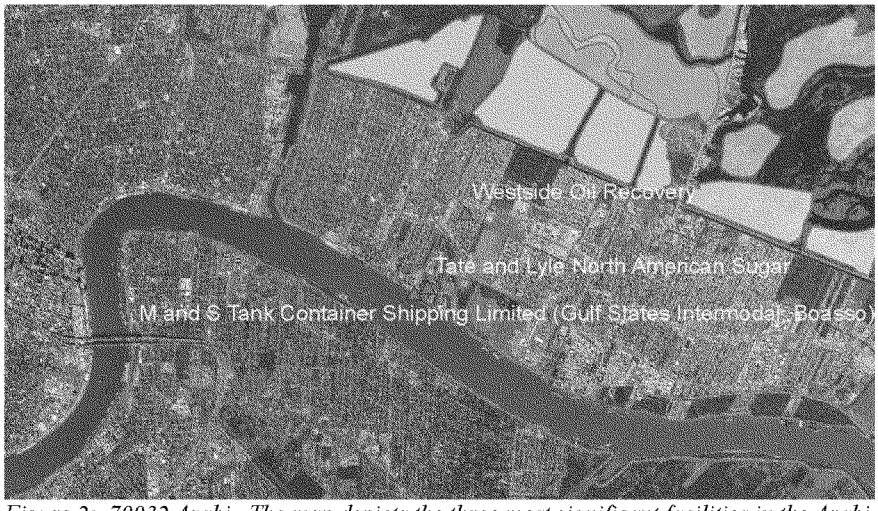


Figure 2: 70032 Arabi. The map depicts the three most significant facilities in the Arabi area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Tate & Lyle Sugar	Sugar refinery	1987-1999	generate	Approx. 2 miles
Westside Oil Recovery	Energy recovery	2003-2007	transfer	< 1 mile

Table 1: The table presents the TRI facilities within the Arabi area, the nature of business, the years the facility is listed within that record, if it is a waste generator or deals with the transfer of wastes, and its relative distance from the project sites.

Tate & Lyle North American Sugars Inc. (Domino Sugar Corp, Amstar Sugar Corps) is a sugars refinery and lies on N. Peter St. which runs adjacent to the Mississippi River approximately 2 miles south of the proposed areas. The site has not been listed on the TRI facility database since 1999. Since this facility is no longer listed as a TRI facility 2 miles from the proposed project areas, the sugar refinery is considered to be of minimal significance to the project area.

The database also presents records of facilities to which wastes are transferred. Westside Oil Recovery accepts wastes. The only address found for this facility is in a residential area of Arabi. This address location is less than 1 mile from the project areas; however, the location is a residential area. There is another location listed in Port Allen, LA which is most likely the facility of waste destination; an area insignificant to the project area.

Only two facilities are listed as TRI facilities in the Arabi area (40032). Domino Sugar is 2 miles from the site and is deemed to be of minimal concern to the project areas. Westside Oil Recovery's address is assumed to be in Port Allen, LA, with only the mailing address being located in Arabi.

Emergency Response Notification System (ERNS)

Between 1990 and 2002, 18 incidents were reported. The database presents three incidents that occurred in states outside of Louisiana. The responsible party was Boasso America Corp (trucking). Boasso America Corps is currently located in Chalmette and the address listed for the responsible party is currently registered to M & S Tank Container Shipping Limited (Gulf States Intermodal) which has other incidents reported in the ERNS database. There are other incidences that occurred in other parts of Louisiana where only the responsibly party is registered within the Arabi area (70032). No incidents were reported in the Arabi area that reported damages.

Hazardous Waste (BRS)

In Arabi, RTK only reports that Boasso America Corps (M & S Tank) handles hazardous wastes. The site is located on N. Peters Road in Arabi which currently listed as M & S Tank Container Shipping Limited (Gulf States Intermodal). This facility handles various wastes and lies more than 1 mile from the projected areas. Boasso is currently located in Chalmette. The facility is listed in the BRS database from 1999 through 2003.

Risk Management (RMP)

No facilities are listed as requiring a Risk Management Plan in Arabi.

Hazardous Waste – Violations and Permits (RCRIS)

There are 35 CESQG, LQG, and SQG sites within the Arabi area, none of which have reported violations since 1999. These facility records were not investigated since they did not report recent violations. These facilities are of interest to the project areas if they fall within the areas of operations, not by historical violations but because of the nature of the facility.

5.1.2.3 70040 Braithwaite

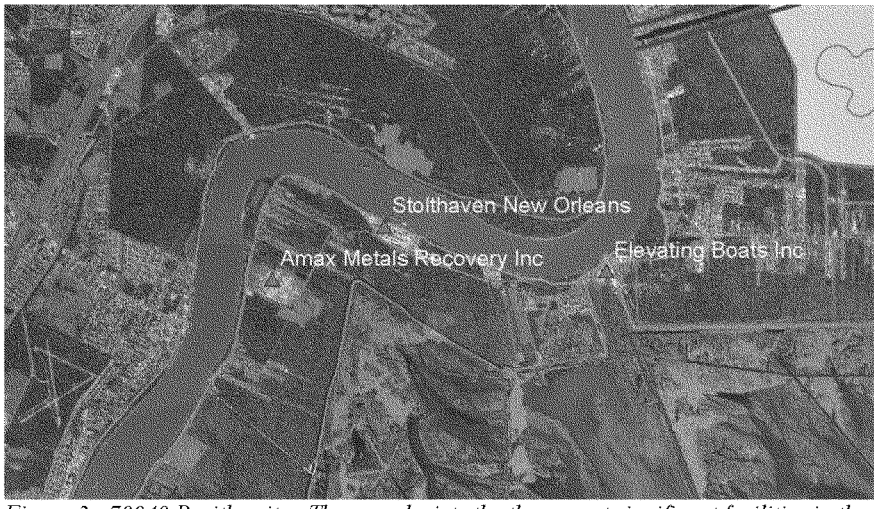


Figure 3: 70040 Braithwaite. The map depicts the three most significant facilities in the Braithwaite area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Amax Metals Recovery Inc (CRI-MET)	oil refinery	1987-2007	generate/transfer	> 1 mile
Elevating Boats Inc.	boat building and repair	1988-1993	generate	> 1 mile

Table 2: The table presents the TRI facilities within the Braithwaite area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

The nature of these sites is noteworthy; however, due to their distances from the project areas their environmental impact should be minimal.

Emergency Response Notification System (ERNS)

There were 32 incidents reported from various facilities between 1992 and 2007, none of which report damages. Since none of the incidents reported damages, they were not investigated further. The incidents reported are considered to be of minor risk to the project areas.

Hazardous Waste (BRS)

Facility Name	Business	Yrs of Records	Generator Class	Dist from Closest Project Areas
Amax Metals Recovery Inc. (CRI-MET)	metals recovery	1991-2005	LQG	> 1 mile
Stolthaven New Orleans, LLC	bulk liquid storage	2003-2007	LQG	> 1 mile

Table 3: The table presents the BRS facilities in the Braithwaite area. The table presents the type of business, the years listed in the database, generator class and distance from the project areas.

These sites are of note due to their nature of business; however, their distance to the projected areas indicates they should be of minimal concern for environmental issues.

Risk Management (RMP)

Stolthaven New Orleans, LLC submitted their revised plan in 2007. Stolthaven is the only facility listed as requiring a RMP.

Hazardous Waste – Violations and Permits (RCRIS)

The database only presents four facilities and only one of which reported violations since 1999. Stolthaven New Orleans, LLC reported four violations in 2004 which were all brought back into compliance that same year.

There are only four listed facilities in this database. There are no recent significant violations that would suggest significant environmental concern for the project areas.

5.1.2.4 70043 Chalmette

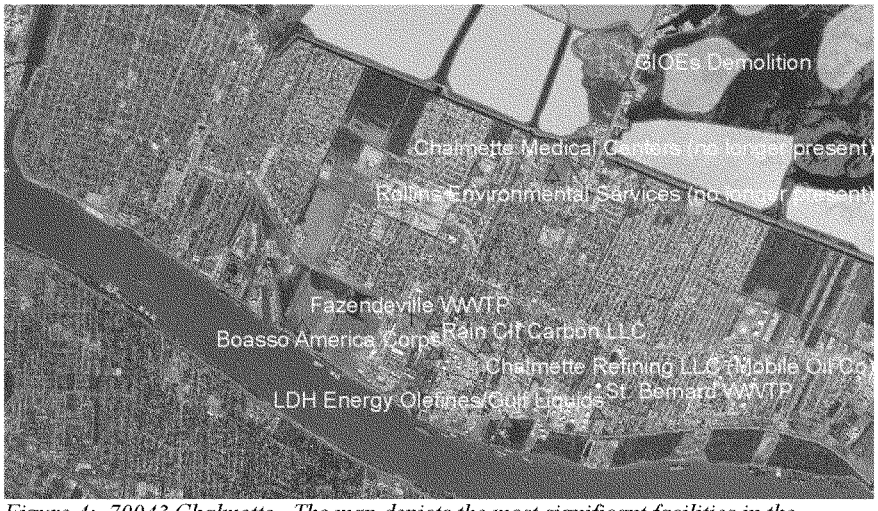


Figure 4: 70043 Chalmette. The map depicts the most significant facilities in the Chalmette area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Chalmette Refining LLC (Mobile Oil Corps)	petroleum	1988-2007	generate	> 1 mile
Rain CII Carbon LLC	petroleum	2004-2007	generate	> 1 mile

Table 4: The table presents the TRI facilities within the Chalmette area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

The TRI database also provides a listing for CRI-MET (AMAX Metals Recovery) which receives materials from other locations in Louisiana and other states. This facility is located in Braithwaite and is addressed in the Braithwaite section.

Emergency Response Notification System (ERNS)

The ERNS database presents 531 incidents that can be seen on the Chalmette ERNS attachment. The large majority of incidents were reported by Chalmette Refining LLC on St. Bernard HWY near the intersection of HWY 46 and HWY 47.

There are few incidents throughout the years reported at RAIN CII Carbon LLC which is located near Chalmette Refining. Both of these locations are approximately 1.5 miles from the project area.

The vast majority of the reported incidents reported no damages. Chalmette Refining LLC reported two incidents resulting in damages. In 2006 there was a hydrogen sulfide gas leak and in 2003 an employee was accidentally sprayed with gas. Due to the nature of the records and the facility's distance from the project site and the nature of the incidents are considered to be of minor to the project area.

GIOE's Demolition reported a fire that took 23 days to be extinguished by the fire department in 2000. The fire was at the demolition landfill which lies adjacent to the project areas off the west side of HWY 47. The fire itself does not present an HTRW concern to the project area and it did not report damages. However, it is important to note that there is a demolition landfill within the project area with an unknown variety of materials.

There are no reported records of significant incident concerns found from the RTK network.

Hazardous Waste (BRS)

Facility Name	Business	Yrs of Records	Generator Class	Dist from Closest Project Areas
Chalmette Refining LLC (Mobile Oil Corps)	petroleum	1989-2007	LQG	> 1 mile
LDH Energy Olefins LLC (Gulf Liquids New River Project)	natural gas	2001-2003, 2007	LQG	> 2 miles
Boasso America Corp	trucking	2003-2005	LQG	> 1 mile
Chalmette Medical Center	medical	1989	LQG	< 0.5 mile
Dela Ronde Family Practice	medical	1989	LQG	< 0.5 mile
Rollins Environmental Services	refuse	1989	LQG	0.25 mile

Table 5: The table presents the BRS facilities in the Chalmette area. The table presents the type of business, the years listed in the database, generator class and distance from the project areas.

None of the records present a significant threat to the project areas due either to their distance from the areas or the fact that they are not listed as current or recent hazardous generators, handlers, or waste receptors.

Risk Management (RMP)

Three RMP facilities were presented by the RTK database.

Fazendeville Wastewater Treatment Plant submitted their last management plan in 1999 and in 2004 they deregistered meaning they no longer were required to submit a plan. The site is located near the Chalmette Battlefield and National Cemetery just north of the Mississippi River, approximately 2.0 miles south of the project areas.

LDH Energy Olefins LLC, a natural gas liquid extractor and LQG, is located at the southern end of HWY 47 bordering the Mississippi River and is more than 2 miles away from the project areas. This facility submitted their 5-year update to their plan in 2006.

St. Bernard Parish Water Treatment Plant is located east of HWY 47 on St. Bernard HWY (HWY 46) and is more than 2 miles from the projected areas. The treatment plant submitted their 5-year update to their plan in 2004.

Hazardous Waste – Violations and Permits (RCRIS)

There are 146 CESQG, LQG, and SQG sites within the Chalmette area. Only two have presented violations since 1999. Chalmette Refining LLC, a petroleum refinery, has reported six records of manifest violations in 2002, all brought back into compliance in 2004. This site is located approximately 1.5 miles from the project areas.

Boasso America Corp also reports three container use violations in 2007 all of which have compliance dates in 2007. There is also handler and waste information on this trucking company. This site is located approximately 1 mile from the project areas.

5.1.2.5 70075 Meraux



Figure 5: 70075 Meraux. The map depicts the two most significant facilities in the Meraux area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Murphy Oil USA Inc., Meraux Refinery	oil refinery	1987-2007	generate	approx. 0.5 miles
Chemcat Corp	unknown	1989-1994	generate	> 1 mile

Table 6: The table presents the TRI facilities within the Meraux area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

The most significant facility record is for Murphy Oil due to its nature and relative proximity to the project sites.

Emergency Response Notification System (ERNS)

A total of 115 incidents were reported. The majority of the ERNS records in the Meraux area are from Murphy Oil; however, they were not reviewed since they

did not report damages. The facility's northernmost part lies 0.5 miles from the border of the project areas.

None of the incidents reported damages (the one that did occurred in Saint Francisville near Baton Rouge, LA; not in Meraux). There are no records of significant incidents of spills or accidents that would cause concern for the project areas.

Hazardous Waste (BRS)

Murphy Oil USA Inc. is the only facility listed as a hazardous waste generator within the Meraux area (70075). Murphy Oil handles various hazardous materials and is listed as a large quantity generator (LQG). Murphy Oil was listed in the BRS database 1989-2007 and its northernmost part of the facility lies 0.5 miles from the projected areas. The nature of this site is of concern if project operations were to reach into the vicinity of the developed areas of Meraux.

Risk Management (RMP)

Three facilities are listed as requiring RMPs; Muster Wastewater Treatment Plant, Murphy Oil, and Violet Wastewater Treatment Plant.

Munster WWTP last submitted their plan update in 2004 and lies adjacent to the proposed areas in a residential neighborhood of Meraux.

Southwest of Muster WWTP is Murphy Oil which submitted their update in 2004.

Violet WWTP has deregistered and no longer is required to submit a plan. Violet WWTP actually lies in Violet (see 5.1.9 Violet 70092).

These sites are of concern but only if the project develops into these areas.

Hazardous Waste – Violations and Permits (RCRIS)

The database lists 18 different facilities that are listed as Large Quantity Generators (LQG), Small Quantity Generators (SQG), Conditional Exempt Small Quantity Generators and other facilities of concern. One facility has reported three violations since 1999; Murphy Oil. Murphy has had several compliance evaluation inspections and several violations throughout the years. The majority of the violations are from the 1980s and 1990s. Two violations were reported in 2003 for generators which were brought into compliance in 2004. In 1999, a manifest violation was brought back into compliance that same year. In the RTK network there does not appear to be a significant incident of concern at Murphy Oil or any other facility listed in this area.

5.1.2.6 70117 New Orleans



Figure 6: 70117 New Orleans. The map depicts the three most significant facilities in the New Orleans 70117 area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Southern Scrap Recycling	Metals recovery	1992-2007	transfer	border
East Bank WWTP	POTW transfer	1991-1998	transfer	border

Table 7: The table presents the TRI facilities within the New Orleans (70117) area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

Southern Scrap, a metals recovery facility, lies on the border of the project areas was listed in the TRI records from 1992-2007. This facility is also listed as part of New Orleans 70126; however, more accurately listed under 70117.

New Orleans Sewerage and Water Board (East Bank Wastewater Treatment Plant) was listed as a publically owned treatment works (POTW) transfer facility from 1991-1998. This facility is located at the project area border.

Emergency Response Notification System (ERNS)

Between 1989 and 2006, 24 incidents were reported at various locations and for various responsible parties. None of the incidents reported damages; therefore, there are no records to suggest significant concern to the project areas.

Hazardous Waste (BRS)

One facility was listed in the BRS database from 1989. US Coast Guard New Orleans Base is located more than one mile from project areas. Due to its distance from the site and since it was last listed in 1989, the Coast Guard base is considered to be of minimal significance to the project areas.

Risk Management (RMP)

East Bank Wastewater Treatment Plant (New Orleans Sewerage and Water Board) submitted their five year update to their plan in 2004. This site should be considered significant by nature and by the fact that it lies within the project areas.

Hazardous Waste – Violations and Permits (RCRIS)

There are 88 locations in the RCRIS database that have had violations over the years. None have presented violations since 1999. There are no records of concern within the RCRIS database.

5.1.2.7 70126 New Orleans

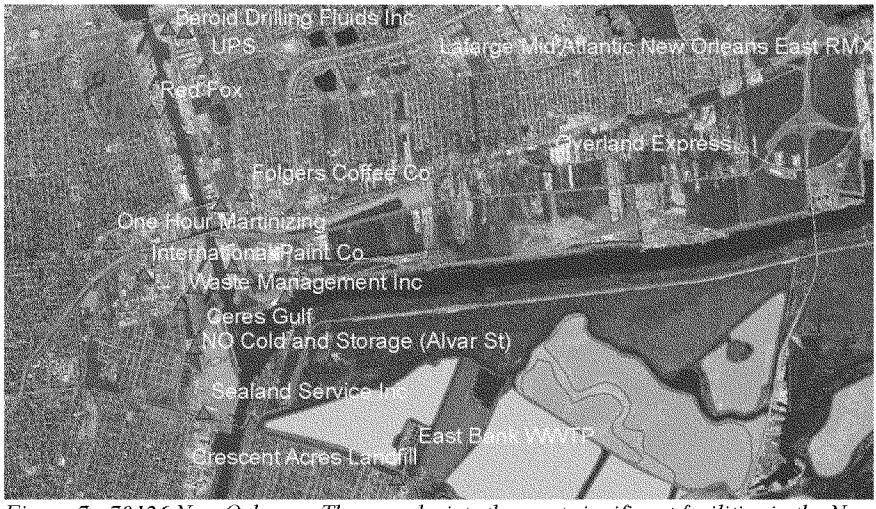


Figure 7: 70126 New Orleans. The map depicts the most significant facilities in the New Orleans 70126 area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Bollinger Gulf Repair LLC	ship building and repair	2002-2007	generate	> 1 mile
U.S. Gypsum Co	concrete manufacturing	2000-2007	generate	> 2 miles
Lafarge Med Atlantic	concrete manufacturing	2004-2007	generate	approx. 2 miles
Equitable/Halter (Trinity Industries)	ship building and repair	1987-1994	generate	approx. 2 miles
Baroid Drilling Fluids Inc.	minerals and earths	1987-1994	generate	> 3 miles
Southern Scrap Recycling	recycling	2005-2007	transfer	borders project areas
Crescent Acres Landfill	landfill	1988-1992	transfer	borders project areas

Table 8: The table presents the TRI facilities within the New Orleans (70126) area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

All of these TRI facilities are significant in nature; however, none of the generators are closer than one mile to project areas. The facilities that accept toxic chemicals from other locations, Southern Scrap Recycling and Crescent Acres Landfill, border the project areas.

Emergency Response Notification System (ERNS)

Between 1988 and 2007, several incidents were reported for various locations and responsible parties. One incident in 2001 reported damages. Corrosive materials were reported being released from a vessel of the responsible party Ceres Gulf (label name on map). The released material was confined to the vessel deck which was approximately 0.8 miles from the project area. This incident does not pose a significant risk to the project areas.

Hazardous Waste (BRS)

Facility Name	Business	Yrs of Records	Generator Class	Dist from Closest Project Areas
Bollinger Gulf Repair LLC	ship building and repair	1997-2007	LQG	> 1 mile
Trinity Yachts	ship building and repair	1991-2007	LQG	approx. 2 miles
Folgers Coffee Co	coffee/tea manufacturer	2001	LQG	approx. 2 miles
Red Fox	unknown	1999	LQG	> 2 miles
Sealand Service Inc	shipping	1997-1999	LQG	borders project areas
International Paint Co	paints	1989	LQG	> 1 mile
Naegele Outdoor Advertising Co.	advertising	1989	LQG	> 3 miles
One Hour Martinizing	dry-cleaning	1989	LQG	approx. 2 miles
United Parcel Service	delivery	1989	LQG	approx. 3 miles
Waste Management Inc	waste management	1989	LQG	> 1 mile

Table 9: The table presents the BRS facilities in the New Orleans 70126 area. The table presents the type of business, the years listed in the database, generator class and distance from the project areas.

There are several LQG in the New Orleans (70126) area. All but one of the facilities lies more than one mile from the project areas. Sealand Service Inc borders a project area; however, Sealand has not been recorded as a BRS facility since 1999. There are no current BRS facilities that are of significant concern to the project areas.

Risk Management (RMP)

Three facilities in the New Orleans area (70126) are required to submit a plan.

Alvar Street Facility, New Orleans Cold and Storage Warehouse, submitted their 5-year update in 2007. The facility is located approximately one mile from the project area.

Another New Orleans Cold Storage Warehouse, which is located on the corner of the GIWW/IHNC, submitted their first plan in 2004. The facility is located approximately one mile from the project area.

The Equitable Shipyard LLC (Trinity) submitted their first plan in 1999. There is no record of submission of the updated plan that would have been required in 2004. The location is approximately two miles from the project areas.

These sites are of note due to their nature; however, their distances from the project area are relatively significant. These sites are considered to be of minimal concern.

Hazardous Waste – Violations and Permits (RCRIS)

New Orleans (70126) has reported 153 CESQGs, LQGs, SQGs and other facilities of interest. Bollinger Repair LLC reported 19 violations in 2003 which were brought back into compliance in 2004. All violations were general generator violations.

New Orleans Depot Services, located more than one mile north of the proposed areas, reported one violation in 2007 concerning used oil which was brought back into compliance that same year.

Overland Express, reported 3 violations in 2007 for used oil, all of which were brought back into compliance that same year. The facility is located approximately one mile north of the GIWW and proposed areas.

Pontchartrain MTLS Corp reported two records keeping violations in 2000. This site is located more than one mile from the project area.

There are several facilities of note listed in the RCRIS database. Within these records, there are none of recent significance that would be considered of major concern for the project areas.

5.1.2.8 70129 New Orleans

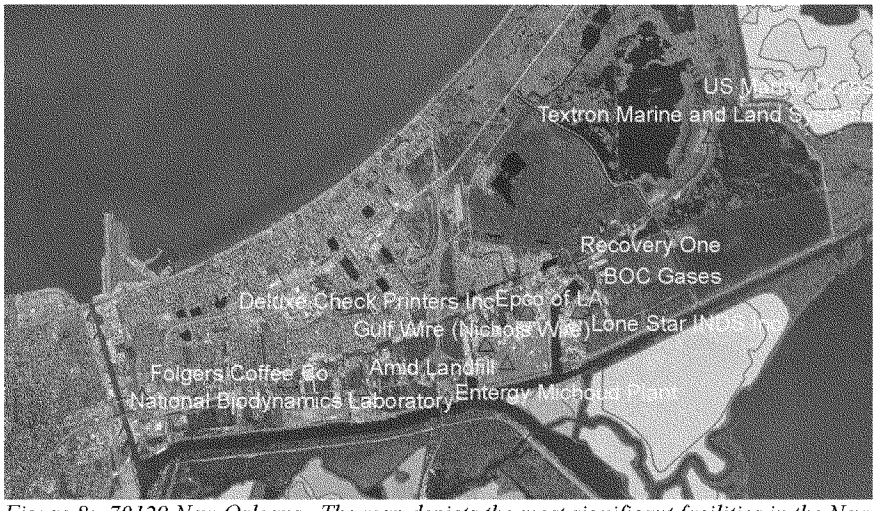


Figure 8: 70129 New Orleans. The map depicts the most significant facilities in the New Orleans 70129 area.

Toxic Releases (TRI) Database

Facility Name	Business	Yrs of Records	Generate/Transfer	Dist from Closest Project Areas
Air Products and Chemicals Inc	gas manufacture	1987-2007	generate	approx. 1 mile
US NASA Michoud Assembly Facility	equipment manufacturer	1987-2007	generate	approx. 1 mile
Hanson Pipes and Products Inc	concrete pipe manufacturer	2007	generate	approx. 1 mile
Entergy Michoud Plant	fossil fuel power generator	2000-2001 and 2007	generate	4 miles
Spectrum Control Technologies	electronic capacitors	1987-2005	generate	approx. 1 mile
US Marine Corps	boat building and repair	1992-2005	generate	within the project areas

Gulf Wire (Nichols Wire) Inc	wiring	1988-2001	generate	approx. 1 mile
Lone Star INDS Inc	minerals	1998-1999	generate	approx. 1 mile
BOC Gases (AIRCO Industrial Gases)	gas manufacture	1987-1998	generate	> 1 mile
Textron Marine and Land Systems	boat building and repair	1987-1989	generate	within the project areas
Deluxe Check Printers Inc	commercial printing	1987-1988	generate	approx. 1 mile
Siemens Energy and Automation Inc	electrical industrial apparatus	1987	generate	approx. 1 mile
Siemens Hydrocarbons (Water Technologies)	energy recovery	2007	transfer	approx. 1 mile
US Filter Recovery Services	energy recovery	2003-2006	transfer	approx. 1 mile
International Petroleum Corps	energy recovery	1991-2003	transfer	approx. 1 mile
AMID Landfill	landfill	2000-2007	transfer	approx. 1 mile
Recovery One	landfill	1992-1994	transfer	> 1 mile

Table 10: The table presents the TRI facilities within the New Orleans (70129) area. The nature of business, the years the facility is listed within the records, if it is a waste generator or deals with the transfer of wastes and its relative distance from the project sites are presented.

The New Orleans area (70129) is presently and historically a very industrial area throughout. The majority of the facilities listed lie approximately one mile north of the project areas in the vicinity of the Michoud Canal. All of the facilities are of significance due to their nature of business; however, most facilities lie a significant distance from the project area. Two of facilities lie within the project areas. The US Marine Corps and Textron (associated with the Marine Corps presumably) both lie within the project area; however, they were not listed in the TRI database since 2005.

Emergency Response Notification System (ERNS)

Several incidents were reported between 1988 and 2007 from various responsible parties. Only one incident, in 1996, reported damages. The incident was recorded in the New Orleans 70129 search because the responsible party, Bridge Terminal Transport, is located in New Orleans. However, the incident occurred outside of New Orleans in St. James Parish and is irrelevant to this project.

The majority of the most recent incidents were reported by Air Products and Chemicals which lies on the east bank of the Michoud Canal. The incidents did not report damages.

There are no records of spills or accidents in the area searched that would pose significant concern to the project areas.

Hazardous Waste (BRS)

Facility Name	Business	Yrs of Records	Generator Class	Dist from Closest Project Areas
Air Products and Chemicals Inc	gas manufacture	1989-2007	LQG	approx. 1 mile
Textron Marine and Land Systems	boat building and repair	2005-2007	LQG	within the project areas
US NASA/Lockheed Martin Michoud Assembly Facility	equipment manufacturer	1997-2007	LQG	approx. 1 mile
Gulf Wire (Nichols Wire) Inc	wiring	1989-2005	LQG	approx. 1 mile
Spectrum Control Technologies	electronic capacitors	1995-2005	LQG	approx. 1 mile
National Biodynamic Laboratory	research	1999-2001	LQG	approx. 1 mile
Martin Marietta/US NASA	unknown	1989-1993	LQG	approx. 1 mile
Folgers Coffee	coffee/tea manufacturer	1991	LQG	> 1 mile

Epco of LA Inc	unknown	1989	LQG	approx. 1 mile
International Petroleum Corp	energy recovery	1989	LQG	approx. 1 mile

Table 11: The table presents the BRS facilities in the New Orleans 70129 area. The table presents the type of business, the years listed in the database, generator class and distance from the project areas.

There are numerous facilities listed in the area that generate significant amounts of wastes. Most facilities appear to be located approximately 1 mile north of the of the project areas. The nature of the facilities is of concern; however, only Textron lies within the project areas.

Risk Management (RMP)

One facility in the New Orleans (70129) area is required to submit a plan. Air Products and Chemicals submitted their 5-year update in 2004 concerning some of their chemicals. Their hydrochloric acid plant is no longer required to submit a plan as of 2006.

The nature of this site is of concern due to its nature; however, it lies approximately one mile north of the project area.

Hazardous Waste – Violations and Permits (RCRIS)

Gulf Wire Inc., located near the Michoud Canal approximately 1 mile north of the project areas, reported three violations in 2001. The three pre-transport violations were brought into compliance in the same year they were reported.

Hydrocarbon Recovery Services Inc., a conditional exempt small quantity generator on the east bank of the Michoud Canal approximately 1 mile north of the project area, reported one violation in 2005. The pre-transport violation was brought back into compliance that same year.

Spectrum Control Technologies, located west of the Michoud Canal approximately one mile north of the project areas, reported eight generator violations in 2000; all of which were brought back into compliance in 2000.

US NASA/Lockheed Martin, located just west of the Michoud Canal approximately one mile north of the project areas, reported one violation in 2003 that was brought back into compliance that same year. Two violations were reported in 2007 which were also brought back into compliance that same year.

There are no RTK network records to suggest outstanding violations in the New Orleans (70129) area. Several violations have been reported throughout the

years; however, few since 1999. There are no records to suggest significant concern to the project areas.

5.1.2.9 70092 Violet

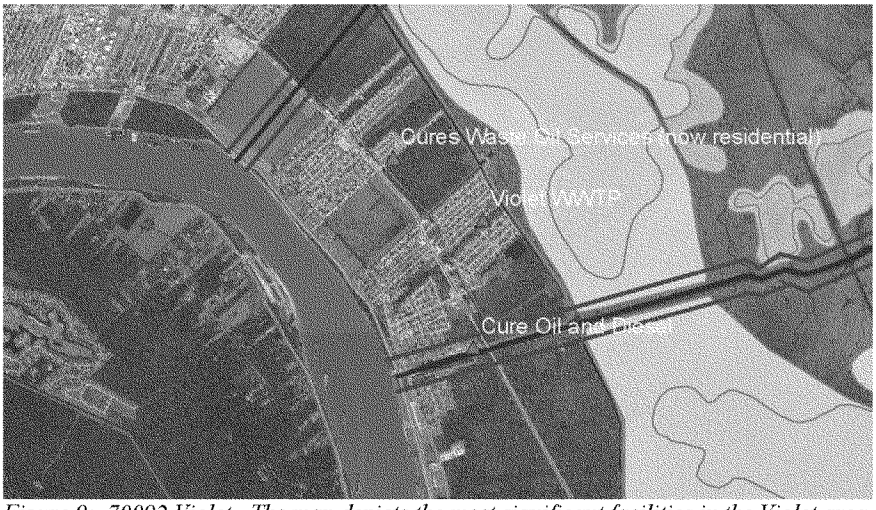


Figure 9: 70092 Violet. The map depicts the most significant facilities in the Violet area.

Toxic Releases (TRI) Database

There is only one facility listed in the TRI database. Cure's Waste Oil Services was listed from 1991 to 1994 as accepting petroleum products from outside facilities. From aerial photos it appears that the address under which Cure's Waste was listed in the records is now residential (verified during site visit). The old site for the facility is located approximately 0.5 miles from the projected areas. There does not appear to be any current TRI records in the Violet area of any significance to the project.

Emergency Response Notification System (ERNS)

The database presents 53 incidents through the years, none of which report damages. All of the incidents listed actually occurred outside of Violet. There are several incidents reported at Murphy Oil located in Meraux. The majority of the incidences listed are from Chevron concerning their platforms out in the Gulf of Mexico. The Chevron office is in Venice, LA (70091) so it is assumed to be an error that they were listed under area code 70092 for Violet.

Many ERNS records exist when searched by the area code 70092; however, there are no actual incidences reported within these areas nor are there incidents reporting damages.

Hazardous Waste (BRS)

No facilities are listed in the Violet area (70092) as handling hazardous wastes.

Risk Management (RMP)

No facilities are listed as requiring a Risk Management Plan in the Violet area (70092); however, in the Meraux databases, Violet Wastewater Treatment Plant was listed which is actually in Violet. This facility has deregistered and no longer requires a RMP.

Hazardous Waste – Violations and Permits (RCRIS)

There are 12 CESQG, and SQG sites within the Violet area. Only one facility has reported a violation since 1999; Cure Oil & Diesel Inc., a waste transporter. Solely based on name, it is assumed that this is related to the Cure Waste Oil Services which is no longer present at its listed address. Cure Oil and Diesel is located approximately 0.7 miles from the project areas. The facility reported six violations in 2001 which were brought into compliance in 2004. They reported one violation in 2004 which was brought back into compliance that same year.

There are no outstanding violations within the RTK network for the Violet area (70092) that pose a significant risk the project areas.

Diversion Alternatives

The Diversion Alternatives run through Violet, LA. Diversion Alternative No.1 appears to run through undeveloped land. In the general vicinity are facilities of concern, both in Meraux and Violet. These facilities include Chemcat Corps, Murphy Oil, USA Inc Meraux Refinery, Cure's Waste Oil Services and the Violet WWTP. There are no records from these facilities that would suggest significant concern to the Diversion Alternative; however, their nature and proximity is of note.

Diversion Alternative No. 3 lies south of Diversion Alternative No. 1 and appears to run closer in proximity to developed areas. Cure Oil and Diesel, a facility that has reported several violations since 1999, is located directly within the Diversion Alternative No. 3 footprint.

5.1.2.10 70461 Slidell

Toxic Releases (TRI) Database

No facilities were listed in the TRI database in this area.

Emergency Response Notification System (ERNS)

Of the incidents reported in the ERNS database, none reported damages.

Hazardous Waste (BRS)

One facility, The Surgery Suite, is listed in the BRS database; however, the facility is located several miles north of the project borders.

Risk Management (RMP)

No facilities were listed in the RMP database for this area.

Hazardous Waste – Violations and Permits (RCRIS)

Several facilities are listed as having violations in the Slidell area; however, none have been reported since 1999.

5.2 Additional Environmental Sources

5.2.1 ECHO

The USACE Environmental Assessment Team investigated EPA records using www.usepa.gov/echo. The site provides compliance records, violations, and enforcement actions taken on specific locations. The record search provides more recent violations and non-compliance; however, there is very little description of their nature. ECHO is beneficial for presenting facilities of interest. Only facilities reporting alleged current significant violations will be discussed. Tables and maps presented by ECHO can be found in **Appendix C**.

5.2.1.1 70085 St. Bernard

ECHO presents four locations reporting current significant violations and in non-compliance. Three of those four locations are platforms located offshore. TOCA Gas Processing Plant is also listed has having reported a current significant violation.

5.2.1.2 70032 Arabi

American Sugar Refining Inc (Tate & Lyle, Domino) is listed has having a current significant violation in Arabi.

5.2.1.3 70040 Braithwaite

There are no facilities listed in this area with an alleged current significant violation.

5.2.1.4 70043 Chalmette

St. Bernard Par Water & Sewer Div is listed as having current significant violations. This facility is assumed to also be named Fazendeville WWTP from the RTK network and lies approximately 2 miles from the projected sites.

5.2.1.5 70075 Meraux

Murphy Oil is listed has having current significant violations.

5.2.1.6 70117 New Orleans

The East Bank WWTP and Magee & Sons Auto Salvage are both listed as having current significant violations. The limited information indicates that enforcement has been issued and these facilities have not meet scheduled requirements. East Bank WWTP lies within the project boarders and Magee lies approximately one mile north of project areas.

5.2.1.7 70126 New Orleans

There are no reported facilities with current significant violations in this area.

5.2.1.8 70129 New Orleans

ECHO does not report any alleged current significant violations in this area.

5.2.1.9 70092 Violet

There are no facilities reporting significant violations in the area of Violet.

5.2.1.10 70461 Slidell

ECHO presents several facilities with violations; however, none are within several miles of the project areas.

5.3 Previous Environmental Assessments

The project areas are very large and several Environmental Assessments have been performed in various areas of the current project areas. The following discusses briefly readily available relevant assessments; however, it should not be assumed that these are the only relevant environmental assessments in the areas.

5.3.1 Phase I Environmental Site Assessments

Phase I ESA Michoud Canal –Bayou Bienvenue Corridor (Option 1). New Orleans, LA. November 2006

Materials Management Group (MMG) conducted a Phase I ESA at the locations of the proposed navigable closure structure located in the Gulf Intracoastal Waterway (GIWW) and in the Mississippi River Gulf Outlet (MRGO) (near the Bayou Bienvenue – Michoud Canal Corridor) This Phase I ESA revealed one Recognized Environmental Condition (REC) in connection with the Property. The REC is the presence of sunken barges about 200 yards east of the GIWW floodgate location (near Michoud Canal). It was recommended to investigate the contents of these barges and the impact to the surrounding environment including surface water and sediment. It was suggested that the sediment at the Property be further investigated to ascertain its hazardous nature for waste management as well as the potential dispersion in the surrounding aquatic environment during the construction phase. These recommendations were followed in a subsequent Phase II ESA discussed in *5.3.2 Phase II Environmental Site Assessments.*

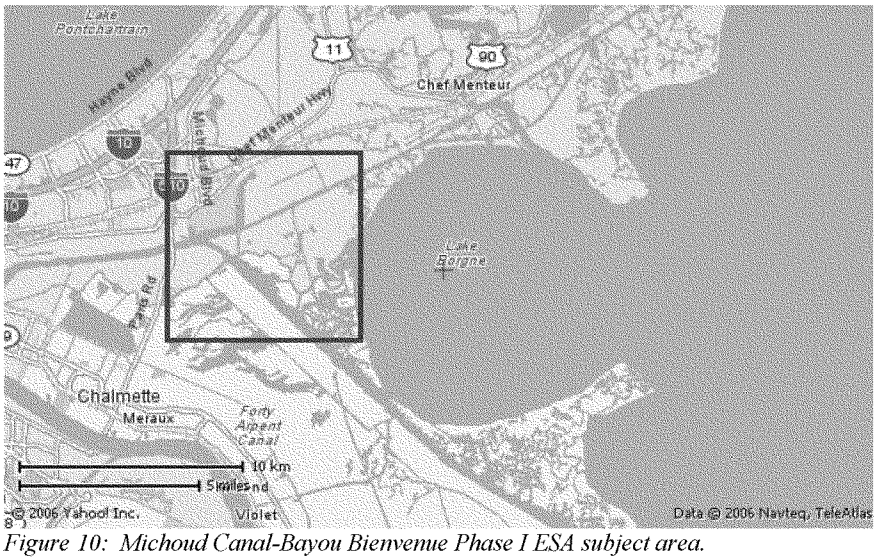


Figure 10: Michoud Canal-Bayou Bienvenue Phase I ESA subject area.

Phase I Environmental site Assessment Report. Chef Menteur-Bayou Dupre Corridor (Option 2). New Orleans, LA. November 2006.

MMG conducted a Phase I ESA at the locations of the proposed navigable closure structure located in the Gulf Intracoastal Waterway (GIWW) and in the Mississippi River Gulf Outlet (MRGO) (near the chef Menteur – Bayou Dupre Corridor). This Phase I ESA did not reveal evidence of Recognized Environmental Conditions

(RECs) in connection with the Property. However, MMG recommend that the sediment at the Property be tested for its chemical characteristics so that future sediment management options, including reuse and disposal, during construction phase of the floodgates can be identified.



Figure 11: Chef Menteur-Bayou Dupre Phase I ESA subject area.

Phase I ESA Federal Levee Reach LPV 109 and 110. South Point to CSX Rail Road and CSX Rail Road Gate, New Orleans, LA. March 2007.

Earth Tech conducted a Phase I ESA for the federal levee reach LPV 109 and LPV 110 in March 2007. No obvious signs of major contamination were discerned during the inspection. No known or suspected RECs, either historical or current, were observed on the Federal Levee Reach within the 1,000-foot footprint.



Figure 12: Outlined in blue is LPV 109-110 Phase I ESA subject area.

Phase I ESA. Federal Levee Reach LPV 111, New Orleans, LA. March 2007.

Earth Tech conducted a Phase I ESA on the federal levee reach LPV 111 in March 2007. No known or suspected RECs were observed on the Federal Levee Reach LPV 111 itself. Similarly, no known RECs were identified within or adjoining the 1,000-foot footprint. Three suspected RECs were identified within the 1,000-foot footprint of LPV 111: The former BOC Gases facility (metals, petroleum products and potentially solvents); the Canal Pump House No. 1 located approximately midway along the northeast-trending stretch of the levee (petroleum products and potentially solvents); and one abandoned port-a-john (human wastes). The following sites were identified as historical suspected RECs whose locations have not been specifically determined, but that may be within the 1,000-foot footprint: Dufour Petroleum (petroleum products) and Groendyke Transport, Inc. (petroleum products).



Figure 13: Outlined in blue LPV 111 Phase I ESA subject area.

Phase I Environmental Assessment MRGO Deep-Draft De-Authorization. August 2007.

BEM Systems Inc. (BEM) conducted a Phase I ESA along MRGO in August 2007. The MRGO Deep-Draft De-Authorization report found no state, federal, or other type of documentation confirming a release of any type of hazardous material into the MRGO areas. The report acknowledges the high possibility of unreported petroleum releases in the area due to the high volume of gas/oil wells and other petroleum activities in the area such as transportation and piping. A site of concern was presented on the east side of Lake Borgne. A historical ammunition area was located east of Lake Borgne at the former Shell Beach Anti-Aircraft Training Center, one-half mile north of MRGO Mile Marker 42. BEM suggested ammunition be handled appropriately if ammunition type findings were encountered during project development. BEM concluded the report by suggesting sediment and soil sampling in the area to ensure the material does not have levels that exceed regulatory standards. It is assumed their reasoning for this recommendation was made in regards to the high volume of petroleum industry operations in the area as well as the heavily industrialized areas north of MRGO in Orleans Parish which may have attributed indirectly to contamination of the MRGO areas by area flooding. There were no records of a release into the area but BEM recommendations represent a very conservative and safe conclusion that area usage has potentially led to contamination of the project areas.

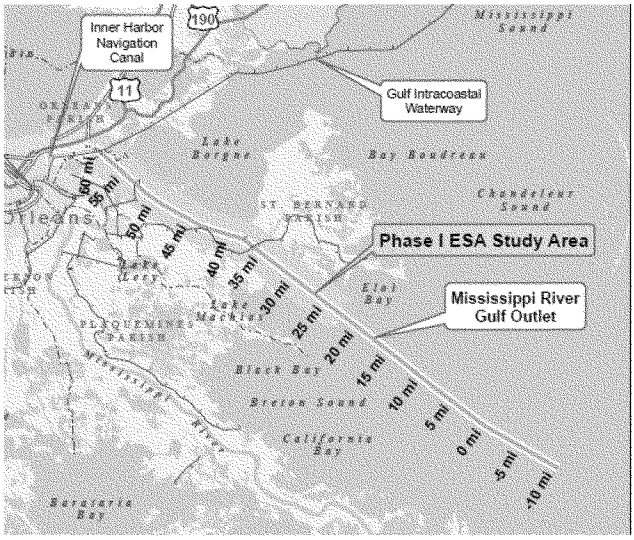


Figure 14: Subject area for MRGO De-Authorization Phase I ESA. Figure created by BEM Systems Inc.

Phase I Environmental Site Assessment. Chalmette Loop Levees and Bayou Bienvenue and Bayou Dupre Control Structures. St. Bernard Parish. September 2007.

The Contractor, URS, conducted a Phase I ESA on approximately 46,000 linear feet of Chalmette levee from the Bayou Bienvenue Control Structures to LA Hwy 46 and Bayou Road. Based on the site reconnaissance, corridor study and database report, and review of historical maps and aerial photographs, no RECs were identified in then area of the levee alignment.

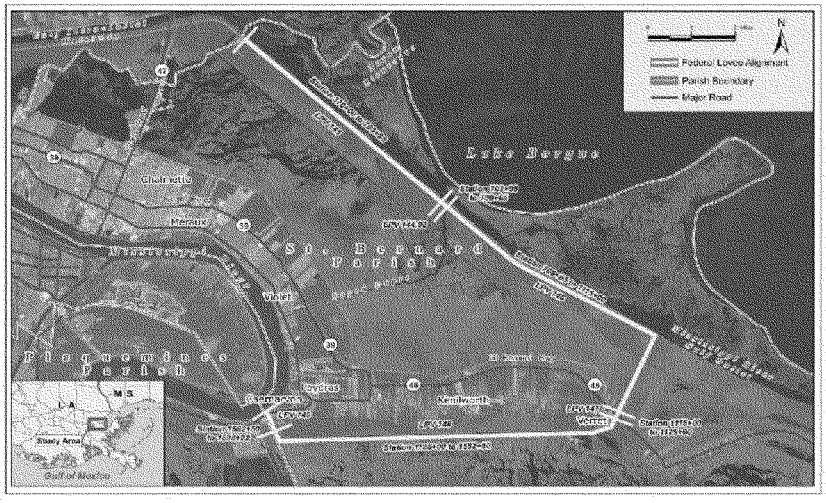


Figure 15: Chalmette Loop study area.

Phase I Environmental Site Assessment, Big Mar Mitigation and Borrow sites, Plaquemines Parish, LA. December 2007.

Materials Management Group, Inc. (MMG) conducted a Phase I ESA of the proposed Mitigation and Borrow Sites in December 2007. The environmental dataset review, including the commercially available EDR report and other governmental databases, did not produce any significant environmental concern related to the Property. The environmental liens search revealed these two sites were not on the CERCLA lien list. MMG conducted interviews of the owner's representatives and other related parties. The interviews did not reveal any significant environmental concerns. Site reconnaissance was conducted throughout the Properties and revealed no RECs associated with either site. This Phase I ESA did not reveal evidence of Recognized Environmental Conditions (RECs) in connection with the either the Mitigation Site or the Borrow Site.



Figure 16: Big Mar Mitigation Phase I ESA study area.

Phase I Environmental Site Assessment Chalmette to Phoenix and Phoenix to Bohemia Levee Enlargement and Concrete Slope Paving Repair Project, Borrow Pits. March 2009.

The United States Army Corps of Engineers, New Orleans District (USACE MVN) performed a Phase I ESA on eight borrow pits adjacent to the east bank of the Mississippi River between the towns of Chalmette and Bohemia of St. Bernard and Plaquemines Parishes. The purpose of this Phase I ESA was to assess the borrow areas that will provide the earthen material for levee enlargement projects for issues of environmental concern. No Recognized Environmental Concerns (RECs) were identified in the vicinity of the borrow areas.

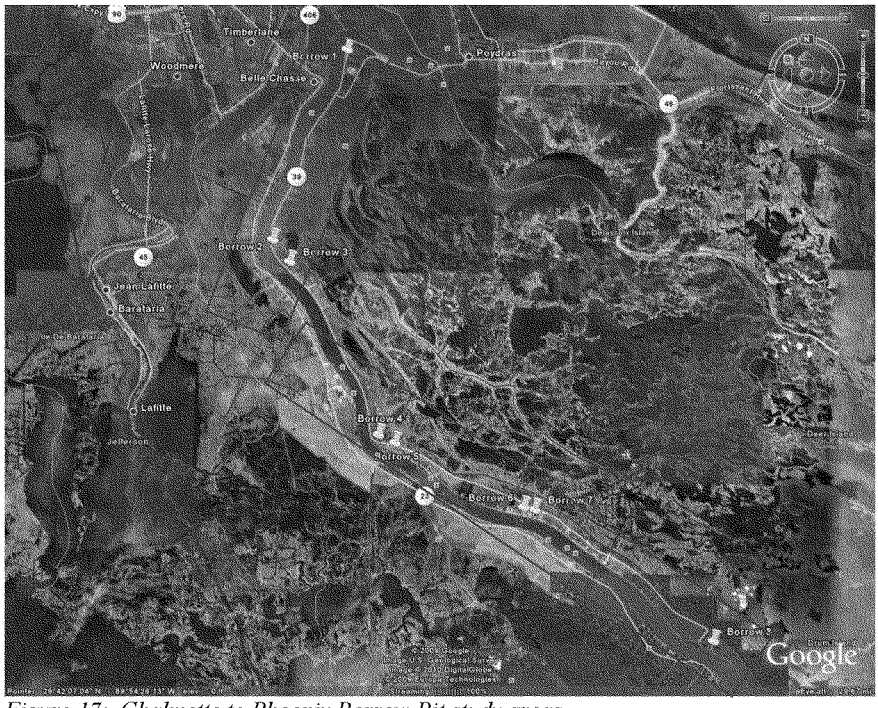


Figure 17: Chalmette to Phoenix Borrow Pit study areas.

Phase I Environmental Site Assessment. Caernarvon Marsh Creation Area. Forty Arpent Canal. St. Bernard Parish, LA. August 2009.

The United States Army Corps of Engineers, New Orleans District (USACE MVN) performed a Phase I ESA on Caernarvon Marsh Creation Area, Forty Arpent Canal in August 2009. The project site is located approximately three miles south of the intersection of the Gulf Intracoastal Waterway (GIWW) and Highway 317. The proposed action consists of marsh and hydrology restoration with three main project features including marsh restoration, canal dredging, and breach construction. The objective of the Phase I ESA was to identify Recognized Environmental Conditions (RECs) in connection with a given property. This assessment revealed no evidence of RECs in connection with the project site.

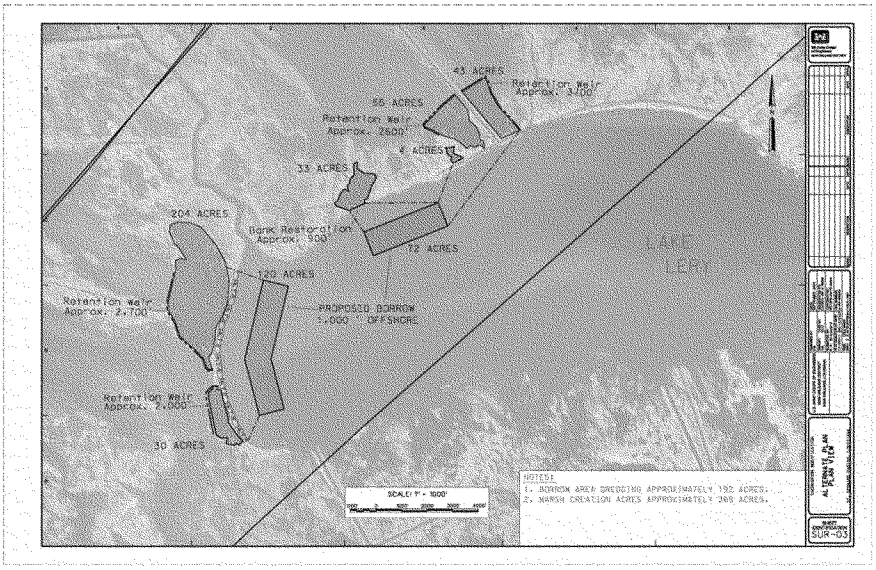


Figure 18: Caernarvon Marsh Creation footprint.

5.3.2 Phase II Environmental Assessments

Phase II Environmental Site Assessment Report—Michoud Canal-GIWW IHNC Hurricane Protection Program. July 2007.

The Phase II ESA investigated soil samples from the northern bank of the GIWW in the vicinity of the Michoud Canal in July 2008. These soil samples presented elevated levels of benzene which were above drinking water standards but below industrial standards. Further investigation of the area was considered to be unnecessary for the construction of the closure structure in the vicinity of this location.



Figure 19: Michoud Canal-GIWW Phase II ESA study area outlined in red.

Phase II Environmental Site Assessment. Proposed Closure Structures—Seabrook, GIWW-MRGO, Michoud Slip. December 2007.

For preparation of possible closure structure options, various areas of sediment samples were taken for analysis. Along the MRGO-GIWW-Michoud Canal area several samples were taken in December 2007. There were no levels of chemicals of concern (COCs) that exceeded RECAP standards within this area.



Figure 20: Proposed Closure Structure at GIWW location Phase II ESA study area.

Phase II Environmental Site Assessment. LPV 149 Floodwall and Gate Locations. October 2008.

In October 2008, a Phase II ESA was performed in the area of Elevating Boats Inc. (IER 9-LPV 149). There were few samples containing elevated levels of petroleum hydrocarbons; however, none of these levels exceeded RECAP screening standards. The report recommended further investigation of the subsurface soils and groundwater of the area due to the lack of "legal protection of a restrictive covenant or other deed restrictions".



Figure 21: LPV 149 Phase II ESA study area outlined in red.

Phase II Environmental Site Assessment/Barge Assessment. Michoud Canal/GIWW Sunken Barges. December 2008.

This Phase II ESA investigated five sunken barges near the GIWW-Michoud Canal east bank corner in December 2008. Sediments from within the barges, as well as a canal sediment sample, were taken. One of the barges had sediments that needed to be disposed of in accordance with regulations regarding removal of contaminated sediments. There was no sign of canal sediment contamination or the barge releasing any material to the surrounding areas. The investigation suggested no further investigation of the area aside from proper disposal of the sediments within the one barge.



Figure 22: Sunken Barge Phase II ESA study area.

Phase II Baseline Sampling Activity, IHNC-CDF, New Orleans, LA. December 2009.

Materials Management Group conducted baseline chemical and geotechnical analysis on Inner Harbor Navigation Canal (IHNC) Confined Disposal Facility (CDF) located south of the Mississippi River Gulf Outlet (MRGO) and north of Bayou Bienvenue in New Orleans. The USACE intends to construct a new Industrial Canal Lock at the IHNC and place the dredged material from construction in the CDF. There was one sample with elevated levels of lead and chromium; which are considered to be of minor concern. Aside from this elevated sample in one location, there is no reported unacceptable contamination at the CDF.



Figure 23: IHNC CDF Phase II ESA study area.

5.3.3 Other Environmental Assessments

IER Addendums

Several Individual Environmental Reports were supplied with addendums that addressed possible HTRW concerns since finalization of the IER. The Environmental Team ED-F investigated IERs 4-11, various levee stretches, and supplied HTRW addendums. These addendums were created by reviewing past documentations concerning the areas, including Phase I and Phase II ESAs and updates as well as performing a site reconnaissance. The addendums were completed in February-April of 2009. These same levee reaches were re-investigated a second time by the Environmental Team ED-F for another addendum to the IERs in November 2009. From the past Phase I and Phase II ESAs, updates, and site reconnaissance, no areas were found in the IER subject areas that were of significant environmental concern and would require further investigation.

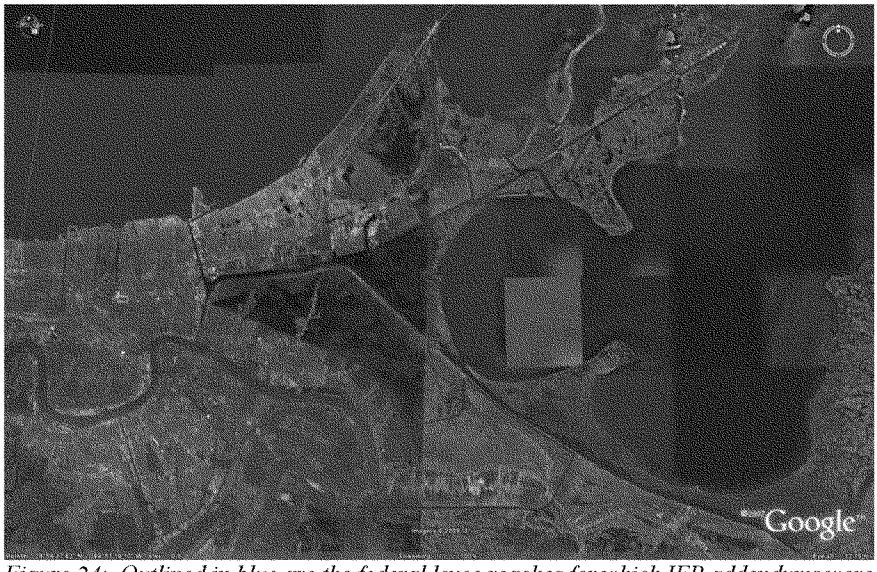


Figure 24: Outlined in blue are the federal levee reaches for which IER addendums were investigated.

5.4 Oil and Gas Wells

There are numerous oil and gas wells located all through out the project areas and vicinity. There are also pipelines running throughout the areas. The 2007 MRGO De-Authorization Phase I ESA mapped wells and pipelines in the area (**Appendix E**). More detailed, and current, information about each well can be found from the Department of Natural Resources website: http://sonris-www.dnr.state.la.us/www_root/sonris_portal_1.htm.

5.5 Leaking Underground Storage Tanks (LUSTs)

The Leaking Underground Storage Tank (LUST) database identifies facilities and/or locations that have notified the State of a possible release of contaminants from underground petroleum storage systems. A review of the most recent listing (January 14, 2009) from LDEQ indicated that several LUST facilities are located at a distance less than 1 mile from the project boundary. **Appendix F** lists all of the LUSTs within Orleans, St. Tammany, Plaquemines and St. Bernard Parishes within the project boundary and those that lie in close proximity to the project areas of significance were mapped. Any project footprint that were to encroach upon developed areas, should evaluate the LUST physical addresses with project footprints.

5.6 Physical Setting Source(s)

USACE MVN did not review USGS Topographic Maps associated with the *site* locations due to the large size of the project areas and its associated costs.

5.6.1 Geography

The majority of the areas are undeveloped marsh lands.

5.6.2 Topography and Surface Drainage

The 2007 Phase I ESA performed by BEM Systems reviewed U.S.G.S maps for much of the MRGO area and reported that the levee areas are the highest points of elevation. The majority of the areas are relatively flat and at sea level. Due to land type and topography it is assumed there would be minimal surface drainage.

5.6.3 Geology and Hydrogeology

As stated throughout this report, the majority of the project areas are wetlands. According to the United States Department of Agriculture (USDA) - Soil Conservation Service (SCS) survey, the majority of the area soils are comprised of Aquents, dredged soil, Lafitte muck, Clovelly muck, Commerce Silty Clay Loam, Fausse clay, saline, Timbalier muck, Bellpass muck, and Scatlake muck clay. More details of these types of soil classifications can be found from the USDA – SCS as well as in the 2007 Phase I ESA for MRGO De-Authorization.

5.7 Historical Use Information on the Subject Property

The 2007 De-Authorization of MRGO Phase I ESA states the general areas of the proposed project have been historically undeveloped marshes prior to the MRGO canal construction. Over the years heavy industrial facilities have arisen in the areas adjacent to the properties. In the general vicinity natural gas plants, aerospace activities, oil/gas exploration and sparse residential/fishing activities have characterized the area; however, the majority of the project areas still remains largely undeveloped marsh lands. Eastern Lake Borgne historically was used as the Shell Beach Anti-Aircraft Training Center which was abandoned prior to 1950. More in-depth information can be found in the 2007 MRGO De-Authorization Phase I ESA. All facilities and areas of significant interest are discussed in greater detail in other sections of this Phase I ESA.

For the purpose of this Phase I ESA, purchased historical documents, photos, and maps were not requested due to lack of significance, cost, and past interpretations by previous environmental studies which are referenced herein.

6.0 Subject Properties Reconnaissance

USACE MVN conducted Phase I ESA site area visits on November 13 and January 14, 2009. The visits were conducted by Haekyung Kim and John

Templeton of the USACE MVN ED-F Environmental Team. The facilities of interest presented by the records review were visited for further inspection. These facilities were located in Orleans, Plaquemines and St. Bernard Parishes. Levees LPV 149-146 and LPV 101-111, which provided a good vantage point to oversee project areas, were ridden in November 2009. The actual project footprints were not accessible due to their remoteness. Site visit photographs can be found in **Appendix D**.

6.1 Methodology and Limiting Conditions

The facilities of interest from the records review all had physical addresses and were approached by vehicle. Entrance to these private properties was not granted so a thorough investigation of the areas was not possible. The main project footprints are in undeveloped areas with limited access which limited the thoroughness of the site investigations. In order to maintain a reasonable budget and schedule, extensive project area investigations were not performed.

6.2 General Subject Properties Setting

The majority of the project areas are undeveloped marsh lands. In the more immediate project vicinities there are sparse populations of residential and commercial facilities. Farther away from the project areas are developed areas such as the cities of New Orleans and Chalmette. Developed areas are densely populated with residential, commercial, and heavy industrial uses.

6.2.1 Structures

In the vicinity of the project are few residential and commercial structures. Farther away from project borders are many more structures of various types. Exact project footprints were not investigated due to inaccessibility. It can be assumed that there are oil and gas wells, both active and inactive, oil and gas pipelines, and commercial and recreational fishing establishments all within the immediate vicinity or within the project footprints. It is also known that there is development within the Diversion Alternative No. 3 footprint which would need to be addressed before project development.

6.2.2 Roads

In the marsh creation footprints it can be assumed that there are no developed roads within the footprints. In the vicinity of the project areas; however, are developed roads. Some of these roads may come very close to actual footprints and possibly should be readdressed if they indeed bisect or boarder the footprints. Diversion Alternatives No. 1 and No. 3 run through Violet, LA. The alternatives' footprints appear to overlap with major and minor roads including but not limited to; HWY 39 and Hwy 46.

6.2.3 Other Improvements

Reaches of levees within the MRGO vicinity are to undergo enlargement and other maintenance operations. Currently there are construction operations at LPV 145 near Bayou Dupre and Bayou Bienvenue. There are also significant construction operations being undertaken for the IHNC Surge Barrier.

6.3 Exterior and Interior Inspections

The property and areas were inspected to determine if the following listed items were present. If an "x" appears to the left, then the item was noted as being present on the Properties.

Geologic/Hydrologic

x Pits
x Pond/Lagoon(s)
x Canal/Ditches-
Oil/Water Sep.
Waste Water
Storm Drains
Sumps
Traps
Wells
Municipal Water
x Wetlands
Stressed Vegetation
x Standing Water
Other (Landfill)

Storage Tanks

USTs
ASTs
Containment
SPCC
Containers
55 gallon
33 gallon
5 gallon
1 gallon
Cylinders
MSDS/HAZCOM
Other

Solid Waste

Municipal Sewer
Septic System
No Waste System
Dumpster
Roll-off Box

Waste or Food Oil AST
X Landfill
Unauthorized Dump
Mound
Trash- (minimal)
x Rail Ties
Treated Poles
X Construction Debris (minimal)
Biohazards
White Waste
Odors

Suspect Hazardous Materials

Pole
"No PCB" Label(s)
Ground Transform
Fluorescent Lights
HVAC (Freon)
Heavy Metals
Lead-based Paint
Asbestos
Other

The site investigation was very limited in nature. All of the facilities of interest from the records review were visited; however, since they are private, access was not granted. It should be assumed that a large majority of items from the checklist above would be found at these facilities if further investigation were permitted.

As stated earlier, LPV 149-146 and LPV 107-111 were ridden. These levee reaches present a good vantage point to see over many of the MRGO Ecosystem Restoration project areas. Minor debris was washed up along side of the levees; however, no significant environmental issues were seen near any of the levee reaches nor seen from the levee reaches in the project areas. The levee reaches investigated are depicted in **Appendix D**.

The footprints of the project were not able to be investigated because they are undeveloped marsh and wetlands and highly inaccessible by reasonable methods. Without significant funding and increased time for investigation a thorough investigation of the project footprints is not possible.

7.0 Interviews

Several interviews with persons familiar with the areas were attempted. Jeff Corbino of USACE MVN, who was involved in the Operations and Maintenance of MRGO, was interviewed. Corbino noted the possibility of unspent

ammunitions from the Anit-Aircraft facility at Shell Beach. Corbino also supplied an attachment of possible past environmental assessments and maps.

Dr. Paul Lo of Materials Management Group (MMG) was interviewed for his familiarity of the MRGO areas. Dr. Lo noted his past work for USACE in conducting Phase I and Phase II ESAs. These reports were noted previously in this report.

George Bacuta, a former Technical Manager for the Environmental Team USACE MVN, was interviewed for his familiarity of the MRGO areas. He most notably discusses the high energy of the MRGO area causing erosion and area decay.

More interviews concerning historical information can be found in the 2007 MRGO De-Authorization Phase I ESA.

8.0 Findings

For a visual representation of the areas refer to *5.1 Standard Environmental Records Services.*

St. Bernard (70085)

In St. Bernard (70085) there are only two facilities of significant concern. Both of them have several names listed over the years in the records. Southern Natural Gas Company is also called Toca Gas Plant and lies approximately one mile from project areas. The Chevron Plant is also listed throughout the years of records as Targa Resources, Yscloskey Plant, Warren Petroleum Company, and Dynergy Midstream Services. Chevron lies approximately 0.65 miles from the closest project areas. Within the area searched, there are no incidents of significant concern; however, the records do indicate these facilities are of concern due to their nature of business.

Arabi (70032)

There are three facilities with significant records within the Arabi area (70032). Westside Oil Recovery is assumed to be the mailing address and not the address of the actual waste accepting site. A general internet search for the facility location presents an address in Port Allen, LA. Boasso America and Tate & Lyle Sugar are both a significant distance from the projected areas. There are no significant records of incidents or releases into surrounding areas from any facility within Arabi. The records indicate facilities of concern due to their nature of business.

Braithwaite (70040)

In the Braithwaite area (70040) there are three facilities listed by the RTK network as of significance. Elevating Boats Inc, Amax Metals Recover Inc., and Stolthaven New Orleans LLC all handle hazardous wastes; however, their distances from the proposed areas and lack of reported significant violations, accidents and spills suggest that they are all of minimal significance to the project areas.

Chalmette (70043)

Of the records reviewed, GIOE's Demolition is the most significant facility because it lies adjacent to proposed project areas. Rollins Environmental and Chalmette Medical are within 0.5 miles of the site; however, they have not been listed in any records database since 1989 and are no longer present at their listed physical addresses. The other facilities from the records are a significant distance from the sites and pose a minimal threat. GIOE's Demolition is a facility of significant concern to the project areas.

Meraux (70075)

The most significant area of interest in the Meraux area (70075) is Murphy Oil. This large oil refinery handles several hazardous materials and wastes and has reported numerous violations over the years. There are no records to suggest that there has been a significant release to the project areas; however, the very nature of the site should be of concern depending on the project footprint. The Muster WWTP lies adjacent to the indicated project border. No records showing a release of hazardous materials into project areas were found; however, records do indicate various industrial facilities to be aware of in the area.

New Orleans (70117)

The area is largely residential. Just south of the GIWW-IHNC corner is Southern Scrap Recycling. Just east of Southern Scrap Recycling is East Bank Wastewater Treatment Plant (N.O. Sewerage and Water Board). The nature of these facilities is of considerable significance, especially considering they both border proposed project areas. There is no indication from the records obtained that there has been a past release of hazardous materials. The ECHO database; however, does note that East Bank WWTP currently has a significant violation.

New Orleans (70126)

There are numerous areas of interest in New Orleans (70126). This area of New Orleans is very industrial and deals with various hazardous chemicals and wastes. There are no records of significant concern suggesting a release of material into the project areas; however, there are facilities whose nature is of

concern. The majority of these facilities lie more than one mile from the project areas.

There are three facilities of significant nature to be noted. At the GIWW-IHNC projected areas are Southern Scrap Recycling, Crescent Acres Landfill, and East Bank Wastewater Treatment Plant. The nature of all of these facilities is of considerable significance to the surrounding areas; however, there is no indication from the records obtained that there has been a past release.

New Orleans (70129)

There are numerous areas of interest in New Orleans (70129). This is a very industrial area that deals with various hazardous chemicals and wastes. There are no records of significant concern suggesting a release of material into the project areas. The majority of the facilities of concern lie one mile or more from the project areas.

There are two areas of significant nature to note. Textron Marine and Land Systems and US Marine Corps are boat building operations that lie within the project areas. From the site reconnaissance it was noticed that US Marine Corps appears to no longer be present at the listed address; however, its past usage is of concern. Gills Crane and Dozer, a heavy construction equipment facility seen during the site reconnaissance, is located in the vicinity of Textron Marine and Land System but was not listed in any of the record databases searched. There are no records of significant concern regarding these areas; however, their nature indicates concern.

Violet (70092)

Violet WWTP is of concern due to the nature of the facility and its proximity to the project areas. Cure Oil and Diesel lies within the footprint of Diversion Alternative No. 3. Since the facility site lies within the footprint, even though there are no records of release, this is a major concern.

Slidell (70461)

There are no significant locations to discuss in relation to the project areas from the Slidell (70461) area. Most of this area is undeveloped wetlands with sparse residential and fished developments.

General Findings

Most developed areas contain various facilities of environmental concern; gas stations, auto garages; hospitals etc. However, no records were found of violations or releases on the Right-To-Know website. All of the facilities identified in the RTK network were also presented in the ECHO databases.

Site reconnaissance was very limited in nature due to the inaccessibility of the wetland areas and private properties of the significant facilities. It should be assumed that the facilities of concern have various issues associated with them that could be of concern to surrounding environments.

Riding levee reaches LPV 149-146 and LPV 107-111 was the best available method for a visual inspection of project areas. During these inspections, there were no visible signs of significant environmental issues. The only issues of note from these inspections were debris build up along the flood sides of the levees and significant construction operations for the IHNC Surge Barrier and at LPV 145. Future work on these levee reaches is scheduled. Due to the cost and time that would be necessary to investigate the inaccessible areas of the project, a more in-depth investigation of all footprints was not feasible.

Several inspections and assessments have been conducted in the areas of the MRGO Ecosystem Restoration project. There have been several Phase I and Phase II ESAs in the vicinity. The most significant and thorough Phase I ESA was conducted for the de-authorization of the MRGO navigational canal. The MRGO De-Authorization Phase I ESA did not note any RECs, only issues of possible concern. The previous report found many of same facilities of interest as this current assessment. The 2007 report states that there are no records to confirm a significant environmental issue within the MRGO areas. The report concluded that despite the lack of significant records; past flooding from hurricanes could very well have transported petroleum and other chemical compounds into project areas. Petroleum exploration activities are suspect as possible undocumented releases could have impacted the project areas. Historical records show the Shell Beach Anti-Aircraft Training Center half a mile north of Mile Marker 42 on the MRGO signifying the possible presence of unspent ammunition in project areas.
The previous Phase I ESAs reviewed for this report did not present any outstanding issues of concern.

The Phase II ESAs reviewed by this report did not find elevated levels of chemicals of concern higher than industrial RECAP screening standards.

IER Addendums presented no areas of significant concern aside from the current construction operations for the IHNC Surge Barrier and levee maintenance.

9.0 Opinions, Conclusions, and Recommendations

The Assessment Team performed a Phase I Environmental Site Assessment of the subject site, in Orleans, St. Bernard, St. Tammany and Plaquemines Parishes Louisiana, in conformance with the scope and limitations of ASTM E

1527. This assessment has revealed evidence of one *recognized environmental condition (REC)* and areas of possible concern.

The USACE MVN-ED Environmental Assessment Team recommends the following:

The REC found is Cure Oil and Diesel, a waste handler in Violet, LA. The site lies directly within the proposed footprint for Diversion Alternative No. 3. Depending upon the amount of disturbance this area will undergo, this area should be further investigated with soil/sediment testing before project development.

There are no records to suggest that there has been a significant release of HTRW materials into project areas. The area has been repeatedly sampled and has not presented data of significant concern. However, due to land usage, it is suggested that possible further investigation for contamination be explored in areas that both; (1) would experience intensive excavation or significant soil/sediment disturbance and (2) are relatively close to or border industrial areas.

Project areas in the vicinity of developed industrial areas that would not experience significant disturbance in soil or sediment would not be suggested to undergo further investigation for HTRW. In cases of minimal project disturbance of soils and sediments, no evidence suggests a high probability of encountering significant levels of HTRW that would require specific management. Moderate disturbance in these project areas that are in the vicinity of industrial areas may require minimal soil/sediment testing.

Many of the project areas are historic marsh lands a significant distance from all development. In these areas there is a low probability of encountering issues of environmental significance or HTRW; the Environmental Team believes that further investigation for HTRW is unnecessary in these undeveloped areas.

Petroleum exploration wells and pipelines are common in most of southeastern Louisiana. Caution is advised in the vicinity of wells and pipelines, and encountered issues should be handled appropriately.

The historical use of a portion of Lake Borgne as the Shell Beach Anti-Aircraft Gunnery Range has been noted. The risk management plan for Lake Borgne states that the consequences of encountering unexploded ordinance (UXO) could be catastrophic, causing loss of life and property damage. At the same time, the probability of encountering UXO is very low. Although in the years after World War II there were several incidents of human encounters with UXO in the Lake Borgne area apparently causing injury, the US Navy performed an extensive remediation of the firing range area in the early 1950s. Since that time there have been no documented cases of any injuries or damage caused by

unexploded ordnance or of UXO being found in the project area. The combination of possible catastrophic consequences from UXO, combined with a very low probability of actually encountering UXO, yields an overall Moderate risk of consequences to the project and personnel. The overall risk can be reduced to Low by having in place plans for proper response and protective measures, in the unlikely event that UXO is encountered during the course of the project. These protective measures include having professionals certified to deal with UXO problems available on call, preparations and readiness for placing screens over intake pipes on dredges, the posting of warning signs in any area where UXO is encountered, and the training of personnel in the proper procedures to follow in the unlikely event that UXO is encountered.

Final construction footprints should take into account conditions of surrounding facilities of all types, in order to ensure the avoidance of HTRW, whether or not there has been a reported release. The Environmental Team ED-F believes that the probability is low of encountering significant levels of HTRW in project areas. However, due to variations in area land use, further investigation of project areas that will experience significant soil and sediment disturbance near industrial areas is recommended. Areas with only minor disturbance potentially could require minimal testing, depending upon the proximity of significant development and industrial activity or documented spills or accidental releases of HTRW or petroleum products. Project areas that will not undergo significant soil or sediment disturbance and historical marsh lands located a significant distance from developed areas would not require further testing in the absence of evidence of HTRW.

10.0 Data Gaps

The Right-To-Know databases searched do not present up-to-date information; therefore, it is possible that there are incidents that have occurred that have yet to be incorporated within the Right-To-Know Network. The databases on RTN.net were last updated on the following dates:

ERNS: January 9, 2008
TRI: September 22, 2008
RMP: April 28, 2008
BRS: December 16, 2008
RCRIS: July 21, 2008

Brownfield locations are also not provided which are significant and prominent findings in many environmental study search results. The lack of Brownfield records should not be considered as an absence of their presence or significance in the area.

Many purchased search results extend their searches into numerous types of facilities that this assessment could not investigate due to cost and accessibility. A purchased search could have resulted in numerous more facilities of concern being presented. Without full knowledge of all environmental aspects within the area a completely confident interpretation cannot be made. Right-To-Know does an acceptable level of investigation into major facilities and hazardous releases; however, it is not complete or up-to-date. More investigation could be warranted depending on how close project operations come to developed areas.

Historical information was not reinvestigated due to the investigation in the 2007 MRGO De-Authorization Phase I ESA of the same area. Historical significance is addressed adequately in this report and more in-depth coverage can be found in the 2007 Phase I ESA.

The Phase I and Phase II ESAs reviewed for this report should not be considered to be all of the relevant reports from the area. The reports reviewed were the most relevant and accessible reports known to the Environmental Team. Other reports may produce more usable information concerning project areas.

The site investigations were very limited due to private properties where access was not granted and the inaccessibility of the remote undeveloped wetland areas.

Despite the data gaps the ED-F Environmental Team is confident in the overall assessment of the area and general recommendations.

11.0 References

Phase I Environmental Site Assessment. MRGO Deep-Draft De-Authorization St. Bernard Parish, LA. BEM Systems, Inc. 06-ECAS04SEF August 2007.

Phase I Environmental Site Assessment. Chalmette to Phoenix and Phoenix to Bohemia Levee Enlargement and Concrete Slope Paving Repair Project, borrow Pits. Plaquemines and St. Bernard Parishes, LA. US Army Corps of Engineers. March 10, 2009

Phase I Environmental Site Assessment. LPV 109 New Orleans East Back Levee – South Point to CSX Rail Road. New Orleans, LA. DACA45-03-D0032. Earth Tech. March 22, 2007.

Phase I Environmental Site Assessment. LPV 110 New Orleans East Back Levee – CSX Rail Road Gate. New Orleans, LA. DACA45-03-D0032. Earth Tech. March 30, 2007.

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Phase I Environmental Site Assessment. LPV 111 New Orleans East Back Levee – CSX Railroad to Michoud Canal East Floodwall. New Orleans, LA. DACA45-03-D0032. Earth Tech. March 29, 2007.

Phase I Environmental Site Assessment. Big Mar Mitigation and Borrow Sites, Plaquemines Parish, LA. Materials Management Group, Inc. DACW29-03-D-0014
Task Order #041. December 14, 2007.

Phase I ESA Michoud Canal –Bayou Bienvenue Corridor (Option 1). New Orleans, LA DACW29-03-D-0014, Task Order 24. November 2006

Phase I Environmental site Assessment Report. Chef Menteur-Bayou Dupre Corridor (Option 2). New Orleans, LA. Materials Management Group, Inc. DACW29-03-D-0014, Task Order 24. November 2006.

Phase I Environmental site Assessment Report. Federal Levee Reach LPV 109-South Point to CSX Rail Road, New Orleans, LA. DACA45-03-D0032. Earth Tech. March 22, 2007.

Phase I Environmental Site Assessment. Caernarvon Marsh Creation Area. Forty Arpent Canal. St. Bernard Parish, LA. US Army Corps of Engineers. August 28, 2009.

Phase I Environmental Site Assessment. Chalmette Loop Levees and Bayou Bienvenue and Bayou Dupre Control Structures. St. Bernard Parish, LA. W9128F-04-D-0001, Task Order CZ05. URS Group Inc. September 2007.

Phase II Environmental Site Assessment. Proposed Closure Structures—Seabrook, GIWW-MRGO, Michoud Slip. New Orleans, LA. Materials Management Group. DACW29-03-D-0014 TO #0037. December 12, 2007.

Phase II Environmental Site Assessment/Barge Assessment. Michoud Canal/GIWW Sunken Barges. New Orleans, LA. Materials Management Group Inc. W912P8-08-D-0029 TO #0005. December 19, 2008.

Phase II Environmental Site Assessment Report—Michoud Canal-GIWW IHNC Hurricane Protection Program. New Orleans, LA. Materials Management Group Inc. DACW29-03-D-0014 TO #0047. July 29, 2008.

Phase II Environmental Site Assessment. LPV 149 Floodwall and Gate Locations.

Caernarvon, St. Bernard Parish, Louisiana. Earth Tech 2008.

IER #4 Addendum, Environmental Team ED-F, 4-17-09.

IER #4 Addendum, Environmental Team ED-F, 11-16-09.

IER #6 Addendum, Environmental Team ED-F, 3-24-09.

IER #6 Addendum, Environmental Team ED-F, 11-16-09.

IER #7 Addendum, Environmental Team ED-F, 3-24-09.

IER #7 Addendum, Environmental Team ED-F, 11-16-09.

IER #8-10 Addendum, Environmental Team ED-F, 3-24-09.

IER #8 & 10 Addendum, Environmental Team ED-F, 11-16-09.

12.0 Signature(s) of Environmental Professional(s)

This Phase I Environmental Site Assessment has been conducted, prepared and reviewed by USACE MVN environmental professionals whose signature is applied to the approval page in the front of this report.

"I have the specific qualifications based on education, training, and experience to assess a Property of the nature, history, and setting of the subject Property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

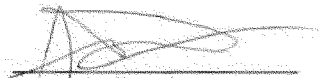


USACE MVN Environmental Professional, PE

The below professionals have performed this environmental assessment under the direction of the EP



Haekyung Kim



John Templeton

APPENDICES

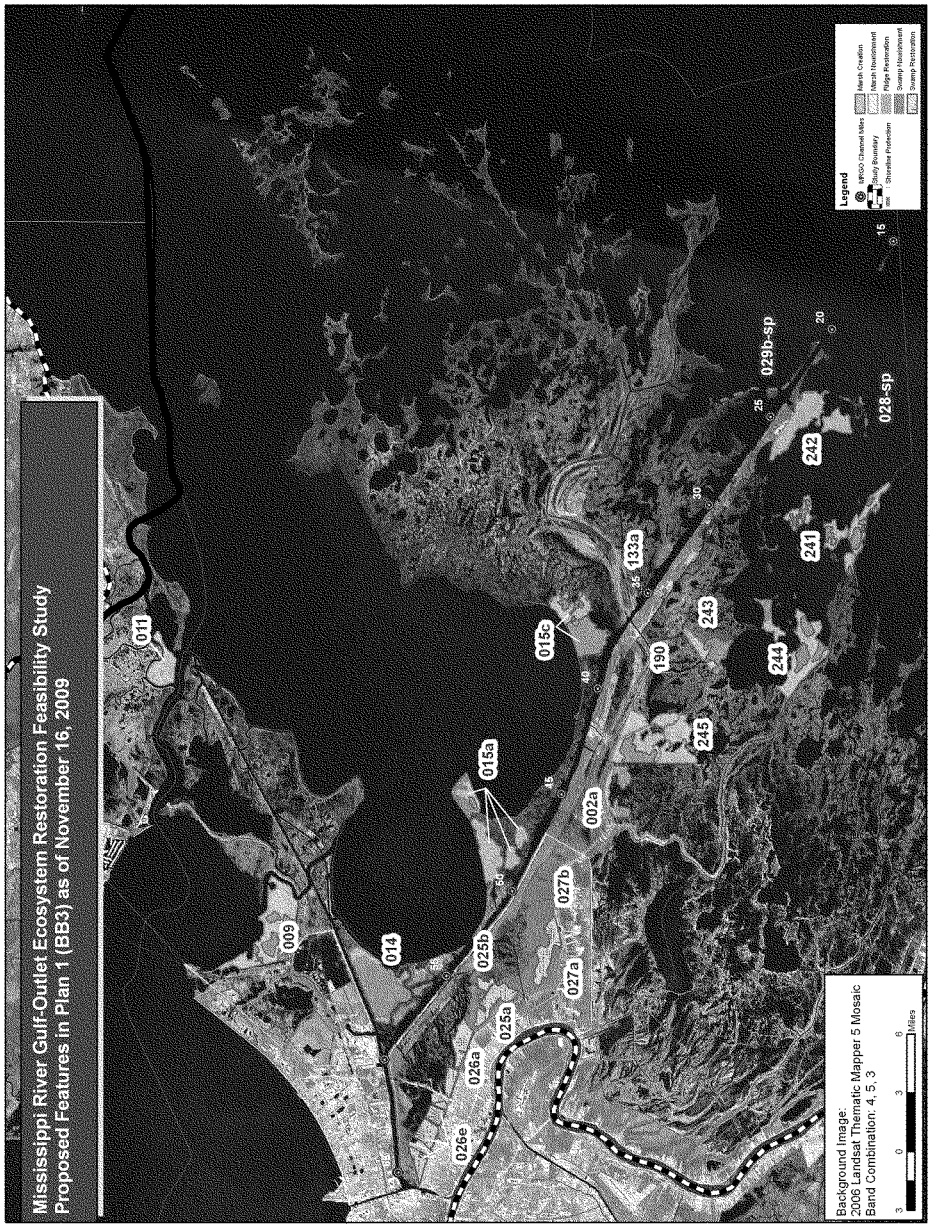
APPENDIX A
MAPS

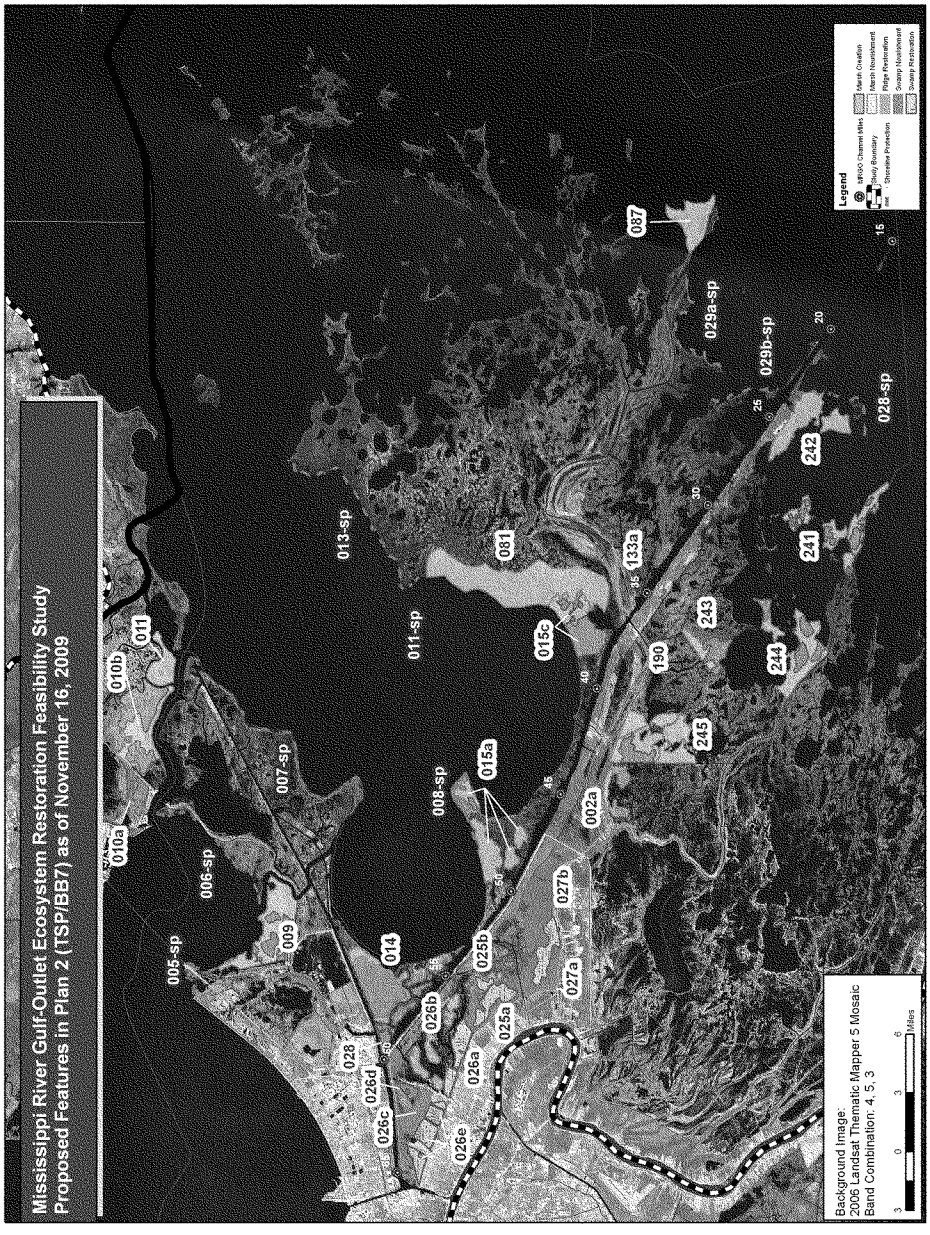
General Project Area

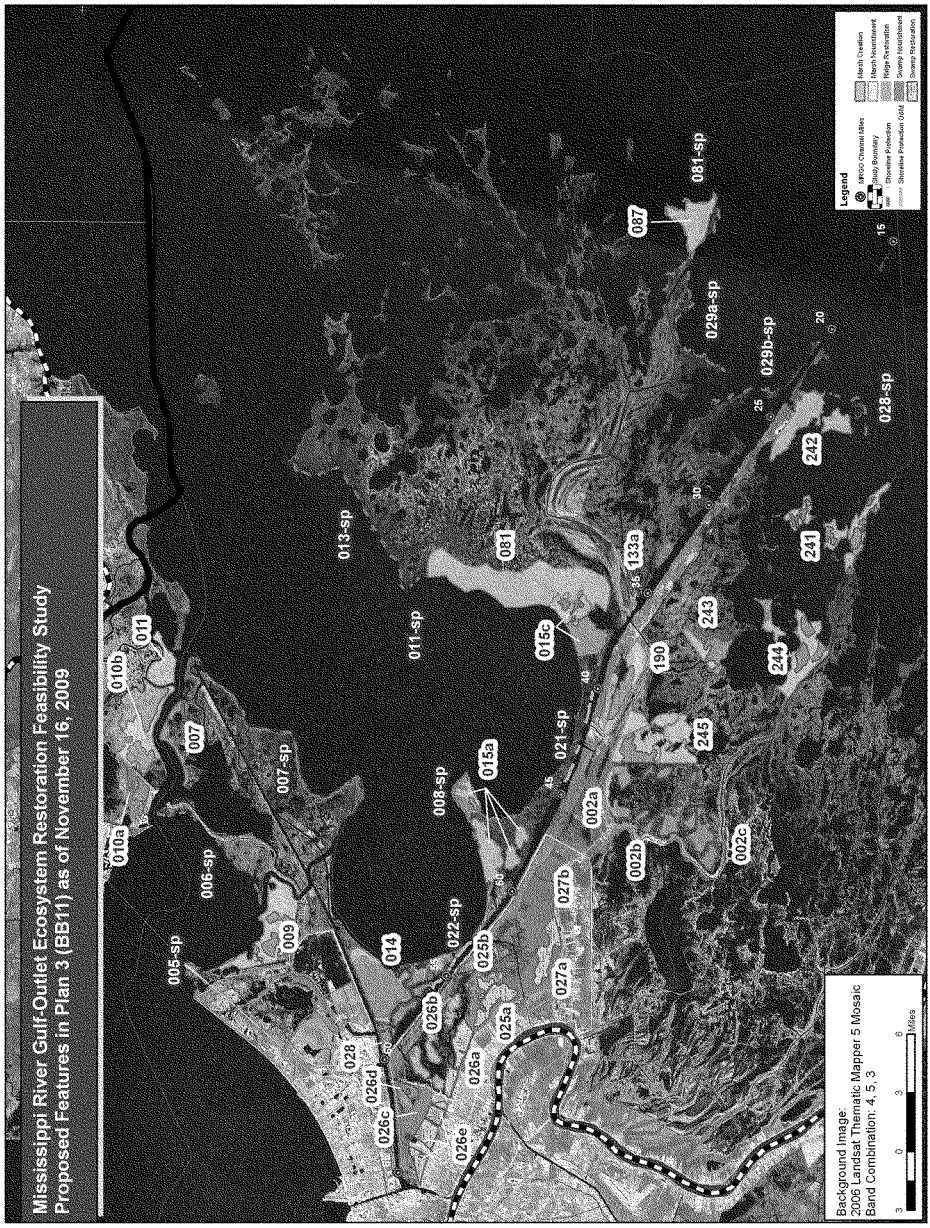
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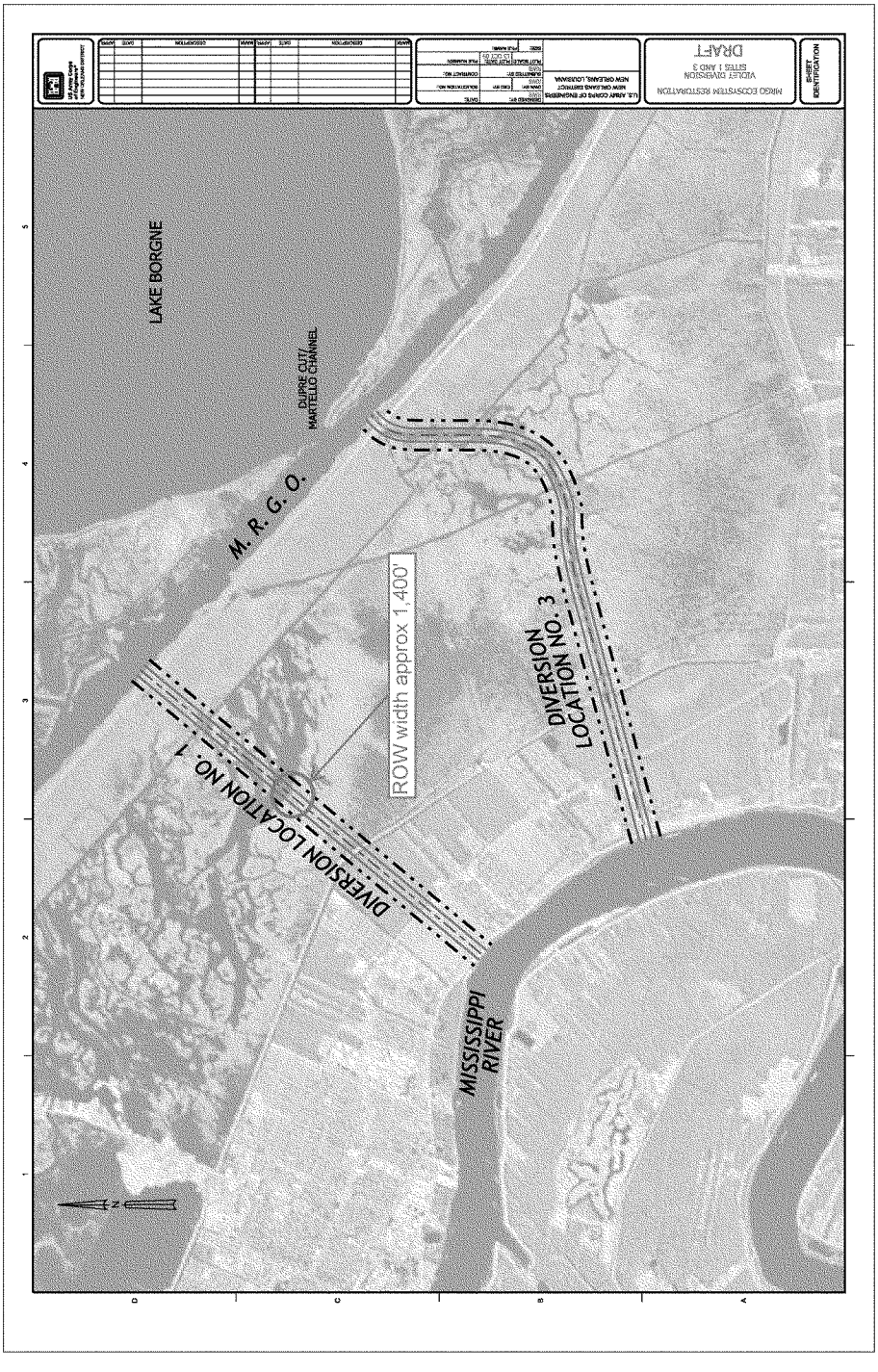

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Violet
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PROJECT FOOTPRINTS

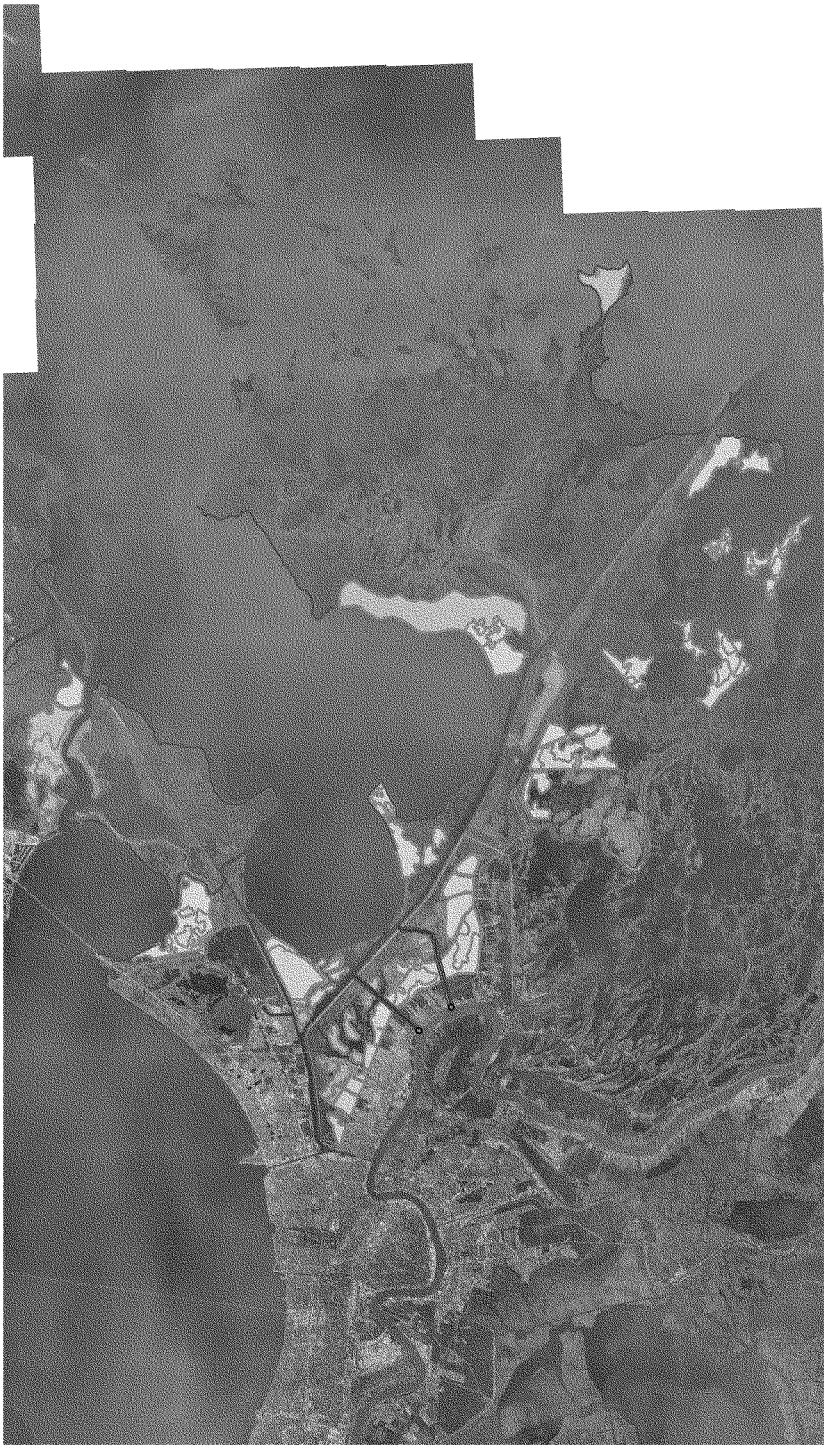

Mississippi River Gulf-Outlet Ecosystem Restoration Feasibility Study
Proposed Features in Plan 1 (BB3) as of November 16, 2009
Background Image:
2006 Landsat Thematic Mapper 5 Mosaic
Band Combination: 4, 5, 3
Miles
Legend
MRGO Channel Mitigation
Study Boundary
Shoreline Protection
Marsh Creation
Marsh Nourishment
Ridge Restoration
Swamp Nourishment
Swamp Restoration
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026a
025a
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015c
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133a
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028-sp
029b-sp


Mississippi River Gulf Outlet Ecosystem Restoration Feasibility Study
Proposed Features in Plan 2 (TSP/BBF) as of November 16, 2009
Background Image:
2006 Landsat Thematic Mapper 5 Mosaic
Band Combination: 4, 5, 3
Miles
Legend
MRGO Channel Miles
Study Boundary
Hydrologic Connection
Marsh Creation
Marsh Nourishment
Ridge Restoration
Swamp Nourishment
Swamp Restoration
005-sp
006-sp
007-sp
008-sp
009
010a
010b
011
011-sp
013-sp
014
015a
015c
026a
026b
026c
026d
026e
027a
027b
028
025a
025b
002a
081
133a
190
241
242
243
244
245
028-sp
029a-sp
029b-sp
087


Mississippi River Gulf-Outlet Ecosystem Restoration Feasibility Study
Proposed Features in Plan 3 (BB11) as of November 16, 2009
Background Image:
2006 Landsat Thematic Mapper 5 Mosaic
Band Combination: 4, 5, 3
Miles
Legend
MRGO Channel Mitre
Basin Boundary
Shoreline Protection
Shoreline Protection Outfall
Marsh Creation
Marsh Nourishment
Ridge Restoration
Swamp Nourishment
Swamp Restoration
005-sp
006-sp
007-sp
008-sp
009
010a
010b
011
011-sp
013-sp
014
015a
015c
021-sp
022-sp
023b
025a
026a
026b
026c
026d
026e
027a
027b
028
028-sp
029a-sp
029b-sp
081
081-sp
087
133a
190
241
242
243
244
245
002a
002b
002c



Diversion Alternatives 1 and 3.dgn 10/13/2009 1:36:35 PM



APPENDIX B
RIGHT TO KNOW NETWORK RECORDS

B-1: 70085 ST. BERNARD
B-2: 70032 ARABI
B-3: 70040 BRAITHWAITE
B-4: 70043 CHALMETTE
B-5: 70075 MERAUX
B-6: 70117 NEW ORLEANS
B-7: 70126 NEW ORLEANS
B-8: 70129 NEW ORLEANS
B-9: 70092 VIOLET
B-10: 70461 SLIDELL

B-1
70085 ST. BERNARD

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL
Level of Detail	Low (list of transfers)
Type of Report Output	Text (HTML)

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			1,500

List of transfers for 1990

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			1,500

List of transfers for 1989

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250

CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			1,500

List of transfers for 1988

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			1,750

List of transfers for 1987

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESCENT ACRES	LA	Landfill/Disposal Surface Impoundment	262,532
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
CRESENT ACRES LANDFILL	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			263,532

END OF REPORT

This search was done on
September 10, 2009. It was

compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70085*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70085, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
857797	ST. BERNARD	LA	TARGA RESOURCES	FIXED	n

Total incidents for reporting year 2007: 1

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
793738	BURAS	LA	SHALLOW DRAFT INC.	VESSEL	n
794545	BURUS	LA	SHALLOW DRAFT ELEVATING BOATS	VESSEL	n
815547	BURAS	LA	SHALLOW DRAFT ELEVATING BOATS, INC.	VESSEL	n

Total incidents for reporting year 2006: 3

List of incidents for 2005

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
768836	City Left Blank	LA	SOUTHERN NATURAL GAS	PIPELINE	n
770223	ST. BERNARD	LA	DYNEGY MIDSTREAM SERVICES	FIXED	n
770658	City Left Blank	LA	SOUTHERN NATURAL GAS	PIPELINE	n
771521	City Left Blank	LA	SOUTHERN NATURAL GAS PIPELINE	PLATFORM	n

Total incidents for reporting year 2005: 4

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that

incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
713555	ST. BERNARD	LA	DYNEGY MIDSTREAM SERVICES	STORAGE TANK	n

Total incidents for reporting year 2004: 1

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
569709	DELACROIX	LA	SOUTHERN NATURAL GAS CO	PIPELINE	n
570647	ST. BERNARD	LA	DYNEGY MIDSTREAM SERVICES	FIXED	n
578170	VENICE	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2001: 3

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
492082	ST. BERNARD	LA	DYNEGY MIDSTREAM SERVICES	FIXED	n

Total incidents for reporting year 1999: 1

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
434760	NEW ORLEANS	LA	CALLON PETROLEUM	PLATFORM	n
437642	NEW ORLEANS	LA	CALLON PETROLEUM	UNKNOWN SHEEN	n
457691	BURAS	LA	ESTATE OF WILLIAM G HELIS	UNKNOWN SHEEN	n
458324	NEW ORLEANS	LA	ESTATE OF WILLIAM G HELIS	PLATFORM	n
460519	NEW ORLEANS	LA	ESTATE OF WILLIAM G HELIS	PLATFORM	n

Total incidents for reporting year 1998: 5

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
378912	POYNTE-LA-HACHE	LA	CALLON PETROLEUM	PLATFORM	n
379775	City Left Blank	LA	CALLON PETROLEUM	PIPELINE	n
395743	POINTE-A-LA-HACHE	LA	CALLON PETROLEUM	VESSEL	n
399400	POINTEALAHACHE	LA	CALLON PETROLEUM	PIPELINE	n
404755	NEW ORLEANS	LA	CALLON PETROLEUM	PLATFORM	n
408208	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
411043	POINTE A LA HACCHE	LA	CALLON PETROLEUM	FIXED	n

Total incidents for reporting year 1997: 7

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
340387	OAKDALE	LA	CALLON PETROLEUM	PLATFORM	n
342808	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
342839	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
361249	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
363939	NEW ORLEANS	LA	CALLON PETROLEUM	PIPELINE	n
365076	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n

Total incidents for reporting year 1996: 6

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
275196	ST BERNARD	LA	WARREN PETROLEUM COMPANY	FIXED	n
276531	BURRIS	LA	CALLON PETROLEUM	PLATFORM	n
277003	POINT LAHOACHE	LA	CALLON PETROLEUM	PLATFORM	n
285274	PT LAHASH	LA	CALLON PETROLEUM	FIXED	n
307479	BURAS	LA	CALLON PETROLEUM	PLATFORM	n
308114	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n

310034	City Left Blank	LA	SOUTHERN NATURAL GAS CO	PIPELINE	n
314868	NEW ORLEANS	LA	CALLON PETROLEUM	VESSEL	n

Total incidents for reporting year 1995: 8

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
219699	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
221675	City Left Blank	LA	CALLON PETROLEUM	FIXED	n
221937	NEW ORLEANS	LA	CALLON PETROLEUM	FIXED	n
234640	HOPEDALE	LA	BRETON SOUND MARINA	FIXED	n
240813	NEW ORLEANS	LA	CALLON PETROLEUM	PLATFORM	n
251373	PORT SULPHUR	LA	CALLON PETROLEUM	VESSEL	n
268414	W. BLACK BAY	LA	CALLON PETROLEUM	FIXED	n
269967	SLIDELL	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 1994: 8

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
177932	ST. BERNARD	LA	WARREN PETROLEUM COMPANY	FIXED	n
187742	NEW ORLEANS	LA	CALLON PETROLEUM	FIXED	n
189471	OFFSHORE	LA	CALLON PETROLEUM	PLATFORM	n
190380	City Left Blank	LA	CALLON PETROLEUM	PLATFORM	n
190764	NEW ORLEANS	LA	CALLON PETROLEUM	FIXED	n
193332	HOPEDALE	LA	CALLON PETROLEUM	FIXED	n
193333	HOPEDALE	LA	CALLON PETROLEUM	FIXED	n
193559	POINT LAHACH	LA	CALLON PETROLEUM	FIXED	n
206610	NEW ORLEANS	LA	CALLON OFFSHORE PRODCUTIO	FIXED	n
206898	NEW ORLEANS	LA	CALLON PETROLEUM	FIXED	n

Total incidents for reporting year 1993: 10

List of incidents for 1992

Emergency Response Notification System (ERNS) Incidents for Zip Code 70085, LA, 1982-2007, low detail

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
106074	ST. BERNARD	LA	WARREN PETROLEUM	FIXED	n
108074	YSCLOSKEY	LA	WARREN PETROLEUM COMPANY	FIXED	n
117979	ST BERNARD	LA	WARREN PETROLEUM	FIXED	n
119348	ST. BERNARD	LA	WARREN PETROLEUM	UNKNOWN SHEEN	n
121986	ST. BERNARD	LA	WARREN PETROLEUM COMPANY	FIXED	n
127701	ST. BERNARD	LA	WARREN PETROLEUM COMPANY	FIXED	n

Total incidents for reporting year 1992: 6

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
65266	ST. BERNARD	LA	WARREN PETROLEUM	MOBILE	n
78313	ST BERNARD	LA	WARREN PETROLEUM	FIXED	n
88439	ST BERNARD	LA	WARREN PETROLEUM COMPANY	FIXED	n
91469	ST. BERNARD	LA	WARREN PETROLEUM	FIXED	n

Total incidents for reporting year 1991: 4

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
34808	ST BERNARD	LA	SHELL OFFSHORE INC.	PIPELINE	n

Total incidents for reporting year 1990: 1

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's Emergency Response Notification System

database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70085*
Reporting Year	ALL
Sort Order	Incident ID
Level of Detail	Low
Type of Report Output	Text (HTML)

BRS Facilities for Zip 70085, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS-TOCA	ST. BERNARD	LA	4	2

Total records for reporting year 2005: 1
Total Waste Tons Generated: 3.543
Total Waste Tons Managed: 2.02
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS - TOCA	ST BERNARD	LA	1	1

Total records for reporting year 2003: 1
Total Waste Tons Generated: 1.363
Total Waste Tons Managed: 1.388
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS - TOCA	ST. BERNARD	LA	9	9

Total records for reporting year 2001: 1
Total Waste Tons Generated: 8.745
Total Waste Tons Managed: 8.746
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS CO.-TOCA COMPRESSOR	ST BERNARD	LA	3	3

Total records for reporting year 1999: 1
Total Waste Tons Generated: 2.75
Total Waste Tons Managed: 2.751
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS CO.	ST. BERNARD	LA	240	182

Total records for reporting year 1997: 1
Total Waste Tons Generated: 240.339
Total Waste Tons Managed: 181.578
Total Waste Tons Received and Managed: 0

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
SOUTHERN NATURAL GAS COMPANY-TOCA TRANS	ST BERNARD	LA	4	5

Total records for reporting year 1995: 1
Total Waste Tons Generated: 3.841
Total Waste Tons Managed: 5.328
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70085*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70085, LA, low detail

RMP Facilities for Zip 70085, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Toca Gas Plant	St. Bernard	LA	21	0	No
Toca Natural Gas Processing Plant	St. Bernard	LA	21	0	Yes
Yscloskey Plant	St. Bernard	LA	33	0	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70085*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70085, LA, low detail

RCRIS Handlers for Zip 70085, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
BERGERON INDUSTRIES INC B	ST BERNARD	LA	none	No	No	No
DYNEGY MIDSTREAM YSCLOSKEY GAS PL	ST BERNARD	LA	CESQG	No	No	No
ENTERPRISE GAS PROCESSING LLC TOCA	ST BERNARD	LA	SQG	No	No	No
ENTERPRISE GAS PROCESSING LLC TOCA PLT	ST BERNARD	LA	CESQG	No	No	No
KERR MCGEE CORP HOPEDALE BASE	ST BERNARD	LA	LQG	No	No	No
RICORDS OIL SVC	POYDRAS	LA	none	No	No	No
SAFEWAY USED OIL	ST BERNARD	LA	none	No	Yes	No
SOUTH CENTRAL BELL STBRLAMA	ST BERNARD	LA	none	No	No	No
SOUTH CENTRAL BELL YSCLLAMA	YSCLOSKEY	LA	none	No	No	No
SOUTHERN NATURAL GAS - TOCA	ST BERNARD	LA	SQG	No	No	No
TENNESSEE GAS PL STA 529	ST BERNARD	LA	CESQG	No	No	No
UNION TEXAS PETROLEUM CORP COX BAY PLT	ST BERNARD	LA	none	No	No	No
UNION TEXAS PETROLEUM CORP POINTE A LA	ST BERNARD	LA	none	No	No	No
US EPA, HURRICANE KATRINA	POYDRAS	LA	none	No	No	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70085*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-2
70032 ARABI

TRI Facilities for Zip 70032, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 1999

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
TATE & LYLE NORTH AMERICAN SUGARS INC.	TATE & LYLE PLC	ARABI	LA	500	500	0.00

List of facilities for 1998

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
TATE & LYLE NORTH AMERICAN SUGARS INC.	TATE & LYLE PLC	ARABI	LA	750	750	0.00

List of facilities for 1997

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	750	750	0.00

List of facilities for 1996

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70032, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	1,000	1,000	0.00

List of facilities for 1995

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	1,000	1,000	0.00

List of facilities for 1994

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	3	3	0.93

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	3	3	0.93

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70032, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	15	3	8.86

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
DOMINO SUGAR CORP.	TATE & LYLE PLC	ARABI	LA	15	3	8.92

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
AMSTAR SUGAR CORP., CHALMETTE REFINERY	AMSTAR SUGAR CORP.	ARABI	LA	15	8.98

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
AMSTAR SUGAR CORP., CHALMETTE REFINERY	AMSTAR SUGAR CORP.	ARABI	LA	750	451.79

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?

AMSTAR SUGAR CORP., CHALMETTE REFINERY	AMSTAR CORP.	ARABI	LA	500	4.50

List of facilities for 1987

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?
AMSTAR SUGAR CORP.,	AMSTAR CORP.	ARABI	LA	750

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Zip Code	70032*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2007

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
WESTSIDE OIL RECOVERY	LA	Energy Recovery	30
WESTSIDE OIL RECOVERY	LA	Energy Recovery	30
Total (lbs)			60

List of transfers for 2006

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
WESTSIDE OIL RECOVERY	LA	Energy Recovery	1,596

List of transfers for 2005

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
WESTSIDE OIL RECOVERY	LA	Energy Recovery	96
WESTSIDE OIL RECOVERY	LA	Energy Recovery	24
Total (lbs)			120

List of transfers for 2004

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
WESTSIDE OIL RECOVERY	LA	Energy Recovery	450

WESTSIDE OIL RECOVERY	LA	Energy Recovery	100
Total (lbs)			550

List of transfers for 2003

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
WESTSIDE OIL RECOVERY	LA	Energy Recovery	25

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70032*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70032, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
592168	DETROIT	MI	BOASSO AMERICA CORP.	MOBILE	y
596461	GREENVILLE	OH	BOASSO	MOBILE	y

Total incidents for reporting year 2002: 2

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
566918	NEW ORLEANS	LA	GULF STATES INTERMOTOR	MOBILE	n
572584	NEW ORLEANS	LA	GULF STATE INTER-MODAL	MOBILE	n

Total incidents for reporting year 2001: 2

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
530849	LAFAYETTE	IN	BOASSO AMERICA	MOBILE	n
540701	ARABI	LA	BOASSO AMERICA CORP	STORAGE TANK	n
548992	City Left Blank	LA	PAGE MARITIME	VESSEL	n

Total incidents for reporting year 2000: 3

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
440565	JEFFERSON	LA	KAISER ALUMINUM	FIXED	n

Total incidents for reporting year 1998: 1

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
385670	NEW ORLEANS	LA	GULF STATES INTERMODEL	MOBILE	n
404691	NEW ORLEANS	LA	GOLF STRAITS TRANSPORTATO	MOBILE	n
410073	NEW ORLEANS	LA	GULF STATES INTERMODAL	FIXED	n

Total incidents for reporting year 1997: 3

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
265057	ARABI	LA	INTER. JEWERLY SCHOOL	FIXED	n

Total incidents for reporting year 1994: 1

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
183007	LAKE CHARLES	LA	PAIGE MARITIME	VESSEL	n

Total incidents for reporting year 1993: 1

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
109162	ARABI	LA	DOMINO SUGAR CORP	FIXED	n

111068	City Left Blank	LA	PAIGE MARITIME	VESSEL	n
121426	City Left Blank	LA	PAIGE MARITIME	VESSEL	n

Total incidents for reporting year 1992: 3

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
6439	BATON ROUGE	LA	PAIGE MARITIME	VESSEL	n
16244	City Left Blank	LA	PAIGE MARITIME	VESSEL	n

Total incidents for reporting year 1990: 2

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70032*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

BRS Facilities for Zip 70032, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOASSO AMERICA CORPORATION	ARABI	LA	17	17

Total records for reporting year 2003: 1
Total Waste Tons Generated: 16.938
Total Waste Tons Managed: 16.938
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOASSO AMERICA CORPORATION	ARABI	LA	20	20

Total records for reporting year 2001: 1
Total Waste Tons Generated: 19.976
Total Waste Tons Managed: 19.976
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOASO INTERNATIONAL,INC.	ARABI	LA	16	16

Total records for reporting year 1999: 1
Total Waste Tons Generated: 16.225
Total Waste Tons Managed: 16.225
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70032*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70032, LA, low detail

RCRIS Handlers for Zip 70032, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
ARABI CAR CARE	ARABI	LA	CESQG	No	No	No
ARABI CLNRS	ARABI	LA	CESQG	No	No	No
ASSOCIATED TERMINALS OF ST BERNARD LLC	ARABI	LA	none	No	No	No
AUTO & MARINE SVC	ARABI	LA	none	No	No	No
BOASSO AMERICA CORPORATION	ARABI	LA	LQG	No	No	No
BOYD BREAUXS ENGINE SVC	ARABI	LA	CESQG	No	No	No
CAROLYN PARK SHELL	ARABI	LA	CESQG	No	No	No
CHALMETTE ELECT MTR SVC	ARABI	LA	none	No	No	No
CRESCENT SHIP SVC INC	ARABI	LA	CESQG	No	No	No
D & MS AUTOMOTIVE REPAIR INC	ARABI	LA	CESQG	No	No	No
DC AUTOMOTIVE	ARABI	LA	none	No	No	No
DOMINO SUGAR CORP	ARABI	LA	CESQG	No	No	No
DUCOTE & LEE MARINE	ARABI	LA	none	No	No	No
DUTCHMANS GOLDEN CLEANERS	ARABI	LA	CESQG	No	No	No
EXXON CO USA 52065	ARABI	LA	CESQG	No	No	No
GULF STATES INTERMODAL INC	ARABI	LA	none	No	No	No
K & A AUTO SVC	ARABI	LA	CESQG	No	No	No
METAL MENDERS	ARABI	LA	none	No	No	No
METAL MENDERS INC	ARABI	LA	CESQG	No	No	No
MOODY AUTOMOTIVE	ARABI	LA	CESQG	No	No	No
PERFORMANCE TIRE & CARE INC	ARABI	LA	none	No	No	No
PORT SHIP SVC INC	ARABI	LA	CESQG	No	No	No
PORT SHIP SVC INC	ARABI	LA	SQG	No	No	No
QUALITY MOBILE AUTO RPR	ARABI	LA	CESQG	No	No	No
SHERWIN WILLIAMS CO	ARABI	LA	none	No	No	No
SPECIAL TS	ARABI	LA	CESQG	No	No	No
ST BERNARD PARISH SCHOOL BOARD	ARABI	LA	CESQG	No	No	No
STAR ENT	ARABI	LA	SQG	No	No	No
TIRE KINGDOM DBA LUCAS TIRE 183	ARABI	LA	CESQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70032, LA, low detail

US EPA, HURRICANE KATRINA, ST BERNARD	CHALMETTE	LA	none	No	No	No
WEIXEL HYDRAULICS INC	ARABI	LA	none	No	No	No

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70032*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-3
70040 BRAITHWAITE

Toxic Release Inventory (TRI) Facilities for Zip Code 70040, LA, 1987-2007, low detail

TRI Facilities for Zip 70040, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 2005

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP	BRAITHWAITE	LA	187,716	549,080	0.00

List of facilities for 2004

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP	BRAITHWAITE	LA	162,136	310,438	0.00

List of facilities for 2003

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC	PHELPS DODGE CORP	BRAITHWAITE	LA	112,814	224,527	0.00

List of facilities for 2002

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70040, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP.	BRAITHWAITE	LA	1,000	1,000	0.00

List of facilities for 2001

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP.	BRAITHWAITE	LA	8,308	8,333	0.00

List of facilities for 2000

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP.	BRAITHWAITE	LA	107,199	246,817	99.58

List of facilities for 1999

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AMAX METALS RECOVERY INC.	PHELPS DODGE CORP.	BRAITHWAITE	LA	16,681	3,380,228	4,119.61

List of facilities for 1998

Click on the column headers below to re-sort the search. Click on facility names for a summary for that

facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	16,226	4,237,583	4,117.74

List of facilities for 1997

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	16,560	4,549,182	4,071.43

List of facilities for 1996

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	16,076	4,713,579	4,017.34

List of facilities for 1995

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	16,298	4,510,640	3,982.36

List of facilities for 1994

Toxic Release Inventory (TRI) Facilities for Zip Code 70040, LA, 1987-2007, low detail

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	16,097	4,722,160	3,876.80

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	19,890	2,817,112	7,614.45
ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	5,354	5,354	19.89
Total				25,244 (lbs)	2,822,466 (lbs)	7,634

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	18,510	3,987,908	5,885.75
ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	9,898	9,808	88.31
Total				28,408 (lbs)	3,997,716 (lbs)	5,974

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70040, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.	CYPRUS AMAX MINERALS CO.	BRAITHWAITE	LA	18,562	3,952,000	4,456.00
ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	17,763	17,763	26.73
Total				36,325 (lbs)	3,969,763 (lbs)	4,483

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	27,712	6.27
AMAX METALS RECOVERY INC.,	AMAX INC.	BRAITHWAITE	LA	17,950	4,426.92
Total				45,662 (lbs)	4,433

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.,	AMAX INC.	BRAITHWAITE	LA	16,550	4,399.57
ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	10,525	1,346.23
Total				27,075 (lbs)	5,746

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
AMAX METALS RECOVERY INC.,	AMAX INC.	BRAITHWAITE	LA	46,400	4,375.96

ELEVATING BOATS INC	ELEVATING BOATS INC	BRAITHWAITE	LA	18,147	901.66
Total				64,547 (lbs)	5,278

List of facilities for 1987

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?
AMAX METALS RECOVERY INC.,	AMAX INC.	BRAITHWAITE	LA	42,356

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Zip Code	70040*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2002

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI	LA	Other Off-Site Management	3

List of transfers for 2001

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI	LA	Other Off-Site Management	3

List of transfers for 2000

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI	LA	Metals Recovery	12,448
CRI	LA	Metals Recovery	356
CRI	LA	Metals Recovery	356
CRI	LA	Other Off-Site Management	8
CRI	LA	Other Off-Site Management	0.00
Total (lbs)			13,168

List of transfers for 1999

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)

AMEX METALS RECOVERY, INC.	LA	Metals Recovery	32,700
AMAX METALS RECOVERY	LA	Metals Recovery	31,677
AMAX METALS RECOVERY	LA	Metals Recovery	12,800
AMAX METAL RECOVERY	LA	Metals Recovery	12,000
AMAX METAL RECOVERY	LA	Metals Recovery	12,000
AMAX METALS RECOVERY	LA	Metals Recovery	7,821
AMAX METALS RECOVERY	LA	Metals Recovery	7,212
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	4,250
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	3,866
AMAX METALS RECOVERY	LA	Metals Recovery	3,200
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	2,125
AMAX METALS RECOVERY	LA	Metals Recovery	1,955
AMAX METAL RECOVERY	LA	Metals Recovery	1,900
CRI-MET	LA	Metals Recovery	791
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	736
AMAX METALS RECOVERY	LA	Metals Recovery	331
AMAX METALS RECOVERY	LA	Metals Recovery	45
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	21
AMAX METALS RECOVERY	LA	Metals Recovery	20
AMAX METALS RECOVERY	LA	Metals Recovery	10
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	2
AMAX METAL RECOVERY	LA	Metals Recovery	1
Total (lbs)			135,463

List of transfers for 1998

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METALS RECOMERY, INC.	LA	Metals Recovery	223,245
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	134,352
AMEX METALS RECOVERY, INC.	LA	Metals Recovery	89,280
AMAX METALS RECOVERY	LA	Metals Recovery	69,057
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	65,065
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	59,378
AMAX METALS RECOMERY, INC.	LA	Metals Recovery	44,649
CRIMET/AMAX METAL RECOVERY	LA	Metals Recovery	38,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	30,758

AMAX METALS RECOVERY, INC.	LA	Metals Recovery	30,590
AMAX METAL RECOVERY	LA	Metals Recovery	24,294
AMAX METALS RECOVERY, INC. AMAX METALS RECOVERY, INC.	LA	Metals Recovery	20,000
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	16,900
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	16,794
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	16,794
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	16,500
CRIMET/AMAX METAL RECOVERY	LA	Metals Recovery	16,000
AMAX METALS RECOVERY	LA	Metals Recovery	15,954
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	13,000
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	12,462
CRI-MET METALS RECOVERY, INC.	LA	Metals Recovery	10,600
CRI-MET	LA	Metals Recovery	10,000
AMAX METALS RECOVERY	LA	Metals Recovery	8,781
AMAX METALS RECOVERY	LA	Metals Recovery	7,557
AMAX METALS RECOVERY, INC.	LA	Other Reuse or Recovery	7,099
CRI-MET METALS RECOVERY INC.	LA	Metals Recovery	6,000
AMAX METALS RECOVERY	LA	Metals Recovery	5,600
AMAX	LA	Metals Recovery	5,600
AMAX METALS RECOVERY	LA	Metals Recovery	5,400
AMAX METAL RECOVERY	LA	Metals Recovery	5,274
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	5,050
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,469
AMAX METALS RECOVERY	LA	Metals Recovery	4,300
AMAX METALS RECOVERY	LA	Metals Recovery	4,265
AMAX METALS RECOVERY INC	LA	Metals Recovery	3,400
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	3,355
CRI-MET	LA	Metals Recovery	3,166
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,084
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	2,820
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	2,300
AMAX METALS RECOVERY, INC	LA	Metals Recovery	2,029
AMAX METALS RECOVERY	LA	Metals Recovery	1,600
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	1,554
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	1,500
AMAX METALS RECOVERY, INC. AMAX METALS RECOVERY, INC.	LA	Metals Recovery	1,400
AMAX	LA	Metals Recovery	1,200

AMAX METALS RECOVERY	LA	Metals Recovery	910
CRI-MET	LA	Metals Recovery	791
AMAX METALS AMAX METALS	LA	Transfer to Waste Broker-Disposal	770
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	750
AMAX METALS RECOVERY INC.	LA	Unknown	671
AMAX METALS RECOVERY, INC	LA	Metals Recovery	520
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	486
AMAX METALS RECOVERY INC.	LA	Unknown	469
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	437
CRI-MET	LA	Other Waste Treatment	400
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	390
CRI-MET METALS RECOVERY INC.	LA	Solvents/Organics Recovery	390
AMAX METALS RECOVERY	LA	Metals Recovery	378
CRI-MET	LA	Other Waste Treatment	370
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	320
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	291
AMAX METALS RECOVERY, INC	LA	Incineration/Thermal Treatment	250
AMAX/CRI-MET METALS RECOVERY	LA	Metals Recovery	250
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	250
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	250
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	250
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	250
AMAX METALS RECOVERY	LA	Metals Recovery	240
CRI-MET AMX METALS RECOVERY	LA	Other Waste Treatment	170
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	160
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	160
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	146
CRI-MET	LA	Other Waste Treatment	140
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	140
AMAX METALS RECOVERY INC.	LA	Metals Recovery	139
AMAX METALS RECOVERY	LA	Metals Recovery	121
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	120
AMAX METALS RECOVERY	LA	Metals Recovery	115
AMAX METALS RECOVERY	LA	Metals Recovery	112
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	93
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	85
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	83

AMAX METALS RECOVERY	LA	Metals Recovery	75
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	74
CRI-MET METALS RECOVERY	LA	Other Waste Treatment	69
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	55
AMAX METALS RECOVERY	LA	Metals Recovery	48
AMAX METALS RECOVERY	LA	Metals Recovery	47
AMAX METALS RECOVERY INC.	LA	Metals Recovery	45
AMAX METALS RECOVERY, INC. AMAX METALS RECOVERY, INC.	LA	Metals Recovery	33
AMAX METAL RECOVERY	LA	Metals Recovery	32
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	30
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	26
AMAX METALS RECOVERY	LA	Metals Recovery	26
CRI - MET AMAX METALS RECOVERY	LA	Other Waste Treatment	25
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	25
AMAX METALS RECOMERY, INC.	LA	Metals Recovery	21
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	20
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	19
AMAX METALS RECOVERY	LA	Metals Recovery	17
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	17
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	17
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	15
AMAX METALS RECOVERY	LA	Metals Recovery	15
AMAX METALS RECOVERY INC.	LA	Metals Recovery	15
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	15
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	13
AMAX METAL RECOVERY	LA	Metals Recovery	12
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	10
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	8
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	8
AMAX METALS RECOVERY	LA	Metals Recovery	7
AMAX METAL RECOVERY	LA	Metals Recovery	6
AMAX METALS RECOVERY	LA	Metals Recovery	6
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	6
AMAX	LA	Metals Recovery	6
AMAX METALS RECOVERY, INC.	LA	Other Reuse or Recovery	5
AMAX METALS RECOVERY	LA	Metals Recovery	5
AMAX Metals Recovery, Inc. (CR I-MET)	LA	Metals Recovery	5

CRI-MET	LA	Other Reuse or Recovery	5
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	5
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	5
AMAX METALS RECOVERY	LA	Metals Recovery	4
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	4
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	3
AMAX METALS RECOVERY	LA	Metals Recovery	3
AMAX METALS RECOVERY, INC. AMAX METALS RECOVERY, INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY	LA	Metals Recovery	3
CRI-MET	LA	Metals Recovery	2
CRI-MET	LA	Metals Recovery	2
AMAX METALS RECOVERY	LA	Metals Recovery	2
AMAX METALS RECOVERY, INC.	LA	Incineration/Thermal Treatment	2
CRI-MET METALS RECOVERY INC.	LA	Metals Recovery	2
CRI-MET	LA	Solidification/Stabilization-Metals and Metal Compounds only	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	1
Total (lbs)			1,083,288

List of transfers for 1997

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METALS RECOVERY	LA	Metals Recovery	230,000
AMAX METALS RECOVERY	LA	Metals Recovery	74,869
AMAX METALS RECOVERY INC.	LA	Solvents/Organics Recovery	71,796
AMAX METALS RECOVERY	LA	Metals Recovery	60,000
AMAX METALS, AMAX METALS	LA	Metals Recovery	59,000
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	57,848
AMAX METALS RECOVERY INC.	LA	Metals Recovery	54,302
AMAX METALS RECOVERY INC.	LA	Metals Recovery	54,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	52,633
AMAX METALS RECOVERY INC	LA	Metals Recovery	43,000

AMAX METALS RECIVERY INC.	LA	Other Reuse or Recovery	39,000
CRI-MET	LA	Metals Recovery	30,000
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	23,000
AMAX METALS RECOVERY	LA	Metals Recovery	19,466
AMAX METALS RECOVERY	LA	Metals Recovery	18,429
AMAX METALS RECOVERY INC.	LA	Metals Recovery	18,101
AMAX METALS RECOVERY INC.	LA	Solvents/Organics Recovery	17,370
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	16,000
AMAX METALS RECOVERY	LA	Metals Recovery	14,000
CRE-MET AMAX METALS RECOVER	LA	Metals Recovery	10,700
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9,581
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9,500
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	8,250
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,800
AMAX METALS RECOVERY INC	LA	Metals Recovery	7,700
AMAX	LA	Metals Recovery	6,600
AMAX METALS RECOVERY	LA	Metals Recovery	6,379
AMAX METAL RECOVERY	LA	Metals Recovery	4,200
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,200
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4,100
AMAX METALS RECOVERY INC	LA	Metals Recovery	3,100
AMAX METALS RECOVERY	LA	Metals Recovery	2,886
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	2,829
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	2,700
AMAX	LA	Metals Recovery	2,500
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	2,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,278
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	2,200
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	2,000
AMAX METALS RECOVERY INC.	LA	Unknown	1,300
AMAX METALS RECOVERY	LA	Metals Recovery	1,114
AMAX METALS, AMAX METALS	LA	Metals Recovery	1,100
AMAX METALS RECOVERY	LA	Metals Recovery	717
AMAX METALS RECOVERY INC.	LA	Unknown	670
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	390
CRI-MET (AMEX)	LA	Landfill/Disposal Surface Impoundment	250
AMAX METALS RECIVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250

AMEX METALS RECOVERY INC.	LA	Metals Recovery	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMAX METAL RECOVERY	LA	Metals Recovery	196
AMAX METALS RECOVERY INC.	LA	Metals Recovery	186
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	180
AMAX METALS RECOVERY INC.	LA	Metals Recovery	146
AMAX METALS RECOVERY INC.	LA	Metals Recovery	133
AMEX METALS RECOVERY INC.	LA	Metals Recovery	129
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	124
AMAX METALS RECOVERY	LA	Metals Recovery	102
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	98
CRI -MET AMAX METALS RECOVER	LA	Metals Recovery	71
AMAX METALS RECOVERY INC	LA	Other Reuse or Recovery	54
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	47
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	29
AMAX METALS RECOVERY INC.	LA	Unknown	27
AMAX METALS RECOVERY	LA	Metals Recovery	26
AMAX METALS RECOVERY INC.	LA	Metals Recovery	26
AMAX METALS RECOVERY	LA	Metals Recovery	24
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	21
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	21
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	15
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	13
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	12
AMAX METALS RECOVERY	LA	Metals Recovery	11
AMAX METALS RECOVERY	LA	Metals Recovery	10
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	9
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	8
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	8
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	8
AMAX METALS RECOVERY	LA	Metals Recovery	7
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	6
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	6
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5

AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
CRI-MET AMAX METALS RECOVER	LA	Metals Recovery	5
AMAX METALS RECOVERY	LA	Metals Recovery	4
AMAX METALS RECOVERY INC., AMAX METALS RECOVERY INC.	LA	Metals Recovery	4
AMAX METALS RECOVERY INC., AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC., AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	3
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	2
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2
AMAX METALS RECOVERY	LA	Metals Recovery	2
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	2
CRI-MET AMAX METALS RECOVER	LA	Other Waste Treatment	2
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX	LA	Metals Recovery	1
CRI-MET	LA	Metals Recovery	1
Total (lbs)			1,063,977

List of transfers for 1996

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METALS RECOVERY INC.	LA	Metals Recovery	158,056
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	124,354
AMAX METALS RECOVERY	LA	Metals Recovery	85,938
CRIMET/AMEX METAL RECOVERY,, INC.	LA	Metals Recovery	85,000
AMAX METALS RECOVERY	LA	Metals Recovery	63,000
CRI-MET	LA	Metals Recovery	58,000
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	43,748
AMAX METALS RECOVERY INC.	LA	Metals Recovery	31,611
AMAX METALS RECOVERY INC	LA	Metals Recovery	31,000

AMAX METALS RECOVERY INC	LA	Metals Recovery	30,000
AMAX METALS RECOVERY	LA	Metals Recovery	27,000
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	22,604
AMAX METALS RECOVERY	LA	Metals Recovery	21,000
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	19,492
AMAX METALS RECOVERY	LA	Metals Recovery	19,188
CRIMET AMAX METALS RECOVERY	LA	Metals Recovery	18,006
AMAX METALS RECOVERY INC.	LA	Metals Recovery	18,000
AMEX METALS RECOVERY INC.	LA	Other Reuse or Recovery	14,583
CRI-MET	LA	Other Reuse or Recovery	14,000
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	13,000
AMAX METALS RECOVERY	LA	Metals Recovery	12,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	10,876
AMAX METALS RECOVERY	LA	Metals Recovery	9,432
AMAX METALS RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	9,300
AMAX METAL RECOVERY	LA	Metals Recovery	7,700
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,348
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,171
AMAX METALS	LA	Other Reuse or Recovery	6,900
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	6,700
CRI-MET METALS RECOVERY INC.	LA	Metals Recovery	6,400
AMAX METALS RECOVERY INC.	LA	Metals Recovery	6,000
AMAX	LA	Metals Recovery	5,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,593
AMAX	LA	Metals Recovery	4,800
AMAX METALS RECOVERY INC	LA	Metals Recovery	4,600
AMAX METAL RECOVERY	LA	Metals Recovery	4,200
CRI-MET AMAX METALS RECOVERY	LA	Metals Recovery	3,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,416
CRI-MET	LA	Metals Recovery	2,139
AMAX METALS RECOVERY	LA	Metals Recovery	1,836
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,705
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1,701
CRI-MET C/O AMAX METALS	LA	Metals Recovery	1,625
AMAX METALS RECOVERY	LA	Metals Recovery	1,519
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,256
AMAX METALS	LA	Other Reuse or Recovery	970
AMAX METAL RECOVERY	LA	Metals Recovery	850
AMAX METAL RECOVERY INC.	LA	Metals Recovery	750
AMAX METALS RECOVERY	LA	Transfer to Waste Broker-Recycling	663

AMAX METALS RECOVERY INC.	LA	Metals Recovery	552
AMAX METALS RECOVERY INC.	LA	Metals Recovery	474
CRI-MET	LA	Metals Recovery	389
AMAX METALS RECOVERY INC.	LA	Metals Recovery	306
AMAX METAL RECOVERY INC.	LA	Unknown	250
AMAX METAL RECOVERY INC.	LA	Metals Recovery	250
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	250
AMAX METALS RECOVERY	LA	Metals Recovery	220
AMAX METALS RECOVERY INC.	LA	Metals Recovery	165
AMAX METALS RECOVERY INC.	LA	Metals Recovery	163
AMEX METALS RECOVERY	LA	Metals Recovery	150
AMAX METALS RECOVERY INC.	LA	Metals Recovery	150
CRIMET AMAX METALS RECOVERY	LA	Metals Recovery	124
CRIMET AMAX METALS RECOVERY	LA	Metals Recovery	112
AMAX METAL RECOVERY	LA	Metals Recovery	103
AMAX METALS RECOVERY INC	LA	Other Reuse or Recovery	99
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	84
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	74
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	65
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	56
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	56
AMAX METALS RECOVERY INC., AMAX METALS RECOVERY INC.	LA	Metals Recovery	53
AMAX METALS RECOVERY INC.	LA	Metals Recovery	48
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	47
AMAX METALS RECOVERY	LA	Metals Recovery	46
CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	41
AMAX METALS RECOVERY INC.	LA	Metals Recovery	36
CRIMET AMAX METALS RECOVERY	LA	Other Waste Treatment	33
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	29
CRI-MET C/O AMAX METALS	LA	Other Waste Treatment	25
AMAX METALS RECOVERY	LA	Metals Recovery	23
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	23
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	21
CRIMET AMAX METALS RECOVERY	LA	Metals Recovery	18
AMAX METALS RECOVERY	LA	Metals Recovery	17
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	15
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	13
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	13

AMAZ METALS RECOVERY INC.	LA	Metals Recovery	12
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	12
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	12
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	12
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	10
CRIMET AMAX METALS RECOVERY	LA	Other Waste Treatment	9
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	8
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	7
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	6
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	6
AMAX METALS RECOVERY	LA	Metals Recovery	6
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	6
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	6
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMEX METALS RECOVERY	LA	Metals Recovery	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
CRIMET AMAX METALS RECOVERY	LA	Metals Recovery	4
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	3
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
CRI-MET METALS RECOVERY	LA	Metals Recovery	2
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	1
AMAX METALS RECOVERY INC., AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	1
AMAX METALS RECOVERY	LA	Landfill/Disposal Surface Impoundment	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1

CRI-MET AMAX METALS RECOVERY	LA	Other Waste Treatment	1
Total (lbs)			1,038,159

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Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRIMET	LA	Metals Recovery	204,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	150,000
AMAX METALS, CATALYST METALS RECOVERY	LA	Metals Recovery	140,000
CRIMET/AMEX METAL RECOVERY	LA	Metals Recovery	140,000
CRIMET	LA	Metals Recovery	119,000
CRI-MET	LA	Metals Recovery	99,000
AMAX METALS RECOVERY	LA	Other Waste Treatment	75,066
AMAX METALS RECOVERY	LA	Metals Recovery	75,000
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	63,783
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	61,300
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	59,213
AMAX METALS RECOVERY, INC.	LA	Metals Recovery	59,213
AMAX METALS RECOVERY INC.	LA	Metals Recovery	52,930
AMAX METALS RECOVERY INC.	LA	Metals Recovery	47,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	43,000
AMAX METALS RECOVERY	LA	Metals Recovery	31,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	31,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	31,000
CRIMET	LA	Metals Recovery	29,000
CRI-MET	LA	Other Reuse or Recovery	23,000
AMAX METALS, CATALYST METALS RECOVERY	LA	Metals Recovery	22,000
AMEX METALS RECOVERYT INC.	LA	Other Reuse or Recovery	20,400
AMAX METALS RECOVERY	LA	Metals Recovery	18,420
AMAX METALS RECOVERY INC.	LA	Metals Recovery	17,643
CRI-MET C/O AMAX METALS	LA	Metals Recovery	17,037
AMAX METAL RECOVERY	LA	Metals Recovery	16,766
AMAX METALS RECOVERY INC.	LA	Metals Recovery	16,570
AMAX METALS, CATALYST METALS RECOVERY	LA	Metals Recovery	16,000

AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	14,915
AMAX METAL RECOVERY INC.	LA	Metals Recovery	14,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	14,000
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	13,000
CRI-MET	LA	Metals Recovery	12,980
AMAX METALS RECOVERY	LA	Metals Recovery	11,379
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	11,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	10,799
AMAX METALS RECOVERY INC.	LA	Metals Recovery	10,000
CRIMET	LA	Metals Recovery	9,600
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9,600
CRIMET	LA	Metals Recovery	8,100
AMAX METALS RECOVERY INC. (LA)	LA	Metals Recovery	8,039
AMAX METALS INC.	LA	Metals Recovery	7,273
AMAX METALS	LA	Metals Recovery	6,464
AMAX MEATALS RECOVERY INC.	LA	Metals Recovery	6,028
AMAX METALS RECOVERY INC., LA	LA	Other Waste Treatment	5,206
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,200
CRI-MET	LA	Metals Recovery	3,200
AMAX METAL RECOVERY	LA	Metals Recovery	3,066
AMAX	LA	Metals Recovery	2,900
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,841
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,600
AMAX METALS RECOVERY INC. (LA)	LA	Metals Recovery	2,573
AMAX METALS RECOVERY	LA	Metals Recovery	2,550
CRI-MET	LA	Metals Recovery	2,360
AMAX	LA	Metals Recovery	2,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,150
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,044
AMAX METALS RECOVERY	LA	Metals Recovery	2,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,916
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,731
AMAX METALS RECOVERY	LA	Metals Recovery	1,645
AMAX METALS, CATALYST METALS RECOVERY	LA	Metals Recovery	1,600
AMAX METALS RECOVERY	LA	Metals Recovery	1,575
CRI-MET C/O AMAX METALS RECOVE, RY INC.	LA	Metals Recovery	750
AMAX METALS RECOVERY INC.	LA	Metals Recovery	675
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	620

AMAX METALS RECOVERY INC.	LA	Metals Recovery	518
AMAX METALS RECOVERY INC.	LA	Metals Recovery	450
AMAX METALS RECOVERY INC.	LA	Metals Recovery	359
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	349
AMAX METALS RECOVERY	LA	Metals Recovery	300
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	250
AMEX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	250
AMAX METAL RECOVERY	LA	Incineration/Insignificant Fuel Value	250
AMAX METAL RECOVERY INC.	LA	Metals Recovery	250
AMAX METALS RECOVERY INC.	LA	Metals Recovery	125
AMAX RECOVERY METALS	LA	Incineration/Insignificant Fuel Value	117
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	114
AMAX METALS RECOVERY INC.	LA	Metals Recovery	110
AMAX METALS RECOVERY INC.	LA	Metals Recovery	93
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	85
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	83
AMAX METALS RECOVERY INC.	LA	Metals Recovery	83
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	75
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	75
AMAX METALS RECOVERY	LA	Metals Recovery	70
AMAX METALS RECOVERY	LA	Metals Recovery	65
AMAX METALS REVOCERY INC., LA	LA	Incineration/Thermal Treatment	63
AMAX METALS RECOVERY	LA	Metals Recovery	58
AMAX METALS RECOVERY INC.	LA	Metals Recovery	53
AMAX METALS RECOVERY INC.	LA	Metals Recovery	53
AMAX	LA	Metals Recovery	53
AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	52
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	52
AMAX METAL RECOVERY	LA	Incineration/Insignificant Fuel Value	50
AMAX METALS RECOVERY INC., LA	LA	Other Waste Treatment	47
AMAX METALS	LA	Metals Recovery	43
AMAX METALS RECOVERY INC.(LA)	LA	Incineration/Thermal Treatment	42
AMAX METALS RECOVERY INC.	LA	Metals Recovery	41
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	36
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	34
AMAX METALS RECOVERY INC.	LA	Metals Recovery	34
AMAX METALS RECOVERY	LA	Metals Recovery	33
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	32

AMAX METALS RECOVERY	LA	Incineration/Insignificant Fuel Value	31
CRI-MET C/O AMAX METALS	LA	Metals Recovery	28
AMAX METALS RECOVERY	LA	Metals Recovery	26
AMAX METALS RECOVERY INC.	LA	Metals Recovery	23
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	17
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	15
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	15
CRI-MET C/O AMAX METALS	LA	Metals Recovery	14
AMAX METALS RECOVERY INC.	LA	Metals Recovery	13
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	13
AMAX METAL RECOVERY INC., LA	LA	Incineration/Thermal Treatment	13
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	13
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	13
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	13
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	10
AMAX METALS, CATALYST METALS RECOVERY	LA	Metals Recovery	9
AMAX METAL RECOVERY	LA	Metals Recovery	9
AMAX METALS RECOVERY INC.	LA	Metals Recovery	8
AMAX METAL RECOVERY INC., LA	LA	Incineration/Thermal Treatment	6
AMAX METALS RECOVERY INC. (LA)	LA	Incineration/Thermal Treatment	6
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMEX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMEX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMAX METALS RECOVERY, INC	LA	Metals Recovery	5
AMAX METALS RECOVERY, INC	LA	Metals Recovery	5
AMAX METALS RECOVERY, INC	LA	Metals Recovery	5
AMAX METALS RECOVERY, INC	LA	Metals Recovery	5
AMAX METALS RECOVERY, INC	LA	Metals Recovery	5
AMAX METALS RECOVERY INC. (LA)	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	4
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4
AMAX METALS RECOVERY INC., LA	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2

AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	2
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX MEATALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
CRI-MET C/O AMAX METALS RECOVE, RY INC.	LA	Solvents/Organics Recovery	1
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	1
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	1
AMAX METALS RECOVERY INC. (CR, I-MET)	LA	Metals Recovery	1
AMAX METALS INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
Total (lbs)			1,901,767

List of transfers for 1994

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METAL RECOVERY	LA	Metals Recovery	402,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	290,000
AMAX METAL RECOVERY	LA	Metals Recovery	216,015
CRIMET	LA	Metals Recovery	186,000
AMAX METALS RECOVERY	LA	Metals Recovery	140,946
AMAX/CRI-MET METAL RECOVERY	LA	Metals Recovery	140,000
AMAX METALS RECOVERY	LA	Metals Recovery	115,620

AMAX METAL RECOVERY	LA	Metals Recovery	91,200
CRIMET	LA	Metals Recovery	85,800
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	83,559
CRI-MET	LA	Metals Recovery	83,000
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Metals Recovery	80,000
CRIMET (AMAX METALS RECOVERY I, NC.)	LA	Other Reuse or Recovery	73,200
AMAX METALS RECOVERY	LA	Other Reuse or Recovery	66,776
AMAX METALS RECOVERY INC.	LA	Metals Recovery	62,000
AMAX METALS RECOVERY	LA	Other Reuse or Recovery	60,923
CRI MET	LA	Metals Recovery	46,511
AMAX METALS RECOVERY	LA	Metals Recovery	43,203
AMAX METALS RECOVERY INC.	LA	Metals Recovery	42,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	41,000
CRIMET	LA	Metals Recovery	35,200
AMEX METALS RECOVERY	LA	Metals Recovery	32,269
AMAX METALS RECOVERY INC.	LA	Metals Recovery	31,600
AMAX METAL RECOVERY INC.	LA	Metals Recovery	31,000
CRI-MET	LA	Metals Recovery	30,000
AMAX METALS RECOVERY	LA	Other Reuse or Recovery	29,984
AMAX METAL RECOVERY	LA	Metals Recovery	27,273
AMAX METALS RECOVERY	LA	Metals Recovery	23,720
CRIMET	LA	Metals Recovery	23,000
AMAX MEATALS RECOVERY INC.	LA	Metals Recovery	20,185
AMAX	LA	Metals Recovery	20,000
CRI-MET	LA	Metals Recovery	19,000
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Metals Recovery	17,000
CRIMET (AMAX METALS RECOVERY I, NC.)	LA	Other Reuse or Recovery	16,560
AMAX METALS RECOVERY	LA	Metals Recovery	16,000
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	14,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	13,923
AMAX METAL RECOVERY INC.	LA	Metals Recovery	13,632
AMAX	LA	Metals Recovery	13,000
AMAX METALS RECOVERY	LA	Other Reuse or Recovery	12,764
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	12,744
AMAX METALS RECOVERY INC.	LA	Metals Recovery	12,722
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	9,681
CRI MET	LA	Metals Recovery	9,302

CRI MET	LA	Metals Recovery	8,820
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,600
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,000
CRIMET	LA	Metals Recovery	6,500
AMAX METAL RECOVERY	LA	Metals Recovery	6,400
CRI-MET	LA	Metals Recovery	6,200
AMAX METALS RECOVERY INC.	LA	Metals Recovery	6,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,969
AMAX METAL RECOVERY	LA	Metals Recovery	4,407
AMAX METALS RECOVERY	LA	Metals Recovery	4,200
AMAX	LA	Metals Recovery	3,700
AMAX METALS RECOVERY	LA	Metals Recovery	3,400
AMAX METALS RECOVERY	LA	Metals Recovery	3,100
AMAX	LA	Metals Recovery	2,981
AMAX	LA	Metals Recovery	2,900
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,865
AMAX METAL RECOVERY INC.	LA	Metals Recovery	2,606
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,180
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	2,000
AMAX METALS RECOVERY	LA	Metals Recovery	1,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,664
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	882
AMAX METALS RECOVERY	LA	Metals Recovery	688
AMAX METAL RECOVERY	LA	Metals Recovery	600
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Reuse or Recovery	410
AMAX METAL RECOVERY	LA	Metals Recovery	401
CRIMET (AMAX METALS RECOVERY, INC.)	LA	Incineration/Thermal Treatment	400
AMAX METAL RECOVERY	LA	Metals Recovery	400
AMAX METALS RECOVERY	LA	Metals Recovery	340
CRI-MET C/O AMAX METALS RECOVE, RY INC.	LA	Metals Recovery	250
AMAX METAL RECOVERY	LA	Metals Recovery	250
AMAX METALS RECOVERY INC.	LA	Metals Recovery	212
AMAX METAL RECOVERY	LA	Metals Recovery	172
AMAX METAL RECOVERY INC.	LA	Metals Recovery	124
AMAX METALS RECOVERY	LA	Incineration/Thermal Treatment	110
AMAX	LA	Metals Recovery	95
AMAX METALS RECOVERY INC.	LA	Metals Recovery	76

AMAX METALS RECOVERY	LA	Metals Recovery	70
AMAX METALS RECOVERY	LA	Incineration/Thermal Treatment	70
CRI-MET	LA	Metals Recovery	67
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	63
AMAX METALS RECOVERY INC.	LA	Metals Recovery	63
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	60
CRI-MET	LA	Metals Recovery	52
AMAX METALS RECOVERY	LA	Metals Recovery	50
AMAX METALS RECOVERY INC.	LA	Metals Recovery	48
AMAX METALS RECOVERY INC.	LA	Metals Recovery	44
AMAX METALS RECOVERY INC.	LA	Metals Recovery	39
AMAX METALS RECOVERY INC.	LA	Metals Recovery	38
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	37
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Solvents/Organics Recovery	33
CRI MET	LA	Metals Recovery	28
AMAX METALS RECOVERY	LA	Metals Recovery	27
AMAX METALS RECOVERY INC.	LA	Metals Recovery	26
AMAX METALS RECOVERY INC.	LA	Metals Recovery	25
CRI-MET C/O AMAX METALS, RECYCLE	LA	Solvents/Organics Recovery	23
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	23
AMAX METALS RECOVERY	LA	Metals Recovery	21
AMAX METALS RECOVERY INC.	LA	Metals Recovery	19
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	19
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	18
AMAX METALS RECOVERY INC.	LA	Metals Recovery	16
CRI MET	LA	Metals Recovery	14
AMAX	LA	Metals Recovery	14
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Metals Recovery	14
AMAX METALS RECOVERY	LA	Metals Recovery	11
AMAX METALS RECOVERY	LA	Incineration/Thermal Treatment	10
AMAX METALS RECOVERY	LA	Other Reuse or Recovery	10
AMAX METAL RECOVERY	LA	Metals Recovery	10
CRI-MET METALS RECOVERY INC.	LA	Other Reuse or Recovery	8
AMAX METALS RECOVERY	LA	Metals Recovery	8
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Solvents/Organics Recovery	8
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	8
AMAX	LA	Incineration/Thermal Treatment	7
AMAX	LA	Incineration/Thermal Treatment	6

AMAX METALS RECOVERY INC.	LA	Metals Recovery	6
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMAX METALS RECOVERY	LA	Metals Recovery	5
AMAX	LA	Incineration/Thermal Treatment	5
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	4
AMAX METALS RECOVERY	LA	Metals Recovery	4
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	4
CRI-MET C/O AMAX METALS, RECYCLE	LA	Metals Recovery	4
CRI-MET	LA	Metals Recovery	3
CRI-MET	LA	Metals Recovery	3
CRI-MET	LA	Metals Recovery	3
AMAX METALS REVOVERY INC.	LA	Incineration/Insignificant Fuel Value	3
AMAX	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	2
CRI-MET, C/O AMAX METALS RECOVERY INC.	LA	Solvents/Organics Recovery	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
AMAX METALS REVOVERY INC.	LA	Incineration/Thermal Treatment	2
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
CRI-MET	LA	Metals Recovery	1
CRI-MET METALS RECOVERY INC.	LA	Other Reuse or Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS REVOVERY INC.	LA	Incineration/Thermal Treatment	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
Total (lbs)			2,938,831

List of transfers for 1993

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METAL RECOVERY	LA	Metals Recovery	681,820
AMAX METALS RECOVERY	LA	Metals Recovery	435,300
AMAX METALS RECOVERY	LA	Metals Recovery	105,923
CRI-MET	LA	Metals Recovery	100,000
AMAX METALS RECOVERY	LA	Metals Recovery	72,600
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	72,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	66,285
AMAX METALS RECOVERY	LA	Metals Recovery	64,000
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	57,000
AMAX	LA	Metals Recovery	47,000
AMAX METALS RECOVERY	LA	Metals Recovery	46,240
AMAX METALS RECOVERY	LA	Metals Recovery	41,758
AMAX METALS RECOVERY	LA	Metals Recovery	41,000
AMAX	LA	Other Reuse or Recovery	39,000
AMAX METALS RECOVERY	LA	Metals Recovery	37,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	32,399
AMAX METALS RECOVERY INC.	LA	Metals Recovery	32,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	26,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	24,000
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Recycling	24,000
CRI-MET	LA	Metals Recovery	23,000
AMAX	LA	Metals Recovery	22,000
CRI-MET C/O AMAX METALS RECYCL, E	LA	Metals Recovery	21,628
AMAX METALS RECOVERY	LA	Metals Recovery	21,185
AMAX METALS RECOVERY INC.	LA	Metals Recovery	18,000
CRI-MET	LA	Metals Recovery	17,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	16,688
AMAX METALS RECOVERY INC.	LA	Metals Recovery	16,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	16,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	15,000
AMAX METALS RECOVERY	LA	Metals Recovery	15,000

CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	15,000
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	15,000
AMAX METALS RECOVERY	LA	Metals Recovery	13,919
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	13,000
AMAX	LA	Metals Recovery	12,000
AMAX	LA	Metals Recovery	12,000
AMAX METAL RECOVERY	LA	Metals Recovery	11,355
AMAX METALS RECOVERY INC.	LA	Metals Recovery	11,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	11,000
AMAX METAL RECOVERY	LA	Metals Recovery	9,800
AMAX METALS RECOVERY OF LA	LA	Landfill/Disposal Surface Impoundment	9,800
AMAX METAL RECOVERY	LA	Metals Recovery	9,300
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	8,800
AMAX METAL RECOVERY INC.	LA	Metals Recovery	8,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	8,400
AMAX METALS RECOVERY	LA	Metals Recovery	8,400
AMAX	LA	Other Reuse or Recovery	8,400
AMAX METALS RECOVERY	LA	Metals Recovery	8,201
AMAX METALS RECOVERY INC.	LA	Metals Recovery	8,200
AMAX METALS RECOVERY	LA	Metals Recovery	7,810
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,087
AMAX	LA	Metals Recovery	6,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	6,240
CRI MET	LA	Metals Recovery	5,904
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,600
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	5,600
CRI-MET	LA	Metals Recovery	5,529
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,330
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,100
CRIMET	LA	Metals Recovery	4,800
CRI-MET	LA	Metals Recovery	4,400
AMAX METALS RECOVERY	LA	Metals Recovery	4,200
CRIMET, (AMAX METALS RECOVERY INC.)	LA	Other Reuse or Recovery	4,100
AMAX	LA	Metals Recovery	4,100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,700
AMAX METALS RECOVERY	LA	Metals Recovery	3,500
AMAX METAL RECOVERY	LA	Metals Recovery	3,300

AMAX METALS RECOVERY OF LA	LA	Landfill/Disposal Surface Impoundment	3,200
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,631
CRI MET	LA	Metals Recovery	2,624
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,300
AMAX METAL RECOVERY	LA	Metals Recovery	2,037
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	1,500
CRI MET	LA	Metals Recovery	1,332
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,300
CRIMET, (AMEX METALS RECOVERY INC.)	LA	Other Reuse or Recovery	1,300
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	1,200
CRIMET	LA	Metals Recovery	1,200
AMAX METALS RECOVERY	LA	Other Waste Treatment	1,200
AMAX	LA	Metals Recovery	1,100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	890
CRI-MET C/O AMAX METALS RECOVE, RY INC.	LA	Metals Recovery	800
CRI-MET	LA	Metals Recovery	730
AMAX METAL RECOVERY	LA	Metals Recovery	503
AMAX METAL RECOVERY	LA	Metals Recovery	500
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Reuse or Recovery	478
AMAX METALS RECOVERY INC.	LA	Metals Recovery	420
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	410
AMAX METALS RECOVERY INC.	LA	Metals Recovery	398
AMAX METALS RECOVERY INC.	LA	Metals Recovery	390
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	340
AMAX METALS RECOVERY	LA	Metals Recovery	330
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	310
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	300
CRI-MET	LA	Unknown	250
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	200
AMAX	LA	Other Reuse or Recovery	190
CRI-MET C/O AMAX METALS RECYCL, E	LA	Other Reuse or Recovery	100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	92
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	83

CRI MET	LA	Metals Recovery	68
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	47
AMAX METALS RECOVERY	LA	Metals Recovery	40
CRI MET	LA	Metals Recovery	39
CRI MET	LA	Metals Recovery	39
AMAX	LA	Other Reuse or Recovery	39
AMAX	LA	Other Reuse or Recovery	36
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	33
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	32
AMAX	LA	Other Reuse or Recovery	26
AMAX	LA	Metals Recovery	23
CRIMET (AMAX METALS RECOVERY, INC.)	LA	Other Reuse or Recovery	17
AMAX METALS RECOVERY INC.	LA	Metals Recovery	12
AMAX METALS RECOVERY	LA	Metals Recovery	12
CRI-MET C/O AMAX METALS	LA	Other Reuse or Recovery	11
AMAX METAL RECOVERY	LA	Metals Recovery	10
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	10
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9
AMAX METALS RECOVERY	LA	Metals Recovery	7
AMAX METALS RECOVERY	LA	Metals Recovery	6
AMAX METAL RECOVERY	LA	Metals Recovery	5
AMAX METALS ROCOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS ROCOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS ROCOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS ROCOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	2
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2
AMAX METALS RECOVERY	LA	Metals Recovery	2
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Other Waste Treatment	1
Total (lbs)			2,588,304

List of transfers for 1992

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METAL REOCVERY	LA	Metals Recovery	483,725
AMAX METALS RECOVERY	LA	Metals Recovery	350,000
AMAX METALS RECOVERY	LA	Metals Recovery	160,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	150,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	130,000
CRI-MET	LA	Metals Recovery	120,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	110,000
AMAX	LA	Metals Recovery	100,000
AMAX METALS RECOVERY	LA	Metals Recovery	64,985
AMEX METAL RECOVERY INC.	LA	Metals Recovery	49,000
AMAX METALS RECOVERY	LA	Metals Recovery	47,675
AMAX METAL RECOVERY INC.	LA	Metals Recovery	32,370
AMAX METAL RECOVERY	LA	Metals Recovery	32,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	31,000
AMAX METAL RECOVERY	LA	Metals Recovery	31,000
CRI-MET	LA	Metals Recovery	27,000
AMEX METALS RECOVERY	LA	Transfer to Waste Broker-Recycling	20,400
AMAX METALS RECOVERY	LA	Metals Recovery	17,280
AMAX METALS RECOVERY INC.	LA	Metals Recovery	17,000
AMAX	LA	Metals Recovery	15,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	14,000
CRI-MET C/O AMX METALS REC.	LA	Other Reuse or Recovery	14,000
CRI-MET C/O AMAX METALS REC.	LA	Other Reuse or Recovery	14,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	13,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	12,000
CRI-MET	LA	Metals Recovery	12,000
AMAX METALS RECOVERY	LA	Metals Recovery	11,035
AMAX METALS RECOVERY INC.	LA	Metals Recovery	10,700
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Recycling	10,200
AMAX	LA	Metals Recovery	10,000
AMAX METALS RECOVERY	LA	Metals Recovery	9,420
AMAX METALS RECOVERY INC.	LA	Metals Recovery	9,400
AMAX METALS RECOVERY INC.	LA	Metals Recovery	8,700

AMAX METALS RECOVERY INC.	LA	Metals Recovery	8,440
AMAX METAL RECOVERY INC.	LA	Metals Recovery	8,320
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	8,100
AMAX METAL REOVERY	LA	Metals Recovery	8,034
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	7,500
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,200
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	7,000
AMAX METALS RECOVERY	LA	Metals Recovery	5,760
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5,012
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,500
AMAX	LA	Metals Recovery	4,100
CRI-MET	LA	Metals Recovery	3,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,100
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	2,940
AMAX	LA	Metals Recovery	2,900
CRI-MET	LA	Metals Recovery	2,800
AMAX METAL REOVERY	LA	Metals Recovery	2,506
AMAX	LA	Metals Recovery	2,400
CRI-MET	LA	Metals Recovery	2,200
AMAX METAL RECOVERY	LA	Metals Recovery	2,000
AMAX	LA	Metals Recovery	1,800
AMEX METALS RECOVERY INC.	LA	Metals Recovery	1,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,700
AMAX METALS RECOVERY	LA	Metals Recovery	1,615
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,400
AMAX	LA	Metals Recovery	1,400
AMAX	LA	Metals Recovery	1,200
CRI-MET	LA	Metals Recovery	1,100
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Disposal	1,028
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Disposal	953
AMAX METALS RECOVERY INC.	LA	Metals Recovery	870
AMAX METALS RECOVERY	LA	Metals Recovery	780
CRI-MET	LA	Metals Recovery	590
AMAX METALS RECOVERY INC.	LA	Metals Recovery	567
AMAX METALS RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	430
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Reuse or Recovery	258
AMAX METAL RECOVERY INC.	LA	Metals Recovery	240
AMAX METALS RECOVERY DBA	LA	Metals Recovery	170

Toxic Release Inventory (TRI) Transfers for Transfer Type : Both POTW ...05 RSEI risk screening data, Level of Detail : Low (list of transfers)

CRI-MET	LA	Metals Recovery	140
AMAX METAL RECOVERY	LA	Metals Recovery	100
AMAX METAL REOVERY	LA	Metals Recovery	100
AMAX METAL RECOVERY	LA	Metals Recovery	75
CRI-MET	LA	Metals Recovery	62
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	40
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	40
AMAX METALS RECOVERY INC.	LA	Metals Recovery	23
AMAX	LA	Incineration/Insignificant Fuel Value	23
AMAX METGAL RECOVERY	LA	Metals Recovery	20
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Recycling	20
AMAX	LA	Incineration/Insignificant Fuel Value	18
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	17
AMAX	LA	Metals Recovery	16
AMAX METALS RECOVERY, INC.	LA	Transfer to Waste Broker	16
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	14
AMAX METALS RECOVERY INC.	LA	Metals Recovery	14
AMAX METALS RECOVERY INC.	LA	Metals Recovery	12
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker-Disposal	10
AMAX	LA	Incineration/Insignificant Fuel Value	10
AMAX	LA	Incineration/Insignificant Fuel Value	9
AMAX METALS RECOVERY INC.	LA	Metals Recovery	8
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	8
AMAX	LA	Incineration/Insignificant Fuel Value	7
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker	7
AMAX METALS RECOVERY INC.	LA	Incineration/Insignificant Fuel Value	5
AMEX METAL RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX	LA	Incineration/Insignificant Fuel Value	4
AMAX	LA	Landfill/Disposal Surface Impoundment	4
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker	4
AMEX METALS RECOVERY INC.	LA	Metals Recovery	4
AMAX	LA	Incineration/Insignificant Fuel Value	3
AMAX	LA	Incineration/Insignificant Fuel Value	3
AMAX METALS RECOVERY INC.	LA	Transfer to Waste Broker	3

AMEX METALS RECOVERY INC.	LA	Metals Recovery	3
AMEX METALS RECOVERY INC.	LA	Metals Recovery	3
AMAX	LA	Incineration/Insignificant Fuel Value	2
AMAX	LA	Landfill/Disposal Surface Impoundment	2
AMAX METAL RECOVERY	LA	Incineration/Thermal Treatment	2
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX	LA	Incineration/Thermal Treatment	1
AMAX	LA	Incineration/Insignificant Fuel Value	1
AMAX	LA	Incineration/Insignificant Fuel Value	1
AMAX	LA	Incineration/Insignificant Fuel Value	1
AMAX	LA	Incineration/Insignificant Fuel Value	1
AMAX	LA	Incineration/Insignificant Fuel Value	1
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	1
CRI-MET AMAX METALS RECOVERY,, INC.	LA	Other Waste Treatment	1
AMAX METALS RECOVERY, INC.	LA	Transfer to Waste Broker	1
Total (lbs)			2,254,301

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METALS RECOVERY	LA	Metals Recovery	410,000
AMAX METAL RECOVERY	LA	Metals Recovery	164,025
AMAX METALS RECOVERY	LA	Metals Recovery	157,680
AMAX METALS RECOVERY INC.	LA	Metals Recovery	141,740
AMAX METALS RECOVERY INC.	LA	Metals Recovery	123,200
AMAX	LA	Metals Recovery	120,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	96,300
AMAX METALS RECOVERY INC.	LA	Metals Recovery	90,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	90,000
AMAX METALS RECOVERY	LA	Metals Recovery	84,000
AMAX	LA	Metals Recovery	60,000
AMAX METALS RECOVERY	LA	Metals Recovery	54,000
AMAX	LA	Metals Recovery	50,000

AMAX METALS RECOVERY INC.	LA	Metals Recovery	49,000
CRI MET, C/O AMAX METALS RECOVERY	LA	Other Reuse or Recovery	48,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	43,214
AMAX METALS RECOVERY INC.	LA	Metals Recovery	41,376
AMAX METAL RECOVERY INC.	LA	Metals Recovery	40,000
AMAX METALS RECOVERY	LA	Metals Recovery	39,420
AMAX METALS RECOVERY INC.	LA	Metals Recovery	36,000
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	36,000
AMAX METALS RECOVERY	LA	Metals Recovery	34,800
AMAX METALS RECOVERY	LA	Metals Recovery	30,000
AMEX METALS RECOVERY	LA	Transfer to Waste Broker-Recycling	29,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	29,000
CRI-MET, C/O AMAX METALS REC.	LA	Other Reuse or Recovery	29,000
CRI-MET, C/O AMAX METALS REC.	LA	Other Reuse or Recovery	28,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	27,000
AMEX METALS RECOVERY INC.	LA	Metals Recovery	25,000
AMEX METAL RECOVERY	LA	Transfer to Waste Broker-Recycling	22,000
AMAX METAL RECOVERY INC.	LA	Metals Recovery	22,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	21,000
AMAX METALS RECOVERY INC.	LA	Metals Recovery	18,000
CRI-MET	LA	Incineration/Insignificant Fuel Value	14,000
AMAX METAL RECOVERY	LA	Other Reuse or Recovery	11,000
AMAX	LA	Metals Recovery	11,000
CRI-MET	LA	Metals Recovery	9,900
AMAX METAL RECOVERY INC.	LA	Other Reuse or Recovery	8,500
CRI-MET	LA	Metals Recovery	7,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	7,084
AMAX METALS RECOVERY INC.	LA	Metals Recovery	6,900
AMAX METALS RECOVERY	LA	Metals Recovery	6,900
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	5,600
AMEX - METAL RECOVERY	LA	Metals Recovery	5,224
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,900
CRI-MET	LA	Metals Recovery	4,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,600
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,600
AMAX METALS RECOVERY INC.	LA	Metals Recovery	4,600
AMEX METALA	LA	Metals Recovery	4,513
CRI-MET, C/O AMAX METALS REC.	LA	Other Reuse or Recovery	4,200

AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,900
CRI-MET	LA	Metals Recovery	3,800
AMAX METALS RECOVERY INC.	LA	Metals Recovery	3,500
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,500
AMAX METAL RECOVERY INC.	LA	Metals Recovery	2,200
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2,200
CRI-MET	LA	Metals Recovery	2,100
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,694
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	1,574
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1,400
AMAX METALS RECOVERY	LA	Metals Recovery	1,356
CRI-MET	LA	Metals Recovery	920
AMAX METALS RECOVERY INC.	LA	Metals Recovery	920
CRI-MET	LA	Metals Recovery	600
CRI-MET	LA	Metals Recovery	510
AMAX METALS RECOVERY INC.	LA	Metals Recovery	320
AMAX METALS RECOVERY INC.	LA	Metals Recovery	270
AMEX METALS RECOVERY INC.	LA	Wastewater Treatment (Excluding POTW)	250
CRI-MET	LA	Metals Recovery	220
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	168
CRI-MET	LA	Metals Recovery	120
CRI-MET	LA	Metals Recovery	100
AMAX METAL RECOVERY INC.	LA	Metals Recovery	100
AMAX	LA	Metals Recovery	82
AMAX	LA	Metals Recovery	70
CRI-MET	LA	Metals Recovery	69
CRI-MET	LA	Metals Recovery	67
CRI-MET	LA	Metals Recovery	50
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	44
CRI-MET	LA	Metals Recovery	43
CRI-MET	LA	Metals Recovery	25
CRI-MET	LA	Metals Recovery	25
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	22
AMAX	LA	Other Waste Treatment	20
AMAX METALS RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	18
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	18
AMAX METALS RECOVERY INC.	LA	Metals Recovery	17
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	16
AMAX	LA	Other Waste Treatment	12

AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	10
AMAX METAL RECOVERY INC.	LA	Metals Recovery	10
AMAX	LA	Other Waste Treatment	10
AMAX METALS RECOVERY INC.	LA	Metals Recovery	6
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	6
AMAX METALS RECOVERY INC.	LA	Other Reuse or Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Metals Recovery	5
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	4
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	4
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	4
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	3
AMAX METALS RECOVERY INC.	LA	Metals Recovery	2
AMAX	LA	Other Waste Treatment	2
AMAX	LA	Other Waste Treatment	1
AMAX	LA	Other Waste Treatment	1
AMAX	LA	Other Waste Treatment	1
AMAX	LA	Other Waste Treatment	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
AMAX METALS RECOVERY INC.	LA	Metals Recovery	1
Total (lbs)			2,454,096

List of transfers for 1990

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET	LA	Other Off-Site Management	18,000
CRI-MET	LA	Other Off-Site Management	17,000
CRI-MET	LA	Other Off-Site Management	10,000
CRI-MET	LA	Other Off-Site Management	5,100
CRI-MET	LA	Other Off-Site Management	2,800
AMAX	LA	Landfill/Disposal Surface Impoundment	1,974
AMAX METALS RECOVERY	LA	Other Waste Treatment	540

AMAX	LA	Landfill/Disposal Surface Impoundment	513
CRI-MET	LA	Other Off-Site Management	300
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	260
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	250
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	205
AMAX	LA	Landfill/Disposal Surface Impoundment	171
CRI-MET	LA	Other Waste Treatment	120
CRE-MET	LA	Other Waste Treatment	110
CRI-MET	LA	Other Waste Treatment	69
CRI-MET	LA	Other Waste Treatment	67
CRI-MET	LA	Other Waste Treatment	52
CRE-MET	LA	Incineration/Thermal Treatment	43
CRI-MET	LA	Other Waste Treatment	25
CRE-MET	LA	Other Waste Treatment	25
AMAX	LA	Landfill/Disposal Surface Impoundment	15
AMAX	LA	Landfill/Disposal Surface Impoundment	10
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	10
AMAX METALS RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMEX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	5
AMAX	LA	Landfill/Disposal Surface Impoundment	4
AMEX METALS RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	2
AMAX	LA	Landfill/Disposal Surface Impoundment	1
AMAX	LA	Landfill/Disposal Surface Impoundment	1
AMAX	LA	Landfill/Disposal Surface Impoundment	1
AMAX	LA	Landfill/Disposal Surface Impoundment	1
AMAX	LA	Landfill/Disposal Surface Impoundment	1
AMAX	LA	Landfill/Disposal Surface Impoundment	1
Total (lbs)			57,691

List of transfers for 1989

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMAX METALS RECOVERY INC.	LA	Other Off-Site Management	33,510
CRI-MET	LA	Other Off-Site Management	30,000

CRI-MET	LA	Other Off-Site Management	24,000
CRI-MET	LA	Other Off-Site Management	17,000
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	10,034
CRI-MET	LA	Other Off-Site Management	8,000
AMAX METALS RECOVERY INC.	LA	Incineration/Thermal Treatment	2,012
AMAX METALS RECOVERY INC.	LA	Other Off-Site Management	1,280
CRI-MET	LA	Other Off-Site Management	500
AMAX METAL RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	250
AMAX METAL RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	250
AMAX METAL RECOVERY INC.	LA	Landfill/Disposal Surface Impoundment	250
CRI-MET	LA	Other Off-Site Management	18
Total (lbs)			127,104

List of transfers for 1988

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
AMEX METALS RECOVERY, INC.	LA	Other Off-Site Management	12,700
AMEX METEALS RECOVERY INC.	LA	Other Off-Site Management	3
AMEX METALS RECOVERY INC.	LA	Other Off-Site Management	3
AMEX METAL RECOVERY INC.	LA	Other Off-Site Management	2
AMEX METALS RECOVERY INC.	LA	Other Off-Site Management	1
Total (lbs)			12,709

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70040*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO

Type of Report Output | Text (HTML) | GO

ERNS Incidents for Zip 70040, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL
Level of Detail	Low
Type of Report Output	Text (HTML)

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
825596	BRAITHWAITE	LA	STOLT HAVEN NEW ORLEANS	FIXED	n
828030	BRAITHWAITE	LA	ELAVATING BOATS INC	FIXED	n
830656	POINTE-LAHACHE	LA	BEPCO LP	PLATFORM	n
847837	BRAITHWAITE	LA	STOLT HAVEN INC.	FIXED	n
851319	DAVANT	LA	TECO BULK TERMINAL	VESSEL	n
854922	BURAS	LA	SHALLOW DRAFT ELEVATING BOATS INC.	VESSEL	n
856796	BRAITHWAITE	LA	UNITED STEEL	VESSEL	n

Total incidents for reporting year 2007: 7

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
798547	DAVANT	LA	TECO BULK TERMINAL LLC	VESSEL	n
806414	City Left Blank	LA	"M/V" SHALLOW DRAFT	VESSEL	n
806428	POINTE-LAHACHE	LA	BEPCO	PIPELINE	n
807760	POINTE-LAHACHE	LA	BEPCO	PIPELINE	n
808125	BLACK BAY	LA	"M/V" SHALLOW DRAFT	VESSEL	n
815229	BRAITHWAITH	LA	STOLTHAVEN NEW ORLENS LLC	FIXED	n
820671	BRAITHWAITH	LA	STOLTHAVEN NEW ORLENS LLC	FIXED	n

Total incidents for reporting year 2006: 7

List of incidents for 2005

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Emergency Response Notification System (ERNS) Incidents for Zip Code 70040, LA, 1982-2007, low detail

Incident ID	City	State	Resp. Company	Incident Type	Damages
766879	BRAITEWAITH	LA	STOLT	STORAGE TANK	n
769605	BRAITHWAITE	LA	STOLTHAVEN INC.	FIXED	n
771405	BRAITEWAITH	LA	STOLT HAVEN TERMINALS	STORAGE TANK	n
782378	DAVANT	LA	TECO BULK TERMINAL LLC	VESSEL	n

Total incidents for reporting year 2005: 4

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
710855	BRAITHWAITE	LA	STOLTHAVEN INC.	FIXED	n
713095	BRAITHWAITE	LA	STOLT HAVEN NEW ORLEANS	FIXED	n
726382	BRAITHWAITE	LA	STOLTHAVEN INC.	VESSEL	n
728793	BRAITHWAITE	LA	STOLT HAVEN NEW ORLEANS	VESSEL	n

Total incidents for reporting year 2004: 4

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
638968	BRAITHWAITE	LA	STOLT HAVEN	PIPELINE	n
704495	BRAITHWAITE	LA	STOLT HAVEN NEW ORLEANS	FIXED	n

Total incidents for reporting year 2003: 2

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
622022	DAVANT	LA	TECO BULK TERMINAL	VESSEL	n

Total incidents for reporting year 2002: 1

List of incidents for 2001

Emergency Response Notification System (ERNS) Incidents for Zip Code 70040, LA, 1982-2007, low detail

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
558070	NEW ORLEANS	LA	ELECTRO-COAL TRANSFER	VESSEL	n

Total incidents for reporting year 2001: 1

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
539127	NEW ORLEANS	LA	ELEVATING BOATS INC	VESSEL	n

Total incidents for reporting year 2000: 1

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
504290	DAVANT	LA	ELECTRO-COAL TRANSFER	VESSEL	n

Total incidents for reporting year 1999: 1

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
357047	VENICE	LA	ELEVATING BOATS INC	VESSEL	n
358456	DAVANT	LA	ELECTRO COAL TRANSFER COR	VESSEL	n

Total incidents for reporting year 1996: 2

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Emergency Response Notification System (ERNS) Incidents for Zip Code 70040, LA, 1982-2007, low detail

Incident ID	City	State	Resp. Company	Incident Type	Damages
293854	GRETNA	LA	PLAQ PARISH GOVERNMENT	FIXED	n
313212	DAVANT	LA	ELECTRO COAL	VESSEL	n

Total incidents for reporting year 1995: 2

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
103909	City Left Blank	LA	ELEVATING BOATS INC	VESSEL	n

Total incidents for reporting year 1992: 1

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70040*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Hazardous Waste (BRS) Facilities for Zip Code 70040, LA, 1989-2007, summary

BRS Facilities for Zip 70040, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2007

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
STOLTHAVEN NEW ORLEANS, LLC	BRAITHWAITE	LA	189	189

Total records for reporting year 2007: 1
Total Waste Tons Generated: 189.04
Total Waste Tons Managed: 189.039
Total Waste Tons Received and Managed: 0

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AMAX METALS RECOVERY, INC.	BRAITHWAITE	LA	403	403
STOLTHAVEN NEW ORLEANS, LLC	BRAITHWAITE	LA	62	62

Total records for reporting year 2005: 2
Total Waste Tons Generated: 464.921
Total Waste Tons Managed: 464.91
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AMAX METALS RECOVERY INC	BRAITHWAITE	LA	147	147
STOLTHAVEN NEW ORLEANS, L.L.C.	BRAITHWAITE	LA	152	152

Total records for reporting year 2003: 2

Total Waste Tons Generated: 299.182
Total Waste Tons Managed: 299.182
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AMAX METALS RECOVERY, INC	BRAITHWAITE	LA	1	1

Total records for reporting year 2001: 1
Total Waste Tons Generated: 0.8
Total Waste Tons Managed: 0.8
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AMAX METALS RECOVERY, INC.	BRAITHWAITE	LA	2,928	2,928

Total records for reporting year 1999: 1
Total Waste Tons Generated: 2,927.915
Total Waste Tons Managed: 2,927.915
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AMAX METALS RECOVERY, INC.	BRAITHWAITE	LA	0	8,982

Total records for reporting year 1997: 1
Total Waste Tons Generated: 0
Total Waste Tons Managed: 8,982.038
Total Waste Tons Received and Managed: 8,982.038

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed [?]
AMAX METALS RECOVERY, INC.	BRAITHWAITE	LA	233	5,771

Total records for reporting year 1995: 1
Total Waste Tons Generated: 232.612
Total Waste Tons Managed: 5,771.063
Total Waste Tons Received and Managed: 5,746.951

Reporting Year: 1993

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed [?]
AMAX METALS RECOVERY INC	BRAITHWAITE	LA	2	2

Total records for reporting year 1993: 1
Total Waste Tons Generated: 1.712
Total Waste Tons Managed: 1.712
Total Waste Tons Received and Managed: 0

Reporting Year: 1991

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed [?]
AMAX METALS RECOVERY, INC.	BRAITHWAITE	LA	18	7,126

Total records for reporting year 1991: 1
Total Waste Tons Generated: 18.474
Total Waste Tons Managed: 7,126.072
Total Waste Tons Received and Managed: 7,107.598

END OF REPORT

This search was done on
September 10, 2009. It was
compiled from government data
last released on December 16,

2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70040*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70040, LA, low detail

RMP Facilities for Zip 70040, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Stolthaven New Orleans, LLC	Braithwaite	LA	59	0	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70040*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70040, LA, low detail

RCRIS Handlers for Zip 70040, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
BENDER SHIPYARD INC	BRAITHWAITE	LA	SQG	No	No	No
ELEVATING BOATS LLC	BRAITHWAITE	LA	SQG	No	No	No
STOLTHAVEN NEW ORLEANS, LLC	BRAITHWAITE	LA	LQG	No	No	Yes
US UNITED BULK TERMINAL LLC	DAVANT	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70040*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-4
70043 CHALMETTE

Toxic Release Inventory (TRI) Facilities for Zip Code 70043, LA, 1987-2007, low detail

TRI Facilities for Zip 70043, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 2007

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
CHALMETTE REFINING LLC	CHALMETTE REFINING LLC	CHALMETTE	LA	1,146,219	2,537,018
RAIN CII CARBON LLC	RAIN CII CARBON LLC	CHALMETTE	LA	11	11
Total				1,146,230 (lbs)	2,537,029 (lbs)

List of facilities for 2006

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
CHALMETTE REFINING LLC	CHALMETTE REFINING LLC	CHALMETTE	LA	1,236,944	4,962,123
CHALMETTE FACILITY	CHALMETTE FACILITY	CHALMETTE	LA	496,610	496,610
Total				1,733,554 (lbs)	5,458,733 (lbs)

List of facilities for 2005

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
CHALMETTE REFINING LLC	CHALMETTE REFINING LLC	CHALMETTE	LA	1,225,696	3,493,199	11,988.23
CHALMETTE FACILITY	CHALMETTE FACILITY	CHALMETTE	LA	105	105	89.13
Total				1,225,801 (lbs)	3,493,304 (lbs)	12,077

List of facilities for 2004

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
CHALMETTE REFINING LLC	CHALMETTE REFINING LLC	CHALMETTE	LA	1,002,982	3,166,189	14,095.48
CHALMETTE FACILITY	CHALMETTE FACILITY	CHALMETTE	LA	302	302	256.72
Total				1,003,284 (lbs)	3,166,491 (lbs)	14,352

List of facilities for 2003

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
CHALMETTE REFINING LLC	CHALMETTE REFINING LLC	CHALMETTE	LA	1,562,677	12,319,712	24,288.98

List of facilities for 2002

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
CHALMETTE REFINING L.L.C.	CHALMETTE REFINING L.L.C.	CHALMETTE	LA	1,416,193	8,480,358	12,259.01

List of facilities for 2001

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]

CHALMETTE REFINING L.L.C.	CHALMETTE REFINING L.L.C.	CHALMETTE	LA	951,267	10,516,972	4,273.06

List of facilities for 2000

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
CHALMETTE REFINING L.L.C.	CHALMETTE REFINING L.L.C.	CHALMETTE	LA	827,517	8,799,632	3,344.32

List of facilities for 1999

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
CHALMETTE REFINING L.L.C.	CHALMETTE REFINING L.L.C.	CHALMETTE	LA	679,497	63,203,659	1,710.67

List of facilities for 1998

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
CHALMETTE REFINING L.L.C	CHALMETTE REFINING L.L.C	CHALMETTE	LA	554,875	6,966,226	1,721.51

List of facilities for 1997

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70043, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
CHALMETTE REFINING L.L.C	CHALMETTE REFINING L.L.C	CHALMETTE	LA	578,819	6,337,695	1,028.07

List of facilities for 1996

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	580,041	5,800,187	987.51

List of facilities for 1995

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	617,367	5,152,297	1,012.99

List of facilities for 1994

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	494,987	13,974,864	1,078.53

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?

MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	549,589	4,131,914	1,124.61

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	557,117	4,270,735	1,066.74

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	3,865,628	8,943,150	1,328.39

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	5,421,182	1,560.77

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
MOBIL OIL CORP.,	MOBIL OIL CORP.	CHALMETTE	LA	4,697,970	1,754.98

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
MOBIL OIL CORP., CHALMETTE REFINERY	MOBIL CORP.	CHALMETTE	LA	5,778,695	1,556.14

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Zip Code	70043*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2001

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET (AMAX METALS RECOVERY)	LA	Other Reuse or Recovery	20,910
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	4,217
Total (lbs)			25,127

List of transfers for 1998

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	8,067

List of transfers for 1997

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET (AMAX METALS RECOVERY)	LA	Metals Recovery	6,280

List of transfers for 1995

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET(AMAX METALS REC. INC.)	LA	Metals Recovery	34,348
CRI-MET(AMAX METALS REC. INC.)	LA	Metals Recovery	5,958
Total (lbs)			40,306

List of transfers for 1994

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRI-MET(AMAX METALS REC. INC.)	LA	Metals Recovery	64,006
CRI-MET(AMAX METALS REC. INC.)	LA	Metals Recovery	8,417
Total (lbs)			72,423

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70043*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70043, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
823017	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
823352	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
823363	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
823415	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
824241	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
827195	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
831711	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
832648	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
832738	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
834886	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
834891	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
835462	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
836655	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
836964	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
839415	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
840974	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
843082	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
843315	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
843719	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
843939	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
844282	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
844968	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
844971	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
845127	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
845224	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
845760	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
846174	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
847591	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
847697	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

847741	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
849028	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
849185	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
849343	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
849792	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
850013	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
850351	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
850621	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
850847	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
851589	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852040	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852153	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852307	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852391	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852397	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
852404	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
852849	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
853250	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
854136	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
855047	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
855078	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
856103	CHALMETTE	LA	CHALMETTE REFINING LLC	VESSEL	n

Total incidents for reporting year 2007: 51

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
784028	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
785297	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
786367	CHALMETTE	LA	CHALMETTE REFINING LLC	MOBILE	n
786438	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
786661	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
787383	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
788076	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
788698	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
790416	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
790747	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

791811	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
792218	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
792347	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
793717	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
794374	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
794475	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
796120	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
796810	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
797740	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
798712	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
799320	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
800303	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
800697	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
800970	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
801073	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
801848	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
803131	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
803136	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
804188	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
804391	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
805042	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
805312	JACKSON	MS	BOASSO AMERICA	MOBILE	n
805588	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
805726	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
806143	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
806144	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	y
806816	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
808654	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
809013	CHALMETTE	LA	CII CARBON	FIXED	n
809572	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
809608	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
810477	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
810709	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
810720	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
811206	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
812356	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
812417	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
812612	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
813250	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
813264	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

814296	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
814417	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
814529	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
814647	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
815152	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
815890	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
816198	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
816409	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
816857	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
818320	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
818575	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
818768	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
819212	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
819400	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
819642	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
819736	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
819919	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820018	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820057	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820264	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820355	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820364	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
820378	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
822177	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Total incidents for reporting year 2006: 74

List of incidents for 2005

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
746427	CHALMETTE	LA	CHALMETTE REFINING	STORAGE TANK	n
747010	CHALMETTE	LA	CHALMETTE REFINING	PIPELINE	n
747682	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
747811	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
747885	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
748064	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
748105	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
748663	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n

749431	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
751471	CHALMETT	LA	CHALMETTE REFINING, LLC	FIXED	n
752598	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
752906	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
754579	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
754945	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
755474	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
755689	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
756100	CHALMETTE	LA	CHALMETTE REFINING	PIPELINE	n
756851	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
757253	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
758075	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
758366	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
758435	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
758501	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
759188	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
759195	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
760589	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
760752	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
762789	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764016	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
764364	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764505	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764615	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764765	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764863	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
764957	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765009	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765164	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765296	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765375	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765428	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765571	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
765576	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765684	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765698	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765718	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765776	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765787	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765831	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

765936	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
765946	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766073	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766100	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766170	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766223	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766338	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766364	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766391	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
766639	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
767262	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
767849	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
768382	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
768768	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
770019	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
770255	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
770577	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
770625	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
775313	CHALMETTE	LA	MURPHY OIL	STORAGE TANK	n
778693	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
779817	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780424	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780496	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780526	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780593	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780669	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780727	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
780855	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781221	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781467	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781588	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781712	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781862	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781897	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
781975	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782070	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782102	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782255	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782328	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782799	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

782963	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
782984	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
783274	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
783408	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Total incidents for reporting year 2005: 92

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
710200	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
710601	CHALMETTE	LA	CHALMETTE REFINING LLC	MOBILE	n
711241	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
711243	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
712570	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
713196	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
713380	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
715120	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
715159	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
715161	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
715164	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
717540	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
718167	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
718188	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
718269	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
718587	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
718648	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
718817	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
719104	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
721030	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
721631	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
722103	CHALMETTE	LA	CHALMETTE REFINING LLC	VESSEL	n
723676	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
724494	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
724720	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
725660	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
725662	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
726469	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

727391	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
727558	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
727762	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
727856	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
728324	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
728657	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
729372	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
730214	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
730955	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
731709	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
731755	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
732259	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
732430	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
733335	CHALMETTE	LA	CHALMETTE REFINING LLC	VESSEL	n
734327	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
735058	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
735509	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
735602	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
735669	CHALMETTE	LA	CHALMETTE REFINEING	FIXED	n
735795	CHALMETTE	LA	CHALMETTE REFINEING	FIXED	n
735923	CHALMETTE	LA	CHALMETTE REFINEING	FIXED	n
735967	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736064	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736146	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736242	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736337	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736418	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
736787	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
738593	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
738609	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
740251	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
740491	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
740651	CHALMETTE	LA	CHALMETTE REFINING	STORAGE TANK	n
740930	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742302	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742404	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742445	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742450	CHALMETTE	LA	CHALMETTE REFINING	STORAGE TANK	n
742519	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742576	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n

742631	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
742731	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
743996	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
745290	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
745852	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n

Total incidents for reporting year 2004: 73

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
634923	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
635209	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
635329	CHALMETTE	LA	CHALMETTE REFINING LLC	VESSEL	n
636099	CHALMETTE	LA	CHALMETTE REFINERY LLC.	FIXED	n
636535	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
637408	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
637548	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
637566	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
637630	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
637735	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638572	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638629	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638635	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638668	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638695	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638729	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638796	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
638864	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639043	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639158	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639242	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639272	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639386	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639492	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
639536	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
640616	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
640634	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

641556	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
641763	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
641870	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
641978	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
642047	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
642107	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
642218	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
642458	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
642556	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
643213	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
643309	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
643376	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
643496	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
643522	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
643637	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
643638	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
643736	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
643840	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
643877	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
644446	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
644753	CHALMETTE	LA	CHALMETTE REFINERY LLC.	FIXED	n
644763	CHALMETTE	LA	CHALMETTE REFINERY LLC.	FIXED	n
644925	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
645328	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
645469	CHALMETTE	LA	CHALMETTE REFINING LLC.	CONTINUOUS	n
645534	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
645682	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
645716	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	y
645777	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
646002	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
646288	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
646732	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
646882	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647014	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647049	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647096	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647120	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647341	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647367	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647432	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

647463	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
647464	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
648570	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
648597	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649053	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649504	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649552	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649564	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649593	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649706	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649806	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649893	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649911	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
649952	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
649959	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
650019	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
650055	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
650087	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
650151	CHALMETTE	LA	SHALE METT REFINING	FIXED	n
650224	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
650346	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
650489	CHALMETTE	LA	CHALMETTE REFINING LLC.	CONTINUOUS	n
650604	CHALMETTE	LA	CHALMETTE REFINING LLC.	CONTINUOUS	n
650613	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651346	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651530	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651583	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651637	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651751	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651874	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651877	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
651883	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
652005	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
652311	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
652329	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
652339	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
652364	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
652429	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
654020	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
654283	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

654313	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
654457	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
654501	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
654598	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
654659	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655029	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655109	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655111	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655238	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655242	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
655821	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
656084	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
656246	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
656401	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
657100	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
657177	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
700230	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
700660	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
701242	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
701313	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
701898	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
702209	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
702389	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
702705	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
703479	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
703602	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
704093	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
704324	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
704654	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
705052	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
705164	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
705231	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
705828	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
706049	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
706269	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
706640	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
706961	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
708032	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Total incidents for reporting year 2003: 145

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
590815	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
591983	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
592272	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
593719	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
595848	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
597758	CHALMETTE	LA	CHALMETTE REFINING LLC.	FIXED	n
599003	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
599431	CHALMETTE	LA	EXXON MOBILE CHALMETTE REFINING LLC	STORAGE TANK	n
614962	CHALMETTE	LA	EXXON MOBILE CHALMETTE REFINING LLC	FIXED	n
618179	CHALMETTE	LA	EXXON MOBILE CHALMETTE REFINING LLC	FIXED	n
621039	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
621904	CHALMETTE	LA	CHALMETTE REFINING LLC	RAILROAD	n
621995	CHALMETTE	LA	CHALMETTE REFINING LLC	VESSEL	n
623886	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
623956	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
623966	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
624068	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
624184	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
626322	CHALMETTE	LA	CHALMETTE REFINERY LLC.	FIXED	n
627949	CHALMETTE	LA	CHALMETTE REFINERY LLC.	FIXED	n
631456	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
631557	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
631670	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
631787	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
632076	CHALMETTE	LA	CHALMETTE REFINING LLC.	STORAGE TANK	n
632314	CHALMETTE	LA	CHALMETTE REFINING LLC.	STORAGE TANK	n
632371	CHALMETTE	LA	CHALMETTE REFINING LLC.	STORAGE TANK	n

Total incidents for reporting year 2002: 27

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

Incident ID	City	State	Resp. Company	Incident Type	Damages
559205	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
562283	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
568379	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
568504	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
568582	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
569049	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
569070	CHALMETTE	LA	CHALMETTE REFINING LLC	PIPELINE	n
571640	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
578598	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
581236	CHALMETTE	LA	CHALMETTE REFINING LLC	STORAGE TANK	n
584279	CHALMETTE	LA	CHALMETTE REFINING LLC.	FIXED	n
585178	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
585337	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
587907	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
588459	CHALMETTE	LA	CHALMETTE REFINING LLC.	FIXED	n

Total incidents for reporting year 2001: 15

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
519649	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n
528891	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n
543270	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n
543273	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n
543446	CHALMETTE	LA	GIOE'S DEMOLITION	FIXED	n
546100	CHALMETTE	LA	CHALEMETTE REFINING	STORAGE TANK	n
547175	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
549520	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n
549709	CHALMETTE	LA	CHALMETTE REFINING LLC	FIXED	n

Total incidents for reporting year 2000: 9

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

Incident ID	City	State	Resp. Company	Incident Type	Damages
478053	CHALMETTE	LA	CHALMETTE REFINING LLC	UNKNOWN SHEEN	n
482637	CHALMETTE	LA	Responsible Co Left Blank	VESSEL	n
484106	GRAND ISLE	LA	Responsible Co Left Blank	VESSEL	n
484175	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n
496548	CHALMETTE	LA	CHALEMETTE REFINING	FIXED	n

Total incidents for reporting year 1999: 5

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
418632	CHALMETTE	LA	CHALMETTE REFINING LLC	UNKNOWN SHEEN	n
422417	CHALMETTE	LA	MOBILE OIL	FIXED	n
438313	CHALMETTE	LA	MOBILE OIL	FIXED	n
438645	CHALMETTE	LA	MOBILE OIL	FIXED	n
440408	CHALMETTE	LA	MOBILE OIL	VESSEL	n
454921	CHALMETTE	LA	CHALMETTE REFINING	FIXED	n
454943	CHALEMETTE	LA	CHALEMETTE REFINING	FIXED	n
454960	CHALEMETTE	LA	CHALEMETTE REFINING	FIXED	n
457056	CHALEMETTE	LA	CHALEMETTE REFINING	FIXED	n

Total incidents for reporting year 1998: 9

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
372339	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
372484	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
378431	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
393211	CHALMETTE	LA	MOBIL OIL CO	VESSEL	n
394296	CHALMETTE	LA	MOBIL OIL CO	FIXED	n

Total incidents for reporting year 1997: 5

List of incidents for 1996

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
331473	CHALMETTE	LA	MOBILE	FIXED	n
352912	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
352913	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
369561	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
370797	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
371486	CHALMETTE	LA	MOBIL OIL CO	FIXED	n

Total incidents for reporting year 1996: 6

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
295764	NEW ORLEANS	LA	P/C JUST US	VESSEL	n
310016	CHALMETTE	LA	MOBILE	FIXED	n
312550	CHALMETTE	LA	MOBIL OIL CO	VESSEL	n

Total incidents for reporting year 1995: 3

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
219451	CHALMETTE	LA	MOBIL OIL CO	VESSEL	n
250003	CHALMETTE	LA	MOBILE OIL CO	FIXED	n
255256	CHALMETTE	LA	MOBIL OIL CO	VESSEL	n
259076	CHALMETTE	LA	MH SHIPPING INC	VESSEL	n
259078	CHALMETTE	LA	MH SHIPPING INC	VESSEL	n
265712	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
265723	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
273546	CHALMETTE	LA	MOBIL OIL CO	FIXED	n
274045	CHALMETTE	LA	T/B MEDICINE BOW (MOBIL)	VESSEL	n
274090	CHALMETTE	LA	T/B MEDICINE BOW (MOBIL)	VESSEL	n

Total incidents for reporting year 1994: 10

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
157292	CHALMETTE	LA	Responsible Co Left Blank	FIXED	n
184986	CHALMETTE	LA	MOBILE OIL CO	FIXED	n
210976	CHALMETTE	LA	MOBIL OIL CO	VESSEL	n

Total incidents for reporting year 1993: 3

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
112578	City Left Blank	LA	TOTAL MINATOME	PLATFORM	n
116083	CHALMETTE	LA	MOBIL OIL	FIXED	n
125225	City Left Blank	LA	CREW BOATS INC	VESSEL	n
129018	CHALMETTE	LA	MOBIL OIL	FIXED	n
133445	SHALMEET	LA	MOBIL REFINING	FIXED	n
140419	CHALMETTE	LA	MOBIL OIL	VESSEL	n
144311	City Left Blank	LA	MOBIL OIL	FIXED	n

Total incidents for reporting year 1992: 7

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
76618	MERAUX	LA	MURPHY OIL CO	FIXED	n

Total incidents for reporting year 1991: 1

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Emergency Response Notification System (ERNS) Incidents for Zip Code 70043, LA, 1982-2007, low detail

Incident ID	City	State	Resp. Company	Incident Type	Damages
42761	VIOLET	LA	G W PRICE VACUUM COMP.	MOBILE	n

Total incidents for reporting year 1990: 1

List of incidents for 1989

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
-106316	ST. ROSE	LA	AYERS	Left Blank	n

Total incidents for reporting year 1989: 1

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70043*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

BRS Facilities for Zip 70043, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2007

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
CHALMETTE REFINING, LLC	CHALMETTE	LA	3,375	3,375
LDH ENERGY OLEFINS LLC	CHALMETTE	LA	102	102

Total records for reporting year 2007: 2
Total Waste Tons Generated: 3,476.996
Total Waste Tons Managed: 3,476.996
Total Waste Tons Received and Managed: 0

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOASSO AMERICA CORPORATION	CHALMETTE	LA	17	17
CHALMETTE REFINING, L.L.C	CHALMETTE	LA	2,263	2,263

Total records for reporting year 2005: 2
Total Waste Tons Generated: 2,280.165
Total Waste Tons Managed: 2,280.156
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOASSO AMERICA CORPORATION	CHALMETTE	LA	2	2
CHALMETTE REFINING, L.L.C	CHALMETTE	LA	4,504	4,504
GULF LIQUIDS NEW RIVER PROJECT	CHALMETTE	LA	376	376

Total records for reporting year 2003: 3
Total Waste Tons Generated: 4,882.23
Total Waste Tons Managed: 4,882.23
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
CHALMETTE REFINING L.L.C.	CHALMETTE	LA	1,725	1,725
GULF LIQUIDS NEW RIVER PROJECT	CHALMETTE	LA	257	257

Total records for reporting year 2001: 2
Total Waste Tons Generated: 1,981.785
Total Waste Tons Managed: 1,981.784
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
CHALMETTE REFINING, L.L.C.	CHALMETTE	LA	8,829	8,829

Total records for reporting year 1999: 1
Total Waste Tons Generated: 8,829.18
Total Waste Tons Managed: 8,829.18
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
CHALMETTE REFINERY	CHALMETTE	LA	28,929	28,929

Total records for reporting year 1997: 1
Total Waste Tons Generated: 28,928.6
Total Waste Tons Managed: 28,928.6

Total Waste Tons Received and Managed: 0

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MOBILE OIL COMPANY CHALMETTE REFINERY	CHALMETTE	LA	15,347	15,347

Total records for reporting year 1995: 1
Total Waste Tons Generated: 15,346.58
Total Waste Tons Managed: 15,346.58
Total Waste Tons Received and Managed: 0

Reporting Year: 1993

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MOBIL OIL CORP - CHALMETTE REFINERY	CHALMETTE	LA	13,229	13,229

Total records for reporting year 1993: 1
Total Waste Tons Generated: 13,229.33
Total Waste Tons Managed: 13,229.43
Total Waste Tons Received and Managed: 0

Reporting Year: 1991

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MOBIL OIL CORPORATION	CHALMETTE	LA	818,542	818,542

Total records for reporting year 1991: 1
Total Waste Tons Generated: 818,541.6
Total Waste Tons Managed: 818,541.5
Total Waste Tons Received and Managed: 0

Hazardous Waste (BRS) Facilities for Zip Code 70043, LA, 1989-2007, summary

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
CHALMETTE MEDICAL CENTERS	CHALMETTE	LA	9	9
DELA RONDE FAMILY PRACTICE CENTER	CHALMETTE	LA	2	2
MOBIL OIL CORPORATION	CHALMETTE	LA	712,130	712,130
ROLLINS ENVIRONMENTAL SERVICES (LA)	CHALMETTE	LA	6,679	45,630

Total records for reporting year 1989: 4
Total Waste Tons Generated: 718,820.07
Total Waste Tons Managed: 757,770.44
Total Waste Tons Received and Managed: 38,950.35

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's Biennial Reporting System (part of RCRAINFO) database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70043*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70043, LA, low detail

RMP Facilities for Zip 70043, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Fazendville Wastewater Treatment Plant	Chalmette	LA	3	0	Yes
Louis Drefyus Olefins LLC Chalmette Gas Plant	Chalmette	LA	6	0	No
St. Bernard Parish Water Treatment Plant	Chalmette	LA	100	0	No

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70043*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70043, LA, low detail

RCRIS Handlers for Zip 70043, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
A & A RADIATOR SVC	CHALMETTE	LA	none	No	No	No
A 1 AUTO RPR	CHALMETTE	LA	none	No	No	No
ABEAR ALIGNMENT CO INC	CHALMETTE	LA	CESQG	No	No	No
ADVANCE AUTO PARTS #9767	CHALMETTE	LA	SQG	No	No	No
AJ LAUNDRY & DRYCLEAN	CHALMETTE	LA	CESQG	No	No	No
ALL SERVICE MACHINE SHOP DLBLDG	CHALMETTE	LA	CESQG	No	No	No
ALS QUALITY CLNRS	CHALMETTE	LA	none	No	No	No
ATHLETES CHOICE INC	CHALMETTE	LA	none	No	No	No
AUTO & MARINE SVC	CHALMETTE	LA	CESQG	No	No	No
AUTO MASTERS AUTOMOTIVE LLC	CHALMETTE	LA	CESQG	No	No	No
BELLSOUTH TELE J2206	CHALMETTE	LA	CESQG	No	No	No
BEND ALL MUFFLER & SVC CNTR	CHALMETTE	LA	CESQG	No	No	No
BILL HOFFERS CHALMETTE EXXON	CHALMETTE	LA	CESQG	No	No	No
BOASSO AMERICA CORPORATION	CHALMETTE	LA	LQG	No	No	Yes
BOB COLLISION CNTR	CHALMETTE	LA	CESQG	No	No	No
BOB OUTBOARD	CHALMETTE	LA	LQG	No	No	No
BOBS COLLISION CTR	CHALMETTE	LA	CESQG	No	No	No
BRANDT CAR CARE	CHALMETTE	LA	CESQG	No	No	No
CAR CRAFT INC	CHALMETTE	LA	CESQG	No	No	No
CEMBELL INDUSTRIES INC	CHALMETTE	LA	CESQG	No	No	No
CHALMETTE GULF	CHALMETTE	LA	none	No	No	No
CHALMETTE MEDICAL CENTER	CHALMETTE	LA	CESQG	No	No	No
CHALMETTE MEDICAL CNTRS	CHALMETTE	LA	CESQG	No	No	No
CHALMETTE ORTHOPAEDIC CLINIC	CHALMETTE	LA	CESQG	No	No	No
CHALMETTE REFINING, L.L.C	CHALMETTE	LA	LQG	Yes	No	Yes
CHALMETTE TIRE INC	CHALMETTE	LA	CESQG	No	No	No
CHALMETTE TRANSMISSION	CHALMETTE	LA	CESQG	No	No	No
CHARTER FOOD STORE	CHALMETTE	LA	none	No	No	No

CLAVERIE PEST CONTROL	CHALMETTE	LA	none	No	No	No
COASTAL GRAPHICS INC	CHALMETTE	LA	CESQG	No	No	No
COASTAL GRAPHICS INC	CHALMETTE	LA	CESQG	No	No	No
COCOS AUTO RPR	CHALMETTE	LA	SQG	No	No	No
CORNES BLACK GOLD OIL SVC	CHALMETTE	LA	none	No	Yes	No
CURES CLNRS INC	CHALMETTE	LA	CESQG	No	No	No
CUSTOM BODY SHOP INC	CHALMETTE	LA	CESQG	No	No	No
CUSTOM CYCLE	CHALMETTE	LA	CESQG	No	No	No
D & J AUTOMOTIVE	CHALMETTE	LA	CESQG	No	No	No
D & M BODY & PAINT	CHALMETTE	LA	CESQG	No	No	No
DE LA RONDE FAMILY PRACTICE CNTR	CHALMETTE	LA	CESQG	No	No	No
DENIS SCHAFF JR PEST CONTROL	CHALMETTE	LA	none	No	No	No
DISCOUNT TIRE CITY INC	CHALMETTE	LA	CESQG	No	No	No
DON FOS PROCESSOR SVC INC	CHALMETTE	LA	none	No	Yes	No
DRS LE AND MUI FAMILY MEDICINE AMC	CHALMETTE	LA	CESQG	No	No	No
DUCOTES AUTO RPR	CHALMETTE	LA	CESQG	No	No	No
DW PRICE VACUUM TRUCK SVCS INC	CHALMETTE	LA	none	No	Yes	No
EXPRESS AUTOMOTIVE	CHALMETTE	LA	CESQG	No	No	No
FIRESTONE STORE 7721	CHALMETTE	LA	CESQG	No	No	No
FRADELLAS COLLISION CNTR INC	CHALMETTE	LA	CESQG	No	No	No
FRADELLAS COLLISION CTR	CHALMETTE	LA	none	No	No	No
FRIENDLY GOLDEN CLEANERS LLC	CHALMETTE	LA	SQG	No	No	No
GENES AUTOMOTIVE	CHALMETTE	LA	LQG	No	No	No
GENUINE PARTS CO, ST BERNARD PARISH	CHALMETTE	LA	LQG	No	No	No
GORMAN TRANSPORT INC	CHALMETTE	LA	CESQG	No	No	No
H BEASLEY TRUCKING SVC	CHALMETTE	LA	SQG	No	No	No
HALTER MARINE INC CHALMETTE DIV	CHALMETTE	LA	none	No	No	No
HERCULES METAL BLDG	CHALMETTE	LA	CESQG	No	No	No
HOME DEPOT #0373	CHALMETTE	LA	SQG	No	No	No
JIFFY LUBE INTL INC 935	CHALMETTE	LA	CESQG	No	No	No
KEITH GUY INC	CHALMETTE	LA	CESQG	No	No	No
KERN CHIROPRACTIC	CHALMETTE	LA	CESQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70043, LA, low detail

LABOURDETTE AUTO COLLISION	CHALMETTE	LA	CESQG	No	No	No
MELS CAR CARE	CHALMETTE	LA	CESQG	No	No	No
MIDAS MUFFLER	CHALMETTE	LA	CESQG	No	No	No
MOTIVA ENTERPRISES LLC, SAP#137431	CHALMETTE	LA	SQG	No	No	No
MUSCLE CARS UNLIMITED	CHALMETTE	LA	CESQG	No	No	No
NALCO COMPANY	CHALMETTE	LA	none	No	No	No
NEW ORLEANS TANK SVCS INC	CHALMETTE	LA	none	No	No	No
NUCLEAR CARDIOLOGY INSTITUTE	CHALMETTE	LA	CESQG	No	No	No
ORLEANS DODGE CHRYSLER JEEP COLLISION	CHALMETTE	LA	CESQG	No	No	No
PACE AUTOMOTIVE INC	CHALMETTE	LA	CESQG	No	No	No
PACKENHAM 66 SVC	CHALMETTE	LA	CESQG	No	No	No
PARETTI TRANSMISSION SVC	CHALMETTE	LA	CESQG	No	No	No
PEI	CHALMETTE	LA	CESQG	No	No	No
PENDLETON MEMORIAL METHODIST HOSPITAL	CHALMETTE	LA	none	No	No	No
PENSKE AUTO CTR	CHALMETTE	LA	CESQG	No	No	No
PEP BOYS 51	NEW ORLEANS	LA	CESQG	No	No	No
PHYLS CONTAINER SERV INC	CHALMETTE	LA	none	No	No	No
PORT SHIP SVC SHIPYARD	CHALMETTE	LA	CESQG	No	No	No
PRO TECH AUTO	CHALMETTE	LA	CESQG	No	No	No
QUALITY BODY & FENDER WORKS INC	CHALMETTE	LA	CESQG	No	No	No
R T AUTOMOTIVE INC	CHALMETTE	LA	none	No	No	No
RAIN CII CARBON LLC	CHALMETTE	LA	CESQG	No	No	No
RECOIL CORP	CHALMETTE	LA	LQG	No	Yes	No
RICHS BODY WORKS INC	CHALMETTE	LA	CESQG	No	No	No
RICORD OIL SVC	CHALMETTE	LA	none	No	No	No
RITE AID, HURRICANE KATRINA	CHALMETTE	LA	LQG	No	No	No
RONALD A SPORL RACING ENT INC	CHALMETTE	LA	SQG	No	No	No
RONALD SPORL RACING	CHALMETTE	LA	CESQG	No	No	No
ROY POMES	CHALMETTE	LA	SQG	No	No	No
RT AUTOMOTIVE INC	CHALMETTE	LA	CESQG	No	No	No
SEABREEZE BOAT BLDS INC	CHALMETTE	LA	CESQG	No	No	No
SERIOUS SHINE	CHALMETTE	LA	CESQG	No	No	No
SHERWIN-WILLIAMS, HURRICANE KATRINA	CHALMETTE	LA	LQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70043, LA, low detail

SON L CORP DBA MEINEKE MUFFLER	CHALMETTE	LA	CESQG	No	No	No
ST BERNARD AUTO RPR	CHALMETTE	LA	CESQG	No	No	No
ST BERNARD PAR WATER & SEWER DIV	CHALMETTE	LA	CESQG	No	No	No
ST BERNARD PARISH GOVT	CHALMETTE	LA	CESQG	No	No	No
ST BERNARD PORT HARBOR & TERM	CHALMETTE	LA	LQG	No	No	No
STAR ENTERPRISE	CHALMETTE	LA	SQG	No	No	No
STEVES ALIGNMENT SVC	CHALMETTE	LA	CESQG	No	No	No
SUBURBAN ATHLETE SPORTING GOODS INC	CHALMETTE	LA	CESQG	No	No	No
T & T MARINE RPR	CHALMETTE	LA	LQG	No	No	No
T & T MARINE WORLD INC	CHALMETTE	LA	CESQG	No	No	No
TENNECO OIL COMPANY	CHALMETTE	LA	none	No	No	No
TEXACO SVC STATION	CHALMETTE	LA	CESQG	No	No	No
THE ALBACH CO	CHALMETTE	LA	CESQG	No	No	No
THE HONDA CENTER	CHALMETTE	LA	SQG	No	No	No
TIMES PICAYUNE INC ST BERNARD BUR	CHALMETTE	LA	CESQG	No	No	No
TOMS MUFFLER SHOP	CHALMETTE	LA	SQG	No	No	No
TONYS AUTO REPAIR INC	CHALMETTE	LA	CESQG	No	No	No
UNION WASH	CHALMETTE	LA	LQG	No	No	No
W W AUTOMOTIVE ENGINE EXCH	CHALMETTE	LA	CESQG	No	No	No
WALGREEN'S CO, HURR KATRINA, ST BERNARD	CHALMETTE	LA	LQG	No	No	No
WALGREENS 1948	CHALMETTE	LA	CESQG	No	No	No
WALMART STORE #909	CHALMETTE	LA	CESQG	No	No	No
WALMART SUPERCENTER #485	DONALDSONVILLE	LA	CESQG	No	No	No
WALMART SUPERCENTER #909	CHALMETTE	LA	CESQG	No	No	No
WINN DIXIE 1432	CHALMETTE	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70043*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low
Type of Report Output	Text (HTML)

B-5
70075 MERAUX

TRI Facilities for Zip 70075, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 2007

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
MURPHY OIL USA INC MERAUX REFINERY	MURPHY OIL CORP	MERAUX	LA	203,819	2,785,411

List of facilities for 2006

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
MURPHY OIL USA INC MERAUX REFINERY	MURPHY OIL CORP	MERAUX	LA	152,879	1,863,624

List of facilities for 2005

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC MERAUX REFINERY	MURPHY OIL CORP	MERAUX	LA	209,631	1,160,164	455.62

List of facilities for 2004

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70075, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC MERAUX REFINERY	MURPHY OIL CORP	MERAUX	LA	244,634	2,637,307	2,038.29

List of facilities for 2003

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC MERAUX REFINERY	MURPHY OIL CORP	MERAUX	LA	250,504	1,826,508	339.04

List of facilities for 2002

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC. MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	390,317	2,261,034	491.34

List of facilities for 2001

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC. MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	438,127	2,908,937	656.49

List of facilities for 2000

Toxic Release Inventory (TRI) Facilities for Zip Code 70075, LA, 1987-2007, low detail

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC. MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	385,653	2,447,419	455.88

List of facilities for 1999

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC. MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	315,976	2,178,532	193.91

List of facilities for 1998

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	375,826	2,756,806	233.91

List of facilities for 1997

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFY.	MURPHY OIL CORP.	MERAUX	LA	382,667	2,905,985	246.89

List of facilities for 1996

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	376,318	3,236,442	206.24

List of facilities for 1995

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	346,955	3,020,036	218.90

List of facilities for 1994

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	263,198	2,688,352	291.45
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	500	800	470.73
Total				263,698 (lbs)	2,689,152 (lbs)	762

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70075, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	100,466	2,287,590	219.29
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	500	800	470.90
Total				100,966 (lbs)	2,288,390 (lbs)	690

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	129,143	1,763,796	340.32
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	500	800	471.07
Total				129,643 (lbs)	1,764,596 (lbs)	811

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	98,259	1,644,206	283.01
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	500	800	471.25
Total				98,759 (lbs)	1,645,006 (lbs)	754

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?

MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	261,131	518.98
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	525	471.42
Total				261,656 (lbs)	990

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
MURPHY OIL USA INC., MERAUX REFINERY	MURPHY OIL CORP.	MERAUX	LA	266,281	1,538.13
CHEMCAT CORP	CHEMCAT CORP	MERAUX	LA	500	471.66
Total				266,781 (lbs)	2,010

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
MURPHY OIL USA INC. MERAUX, REFINERY	MURPHY OIL USA INC.	MERAUX	LA	1,716,765	2,159.85

List of facilities for 1987

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?
MURPHY OIL USA INC., MERAUX LA. REFINERY	MURPHY OIL USA INC. - ELDORADO ARKANSAS	MERAUX	LA	2,030,680

END OF REPORT

This search was done on
September 10, 2009. It was
compiled from government data
last released on September 22,

2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Zip Code	70075*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
BLACK GOLD OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	1
BLACK GOLD OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	1
Total (lbs)			2

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's Toxic Release Inventory database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70075*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Search Results (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
827313	MERAUX	LA	MURPHY OIL USA	FIXED	n
831707	MERAUX	LA	MURPHY OIL USA	FIXED	n
835519	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
844083	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
852355	MERAUX	LA	MURPHY OIL USA	FIXED	n
853182	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 2007: 6

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
795231	MEREAUX	LA	MURPHY OIL USA	STORAGE TANK	n
795253	MERAUX	LA	MURPHY OIL USA	FIXED	n
796229	MERAUX	LA	MURPHY OIL USA	FIXED	n
797768	MERAUX	LA	MURPHY OIL USA	FIXED	n
797945	MERAUX	LA	MURPHY OIL USA	PIPELINE	n
799681	MERAUX	LA	MURPHY OIL USA	FIXED	n
803480	MERAUX	LA	MURPHY OIL USA	FIXED	n
810385	MERAUX	LA	MURPHY OIL USA	FIXED	n
812153	MERAUX	LA	MURPHY OIL USA	MOBILE	n
818149	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
820526	MERAUX	LA	MURPHY OIL USA	FIXED	n
821733	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 2006: 12

List of incidents for 2005

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
749388	MERAUX	LA	MURPHY OIL USA	PIPELINE	n
769826	MERAUX	LA	MURPHY OIL USA	FIXED	n
777209	MERAUX	LA	Responsible Co Left Blank	FIXED	n

Total incidents for reporting year 2005: 3

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
711902	MERAUX	LA	MURPHY OIL USA	FIXED	n
719833	MERAUX	LA	MURPHY OIL	FIXED	n
722555	MERAUX	LA	MURPHY OIL USA	FIXED	n
738943	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n

Total incidents for reporting year 2004: 4

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
634244	MERAUX	LA	MURPHY OIL USA	FIXED	n
636845	MERAUX	LA	MURPHY OIL USA	FIXED	n
637909	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
641719	MERAUX	LA	MURPHY OIL USA	FIXED	n
646453	MERAUX	LA	MURPHY OIL USA	FIXED	n
703333	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
703508	MERAUX	LA	MURPHY OIL USA	PIPELINE	n
704385	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n
706974	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n

Total incidents for reporting year 2003: 9

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
593443	MERAUX	LA	MURPHY OIL USA	FIXED	n
593455	MERAUX	LA	MURPHY OIL USA	FIXED	n
595114	NEW ORLEANS	LA	U.S. ENVIRONMENTAL	FIXED	n
596089	MERAUX	LA	MURPHY OIL USA	PIPELINE	n
596291	MEREAUX	LA	COLLINS PIPELINE	FIXED	n
597000	BELLE CHASE	LA	US ENVIRONMENTAL SERVICES	VESSEL	n
597010	BELLE CHASSE	LA	U.S. ENVIRONMENTAL	FIXED	n
618659	City Left Blank	LA	MURPHY OIL USA	FIXED	n
626546	MERAUX	LA	MURPHY OIL	FIXED	n

Total incidents for reporting year 2002: 9

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
557386	MERAUX	LA	MURPHY OIL USA	FIXED	n
557944	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n
572911	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 2001: 3

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
521672	MERAUX	LA	MURPHY OIL USA	FIXED	n
522469	MERAUX	LA	MURPHY OIL USA	FIXED	n
522766	MERAUX	LA	MURPHY OIL	UNKNOWN SHEEN	n
524341	MERAUX	LA	MURPHY OIL USA	PIPELINE	n
533168	MERAUX	LA	MURPHY OIL	VESSEL	n
541686	MERAUX	LA	MURPHY OIL USA	FIXED	n
542243	MERAUX	LA	MURPHY OIL USA	FIXED	n
544443	MERAUX	LA	MURPHY OIL USA	STORAGE TANK	n

545479	MERAUX	LA	MURPHY OIL USA	FIXED	n
545516	MERAUX	LA	MURPHY OIL USA	FIXED	n
545914	MERAUX	LA	MURPHY OIL USA	FIXED	n
546439	MERAUX	LA	MURPHY OIL USA	VESSEL	n
549357	MEURAUX	LA	MURPHY OIL USA	VESSEL	n

Total incidents for reporting year 2000: 13

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
476901	VIOLET	LA	QUICK CHECK INC.	FIXED	n
478104	MERAUX	LA	MURPHY OIL USA	FIXED	n
478300	MERAUX	LA	MURPHY OIL USA	FIXED	n
479977	MERAUX	LA	MURPHY OIL USA	FIXED	n
482153	MERAUX	LA	MURPHY OIL USA	FIXED	n
500000	NEW ORLEANS	LA	U.S. ENVIRONMENTAL	VESSEL	n
506161	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 1999: 7

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
419409	MERAUX	LA	MURPHY OIL USA	FIXED	n
426236	MERAUX	LA	MURPHY OIL USA	FIXED	n
426499	MERAUX	LA	MURPHY OIL USA	FIXED	n
437074	MERAUX	LA	MURPHY OIL USA	FIXED	n
437949	MERAUX	LA	MURPHY OIL USA	FIXED	n
439763	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n
444574	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n
453373	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 1998: 8

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
376974	MEROUX	LA	MURPHY OIL USA	FIXED	n
384830	MERAUX	LA	MURPHY OIL USA	FIXED	n
394826	MERAUX	LA	MURPHY OIL	FIXED	n
397600	MERAUX	LA	MURPHY OIL USA	FIXED	n
398112	NEW ORLEANS	LA	MURPHY OIL USA	FIXED	n
410231	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n
412298	MERAUX	LA	MURPHY OIL USA	FIXED	n
416547	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n

Total incidents for reporting year 1997: 8

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
324296	MERAUX	LA	MURPHY OIL USA	FIXED	n
325821	MERAUX	LA	MURPHY OIL USA	FIXED	n
332806	MERAUX	LA	MURPHY OIL USA	FIXED	n
337468	MERAUX	LA	MURPHY OIL USA	FIXED	n
339059	MERAUX	LA	MURPHY OIL USA	FIXED	n
361585	MERAUX	LA	MURPHY OIL USA	PIPELINE	n

Total incidents for reporting year 1996: 6

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
275405	MERAUX	LA	MURPHY OIL CORP	FIXED	n
275666	MERAUX	LA	MURPHY OIL USA	FIXED	n
318123	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n

Total incidents for reporting year 1995: 3

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
215482	MERAUX	LA	MURPHY OIL CORP	FIXED	n
236362	MERAUX	LA	MURPHY OIL USA	FIXED	n
258008	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 1994: 3

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
159111	MERAUX	LA	MURPHY OIL USA	FIXED	n
168908	MERAUX	LA	MURPHY OIL USA	VESSEL	n
187851	ST FRANCISVILLE	LA	JAMES RIVER CORP	FIXED	y
195260	HARVEY	LA	DELTA COMMADATIES CO	FIXED	n
199594	MERAUX	LA	MURPHY OIL USA	UNKNOWN SHEEN	n
204536	HARVEY	LA	DELTA COMMODITIES CO	FIXED	n

Total incidents for reporting year 1993: 6

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
105883	MERAUX	LA	MURPHY OIL USA	FIXED	n
106175	MERAUX	LA	MURPHY OIL USA	FIXED	n
126956	MERAUX	LA	MURPHY OIL USA	FIXED	n
134121	MERAUX	LA	MURPHY OIL REFINERY	UNKNOWN SHEEN	n

Total incidents for reporting year 1992: 4

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
56933	MERAUX	LA	MURPHY OIL USA	FIXED	n
69438	MERAUX	LA	MURPHY OIL USA	FIXED	n
72960	MERAUX	LA	MURPHY OIL USA	FIXED	n
75887	MERAUX	LA	MURPHY OIL USA	FIXED	n
77085	MERAUX	LA	MURPHY OIL USA	FIXED	n
80349	MERAUX	LA	MURPHY OIL USA	FIXED	n
95556	MERAUX	LA	MURPHY OIL USA	FIXED	n
98574	MERAUX	LA	MURPHY OIL USA	FIXED	n

Total incidents for reporting year 1991: 8

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
11072	MERAUX	LA	MURPHY OIL CO	FIXED	n
35965	MERAUX	LA	MURPHY OIL CO	VESSEL	n

Total incidents for reporting year 1990: 2

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Incident Location State	Louisiana
Responsible Company State	Louisiana
Responsible Company Zip Code	70075*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Hazardous Waste (BRS) Facilities for Zip Code 70075, LA, 1989-2007, summary

BRS Facilities for Zip 70075, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2007

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA, INC.	MERAUX	LA	18,826	18,826

Total records for reporting year 2007: 1
Total Waste Tons Generated: 18,826.49
Total Waste Tons Managed: 18,826.49
Total Waste Tons Received and Managed: 0

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA, INC. MERAUX REFINERY	MERAUX	LA	9,575	9,575

Total records for reporting year 2005: 1
Total Waste Tons Generated: 9,574.867
Total Waste Tons Managed: 9,574.827
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA, INC. MERAUX REFINERY	MERAUX	LA	12,754	12,754

Total records for reporting year 2003: 1
Total Waste Tons Generated: 12,754.3
Total Waste Tons Managed: 12,754.3
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA, INC. MERAUX REFINERY	MERAUX	LA	17,190	17,190

Total records for reporting year 2001: 1
Total Waste Tons Generated: 17,189.87
Total Waste Tons Managed: 17,189.87
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA,INC.MERAUX REFINERY	MERAUX	LA	10,375	10,375

Total records for reporting year 1999: 1
Total Waste Tons Generated: 10,375.105
Total Waste Tons Managed: 10,375.105
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA INC MERAUX REFINERY	MERAUX	LA	4,064	8,795

Total records for reporting year 1997: 1
Total Waste Tons Generated: 4,064
Total Waste Tons Managed: 8,794.9
Total Waste Tons Received and Managed: 0

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on

that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA, INC MERAUX REFINERY	MERAUX	LA	11,364	11,364

Total records for reporting year 1995: 1
Total Waste Tons Generated: 11,364.243
Total Waste Tons Managed: 11,364.243
Total Waste Tons Received and Managed: 0

Reporting Year: 1993

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA INC - MERAUX REFINERY	MERAUX	LA	10,231	10,231

Total records for reporting year 1993: 1
Total Waste Tons Generated: 10,230.9
Total Waste Tons Managed: 10,230.9
Total Waste Tons Received and Managed: 0

Reporting Year: 1991

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL U.S.A., INC.	MERAUX	LA	7,953	7,953

Total records for reporting year 1991: 1
Total Waste Tons Generated: 7,952.5
Total Waste Tons Managed: 7,952.5
Total Waste Tons Received and Managed: 0

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
MURPHY OIL USA,INC. MERAUX REFINERY	MERAUX	LA	1,818	1,818

Total records for reporting year 1989: 1
Total Waste Tons Generated: 1,818
Total Waste Tons Managed: 1,818
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70075*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70075, LA, low detail

RMP Facilities for Zip 70075, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Munster Wastewater Treatment Plant	Meraux	LA	4	0	No
Murphy Oil USA, Inc. Meraux Refinery	Meraux	LA	253	2	No
Violet Wastewater Treatment Plant	Violet	LA	2	0	Yes

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70075*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70075, LA, low detail

RCRIS Handlers for Zip 70075, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
CHALMETTE COLLISION	MERAUX	LA	CESQG	No	No	No
CORNES BLACK GOLD OIL SVC	MERAUX	LA	none	No	No	No
EXXONMOBIL OIL CORP #50251	MERAUX	LA	CESQG	No	No	No
FUTURE AUTO RPR INC	MERAUX	LA	SQG	No	No	No
HENRYS BODY SHOP	MERAUX	LA	CESQG	No	No	No
JESSES AUTO RPR	MERAUX	LA	CESQG	No	No	No
JOE MENANT'S BODY SHOP	MERAUX	LA	CESQG	No	No	No
L A LUCK LLC, MOVIE PRODUCTION	MERAUX	LA	CESQG	No	No	No
LESLIE'S SWIMMING POOL SUPPLY	MERAUX	LA	none	No	No	No
MIKES OUTBOARD RPR INC	MERAUX	LA	SQG	No	No	No
MURPHY OIL USA, INC. MERAUX REFINERY	MERAUX	LA	LQG	No	No	Yes
SEARS 2385 6557 ROEBUCK & CO	MERAUX	LA	CESQG	No	No	No
SMITTYS TIRE	MERAUX	LA	CESQG	No	No	No
SOUTH CENTRAL BELL NWORLAJP	MERAUX	LA	none	No	No	No
US ENV SVCS LLC	MERAUX	LA	none	No	Yes	No
US INDUSTRIAL SVCS	MERAUX	LA	none	No	Yes	No
WINN DIXIE 1438	MERAUX	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70075*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-6
70117 NEW ORLEANS

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2007

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Metals Recovery	61,000
SOUTHERN SCRAP	LA	Metals Recovery	61,000
SOUTHERN SCRAP	LA	Metals Recovery	53,000
SOUTHERN SCRAP	LA	Metals Recovery	53,000
SOUTHERN SCRAP	LA	Metals Recovery	51,000
SOUTHERN SCRAP	LA	Metals Recovery	51,000
SOUTHERN SCRAP	LA	Metals Recovery	25,000
SOUTHERN SCRAP	LA	Metals Recovery	21,000
Total (lbs)			376,000

List of transfers for 2006

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Metals Recovery	170,000
SOUTHERN SCRAP	LA	Metals Recovery	170,000
SOUTHERN SCRAP	LA	Metals Recovery	69,000
SOUTHERN SCRAP	LA	Metals Recovery	44,000
SOUTHERN SCRAP	LA	Metals Recovery	44,000
SOUTHERN SCRAP	LA	Metals Recovery	34,000
SOUTHERN SCRAP	LA	Metals Recovery	34,000
SOUTHERN SCRAP	LA	Metals Recovery	20,000
SOUTHERN SCRAP	LA	Metals Recovery	20,000
SOUTHERN SCRAP	LA	Metals Recovery	18,000
SOUTHERN SCRAP	LA	Metals Recovery	14,000
Total (lbs)			637,000

List of transfers for 2005

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Metals Recovery	83,000
SOUTHERN SCRAP	LA	Metals Recovery	83,000
SOUTHERN SCRAP	LA	Metals Recovery	78,000
SOUTHERN SCRAP	LA	Metals Recovery	78,000
SOUTHERN SCRAP	LA	Metals Recovery	48,000
SOUTHERN SCRAP	LA	Metals Recovery	48,000
SOUTHERN SCRAP	LA	Metals Recovery	33,000
SOUTHERN SCRAP	LA	Metals Recovery	31,000
SOUTHERN SCRAP	LA	Metals Recovery	31,000
SOUTHERN SCRAP	LA	Metals Recovery	12,000
Total (lbs)			525,000

List of transfers for 2004

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Metals Recovery	83,000
SOUTHERN SCRAP	LA	Metals Recovery	83,000
SOUTHERN SCRAP	LA	Metals Recovery	63,000
SOUTHERN SCRAP	LA	Metals Recovery	63,000
SOUTHERN SCRAP	LA	Metals Recovery	34,000
SOUTHERN SCRAP	LA	Metals Recovery	33,000
SOUTHERN SCRAP	LA	Metals Recovery	33,000
SOUTHERN SCRAP	LA	Metals Recovery	25,000
Total (lbs)			417,000

List of transfers for 2003

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)

SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	191,015
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	140,078
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	127,343
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	63,672
Total (lbs)			522,108

List of transfers for 2002

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	74,589
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	4,662
Total (lbs)			79,251

List of transfers for 2001

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP MATERIALS	LA	Other Reuse or Recovery	80,000
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	30,000
SOUTHERN SCRAP MATERIAL CO.	LA	Other Reuse or Recovery	750
SOUTHERN SCRAP MATERIAL CO.	LA	Other Reuse or Recovery	250
Total (lbs)			111,000

List of transfers for 2000

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	262,907
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	64,345
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	31,134
SOUTHERN SCRAP RECYCLING - NO	LA	Metals Recovery	6,356

SOUTHERN SCRAP MATERIAL CO.	LA	Other Reuse or Recovery	5,860
SOUTHERN SCRAP MATERIAL CO.	LA	Other Reuse or Recovery	4,420
SOUTHERN SCRAP MATERIAL CO.	LA	Other Reuse or Recovery	3,540
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	2,560
SOUTHERN SCRAP MATERIALS	LA	Metals Recovery	250
Total (lbs)			381,372

List of transfers for 1999

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	82,160
SOUTHERN SCRAP RECYCLING - NO	LA	Metals Recovery	28,227
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	24,900
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	20,900
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	2,460
Total (lbs)			158,647

List of transfers for 1998

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	2,430,000
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	378,000
SOUTHERN SCRAP COMPANY	LA	Metals Recovery	272,000
NEW ORLEANS SEWAGE & WATER BOA RD	LA	POTW Transfer	985
Total (lbs)			3,080,985

List of transfers for 1997

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)

SOUTHERN SCRAP	LA	Metals Recovery	2,500,000
SOUTHERN SCRAP	LA	Metals Recovery	390,000
SOUTHERN SCRAP	LA	Metals Recovery	280,000
NEW ORLEANS SEWERAGE & WATER B, OARD	LA	POTW Transfer	23,636
Total (lbs)			3,193,636

List of transfers for 1996

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Metals Recovery	270,300
SOUTHERN SCRAP	LA	Metals Recovery	191,300
SOUTHERN SCRAP	LA	Metals Recovery	182,300
NEW ORLEANS SEWERAGE & WATER, BOARD	LA	POTW Transfer	6,299
Total (lbs)			650,199

List of transfers for 1995

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	297,600
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	104,000
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	104,000
N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	6,988
Total (lbs)			512,588

List of transfers for 1994

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	53,300
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	26,200

N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	433
Total (lbs)			79,933

List of transfers for 1993

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP	LA	Other Reuse or Recovery	55,250
SOUTHERN SCRAP	LA	Metals Recovery	55,160
SOUTHERN SCRAP	LA	Other Reuse or Recovery	670
N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	413
Total (lbs)			111,493

List of transfers for 1992

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	113,000
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	19,500
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	14,450
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	14,300
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	14,300
SOUTHERN SCRAP RECYCLING CORP.	LA	Metals Recovery	1,500
N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	423
Total (lbs)			177,473

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	479
N. O. SEWAGE & WATER BOARD	LA	POTW Transfer	479
Total (lbs)			958

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70117*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70117, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
794685	NEW ORLEANS	LA	SOUTHERN SCRAP MATERIAL	FIXED	n

Total incidents for reporting year 2006: 1

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
707990	City Left Blank	LA	CHEVRON TEXACO	PLATFORM	n

Total incidents for reporting year 2003: 1

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
625485	NEW ORLEANS	LA	USCG - ANT NEW ORLEANS	VESSEL	n

Total incidents for reporting year 2002: 1

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
578881	NEW ORLEANS	LA	WASHINGTON GROUP INTERNATIONAL	UNKNOWN SHEEN	n

Total incidents for reporting year 2001: 1

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
529391	NEW ORLEANS	LA	U. S. COAST GUARD	FIXED	n

Total incidents for reporting year 2000: 1

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
448617	NEW ORLEANS	LA	US ARMY CORP OF ENGINEERS	FIXED	n

Total incidents for reporting year 1998: 1

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
393753	NEW ORLEANS	LA	USCG-CUTTER WHITE HOLLY	VESSEL	n

Total incidents for reporting year 1997: 1

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
251705	NEW ORLEANS	LA	USCG-SUPCEN NEW ORLEANS	FIXED	n

Total incidents for reporting year 1994: 1

List of incidents for 1993

Emergency Response Notification System (ERNS) Incidents for Zip Code 70117, LA, 1982-2007, low detail

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
151623	NEW ORLEANS	LA	SOUTHERN SCRAP	FIXED	n

Total incidents for reporting year 1993: 1

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
132847	NEW ORLEANS	LA	SAUCER MARINE	UNKNOWN SHEEN	n

Total incidents for reporting year 1992: 1

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
75405	MOBILE	AL	EXXON CO. USA	VESSEL	n
76613	City Left Blank	AL	EXXON CO. USA	VESSEL	n
80303	MOBILE	AL	EXXON CO. USA	VESSEL	n
85079	MOBILE	AL	EXXON CO. USA	VESSEL	n
85337	MOBILE	AL	EXXON CO. USA	VESSEL	n
86284	City Left Blank	AL	EXXON CO. USA	VESSEL	n
86646	City Left Blank	AL	EXXON CO. USA	VESSEL	n
88942	GULF SHORES	AL	EXXON CO. USA	VESSEL	n
88944	GULF SHORES	AL	EXXON CO. USA	VESSEL	n
89055	City Left Blank	AL	EXXON CO. USA	PLATFORM	n

Total incidents for reporting year 1991: 10

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages

9346	NEW ORLEAN	LA	CITADEL CEMENT	FIXED	n
30631	NEW ORLEANS	LA	NEEB AND KERNEY	FIXED	n
40422	NEW ORLEANS	LA	BRITE MANUFACTURING CO	MOBILE	n

Total incidents for reporting year 1990: 3

List of incidents for 1989

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
-93959	City Left Blank	LA	MARINE TERMINAL	Left Blank	n

Total incidents for reporting year 1989: 1

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70117*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

BRS Facilities for Zip 70117, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
US COAST GUARD NEW ORLEANS BASE	NEW ORLEANS	LA	7	7

Total records for reporting year 1989: 1
Total Waste Tons Generated: 6.83
Total Waste Tons Managed: 6.83
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's Biennial Reporting System (part of RCRAINFO) database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70117*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70117, LA, low detail

RMP Facilities for Zip 70117, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
East Bank Wastewater Treatment Plant	New Orleans	LA	26	0	No

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70117*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70117, LA, low detail

RCRIS Handlers for Zip 70117, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
7 UP RC BOTTLING CO	NEW ORLEANS	LA	none	No	No	No
ADVANCE AUTO PARTS #9788	NEW ORLEANS	LA	SQG	No	No	No
ADVANCE POLYBAG INC	NEW ORLEANS	LA	CESQG	No	No	No
ALL STAR CLEANERS	NEW ORLEANS	LA	CESQG	No	No	No
ALVARDALE CLEANERS	NEW ORLEANS	LA	none	No	No	No
ASHER CLNRS & LNDRY	NEW ORLEANS	LA	CESQG	No	No	No
BASF WYANDOTTE CORP TRANS INTERNATIONAL	NEW ORLEANS	LA	none	No	No	No
BEARDS AUTO INC	NEW ORLEANS	LA	CESQG	No	No	No
BILLS TEXACO	NEW ORLEANS	LA	SQG	No	No	No
BLANCHARDS BODY SHOP INC	NEW ORLEANS	LA	CESQG	No	No	No
BOLAND MARINE & MFG CO INC	NEW ORLEANS	LA	none	No	No	No
BY WATER CLEANERS INC	NEW ORLEANS	LA	CESQG	No	No	No
BYWATER WOODWORKS	NEW ORLEANS	LA	CESQG	No	No	No
C & R ENGINE SVC	NEW ORLEANS	LA	CESQG	No	No	No
CANAL MARINE REPAIRS INC	NEW ORLEANS	LA	none	No	No	No
CHEVRON NO 108931	NEW ORLEANS	LA	CESQG	No	No	No
CHEVRON STATIONS INC # 108951	NEW ORLEANS	LA	CESQG	No	No	No
CHIEF BODY & FENDER WORKS	NEW ORLEANS	LA	CESQG	No	No	No
CLARENCE JACOB AUTO RPR	NEW ORLEANS	LA	LQG	No	No	No
CLAUDE BEANS BODY SHOP	NEW ORLEANS	LA	CESQG	No	No	No
CORDELLS AUTO WORKS	NEW ORLEANS	LA	CESQG	No	No	No
COTTMAN TRANSMISSION	NEW ORLEANS	LA	SQG	No	No	No
COURSEAULTS MOBILE SVC	NEW ORLEANS	LA	CESQG	No	No	No
D & G BODY SHOP	NEW ORLEANS	LA	SQG	No	No	No
D & G BODY SHOP INC	NEW ORLEANS	LA	CESQG	No	No	No
DAVID O SHURDEN MD	NEW ORLEANS	LA	CESQG	No	No	No
DINVAUTS TRUCKING SVC INC	NEW ORLEANS	LA	none	No	Yes	No
DUCROS AUTOMOTIVE BODY & PAINT SHOP	NEW ORLEANS	LA	CESQG	No	No	No
ELDRIGES AUTO RPR	NEW ORLEANS	LA	SQG	No	No	No
EVERKLEEN CLNRS	NEW ORLEANS	LA	CESQG	No	No	No

EXPRESS AUTO PARTS	NEW ORLEANS	LA	CESQG	No	No	No
EXXON CO USA 58056	NEW ORLEANS	LA	CESQG	No	No	No
F & S AUTO	NEW ORLEANS	LA	CESQG	No	No	No
FINDLEY ADHESIVES INC	NEW ORLEANS	LA	none	No	No	No
FRESH START AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No
GALLAGHER TRANSFER & STORAGE CO INC	NEW ORLEANS	LA	none	No	No	No
HIGH TECHNOLOGY CAR CARE	NEW ORLEANS	LA	CESQG	No	No	No
HOLY CROSS SCHOOL	NEW ORLEANS	LA	CESQG	No	No	No
INDUSTRIAL MATERIALS MGMT INC	NEW ORLEANS	LA	CESQG	No	No	No
JAMES BROS & PRISCOE AUTO REPAIR	NEW ORLEANS	LA	SQG	No	No	No
JOHNSON AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No
KERN CHIROPRACTICS FAMILY HEALTH CNTR	NEW ORLEANS	LA	CESQG	No	No	No
LAFARGE CORP	NEW ORLEANS	LA	none	No	No	No
M & M DRYCLEANERS	NEW ORLEANS	LA	SQG	No	No	No
MASON AUTO RPR	NEW ORLEANS	LA	LQG	No	No	No
MINI MTRS	NEW ORLEANS	LA	SQG	No	No	No
NEAPOLEN AUTO SVC	NEW ORLEANS	LA	CESQG	No	No	No
NEEB KEARNEY CO INC	NEW ORLEANS	LA	CESQG	No	No	No
NEW ORLEANS STEVEDORING CO	NEW ORLEANS	LA	CESQG	No	No	No
NORFOLK SOUTHERN RAILWAY CO	NEW ORLEANS	LA	SQG	No	No	No
OCEAN TECHNICAL SVC INC	NEW ORLEANS	LA	SQG	No	No	No
P & P COLLISION CNTR	NEW ORLEANS	LA	CESQG	No	No	No
PAULS SVC CNTR	NEW ORLEANS	LA	SQG	No	No	No
PELICAN ICE & COLD STORAGE	NEW ORLEANS	LA	none	No	No	No
PRESS CRAFT PRINTING CO	NEW ORLEANS	LA	SQG	No	No	No
PROFESSIONAL AUTO RPR	NEW ORLEANS	LA	SQG	No	No	No
R & E AUTO RPR & CAR WASH	NEW ORLEANS	LA	CESQG	No	No	No
R & G IMPORTS & SPORT	NEW ORLEANS	LA	SQG	No	No	No
REDS RADIATOR SPECIALITY	NEW ORLEANS	LA	CESQG	No	No	No
REISINGS SUNRISE BAKERY INC	NEW ORLEANS	LA	CESQG	No	No	No
RONALD GETTRIDGE	NEW ORLEANS	LA	CESQG	No	No	No
ROYAL ST FOREIGN CAR	NEW ORLEANS	LA	CESQG	No	No	No
SHELL CHEMICAL	NEW ORLEANS	LA	SQG	No	No	No
SOUTH CENTRAL BELL LA AREA WHSE PBX	NEW ORLEANS	LA	none	No	No	No
SOUTHERN SCRAP MTL CO LLC	NEW ORLEANS	LA	CESQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70117, LA, low detail

ST CLAUDE MED CNTR	NEW ORLEANS	LA	LQG	No	No	No
STAR COLLISION CENTER	NEW ORLEANS	LA	CESQG	No	No	No
STAR ENTERPRISE	NEW ORLEANS	LA	SQG	No	No	No
THE GREEN PROJECT INC	NEW ORLEANS	LA	CESQG	No	No	No
TOMMY NYES TRUCK RPR	NEW ORLEANS	LA	CESQG	No	No	No
TONTI BODY & FENDER WORKS INC	NEW ORLEANS	LA	SQG	No	No	No
TURNER & SON	NEW ORLEANS	LA	CESQG	No	No	No
US ARMY CORPS OF ENGN INNER HARBOR NAV	NEW ORLEANS	LA	CESQG	No	No	No
US FILTER OPERATING SERVICES	NEW ORLEANS	LA	CESQG	No	No	No
USA COE, INNER HARBOR NAVIG CANAL	NEW ORLEANS	LA	CESQG	No	No	No
USCG INTEGRATED SUPPORT COMM	NEW ORLEANS	LA	SQG	No	No	No
WIZ AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 14, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70117*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-7
70126 NEW ORLEANS

Toxic Release Inventory (TRI) Facilities for Zip Code 70126, LA, 1987-2007, low detail

TRI Facilities for Zip 70126, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 2007

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
BOLLINER GULF REPAIR LLC	BOLLINGER SHIPYARDS LOCKPORT LLC	NEW ORLEANS	LA	5,322	152,284
U.S. GYPSUM CO	USG CORP	NEW ORLEANS	LA	179	180
LAFARGE MID ATLANTIC NEW ORLEANS EAST RMX	LAFARGE N.A.	NEW ORLEANS	LA	0.02	0.02
Total				5,501 (lbs)	152,464 (lbs)

List of facilities for 2006

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
BOLLINGER GULF REPAIR LLC	BOLLINGER SHIPYARDS LOCKPORT LLC	NEW ORLEANS	LA	128	409,128
UNITED STATES GYPSUM CO	UNITED STATES GYPSUM CORP	NEW ORLEANS	LA	102	105
LAFARGE MID ATLANTIC NEW ORLEANS EAST RMX	LAFARGE NORTH AMERICA	NEW ORLEANS	LA	0.02	0.02
Total				230 (lbs)	409,233 (lbs)

List of facilities for 2005

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70126, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
BOLLINGER GULF REPAIR LLC	BOLLINGER SHIPYARDS LOCKPORT LLC	NEW ORLEANS	LA	169	199,169	784.83
UNITED STATES GYPSUM CO	UNITED STATES GYPSUM CORP	NEW ORLEANS	LA	131	134	4.68
LAFARGE MID ATLANTIC NEW ORLEANS EAST RMX	LAFARGE MID ATLANTIC	NEW ORLEANS	LA	0.02	0.02	0.01
Total				300 (lbs)	199,303 (lbs)	790

List of facilities for 2004

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
BOLLINGER GULF REPAIR L.L.C.	BOLLINGER SHIPYARDS LOCKPORT L.L.C.	NEW ORLEANS	LA	4,199	203,162	491.93
U.S. GYPSUM CO	USG CORP	NEW ORLEANS	LA	159	163	5.97
LAFARGE NORTH AMERICA INC NO EAST RMX	LAFARGE NORTH AMERICA	NEW ORLEANS	LA	0.04	0.04	0.03
Total				4,358 (lbs)	203,325 (lbs)	498

List of facilities for 2003

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
BOLLINGER GULF REPAIR LLC	BOLLINGER SHIPYARDS LOCKPORT LLC	NEW ORLEANS	LA	4,678	110,650	4,537.20
US GYPSUM CO	USG CORP	NEW ORLEANS	LA	162	165	3.64
Total				4,840 (lbs)	110,815 (lbs)	4,541

List of facilities for 2002

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
BOLLINGER GULF REPAIR L.L.C.	BOLLINGER SHIPYARDS LOCKPORT L.L.C.	NEW ORLEANS	LA	25,772	85,840	3,100.66
U.S. GYPSUM CO.	USG CORP.	NEW ORLEANS	LA	117	120	3.45
Total				25,889 (lbs)	85,960 (lbs)	3,104

List of facilities for 2001

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
U.S. GYPSUM CO.	USG CORP.	NEW ORLEANS	LA	146	149	3.56

List of facilities for 2000

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
U.S. GYPSUM CO.	USG CORP.	NEW ORLEANS	LA	18	12	4.61

List of facilities for 1994

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
EQUITABLE/ HALTER	TRINITY INDUSTRIES INC	NEW ORLEANS	LA	10,962	13,153	34.57

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
BAROID DRILLING FLUIDS INC.	DRESSER INDUSTRIES INC.	NEW ORLEANS	LA	8,480	0.00	2,822.94

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
EQUITABLE/ HALTER	TRINITY INDUSTRIES INC	NEW ORLEANS	LA	158,124	192,873	237.33
BAROID DRILLING FLUIDS INC.	DRESSER INDUSTRIES INC.	NEW ORLEANS	LA	6,580	0.00	2,170.91
Total				164,704 (lbs)	192,873 (lbs)	2,408

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
EQUITABLE/ HALTER	TRINITY INDUSTRIES INC	NEW ORLEANS	LA	228,400	253,260	4,919.74
BAROID DRILLING FLUIDS INC.	DRESSER INDUSTRIES INC.	NEW ORLEANS	LA	9,280	0.00	3,096.20
Total				237,680 (lbs)	253,260 (lbs)	8,016

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
EQUITABLE/HALTER	TRINITY INDUSTRIES INC	NEW ORLEANS	LA	66,815	180.17
BAROID DRILLING FLUIDS INC.	DRESSER INDUSTRIES INC.	NEW ORLEANS	LA	10,510	3,517.06
Total				77,325 (lbs)	3,697

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
EQUITABLE/HALTER	TRINITY INDUSTRIES INC	NEW ORLEANS	LA	10,169	5.10
BAROID DRILLING FLUIDS INC.,	BAROID CORP.	NEW ORLEANS	LA	9,250	3,085.32
Total				19,419 (lbs)	3,090

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
EQUITABLE/HALTER DIV.,	TRINITY INDUSTRIES INC.	NEW ORLEANS	LA	1,217	4.45
BAROID DRILLING FLUIDS INC.,	BAROID DRILLING FLUIDS INC.,	NEW ORLEANS	LA	540	153.87
Total				1,757 (lbs)	158

List of facilities for 1987

Click on the column headers below to re-sort the search. Click on facility names for a summary for that

facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?
EQUITABLE DIV.,	TRINITY INDUSTRIES INC.	NEW ORLEANS	LA	19,701
NL BAROID, NL PETROLEUM SERVICE INC.	NL PETROLEUM	NEW ORLEANS	LA	0.00
Total				19,701 (lbs)

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Zip Code	70126*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2007

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	478
SOUTHERN SCRAP RECYCLING	LA	Other Reuse or Recovery	467
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	389
Total (lbs)			1,334

List of transfers for 2006

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	387
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	362
SOUTHERN SCRAP RECYCLING	LA	Other Reuse or Recovery	175
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	53
Total (lbs)			977

List of transfers for 2005

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	1,613
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	240
SOUTHERN SCRAP RECYCLING	LA	Metals Recovery	124
Total (lbs)			1,977

List of transfers for 1992

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL BFI	LA	Landfill/Disposal Surface Impoundment	5,219

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES LANDFILL BFI	LA	Landfill/Disposal Surface Impoundment	5,610

List of transfers for 1990

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
ROLLINS ENVIRONMENTAL	LA	Landfill/Disposal Surface Impoundment	250

List of transfers for 1989

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESCENT ACRES	LA	Landfill/Disposal Surface Impoundment	250
CRESCENT ACRES	LA	Landfill/Disposal Surface Impoundment	250
Total (lbs)			500

List of transfers for 1988

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CRESENT ACRES	LA	Landfill/Disposal Surface Impoundment	12

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70126*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70126, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
853730	BIRMINGHAM	AL	CSX TRANSPORTATION	RAILROAD	n

Total incidents for reporting year 2007: 1

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
812991	NEW ORLEANS	LA	BOLLINGER GULF REPAIR	STORAGE TANK	n
815183	NEW ORLEANS	LA	BOLLINGER GULF REPAIR	VESSEL	n
818196	PORT SULFUR	LA	FREEPORT-MCMORAN ENERGY	FIXED	n

Total incidents for reporting year 2006: 3

List of incidents for 2005

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
768809	NEW ORLEANS	LA	BOLLINGER GULF REPAIR	FIXED	n

Total incidents for reporting year 2005: 1

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages

719765	NEW ORLEANS	LA	MOTOR YACHT LEDA	VESSEL	n

Total incidents for reporting year 2004: 1

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
650689	NEW ORLEANS	LA	BOLLINGER GULF REPAIR	VESSEL	n
655924	NEW ORLEANS	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2003: 2

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
553412	NEWTON	MS	UNITED PARCEL SERVICE (UPS)	MOBILE	y
558582	NEW ORLEANS	LA	TRIPLE E. TRANSPORTATION	MOBILE	n
566552	NEW ORLEANS	LA	CERES GULF	VESSEL	y
569292	NEW ORLEANS	LA	LIFE LINE	STORAGE TANK	n
572438	NEW ORLEANS	LA	BALLINGER GULF REPAIR	VESSEL	n
575645	NEW ORLEANS	LA	NEW ORLEANS MARINE CONTRA	STORAGE TANK	n
583424	NEW ORLEANS	LA	UNIVERSAL MARITIME SERV, DIV. OF MARSEK	FIXED	n

Total incidents for reporting year 2001: 7

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
537211	NEW ORLEANS	LA	UNITED PARCEL SERVICE	MOBILE	n

Total incidents for reporting year 2000: 1

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
472749	NEW ORLEANS	LA	HOLTER GULF REPAIR	FIXED	n
481730	NEW ORLEANS	LA	NEW ORLEANS MARINE CONTRA	FIXED	n
483544	NEW ORLEANS	LA	HALTER GULF REPAIR	UNKNOWN SHEEN	n
500967	NEW ORLEANS	LA	HALTER GULF REPAIR	VESSEL	n
506534	NEW ORLEANS	LA	GULF COAST DOCKSIDE INC.	VESSEL	n

Total incidents for reporting year 1999: 5

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
429183	NEW ORLEANS	LA	CERES GOLF INC.	MOBILE	n
436856	NEW ORLEANS	LA	HOLTER GULF REPAIR	VESSEL	n
438599	NEW ORLEANS	LA	NOLA MARINE CONTRACTOR	FIXED	n
442507	NEW ORLEANS	LA	CERES GULF INC	MOBILE	n
445115	NEW ORLEANS	LA	HOLTER GULF REPAIR	VESSEL	n
446298	NEW ORLEANS	LA	NOLA MARINE CONTRACTOR	FIXED	n
448150	NEW ORLEANS	LA	NOLA MARINE CONTRACTOR	FIXED	n
461911	GULFPORT	MS	HALTER MARINE GROUP	FIXED	n

Total incidents for reporting year 1998: 8

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
401434	NEW ORLEANS	LA	NEW ORLEANS MARINE	FIXED	n
404327	NEW ORLEANS	LA	NEW ORLEANS MARINE CONT.	MOBILE	n
406658	NEW ORLEANS	LA	HOLTER GULF REPAIR	FIXED	n
408345	NEW ORLEANS	LA	NEW ORLEANS MARINE CONT.	MOBILE	n
408753	NEW ORLEANS	LA	ZENECA	MOBILE	n
411453	NEW ORLEANS	LA	NEW ORLEANS MARINE CONTRA	FIXED	n
411639	NEW ORLEANS	LA	NEW ORLEANS MARINE CONTRA	MOBILE	n

412345	NEW ORLEANS	LA	EQUITABLE SHIPYARD	VESSEL	n

Total incidents for reporting year 1997: 8

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
351144	NEW ORLEANS	LA	NEW ORLEANS MARINE	FIXED	n
369459	NEW ORLEANS	LA	HALTER MARINE GROUP	VESSEL	n

Total incidents for reporting year 1996: 2

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
281865	NEW ORLEANS	LA	F/V NO.LA3774CA	VESSEL	n
290674	NEW ORLEANS	LA	ORLEANS LEVY DISTRICT	FIXED	n
307711	NEW ORLEANS	LA	P&H TRANSPORTATION CO	FIXED	n
317930	NEW ORLEANS	LA	NAVIERAS	VESSEL	n

Total incidents for reporting year 1995: 4

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
254005	NEW ORLEANS	LA	LEVER DISTRICT	VESSEL	n

Total incidents for reporting year 1994: 1

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages

77640	NEW ORLEANS	LA	TRINITY INDUSTRIES	FIXED	n
80019	MOSS POINT	MS	TRINITY INDUSTRIES	VESSEL	n

Total incidents for reporting year 1991: 2

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
37360	GALVESTON	TX	PACIFIC GULF MARINE	VESSEL	n

Total incidents for reporting year 1990: 1

List of incidents for 1988

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
-84638	City Left Blank	LA	SEALAND INC	Left Blank	n
-74224	NEW ORLEANS	LA	MURPHY OIL	Left Blank	n

Total incidents for reporting year 1988: 2

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70126*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Hazardous Waste (BRS) Facilities for Zip Code 70126, LA, 1989-2007, summary

BRS Facilities for Zip 70126, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2007

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOLLINGER GULF REPAIR, LLC	NEW ORLEANS	LA	10	10
TRINITY YACHTS	NEW ORLEANS	LA	2	2

Total records for reporting year 2007: 2
Total Waste Tons Generated: 12.295
Total Waste Tons Managed: 12.295
Total Waste Tons Received and Managed: 0

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOLLINGER GULF REPAIR, LLC	NEW ORLEANS	LA	8	8
TRINITY YACHTS LLC	NEW ORLEANS	LA	9	7

Total records for reporting year 2005: 2
Total Waste Tons Generated: 16.219
Total Waste Tons Managed: 14.319
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOLLINGER GULF REPAIR, LLC	NEW ORLEANS	LA	20	20
TRINITY YACHTS, INC.	NEW ORLEANS	LA	13	13

Hazardous Waste (BRS) Facilities for Zip Code 70126, LA, 1989-2007, summary

Total records for reporting year 2003: 2
Total Waste Tons Generated: 32.586
Total Waste Tons Managed: 32.586
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
BOLLINGER GULF REPAIR, L.L.C.	NEW ORLEANS	LA	9	9
FOLGER COFFEE COMPANY - CHEF	NEW ORLEANS	LA	5	5
TRINITY YACHTS LLC	NEW ORLEANS	LA	5	5

Total records for reporting year 2001: 3
Total Waste Tons Generated: 18.575
Total Waste Tons Managed: 18.575
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
EQUITABLE SHIPYARDS,LLC	NEW ORLEANS	LA	7	7
HALTER GULF REPAIR, INC.	NEW ORLEANS	LA	12	12
RED FOX - NEW ORLEANS	NEW ORLEANS	LA	9	9
SEALAND SERVICE,INC.	NEW ORLEANS	LA	4	4

Total records for reporting year 1999: 4
Total Waste Tons Generated: 32.188
Total Waste Tons Managed: 32.188
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
HALTER EQUITABLE SHIPYARDS	NEW ORLEANS	LA	5	5

HALTER GULF REPAIR INC	NEW ORLEANS	LA	266	27
SEALAND SERVICE INC	NEW ORLEANS	LA	5	5

Total records for reporting year 1997: 3
Total Waste Tons Generated: 275.629
Total Waste Tons Managed: 36.569
Total Waste Tons Received and Managed: 0

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
TRINITY INDUSTRIES EQUITABLE/ HALTER	NEW ORLEANS	LA	61	61

Total records for reporting year 1995: 1
Total Waste Tons Generated: 61.427
Total Waste Tons Managed: 61.427
Total Waste Tons Received and Managed: 0

Reporting Year: 1993

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
EQUITABLE SHIPYARD	NEW ORLEANS	LA	32	32

Total records for reporting year 1993: 1
Total Waste Tons Generated: 32
Total Waste Tons Managed: 32
Total Waste Tons Received and Managed: 0

Reporting Year: 1991

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
EQUITABLE SHIPYARD	NEW ORLEANS	LA	28	28

Hazardous Waste (BRS) Facilities for Zip Code 70126, LA, 1989-2007, summary

Total records for reporting year 1991: 1
Total Waste Tons Generated: 27.5
Total Waste Tons Managed: 27.5
Total Waste Tons Received and Managed: 0

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
INTERNATIONAL PAINT CO INC	NEW ORLEANS	LA	12	12
NAEGELE OUTDOOR ADVERTISING CO.	NEW ORLEANS	LA	2	2
ONE HOUR MARTINIZING	NEW ORLEANS	LA	1	1
UNITED PARCEL SERVICE	NEW ORLEANS	LA	3	3
WASTE MGMT INC, ALVAR-DBA AM WASTE	NEW ORLEANS	LA	2	2

Total records for reporting year 1989: 5
Total Waste Tons Generated: 20.25
Total Waste Tons Managed: 20.25
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70126*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70126, LA, low detail

RMP Facilities for Zip 70126, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Alvar Street Facility	New Orleans	LA	16	0	No
Equitable Shipyard LLC	New Orleans	LA	675	0	No
New Orleans Cold Storage	New Orleans	LA	42	0	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70126*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70126, LA, low detail

RCRIS Handlers for Zip 70126, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
10 MINUTE OIL CHANGE	NEW ORLEANS	LA	CESQG	No	No	No
ABA	NEW ORLEANS	LA	CESQG	No	No	No
ACE PRECISION FRAM & BODY	NEW ORLEANS	LA	CESQG	No	No	No
ADVANCE AUTO PARTS #9790	NEW ORLEANS	LA	SQG	No	No	No
ADVANTAGE TIRE SVC	NEW ORLEANS	LA	SQG	No	No	No
AERO SVCS INTERNATIONAL	NEW ORLEANS	LA	CESQG	No	No	No
AIR RELDAN INC	NEW ORLEANS	LA	CESQG	No	No	No
ALEXANDER/RYAN MARINE & SAFETY CO LA	NEW ORLEANS	LA	none	No	No	No
ALS QUAL CLNRS GENTILLY WDS	NEW ORLEANS	LA	CESQG	No	No	No
AMERICAN WHOLESALE FENCE CO INC	NEW ORLEANS	LA	CESQG	No	No	No
ARATEX UNIFORM RENTAL	NEW ORLEANS	LA	none	No	No	No
ASSOCIATED HOSPITAL SERVICES INC	NEW ORLEANS	LA	LQG	No	No	No
ATLANTIC TECHNICAL SVCS	NEW ORLEANS	LA	CESQG	No	No	No
ATLANTIC TECHNICAL SVCS INC	NEW ORLEANS	LA	CESQG	No	No	No
ATLANTIC TECHNICAL SVCS SHOP 2	NEW ORLEANS	LA	CESQG	No	No	No
BANNER CHEVROLET INC	NEW ORLEANS	LA	SQG	No	No	No
BARRIERE CONST CO	NEW ORLEANS	LA	CESQG	No	No	No
BERGERON MARINE SVC INC	NEW ORLEANS	LA	none	No	No	No
BFI CRESCENT ACRES LANDFILL	NEW ORLEANS	LA	CESQG	No	No	No
BIG EASY TRAVEL PLAZA	NEW ORLEANS	LA	CESQG	No	No	No
BOARD OF COMMISSIONERS ORLEANS LEVEE DIS	NEW ORLEANS	LA	CESQG	No	No	No
BOH BROS CONST CO ASPHALT BATCH PL	NEW ORLEANS	LA	CESQG	No	No	No
BOLLINGER GULF REPAIR, LLC	NEW ORLEANS	LA	none	No	No	Yes
BUDGET AUTO CENT	NEW ORLEANS	LA	CESQG	No	No	No
BUNNY BREAD	NEW ORLEANS	LA	none	No	No	No
C & L AUTO REPAIR	NEW ORLEANS	LA	CESQG	No	No	No
CAJUN CAMPING	NEW ORLEANS	LA	CESQG	No	No	No
CAPITOL TIRE SYSTEMS	NEW ORLEANS	LA	SQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70126, LA, low detail

CARNESIS GULF SVC	NEW ORLEANS	LA	none	No	No	No
CAUSEY BUS SVC	NEW ORLEANS	LA	CESQG	No	No	No
CBS OUTDOOR	NEW ORLEANS	LA	CESQG	No	No	No
CHEF & I10 SHELL	NEW ORLEANS	LA	CESQG	No	No	No
CHEMETRON CORP	NEW ORLEANS	LA	none	No	No	No
CHEVRON SS 108963	NEW ORLEANS	LA	CESQG	No	No	No
CHEVRON SS 109016	NEW ORLEANS	LA	CESQG	No	No	No
CHEVRON USA INC	NEW ORLEANS	LA	none	No	No	No
CHEVRON USA INC NO LAKEFRONT AIRPT	NEW ORLEANS	LA	SQG	No	No	No
CHUCKS AUTO REPAIR SHOP	NEW ORLEANS	LA	CESQG	No	No	No
CON WAY SOUTHERN EXP	NEW ORLEANS	LA	CESQG	No	No	No
CSX INTERMODAL	NEW ORLEANS	LA	CESQG	No	No	No
CUMMINS MID SOUTH INC	NEW ORLEANS	LA	none	No	No	No
DELGADO COMM COLL AIRCRAFT SCH	NEW ORLEANS	LA	CESQG	No	No	No
DICKSON GMP INTL INC NO E YD	NEW ORLEANS	LA	SQG	No	No	No
DON HINGLES BODY SHOP INC	NEW ORLEANS	LA	CESQG	No	No	No
DUCROS AUTO	NEW ORLEANS	LA	CESQG	No	No	No
DUPUY STORAGE & FORWARDING LLC	NEW ORLEANS	LA	CESQG	No	No	No
EAGER AVIATION CORP	NEW ORLEANS	LA	CESQG	No	No	No
EAST BANK AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No
EASTSIDE AUTO & TRUCK RPRS	NEW ORLEANS	LA	CESQG	No	No	No
EBERTS ENGINE SVC INC	NEW ORLEANS	LA	CESQG	No	No	No
ENTERGY NEW ORLEANS INC AB PATERSON	NEW ORLEANS	LA	SQG	No	No	No
EQUIPMENT MAINT CITY OF NO	NEW ORLEANS	LA	SQG	No	No	No
ETC GULF SOUTH	NEW ORLEANS	LA	SQG	No	No	No
EXXON CO USA # 55511	NEW ORLEANS	LA	CESQG	No	No	No
FAITH INC COLLISION SERVICE	NEW ORLEANS	LA	CESQG	No	No	No
FIRESTONE STORE 013617	NEW ORLEANS	LA	CESQG	No	No	No
FIRST RECOVERY	NEW ORLEANS	LA	CESQG	No	No	No
FOLGER COFFEE COMPANY - CHEF	NEW ORLEANS	LA	LQG	No	No	No
GENTILLY SUPER SVC	NEW ORLEANS	LA	CESQG	No	No	No
GEORGIA PACIFIC	NEW ORLEANS	LA	CESQG	No	No	No
GLY TECH SERVICES INC	NEW ORLEANS	LA	none	No	Yes	No
GOODYEAR AUTO SVC CNTR	NEW ORLEANS	LA	CESQG	No	No	No
GULF STATES ENG CO INC	NEW ORLEANS	LA	CESQG	No	No	No
GULF STATES ENGINEERING CO INC	NEW ORLEANS	LA	CESQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70126, LA, low detail

HALLIBURTON ENERGY SVCS	NEW ORLEANS	LA	CESQG	No	No	No
HARVEY PRESS	NEW ORLEANS	LA	CESQG	No	No	No
HBH INC NEW ORLEANS	NEW ORLEANS	LA	SQG	No	No	No
HEAVY MACHINES INC	NEW ORLEANS	LA	CESQG	No	No	No
HEISSERS INC	NEW ORLEANS	LA	CESQG	No	No	No
HERITAGE HYUNDAI	NEW ORLEANS	LA	CESQG	No	No	No
HERTZ EQUIP RENTAL CORP	NEW ORLEANS	LA	CESQG	No	No	No
HIPCO HAZARDOUS MATERIAL RESPONSE TEAM	NEW ORLEANS	LA	none	No	No	No
HOLNAM INC	NEW ORLEANS	LA	CESQG	No	No	No
HOME DEPOT USA #HD0348	NEW ORLEANS	LA	SQG	No	No	No
HOUSING AUTHORITY OF NEW ORLEANS	NEW ORLEANS	LA	CESQG	No	No	No
IMPERIAL AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No
INDUSTRIAL AIR & HYDRAULICS INC	NEW ORLEANS	LA	CESQG	No	No	No
KANSAS PACKING	NEW ORLEANS	LA	SQG	No	No	No
KENILWORTH EXXON CO USA #50799	NEW ORLEANS	LA	CESQG	No	No	No
LA TECH COLL- SIDNEY N COLLIER	NEW ORLEANS	LA	CESQG	No	No	No
LA NATL GUARD AASF 1	NEW ORLEANS	LA	CESQG	No	No	No
LA POWER HOUSE	NEW ORLEANS	LA	SQG	No	No	No
LAFARGE CONCRETE NEW ORLEANS EAST PLANT	NEW ORLEANS	LA	CESQG	No	No	No
LEADER BUICK GMC TRUCKS	NEW ORLEANS	LA	CESQG	No	No	No
LEE DINETT	NEW ORLEANS	LA	SQG	No	No	No
LUTHERAN HOME OF NEW ORLE	NEW ORLEANS	LA	none	No	No	No
MACFRUGALS	NEW ORLEANS	LA	CESQG	No	No	No
MATERIAL TRANSPORT SPECIALISTS	NEW ORLEANS	LA	LQG	No	Yes	No
MCMILLIANS AUTO & TRUCK RPR	NEW ORLEANS	LA	CESQG	No	No	No
MD SPECIALTIES	NEW ORLEANS	LA	CESQG	No	No	No
MECHANICAL EQUIPMENT CO INC	NEW ORLEANS	LA	SQG	No	No	No
MEINEKE DISCOUNT MUFFLER	NEW ORLEANS	LA	CESQG	No	No	No
MIKE & JERRYS PAINT & SUPPLY	NEW ORLEANS	LA	CESQG	No	No	No
MILLION AIRE OF NEW ORLEANS	NEW ORLEANS	LA	CESQG	No	No	No
MORRISON & I10 SHELL	NEW ORLEANS	LA	CESQG	No	No	No
NATIONAL LINEN SVC	NEW ORLEANS	LA	CESQG	No	No	No
NEW ORLEANS BIDS TERMINAL	NEW ORLEANS	LA	none	No	No	No
NEW ORLEANS DEPOT SERVICES INC YARD 2	NEW ORLEANS	LA	CESQG	No	No	Yes

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70126, LA, low detail

NEW ORLEANS DRAYAGE CO INC	NEW ORLEANS	LA	LQG	No	No	No
NEW ORLEANS DRESSER MINERALS	NEW ORLEANS	LA	none	No	No	No
NEW ORLEANS LAKEFRONT AIRPORT	NEW ORLEANS	LA	CESQG	No	No	No
NL PETROLEUM SVC INC	NEW ORLEANS	LA	none	No	No	No
NPR INC	NEW ORLEANS	LA	none	No	Yes	No
ONE HOUR CLEANERS	NEW ORLEANS	LA	SQG	No	No	No
ORLEANS MATERIALS & EQUIPMENT CO INC	NEW ORLEANS	LA	CESQG	No	No	No
ORLEANS PARISH MOSQUITO CONTROL	NEW ORLEANS	LA	none	No	No	No
ORLEANS PARISH SCH BD/ CENTRAL SVC GARAGE	NEW ORLEANS	LA	CESQG	No	No	No
OVERLAND EXPRESS	NEW ORLEANS	LA	CESQG	No	No	Yes
PICHONS AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No
PONTCHARTRAIN MTLS CORP	NEW ORLEANS	LA	CESQG	No	No	Yes
PRECISION BODY SHOP INC	NEW ORLEANS	LA	CESQG	No	No	No
PROFESSIONAL AUTO SALES & SVC	NEW ORLEANS	LA	CESQG	No	No	No
QUALITY RECONDITIONING SVC INC	NEW ORLEANS	LA	CESQG	No	No	No
RED FOX NEW ORLEANS	NEW ORLEANS	LA	LQG	No	No	No
REGIONAL TRANSIT AUTHORITY	NEW ORLEANS	LA	SQG	No	No	No
RFB FLYING SVC CAUDLE AVIATION	NEW ORLEANS	LA	CESQG	No	No	No
RING ELECTRIC CO	NEW ORLEANS	LA	CESQG	No	No	No
ROADWAY EXPRESS	NEW ORLEANS	LA	CESQG	No	No	No
RYDER TRANSPORTATION	NEW ORLEANS	LA	CESQG	No	No	No
RYDER TRUCK SCARIANOS	NEW ORLEANS	LA	CESQG	No	No	No
RYDER TRUCK SCARIONO	NEW ORLEANS	LA	CESQG	No	No	No
SEABROOK MARINE LLC	NEW ORLEANS	LA	SQG	No	No	No
SHELL OIL CO	NEW ORLEANS	LA	SQG	No	No	No
SHELL OIL CO MOTIVA ENTERPRISES	NEW ORLEANS	LA	SQG	No	No	No
SIMMONS PLATING & METAL FINISHING	NEW ORLEANS	LA	CESQG	No	No	No
SOUTH CENTRAL BELL NWORLACH	NEW ORLEANS	LA	SQG	No	No	No
SOUTHERN HOLDINGS	NEW ORLEANS	LA	CESQG	No	No	No
SOUTHERN UNIV AT NEW ORLEANS	NEW ORLEANS	LA	SQG	No	No	No
SPARKEYS AUTO RPR	NEW ORLEANS	LA	CESQG	No	No	No
SPEEDEE OIL CHANGE & TUNE UP	NEW ORLEANS	LA	CESQG	No	No	No
STAN TRANSMISSION	NEW ORLEANS	LA	CESQG	No	No	No
STAR ENT	NEW ORLEANS	LA	SQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70126, LA, low detail

STAR ENTERPRISE	NEW ORLEANS	LA	SQG	No	No	No
SUPERIOR AUTO RPR	NEW ORLEANS	LA	CESQG	No	No	No
SUWEST AIRWAYS INC	NEW ORLEANS	LA	CESQG	No	No	No
TAYLOR ENERGY	NEW ORLEANS	LA	CESQG	No	No	No
TEEDS AUTOMOTIVE	NEW ORLEANS	LA	SQG	No	No	No
THE OCCUPATIONAL HEALTHCENTERS	NEW ORLEANS	LA	CESQG	No	No	No
TIRE TOWN STORES INC	NEW ORLEANS	LA	CESQG	No	No	No
TIRE WAREHOUSE	NEW ORLEANS	LA	CESQG	No	No	No
TMC AUTO REPAIR LLC	NEW ORLEANS	LA	CESQG	No	No	No
TOP QUALITY AUTO SVC	NEW ORLEANS	LA	CESQG	No	No	No
TOYOTA OF NEW ORLEANS	NEW ORLEANS	LA	CESQG	No	No	No
TRINITY YACHTS LLC	NEW ORLEANS	LA	LQG	No	No	No
TRIPLE E TRANSPORT INC	NEW ORLEANS	LA	none	No	Yes	No
TURNER MARINE BULK INC	NEW ORLEANS	LA	SQG	No	No	No
U HAUL 74774	NEW ORLEANS	LA	CESQG	No	No	No
UNITED PARCEL SVC	NEW ORLEANS	LA	SQG	No	No	No
UNITED STATES GYPSUM COMPANY	NEW ORLEANS	LA	CESQG	No	No	No
VAN AUTO RPR	NEW ORLEANS	LA	CESQG	No	No	No
VIZZINI PRINTING	NEW ORLEANS	LA	CESQG	No	No	No
VIZZINI PRINTING SERVICE	NEW ORLEANS	LA	CESQG	No	No	No
WASTE MANAGEMENT OF NEW ORLEANS COMMERL	NEW ORLEANS	LA	CESQG	No	No	No
WILTZ AUTOMOTIVE	NEW ORLEANS	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 10, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70126*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-8
70129 NEW ORLEANS

Toxic Release Inventory (TRI) Facilities for Zip Code 70129, LA, 1987-2007, low detail

TRI Facilities for Zip 70129, LA (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

List of facilities for 2007

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
AIR PRODUCTS & CHEMICALS INC (NEW ORLEANS LA FACILITY)	AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	162,507	1,956,048
U.S. NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	3,202	51,702
HANSON PIPE & PRECAST INC.	HANSON PIPE & PRECAST INC.	NEW ORLEANS	LA	0.31	0.31
ENTERGY MICHOUD PLANT	ENTERGY CORP	NEW ORLEANS	LA	0.07	0.07
Total				165,710 (lbs)	2,007,750 (lbs)

List of facilities for 2006

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?
AIR PRODUCTS & CHEMICALS INC (NEW ORLEANS LA FACILITY)	AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	67,572	3,732,158
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	2	12,002
Total				67,574 (lbs)	3,744,160 (lbs)

List of facilities for 2005

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODUCTS & CHEMICALS INC NEW ORLEANS LA FACILITY	AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	104,033	1,532,460	48.55
SPECTRUM CONTROL TECHNOLOGY INC	SPECTRUM CONTROL INC	NEW ORLEANS	LA	31,123	45,259	1.04
UNITED STATES MARINE INC.	UNITED STATES MARINE INC.	NEW ORLEANS	LA	3,678	3,678	0.07
Total				138,834 (lbs)	1,581,397 (lbs)	50

List of facilities for 2004

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODUCTS & CHEMICALS INC (NEW ORLEANS LA FACILITY)	AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	131,865	1,450,811	53.43
SPECTRUM CONTROL TECHNOLOGY INC	SPECTRUM CONTROL INC	NEW ORLEANS	LA	42,931	58,169	1.43
UNITED STATES MARINE INC	UNITED STATES MARINE INC	NEW ORLEANS	LA	5,726	5,573	0.10
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	226	8,726	16.41
Total				180,748 (lbs)	1,523,279 (lbs)	71

List of facilities for 2003

Toxic Release Inventory (TRI) Facilities for Zip Code 70129, LA, 1987-2007, low detail

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODUCTS & CHEMICALS INC (NEW ORLEANS LA FACILITY)	AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	126,059	1,314,263	56.06
SPECTRUM CONTROL TECHNOLOGY INC	SPECTRUM CONTROL INC	NEW ORLEANS	LA	28,838	43,582	0.96
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	6,202	39,912	16.51
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	5,726	5,726	0.10
Total				166,825 (lbs)	1,403,483 (lbs)	74

List of facilities for 2002

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC. NEW ORLEANS LA FACILITY	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	130,082	1,137,277	38.04
SPECTRUM CONTROL TECH. INC.	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	31,652	50,929	1.06
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	28,102	82,102	16.51
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	5,246	5,246	0.10
Total				195,082 (lbs)	1,275,554 (lbs)	56

List of facilities for 2001

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC. NEW ORLEANS LA FACILITY	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	123,442	764,415	34.33
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	28,271	59,043	25.36
SPECTRUM CONTROL TECH.	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	27,647	25,852	0.92
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	16,402	61,142	16.49
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	9,097	9,097	0.17
ENTERGY MICHOUD PLANT	ENTERGY CORP.	NEW ORLEANS	LA	0.50	0.50	0.06
Total				204,860 (lbs)	919,550 (lbs)	77

List of facilities for 2000

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC. NEW ORLEANS LA FACILITY	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	88,015	713,373	31.45

NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	36,754	97,010	16.49
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	31,233	75,328	19.43
SPECTRUM CONTROL TECH.	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	14,667	128,883	0.49
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	6,442	6,442	0.12
ENTERGY MICHOUD PLANT	ENERGY CORP.	MICHOUD	LA	0.46	0.46	0.03
Total				177,111 (lbs)	1,021,036 (lbs)	68

List of facilities for 1999

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AIR PRODS. & CHEMICALS INC. (NEW ORLEANS LA FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	87,988	639,577	31.16
SPECTRUM CONTROL TECH.	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	72,132	69,918	1.66
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	65,474	222,922	16.96
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	54,345	87,098	47.66
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	11,490	11,490	0.21
LONE STAR INDS. INC.	LONE STAR INDS. INC.	NEW ORLEANS	LA	5	5	9.50
Total				291,434 (lbs)	1,031,010 (lbs)	107

List of facilities for 1998

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	128,605	303,041	10.25
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	95,370	95,370	0.64
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	83,369	94,380	73.35
AIR PRODS. & CHEMICALS INC. (NEW ORLEANS LA FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	79,334	710,350	26.60
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	49,700	317,700	0.74
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	6,217	5,890	0.11
LONE STAR INDS. INC.	LONE STAR INDS. INC.	NEW ORLEANS	LA	505	58	0.00
Total				443,100 (lbs)	1,526,789 (lbs)	112

List of facilities for 1997

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	87,980	131,860	1.23
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	82,355	1,333,070	30.21
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	72,118	102,960	63.44

NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	48,721	149,858	736.79
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	2,906	2,906	0.05
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	2,600	224,100	0.03
Total				296,680 (lbs)	1,944,754 (lbs)	832

List of facilities for 1996

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	188,900	443,400	2.82
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	113,180	120,440	1.44
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	96,990	162,316	85.03
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	74,292	1,114,550	27.12
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	60,568	220,802	5,392.13
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	2,823	2,823	0.05
Total				536,753 (lbs)	2,064,331 (lbs)	5,509

List of facilities for 1995

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Toxic Release Inventory (TRI) Facilities for Zip Code 70129, LA, 1987-2007, low detail

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	211,300	440,000	3.15
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	120,745	109,430	1.61
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	86,181	736,250	30.85
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	68,607	208,485	20.43
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	64,659	139,062	56.71
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	1,993	1,993	0.04
Total				553,485 (lbs)	1,635,220 (lbs)	113

List of facilities for 1994

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	167,697	1,523,295	42.11
NASA MICHOUD ASSEMBLY FACILITY	NATIONAL AERONAUTICS & SPACE ADMINISTRATION	NEW ORLEANS	LA	100,032	566,873	23.44
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	99,723	110,560	1.11
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	66,445	115,808	58.10
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	11,257	11,257	0.20
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	1,600	135,600	0.02

Total				446,754 (lbs)	2,463,393 (lbs)	125

List of facilities for 1993

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	187,708	1,602,177	44.55
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	98,714	954,422	37.92
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	98,200	74,350	1.56
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	63,889	120,007	55.47
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	5,200	5,200	0.09
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	2,000	199,009	0.03
Total				455,711 (lbs)	2,955,165 (lbs)	140

List of facilities for 1992

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) [?]	Waste (lbs) [?]	RSEI Score [?]
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	518,489	1,523,117	192.05
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	138,183	1,635,485	36.80

GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	44,000	65,000	38.09
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	36,000	19,240	0.70
U.S. MARINE INC.	U.S. MARINE INC.	NEW ORLEANS	LA	3,600	3,600	0.06
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	1,920	193,940	0.02
Total				742,192 (lbs)	3,440,382 (lbs)	268

List of facilities for 1991

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	Waste (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	637,665	1,558,724	248.62
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	164,447	1,118,405	79.35
GULF WIRE CORP.	NICHOLS WIRE INC.	NEW ORLEANS	LA	56,400	80,520	48.72
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	12,430	17,647	0.36
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	2,326	232,560	0.03
Total				873,268 (lbs)	3,007,856 (lbs)	377

List of facilities for 1990

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?

AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	724,858	268.66
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	246,419	155.01
GULF WIRE CORP.,	NICHOLS HOMESHIELD	NEW ORLEANS	LA	101,110	58.64
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	27,500	2.05
BOC GASES	BOC GROUP INC.	NEW ORLEANS	LA	5	0.00
Total				1,099,892 (lbs)	484

List of facilities for 1989

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?
AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	671,692	243.94
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	199,592	133.08
GULF WIRE CORP.,	NICHOLS HOMESHIELD	NEW ORLEANS	LA	104,751	35.15
SPECTRUM CONTROL TECHNOLOGY	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	30,694	0.40
TEXTRON MARINE SYS. SHIPYARD OPS.	TEXTRON INC.	NEW ORLEANS	LA	18,355	0.13
AIRCO INDUSTRIAL GASES, BOC GROUP 340	BOC GROUP	NEW ORLEANS	LA	0.00	0.00
Total				1,025,084 (lbs)	413

List of facilities for 1988

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?	RSEI Score ?

AIR PRODS. & CHEMICALS INC., (NEW ORLEANS FACILITY)	AIR PRODS. & CHEMICALS INC.	NEW ORLEANS	LA	627,102	215.11
MICHOUD ASSEMBLY FACILITY	LOCKHEED MARTIN CORP.	NEW ORLEANS	LA	298,400	166.14
GULF WIRE CORP.,	NICHOLS HOMESHIELD INC.	NEW ORLEANS	LA	79,337	68.04
TEXTRON MARINE SYSTEMS, SHIPYARD OPERATIONS	TEXTRON INC.	NEW ORLEANS	LA	11,335	0.08
DELUXE CHECK PRINTERS INC.	DELUXE CORP.	NEW ORLEANS	LA	7,395	0.20
AIRCO INDUSTRIAL GASES, (BOC GROUP) #340	BOC GROUP INC.	NEW ORLEANS	LA	0.00	0.00
Total				1,023,569 (lbs)	450

List of facilities for 1987

Click on the column headers below to re-sort the search. Click on facility names for a summary for that facility and on release amounts for extended detail on that facility.

Facility Name	Parent Name	City	State	Releases (lbs) ?
AIR PRODUCTS & CHEMICALS INC.,	AIR PORDUCTS & CHEMICALS INC.	NEW ORLEANS	LA	698,508
MICHOUD ASSEMBLY FACILITY,	MARTIN MARIETTA CORPORATIOON	NEW ORLEANS	LA	537,964
SPECTRUM CONTROL TECHNOLOGY, INC.	SPECTRUM CONTROL INC.	NEW ORLEANS	LA	16,617
TEXTRON MARINE SYSTEMS/BELL, HALTER INC. SHIPYARD	TEXTRON INC.	NEW ORLEANS	LA	16,097
DELUXE CHECK PRINTERS INC.	DELUXE CORP.	NEW ORLEANS	LA	9,979
SIEMENS ENERGY & AUTOMATION INC.	SIEMENS CORP.	NEW ORLEANS	LA	24
AIRCO INDUSTRIAL GASES, (BOC GROUP)	THE BOC GROUP	NEW ORLEANS	LA	0.00
Total				1,279,189 (lbs)

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Zip Code	70129*
State	Louisiana
Database Type	Current
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By releases (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of facilities) GO
Type of Report Output	Text (HTML) GO

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 2007

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
SEIMENS HYDROCARBONS	LA	Energy Recovery	1,739
SEIMENS HYDROCARBONS	LA	Energy Recovery	1,617
SEIMENS HYDROCARBONS	LA	Unknown	1,344
SEIMENS HYDROCARBONS	LA	Energy Recovery	1,272
SEIMENS HYDROCARBONS	LA	Other Off-Site Management	1,023
SEIMENS HYDROCARBONS	LA	Energy Recovery	478
SEIMENS HYDROCARBONS	LA	Energy Recovery	412
SEIMENS HYDROCARBONS	LA	Energy Recovery	271
AMID LANDFILL	LA	Other Surface Impoundment	172
SEIMENS HYDROCARBONS	LA	Energy Recovery	78
SEIMENS HYDROCARBONS	LA	Energy Recovery	66
SEIMENS HYDROCARBONS	LA	Energy Recovery	39
SEIMENS HYDROCARBONS	LA	Energy Recovery	39
AMID LANDFILL	LA	Other Surface Impoundment	1
SEIMENS HYDROCARBONS	LA	Energy Recovery	1
SIEMANS WATER TECHNOLOGIES	LA	Other Landfills	0.20
SIEMANS WATER TECHNOLOGIES	LA	Other Landfills	0.10
Total (lbs)			8,552

List of transfers for 2006

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	25,874
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	14,080
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	11,841
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	9,207
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	3,515

U.S. FILTER RECOVERY SERVICES	LA	Other Off-Site Management	2,548
U S FILTER	LA	Other Reuse or Recovery	920
U S FILTER	LA	Other Reuse or Recovery	580
U.S. FILTER RECOVERY SERVICES	LA	Other Off-Site Management	564
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	455
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	441
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	249
AMID LANDFILL	LA	Other Surface Impoundment	94
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	46
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	46
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	11
AMID LANDFILL	LA	Other Surface Impoundment	1
Total (lbs)			70,472

List of transfers for 2005

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	7,773
U.S. FILTER RECOVERY SERVICES	LA	Other Off-Site Management	1,934
U S FILTER	LA	Other Reuse or Recovery	830
U S FILTER	LA	Other Reuse or Recovery	520
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	240
AMID LANDFILL	LA	Other Surface Impoundment	122
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	78
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	52
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	34
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	31
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	20
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	16
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	10
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	2
AMID LANDFILL	LA	Other Surface Impoundment	1
Total (lbs)			11,663

List of transfers for 2004

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	6,093
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	4,769
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	2,586
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	1,080
U S FILTER	LA	Other Reuse or Recovery	880
U.S. FILTER RECOVERY SERVICES	LA	Other Off-Site Management	331
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	283
AMID LANDFILL	LA	Other Surface Impoundment	147
US FILTER RECOVERY SERVICES	LA	Solvents/Organics Recovery	69
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	35
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	25
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	21
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	5
AMID LANDFILL	LA	Other Surface Impoundment	2
U.S. FILTER RECOVERY SERVICES	LA	Energy Recovery	2
Total (lbs)			16,328

List of transfers for 2003

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
U S FILTER	LA	Other Reuse or Recovery	440
AMID LANDFILL	LA	Other Surface Impoundment	153
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	10
AMID LANDFILL	LA	Other Surface Impoundment	2
Total (lbs)			605

List of transfers for 2002

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)

INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	8,648
INTERNATIONAL PETROLEUM CORP	LA	Other Off-Site Management	6,430
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	1,540
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	752
U S FILTER	LA	Other Reuse or Recovery	430
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	203
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	187
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	147
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	135
A.M.I.D.	LA	Surface Impoundment	109
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	103
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	59
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	45
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	31
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	27
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	23
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	16
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	8
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	4
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	3
A.M.I.D.	LA	Surface Impoundment	2
INTERNATIONAL OIL SERVICES IPC	LA	Unknown	2
INTERNATIONAL PETROLEUM CORPOR	LA	Solvents/Organics Recovery	2
INTERNATIONAL OIL SERVICES IPC	LA	Unknown	1
INTERNATIONAL OIL SERVICES IPC	LA	Unknown	1
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	1
Total (lbs)			18,909

List of transfers for 2001

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	10,614
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	3,086
INTERNATIONAL PETROLEUM CORP	LA	Other Off-Site Management	2,882
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	1,282
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	1,060

INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	490
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	400
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	194
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	141
A.M.I.D.	LA	Landfill/Disposal Surface Impoundment	138
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	107
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	61
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	47
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	24
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	20
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	16
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	11
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	10
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	8
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	2
INTERNATIONAL PETROLEUM CORP	LA	Other Off-Site Management	2
INTERNATIONAL OIL SERVICE	LA	Wastewater Treatment(Excluding POTW)-Metals and Metal Compounds only	2
A.M.I.D.	LA	Landfill/Disposal Surface Impoundment	1
INTERNATIONAL OIL SERVICES IPC	LA	Unknown	1
INTERNATIONAL OIL SERVICES IPC	LA	Unknown	1
Total (lbs)			20,601

List of transfers for 2000

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	9,759
INTERNATIONAL PETROLEUM CORP.	LA	Other Land Disposal	8,598
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	6,758
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	6,047
INTERNATIONAL PETROLEUM CORP.	LA	Other Waste Treatment	2,403
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	2,029
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	968
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	710
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	303

INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	250
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	168
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	60
INTERNATIONAL PETROLEUM CORP	LA	Energy Recovery	60
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	44
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	34
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	30
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	21
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	11
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	8
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	5
INTERNATIONAL OIL SERVICE NA	LA	Other Reuse or Recovery	4
A.M.I.D.	LA	Unknown	4
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	2
INTERNATIONAL PETROLEUM CORP.	LA	Solvents/Organics Recovery	2
Total (lbs)			38,278

List of transfers for 1999

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP	LA	Landfill/Disposal Surface Impoundment	9,470
INTERNATIONAL OIL SERVICE NA	LA	Other Reuse or Recovery	2,431
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,400
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	912
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	800
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	154
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	104
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	56
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	37
INTERNATIONAL PETROLEUM CORP	LA	Transfer to Waste Broker-Disposal	12
INTERNATIONAL PETROLEUM CORP	LA	Transfer to Waste Broker-Disposal	2
Total (lbs)			15,378

List of transfers for 1998

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	2,000
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,100
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	490
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	250
INTERNATIONAL PETROLEUM CORP	LA	Transfer to Waste Broker-Disposal	22
NATIONAL OIL SERVICES, INC.	LA	Transfer to Waste Broker-Recycling	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL PETROLEUM CORP	LA	Transfer to Waste Broker-Disposal	4
INTERNATIONAL OIL SERVICE NA	LA	Transfer to Waste Broker-Energy Recovery	2
Total (lbs)			3,883

List of transfers for 1997

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,700
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,700
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,600
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	950
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	780
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	520
NATIONAL OIL SERVICES INC.	LA	Transfer to Waste Broker-Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL OIL SERVICE, NA	LA	Transfer to Waste Broker-Energy Recovery	2
Total (lbs)			7,267

List of transfers for 1996

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTL. PETROLEUM CORP.	LA	Other Reuse or Recovery	2,000
INTL. PETROLEUM CORP.	LA	Other Reuse or Recovery	1,500
INTERNATION PETROLEUM CORP.	LA	Other Reuse or Recovery	1,229
INTERNATION PETROLEUM CORP.	LA	Other Reuse or Recovery	1,228
INTL. PETROLEUM CORP.	LA	Other Reuse or Recovery	910
INTERNATIONAL OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	837
INTERNATIONAL OIL SERVICE	LA	Other Reuse or Recovery	260
INTERNATIONAL PETROLEUM	LA	Energy Recovery	47
NATIONAL OIL SERVICES INC.	LA	Transfer to Waste Broker-Energy Recovery	5
NATIONAL OIL SERVICES INC.	LA	Transfer to Waste Broker-Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
Total (lbs)			8,031

List of transfers for 1995

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	3,191
INTERNATIONAL OIL SERVICE	LA	Other Reuse or Recovery	3,137
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	3,100
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	2,200
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,800
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,400
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	550
INTERNATIONAL OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	119
INTL. PETROLEUM CORP.	LA	Other Off-Site Management	64
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
INTERNATIONAL OIL SERVICE	LA	Unknown	5
Total (lbs)			15,576

List of transfers for 1994

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	37,000
INTERNATIONAL OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	10,000
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	8,400
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	3,500
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	3,198
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	2,200
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	1,400
RECOVERY ONE	LA	Landfill/Disposal Surface Impoundment	500
RECOVERY ONE	LA	Landfill/Disposal Surface Impoundment	300
INTERNATIONAL PETROLEUM CORP.	LA	Other Off-Site Management	63
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Transfer to Waste Broker-Energy Recovery	5
Total (lbs)			66,576

List of transfers for 1993

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL OIL SERVICE	LA	Energy Recovery	13,852
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	3,114
INTERNATIONAL OIL SERVICE	LA	Transfer to Waste Broker-Recycling	845
INTERNATIONAL PETROLEUM CORP.	LA	Other Off-Site Management	668
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	580
INTERNATIONAL OIL	LA	Other Reuse or Recovery	513
INTERNATIONAL PETROLEUM CORP.	LA	Other Off-Site Management	378
RECOVERY ONE	LA	Landfill/Disposal Surface Impoundment	300
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	130
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	47

INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	44
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	28
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
INTERNATIONAL OIL SERVICE	LA	Unknown	1
INTERNATIONAL OIL SERVICE	LA	Unknown	1
Total (lbs)			20,511

List of transfers for 1992

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PERTROLEUM CORP.	LA	Other Reuse or Recovery	4,300
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,719
INTERNATIONAL PETROLEUM CORP.	LA	Other Off-Site Management	450
INTERNATIONAL PETROLEUM CORP.	LA	Other Off-Site Management	430
RECOVERY ONE	LA	Landfill/Disposal Surface Impoundment	300
RECOVERY ONE	LA	Landfill/Disposal Surface Impoundment	250
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	31
INTERNATIONAL PETROLEUM CORPOR, ATION	LA	Energy Recovery	5
INTERNATIONAL PETROLEUM CORPOR, ATION	LA	Energy Recovery	5
Total (lbs)			7,490

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
INTERNATIONAL PETROLEUM CO.	LA	Other Reuse or Recovery	2,800
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	1,900
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	300
INTERNATIONAL PETROLEUM CO.	LA	Other Reuse or Recovery	47
INTERNATIONAL PETROLEUM CORP.	LA	Other Reuse or Recovery	30

INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
INTERNATIONAL PETROLEUM CORP.	LA	Energy Recovery	5
Total (lbs)			5,087

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70129*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70129, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
857546	NEW ORLEANS	LA	AIR PRODUCTS AND CHEMICALS INC.	FIXED	n

Total incidents for reporting year 2007: 1

List of incidents for 2006

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
815012	NEW ORLEANS	LA	Responsible Co Left Blank	STORAGE TANK	n

Total incidents for reporting year 2006: 1

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
744431	NEW ORLEANS	LA	AIR PRODUCT AND CHEMICALS, INC.	FIXED	n

Total incidents for reporting year 2004: 1

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
635988	NEW ORLEANS	LA	UNITED STATES MARINE INC	VESSEL	n

Total incidents for reporting year 2003: 1

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
626168	NEW ORLEANS	LA	ENTERGY(MICHOUD)	CONTINUOUS	n
628883	NEW ORLEANS	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2002: 2

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
571059	DES ALLEMANDS	LA	CX TRANSPORTATION	MOBILE	n
588364	NEW ORLEANS	LA	AIR PRODUCTS AND CHEMICALS	FIXED	n

Total incidents for reporting year 2001: 2

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
456671	NEW ORLEANS	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 1998: 1

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
344882	VENICE	LA	Responsible Co Left Blank	VESSEL	n
367624	GRAMMERCY	LA	BRIDGE TERMINAL TRANSPORT	MOBILE	y

Total incidents for reporting year 1996: 2

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
279871	NEW ORLEANS	LA	MARTIN MARIETTA	MOBILE	n

Total incidents for reporting year 1995: 1

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
223618	NEW ORLEANS	LA	LOMBARDS BAIT CENTER	FIXED	n
224559	NEW ORLEANS	LA	NEW ORLEANS PUBLIC SERV	FIXED	n

Total incidents for reporting year 1994: 2

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
161313	NEW ORLEANS	LA	AIR PRODUCTS	FIXED	n
164201	NEW ORLEANS	LA	MARTIN MARIETTA MANNED SY	FIXED	n
166143	NEW ORLEANS	LA	AIR PRODUCTS & CHEMICALS	FIXED	n
182397	NEW ORLEANS	LA	US MARINE INC	VESSEL	n
206384	NEW ORLEANS	LA	WASTE MANAGEMENT CO	FIXED	n

Total incidents for reporting year 1993: 5

List of incidents for 1992

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
112958	INTRACOASTAL	LA	Responsible Co Left Blank	VESSEL	n
137289	NEW ORLEANS	LA	MARTIN MARIETTA MANNED SY	CONTINUOUS	n

148707	NEW ORLEANS	LA	AIR PRODUCTS & CHEMICALS	FIXED	n

Total incidents for reporting year 1992: 3

List of incidents for 1991

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
91741	NEW ORLEANS	LA	AIR PRODUCTS & CHEMICAL	UNKNOWN SHEEN	n

Total incidents for reporting year 1991: 1

List of incidents for 1988

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
-74856	City Left Blank	LA	SOUTH EAST SEAFOOD WHOLESALE	Left Blank	n

Total incidents for reporting year 1988: 1

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70129*
Reporting Year	ALL GC
Sort Order	Incident ID
Level of Detail	Low GC
Type of Report Output	Text (HTML) GC

BRS Facilities for Zip 70129, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Reporting Year: 2007

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS AND CHEMICALS, INC.	NEW ORLEANS	LA	3	3
TEXTRON MARINE AND LAND SYSTEMS	NEW ORLEANS	LA	51	51
US NASA / LOCKHEED MARTIN	NEW ORLEANS	LA	359	359

Total records for reporting year 2007: 3
Total Waste Tons Generated: 413.948
Total Waste Tons Managed: 413.948
Total Waste Tons Received and Managed: 0

Reporting Year: 2005

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS AND CHEMICALS, INC.	NEW ORLEANS	LA	1	1
GULF WIRE CORPORATION	NEW ORLEANS	LA	8	8
SPECTRUM CONTROL TECHNOLOGY	NEW ORLEANS	LA	45	45
TEXTRON SYSTEMS-MARINE AND LAND OPS	NEW ORLEANS	LA	29	29
US NASA / LOCKHEED MARTIN	NEW ORLEANS	LA	230	230

Total records for reporting year 2005: 5
Total Waste Tons Generated: 312.952
Total Waste Tons Managed: 312.958
Total Waste Tons Received and Managed: 0

Reporting Year: 2003

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Hazardous Waste (BRS) Facilities for Zip Code 70129, LA, 1989-2007, summary

Facility Name	City	State	Tons Generated	Tons Managed ?
GULF WIRE CORP	NEW ORLEANS	LA	18	18
SPECTRUM CONTROL TECHNOLOGY INCORPORATED	NEW ORLEANS	LA	63	63
US NASA / LOCKHEED MARTIN	NEW ORLEANS	LA	1,307	1,307

Total records for reporting year 2003: 3
Total Waste Tons Generated: 1,387.876
Total Waste Tons Managed: 1,387.876
Total Waste Tons Received and Managed: 0

Reporting Year: 2001

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS AND CHEMICALS, INC. NOLA	NEW ORLEANS	LA	1	1
GULF WIRE CORPORATION	NEW ORLEANS	LA	15	15
NATIONAL BIODYNAMICS LABORATORY	NEW ORLEANS	LA	1	1
SPECTRUM CONTROL TECHNOLOGY INC	NEW ORLEANS	LA	149	149
US NASA / LOCKHEED MARTIN	NEW ORLEANS	LA	521	521

Total records for reporting year 2001: 5
Total Waste Tons Generated: 687.042
Total Waste Tons Managed: 687.042
Total Waste Tons Received and Managed: 0

Reporting Year: 1999

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS AND CHEMICALS,INC.	NEW ORLEANS	LA	29	29
GULF WIRE CORPORATION	NEW ORLEANS	LA	17	17
NATIONAL BIODYNAMICS LABORATORY	NEW ORLEANS	LA	0	0
SPECTRUM CONTROL TECHNOLOGY	NEW ORLEANS	LA	76	76
US NASA/ LOCKHEED MARTIN	NEW ORLEANS	LA	189,567	188,231

Total records for reporting year 1999: 5
Total Waste Tons Generated: 189,688.953
Total Waste Tons Managed: 188,353.371
Total Waste Tons Received and Managed: 0

Reporting Year: 1997

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
GULF WIRE CORPORATION	NEW ORLEANS	LA	15	15
SPECTRUM CONTROL TECHNOLOGY	NEW ORLEANS	LA	66	66
US NASA LOCKHEED MARTIN	NEW ORLEANS	LA	206,859	206,823

Total records for reporting year 1997: 3
Total Waste Tons Generated: 206,941.205
Total Waste Tons Managed: 206,904.35
Total Waste Tons Received and Managed: 0

Reporting Year: 1995

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS AND CHEMICALS, INC.	NEW ORLEANS	LA	3	3
GULF WIRE CORPORATION	NEW ORLEANS	LA	12	12
SPECTRUM CONTROL TECHNOLOGIES	NEW ORLEANS	LA	88	88

Total records for reporting year 1995: 3
Total Waste Tons Generated: 103.044
Total Waste Tons Managed: 103.044
Total Waste Tons Received and Managed: 0

Reporting Year: 1993

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?

AIR PRODUCTS & CHEMCIALS INC NEW ORLEANS	NEW ORLEANS	LA	17	17
INTERNATIONAL PETROLEUM CORP OF LA	NEW ORLEANS	LA	0	0
MARTIN MARIETTA/US NASA	NEW ORLEANS	LA	705	750

Total records for reporting year 1993: 3
Total Waste Tons Generated: 722.652
Total Waste Tons Managed: 767.027
Total Waste Tons Received and Managed: 0

Reporting Year: 1991

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
FOLGER COFFEE COMPANY	NEW ORLEANS	LA	10	14
GULF WIRE CORPORATION	NEW ORLEANS	LA	12	12
MARTIN MARIETTA/US NASA	NEW ORLEANS	LA	487	1,366
TEXTRON MARINE SYSTEMS	NEW ORLEANS	LA	1	1

Total records for reporting year 1991: 4
Total Waste Tons Generated: 508.847
Total Waste Tons Managed: 1,392.536
Total Waste Tons Received and Managed: 0

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed ?
AIR PRODUCTS & CHEMICALS INC	NEW ORLEANS	LA	2	2
EPCO OF LOUISIANA INC	NEW ORLEANS	LA	9	9
GULF WIRE CORP	NEW ORLEANS	LA	8	8
INTERNATIONAL PETRO CORP DBA NATL O	NEW ORLEANS	LA	21,073	21,338
MARTIN MARIETTA-US NASA/NEW ORLEANS	NEW ORLEANS	LA	1,249	1,249

Total records for reporting year 1989: 5
Total Waste Tons Generated: 22,339.67

Total Waste Tons Managed: 22,605.01
Total Waste Tons Received and Managed: 265.33

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's **Biennial Reporting System (part of RCRAINFO)** database (BRS).

Search Criteria Used	
Reporting Year	ALL GO
Facility State	Louisiana
Facility Zip Code	70129*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Risk Management Plan (RMP) Facilities for Zip Code 70129, LA, low detail

RMP Facilities for Zip 70129, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on facility name for extended detail.

Facility Name	City	State	Num. FTE ?	Num. Accidents ?	Deregistration ?
Air Products, New Orleans H2/NH3/Cl2	New Orleans	LA	90	0	No
Air Products, New Orleans HCL Plant	New Orleans	LA	3	0	Yes

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on April 28, 2008. The data were obtained from the U.S. EPA's Risk Management System database (RMP).

Search Criteria Used	
Facility State	Louisiana
Facility Zip Code	70129*
Sort Order	By facility name
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70129, LA, low detail

RCRIS Handlers for Zip 70129, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
AIR PROD & CHEMICALS	NEW ORLEANS	LA	SQG	No	No	No
AIR PRODUCTS AND CHEMICALS, INC.	NEW ORLEANS	LA	LQG	No	No	No
AMERICAN FREIGHTWAYS INC	NEW ORLEANS	LA	CESQG	No	No	No
AMERICAN WASTE & POLL CTRL RES DIV	NEW ORLEANS	LA	SQG	No	No	No
BAYOU SAUVAGE BOAT LIFT INC	NEW ORLEANS	LA	CESQG	No	No	No
BELLSOUTH J2213	NEW ORLEANS	LA	SQG	No	No	No
BOC GASES	NEW ORLEANS	LA	CESQG	No	No	No
BRANDT CAR CARE	NEW ORLEANS	LA	CESQG	No	No	No
BRIDGE TERMINAL SVCS	NEW ORLEANS	LA	CESQG	No	No	No
C & J DELIVERY	NEW ORLEANS	LA	CESQG	No	No	No
CERTECH	NEW ORLEANS	LA	SQG	No	No	No
CHEMICAL EXPRESS	NEW ORLEANS	LA	CESQG	No	No	No
CHEVRON SS 109006	NEW ORLEANS	LA	CESQG	No	No	No
DELGADO COMM COLL FIRE SCH	NEW ORLEANS	LA	CESQG	No	No	No
DELUXE CHECKPRINTERS INC	NEW ORLEANS	LA	SQG	No	No	No
ENGINE WORLD	NEW ORLEANS	LA	CESQG	No	No	No
ENTERGY NEW ORLEANS INC MICHOUD PLNT	NEW ORLEANS	LA	SQG	No	No	No
EPCO OF LOUISIANA INC	NEW ORLEANS	LA	CESQG	No	No	No
ERGON TRUCKING	NEW ORLEANS	LA	none	No	Yes	No
EXXON CO USA 53377	NEW ORLEANS	LA	CESQG	No	No	No
FEDERAL RESERVE BANK	NEW ORLEANS	LA	CESQG	No	No	No
FOLGER COFFEE CO	NEW ORLEANS	LA	SQG	No	No	No
GARNER ENVIRONMENTAL SVCS INC	NEW ORLEANS	LA	CESQG	No	No	No
GENERAL DYNAMICS LAND SYSTEM	NEW ORLEANS	LA	SQG	No	No	No
GILLS CRANE & DOZER SVC INC	NEW ORLEANS	LA	CESQG	No	No	No
GULF WIRE CORPORATION	NEW ORLEANS	LA	LQG	No	No	Yes
GULFWAY TERRACE INC	NEW ORLEANS	LA	none	No	No	No
HALTER MARINE INC NEW ORLEANS DIV	NEW ORLEANS	LA	none	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70129, LA, low detail

HOLNAM INC NEW ORLEANS TERMINAL	NEW ORLEANS	LA	CESQG	No	No	No
HURST TRUCKING INC	NEW ORLEANS	LA	none	No	Yes	No
HYDROCARBON RECOVERY SERVICES INC	NEW ORLEANS	LA	CESQG	No	No	Yes
ISOTRON CORP	NEW ORLEANS	LA	none	No	No	No
JOHN HARLAND CO NEW ORLEANS LA	NEW ORLEANS	LA	CESQG	No	No	No
KYE INC	NEW ORLEANS	LA	CESQG	No	No	No
LA BULK CARRIERS INC	NEW ORLEANS	LA	CESQG	No	No	No
LONE STAR INDUSTRIES INC	NEW ORLEANS	LA	none	No	No	No
MARINE INDUSTRIAL CABLE CORP	NEW ORLEANS	LA	CESQG	No	No	No
NEW ORLEANS CEMENT PRODUCTS CO INC	NEW ORLEANS	LA	CESQG	No	No	No
NEW ORLEANS E PROF DRY CLEANERS	NEW ORLEANS	LA	CESQG	No	No	No
NEW ORLEANS MUNICIPAL TRAINING ACADEMY	NEW ORLEANS	LA	SQG	No	No	No
NM CRC NOLA TRAINING SYSTEMS SCH	NEW ORLEANS	LA	SQG	No	No	No
OLIVIER CELCURE WOOD PRES CORP	NEW ORLEANS	LA	SQG	No	No	No
OMERO INC	NEW ORLEANS	LA	CESQG	No	No	No
ORTHODONTIC RECONDITION CO	NEW ORLEANS	LA	CESQG	No	No	No
PETROCHEM INSPECTION SERVICES	NEW ORLEANS	LA	SQG	No	No	No
PRODUCTION MGMT STRUCTURAL SYSTEMS INC	NEW ORLEANS	LA	CESQG	No	No	No
RECOVERY 1 INC	NEW ORLEANS	LA	CESQG	No	No	No
RICHARDS DISPOSAL INC	NEW ORLEANS	LA	none	No	Yes	No
RICORD OIL SVC	NEW ORLEANS	LA	none	No	No	No
RIVER ROAD CONSTRUCTION INC	NEW ORLEANS	LA	CESQG	No	No	No
SEARS ROEBUCK & CO	NEW ORLEANS	LA	LQG	No	No	No
SFJ MANAGEMENT INC SIX FLAGS NEW ORLEANS	NEW ORLEANS	LA	CESQG	No	No	No
SHELL SVC STA	NEW ORLEANS	LA	SQG	No	No	No
SMITH TECHN CORP	NEW ORLEANS	LA	LQG	No	No	No
SPECTRUM CONTROL TECHNOLOGY INCORPORATED	NEW ORLEANS	LA	LQG	No	No	Yes
TANO MARINE SYSTEMS	NEW ORLEANS	LA	CESQG	No	No	No
TEXTRON SYSTEMS-MARINE AND LAND OPS	NEW ORLEANS	LA	LQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70129, LA, low detail

TONYS AUTO RPR	NEW ORLEANS	LA	CESQG	No	No	No
TRANSWOOD LOGISTICS INC	NEW ORLEANS	LA	none	No	No	No
TRANSWOOD LOGISTICS INC	NEW ORLEANS	LA	none	No	No	No
U HAUL 187	NEW ORLEANS	LA	CESQG	No	No	No
UNITED STATES MARINE INC	NEW ORLEANS	LA	CESQG	No	No	No
UNO NATIONAL BIODYNAMICS LAB	NEW ORLEANS	LA	SQG	No	No	No
UPS FREIGHT	NEW ORLEANS	LA	SQG	No	No	No
US NASA / LOCKHEED MARTIN	NEW ORLEANS	LA	LQG	Yes	No	Yes
YELLOW FREIGHT NEW ORLEANS	NEW ORLEANS	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70129*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-9
70092 VIOLET

TRI Search Results (1987-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

List of transfers for 1994

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CURE'S WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	57

List of transfers for 1993

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CURE'S WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	77
CURE'S WASTE OIL SERVICES INC., .	LA	Transfer to Waste Broker-Energy Recovery	3
Total (lbs)			80

List of transfers for 1992

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)
CURE'S WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	80
CURE'S WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	1
Total (lbs)			81

List of transfers for 1991

Click on the column headers below to re-sort the search. Click on transfer amount for extended detail on that transfer.

Destination Name	Dest. State	Management Type	Transfer (lbs)

CURES WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	113
CURES WASTE OIL SERVICES	LA	Transfer to Waste Broker-Energy Recovery	1
Total (lbs)			114

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on September 22, 2008. The data were obtained from the U.S. EPA's **Toxic Release Inventory** database (TRI).

Search Criteria Used	
Database Type	Current
Transfer Type	Both POTW and other off-site transfers
Destination Zip Code	70092*
Destination State	Louisiana
Core Chemicals and Industries	All chemicals and industries
Use RSEI Risk Screening Data	Display additional 1988-2005 RSEI risk screening data
Sort Order	By transfer amount (descending)
Reporting Year	ALL GO
Level of Detail	Low (list of transfers) GO
Type of Report Output	Text (HTML) GO

ERNS Incidents for Zip 70092, LA (1982-2007)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2007

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
827018	HOPEDALE	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2007: 1

List of incidents for 2002

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
590751	MEREAUX	LA	MURPHY OIL USA	PIPELINE	n
595891	MEREAUX	LA	MURPHY OIL USA	VESSEL	n
596298	DELACROW ISLAND	LA	Responsible Co Left Blank	VESSEL	n
601337	City Left Blank	LA	CHEVRON TEXACO	PLATFORM	n

Total incidents for reporting year 2002: 4

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
553131	City Left Blank	LA	COIL TUBING AND SERVICES	PLATFORM	n
553985	City Left Blank	LA	CHEVRON USA	PLATFORM	n
557571	City Left Blank	LA	CHEVRON	VESSEL	n
559957	MEREAUX	LA	MURPHY OIL USA	FIXED	n
562603	City Left Blank	LA	CHEVRON	PLATFORM	n
562652	City Left Blank	LA	CHEVRON	PLATFORM	n
564932	City Left Blank	LA	CHEVRON	PLATFORM	n
569316	City Left Blank	LA	CHEVRON	PLATFORM	n

572172	City Left Blank	LA	CHEVRON	PLATFORM	n
572322	City Left Blank	LA	CHEVRON	PLATFORM	n
573084	City Left Blank	LA	CHEVRON	PLATFORM	n
576370	City Left Blank	LA	CHEVRON	PLATFORM	n

Total incidents for reporting year 2001: 12

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
516189	City Left Blank	LA	CHEVRON USA	PLATFORM	n
521929	City Left Blank	LA	CHEVRON USA	PLATFORM	n
525819	City Left Blank	LA	CHEVRON USA	PLATFORM	n
530078	VENICE	LA	CHEVRON USA	PLATFORM	n
533520	City Left Blank	LA	CHEVRON USA	PLATFORM	n
534150	City Left Blank	LA	CHEVRON USA	PLATFORM	n
542147	City Left Blank	LA	CHEVRON USA	PLATFORM	n

Total incidents for reporting year 2000: 7

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
471782	City Left Blank	LA	CHEVRON USA	PLATFORM	n
474619	City Left Blank	LA	CHEVRON USA	PLATFORM	n
481735	City Left Blank	LA	CHEVRON USA	PLATFORM	n
483839	City Left Blank	LA	CHEVRON USA	PLATFORM	n
489702	City Left Blank	LA	CHEVRON USA	PLATFORM	n
490018	City Left Blank	LA	CHEVRON USA	PLATFORM	n
492628	VENICE	LA	CHEVRON USA	PLATFORM	n
495922	City Left Blank	LA	CHEVRON USA	PLATFORM	n
505522	City Left Blank	LA	CHEVRON USA	PLATFORM	n

Total incidents for reporting year 1999: 9

List of incidents for 1998

Emergency Response Notification System (ERNS) Incidents for Zip Code 70092, LA, 1982-2007, low detail

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
430172	City Left Blank	LA	CHEVRON USA	PLATFORM	n
430193	City Left Blank	LA	CHEVRON USA	PLATFORM	n
434417	City Left Blank	LA	CHEVRON USA	PIPELINE	n
441484	City Left Blank	LA	CHEVRON USA	PLATFORM	n
446209	City Left Blank	LA	CHEVRON USA	PLATFORM	n
446646	City Left Blank	LA	CHEVRON USA	PLATFORM	n
456307	SOUTH PASS	LA	CHEVRON USA	PLATFORM	n
458689	VENICE	LA	CHEVRON USA	PLATFORM	n
460204	SOUTH PASS	LA	CHEVRON USA	PLATFORM	n

Total incidents for reporting year 1998: 9

List of incidents for 1997

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
386844	City Left Blank	LA	CHEVRON USA	PLATFORM	n
386966	City Left Blank	LA	CHEVRON USA	PLATFORM	n
401349	City Left Blank	LA	CHEVRON USA	PLATFORM	n
411337	VENICE	LA	CHEVRON USA	PLATFORM	n

Total incidents for reporting year 1997: 4

List of incidents for 1996

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
345983	City Left Blank	LA	CHEVRON USA PRODUCTION CO	PLATFORM	n
347870	City Left Blank	LA	CHEVRON USA PRODUCTION CO	PLATFORM	n
358630	City Left Blank	LA	CHEVRON USA PRODUCTION CO	PIPELINE	n
371042	City Left Blank	LA	CHEVRON USA	PLATFORM	n

Total incidents for reporting year 1996: 4

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
300237	City Left Blank	LA	CHEVRON USA	PLATFORM	n
300263	City Left Blank	LA	CHEVRON USA	PLATFORM	n
312970	City Left Blank	LA	CHEVRON	PLATFORM	n

Total incidents for reporting year 1995: 3

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on January 9, 2008. The data were obtained from the U.S. Coast Guard's **Emergency Response Notification System** database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70092*
Reporting Year	ALL GO
Sort Order	Incident ID
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70092, LA, low detail

RCRIS Handlers for Zip 70092, LA

Search Criteria Used (More)	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
A & A CUSTOM ENGINES	VIOLET	LA	CESQG	No	No	No
ADVANCE HEAD MACH INC	VIOLET	LA	SQG	No	No	No
AMERICAN OVERSEAS MARINE VIOLET DOCK	VIOLET	LA	SQG	No	No	No
CHRISTIAN OIL SERVICE	VIOLET	LA	none	No	No	No
CURE OIL & DIESEL INC	VIOLET	LA	none	No	No	Yes
CURES WASTE OIL SVC	VIOLET	LA	none	No	No	No
MOORE & MOORE TRUCKING LLC	VIOLET	LA	none	No	Yes	No
PIERS IN VIOLET	VIOLET	LA	CESQG	No	No	No
RICORDS OIL SVC	VIOLET	LA	none	No	No	No
RICORDS OIL SVC	VIOLET	LA	none	No	Yes	No
RUSH & GUERRA	VIOLET	LA	none	No	No	No
SAMS AUTO REPAIR	VIOLET	LA	CESQG	No	No	No

END OF REPORT

This search was done on September 11, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Search Criteria Used	
Handler Zip Code	70092*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

B-10
70461 SLIDELL

ERNS Incidents for Zip 70461, LA (1982-2008)

Search Criteria Used (More)	
Reporting Year	ALL GO
Level of Detail	Low GO
Type of Report Output	Text (HTML) GO

List of incidents for 2008

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
883148	SLIDELL	LA	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2008: 1

List of incidents for 2004

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
728964	City Left Blank	LA	CONN ENERGY	PLATFORM	n

Total incidents for reporting year 2004: 1

List of incidents for 2003

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
650686	SLIDELL	LA	Responsible Co Left Blank	VESSEL	n
652857	City Left Blank	LA	CONN ENERGY	PLATFORM	n
655049	SLIDELL	LA	Responsible Co Left Blank	STORAGE TANK	n
655425	OCEAN SPRINGS	MS	Responsible Co Left Blank	MOBILE	n

Total incidents for reporting year 2003: 4

List of incidents for 2001

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
571672	SEABROOK	TX	M/V "BANK RUNNER"	VESSEL	n

Total incidents for reporting year 2001: 1

List of incidents for 2000

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
532111	FLIDELL	LA	MCMATH CONSTRUCTION	STORAGE TANK	n
549772	PASS CHRISTIAN	MS	Responsible Co Left Blank	VESSEL	n

Total incidents for reporting year 2000: 2

List of incidents for 1999

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
471860	SLIDELL	LA	TNM BAIT AND TACKLE	FIXED	n

Emergency Response Notification System (ERNS) Incidents for Zip Code 70461, LA, 1982-2008, low detail

Total incidents for reporting year 1999: 1

List of incidents for 1998

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
427198	SLIDELL	LA	AMCLYDE/UTILITY STEEL	VESSEL	n

Total incidents for reporting year 1998: 1

List of incidents for 1995

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
283326	SLIDELL	LA	Responsible Co Left Blank	FIXED	n

Total incidents for reporting year 1995: 1

List of incidents for 1994

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
255327	SLIDELL	LA	PINE CREST TRAILER COURT	FIXED	n

Total incidents for reporting year 1994: 1

List of incidents for 1993

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
153229	SLIDELL	LA	EMITENT ROSS CONSTRUCTION	FIXED	n
168058	SLIDELL	LA	ANOTHY ESCORT SERVICE	FIXED	n

Total incidents for reporting year 1993: 2

List of incidents for 1990

Click on the column headers below to re-sort the search. Click on incident ID for extended detail on that incident.

Incident ID	City	State	Resp. Company	Incident Type	Damages
18993	SLIDELL	LA	Responsible Co Left Blank	FIXED	n

Total incidents for reporting year 1990: 1

END OF REPORT

This search was done on December 17, 2009. It was compiled from government data last released on September 24, 2009. The data were obtained from the U.S. Coast Guard's Emergency Response Notification System database (ERNS).

Search Criteria Used	
Responsible Company State	Louisiana
Responsible Company Zip Code	70461*
Reporting Year	ALL
Sort Order	Incident ID
Level of Detail	Low
Type of Report Output	Text (HTML)

BRS Facilities for Zip 70461, LA (1989-2007)

Search Criteria Used (More)	
Reporting Year	ALL
Level of Detail	Low
Type of Report Output	Text (HTML)

Reporting Year: 1989

Click on the column headers below to re-sort the search. Click on facility name for extended detail on that facility.

Facility Name	City	State	Tons Generated	Tons Managed	?
THE SURGERY SUITE	SLIDELL	LA	0	0	

Total records for reporting year 1989: 1
Total Waste Tons Generated: 0
Total Waste Tons Managed: 0.01
Total Waste Tons Received and Managed: 0

END OF REPORT

This search was done on December 17, 2009. It was compiled from government data last released on December 16, 2008. The data were obtained from the U.S. EPA's Biennial Reporting System (part of RCRAINFO) database (BRS).

Search Criteria Used	
Reporting Year	ALL
Facility State	Louisiana
Facility Zip Code	70461*
Sort Order	Default sort (by year, then handler name)
Level of Detail	Low
Type of Report Output	Text (HTML)

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70461, LA, low detail

RCRIS Handlers for Zip 70461, LA

Search Criteria Used (Mine)	
Level of Detail	0
Type of Report Output	T

Click on the column headers below to re-sort the search. Click on handler name for extended detail.

Handler Name	City	State	Generator	TSD	Transport	Viol. since 1999
AARON OIL CO INC	SLIDELL	LA	none	No	No	No
ADRIAN VEGAS SLIDELL FORD L M NISSAN	SLIDELL	LA	SQG	No	No	No
ADVANCE AUTO PARTS #9797	SLIDELL	LA	SQG	No	No	No
ALEXS BODY SHOP	SLIDELL	LA	CESQG	No	No	No
ALL STAR TOYOTA	SLIDELL	LA	CESQG	No	No	No
AMERICAN CABLE CO INC	SLIDELL	LA	LQG	No	No	No
AUTO EXCELLENCE	SLIDELL	LA	CESQG	No	No	No
B & C DBA JADE LANDSCAPE	SLIDELL	LA	CESQG	No	No	No
BELARUS MACHINERY INC	SLIDELL	LA	SQG	No	No	No
BOYET JUNIOR HIGH SCHOOL	SLIDELL	LA	SQG	No	No	No
BRIAN HARRIS PONT BUICK GMC INC	SLIDELL	LA	CESQG	No	No	No
CHARLES CHAPMAN	SLIDELL	LA	CESQG	No	No	No
CHUCK MCCARTHY	SLIDELL	LA	CESQG	No	No	No
CLARKS MARINE RPR SVC INC (RONALD & KENN	SLIDELL	LA	CESQG	No	No	No
CUT RITE	SLIDELL	LA	SQG	No	No	No
D & B LAWNMOWER & BIKE SHOP	SLIDELL	LA	CESQG	No	No	No
DORRS AUTOMOTIVE	SLIDELL	LA	LQG	No	No	No
DR MIKES MOBILE AUTO CLINIC	SLIDELL	LA	LQG	No	No	No
DUBOSE OIL PRODUCTS COMPANY	SLIDELL	LA	none	No	No	No
DURWARD DUNN INC SLIDELL LA YARD	SLIDELL	LA	CESQG	No	No	No
ENVIRONMENTAL ENTERPRISES	SLIDELL	LA	CESQG	No	No	No
ENVIRONMENTAL ENTERPRISES USA INC	SLIDELL	LA	CESQG	No	No	No
ERNIES TRANS & AUTO	SLIDELL	LA	CESQG	No	No	No
ERNIES TRANS & AUTOMOTIVE	SLIDELL	LA	CESQG	No	No	No
EXXONMOBIL 51233	SLIDELL	LA	CESQG	No	No	No
FRANKS ACCURATE BODY SHOP	SLIDELL	LA	CESQG	No	No	No
GRAHAM CABINETS INC	SLIDELL	LA	CESQG	No	No	No
HONEY ISLAND ELEMENTARY	SLIDELL	LA	SQG	No	No	No
JAMES R GOSEY JR MD & CHRLS W KRIEGER JR	SLIDELL	LA	SQG	No	No	No
JOHNNY SMITH TRUCKING	SLIDELL	LA	CESQG	No	No	No
KATORE BODY CTR INC	SLIDELL	LA	CESQG	No	No	No
LAKESHORE CHRYSLER DODGE JEEP INC	SLIDELL	LA	CESQG	No	No	No
LAWLESS AUTO DETAIL & CAR WASH	SLIDELL	LA	CESQG	No	No	No
LITTLE OAK MIDDLE SCHOOL	SLIDELL	LA	SQG	No	No	No
LOWES COMPANIES #1684	SLIDELL	LA	CESQG	No	No	No
MARKS AUTO RPR	SLIDELL	LA	SQG	No	No	No
MI DRILLING FLUIDS CO SLIDELL	SLIDELL	LA	none	No	No	No
MILITARY RD PET HOSPITAL	SLIDELL	LA	CESQG	No	No	No
MILITARY RD PET HOSPITAL	SLIDELL	LA	CESQG	No	No	No

Haz. Waste Permits (RCRIS) Handlers for Zip Code 70461, LA, low detail

INC						
NORTH SHORE REGIONAL MEDICAL CTR	SLIDELL	LA	CESQG	No	No	No
NORTHSHORE AUTOMOTIVE INC	SLIDELL	LA	CESQG	No	No	No
NORTHSHORE FAMILY MED CNTR	SLIDELL	LA	CESQG	No	No	No
NORTHSHORE HIGH SCHOOL	SLIDELL	LA	SQG	No	No	No
PARISH NATL BANK	SLIDELL	LA	CESQG	No	No	No
PERINOS TRUCK & AUTO BODY INC	SLIDELL	LA	CESQG	No	No	No
PIKES CLASSICS OF YESTERYEAR	SLIDELL	LA	CESQG	No	No	No
RAYS AUTOMOTIVE	SLIDELL	LA	CESQG	No	No	No
RAYS AUTOMOTIVE	SLIDELL	LA	CESQG	No	No	No
SHERWIN WILLIAMS AUTO FINISHES #9719	SLIDELL	LA	CESQG	No	No	No
SIGNLITE	SLIDELL	LA	CESQG	No	No	No
TAYLOR YACHT SVC	SLIDELL	LA	CESQG	No	No	No
TECH CON SYSTEMS INC	SLIDELL	LA	CESQG	No	No	No
THE SURGERY SUITE	SLIDELL	LA	CESQG	No	No	No
TIRE KINGDOM #203	SLIDELL	LA	CESQG	No	No	No
USBI COMPANY	SLIDELL	LA	CESQG	No	No	No
VALENTINOS COLORS INC	SLIDELL	LA	none	No	No	No
VERAS VALET	SLIDELL	LA	CESQG	No	No	No
WALMART SUPERCENTER #553	SLIDELL	LA	CESQG	No	No	No
WINDWARD INC	SLIDELL	LA	CESQG	No	No	No
WINN DIXIE 1502	SLIDELL	LA	CESQG	No	No	No

END OF REPORT

This search was done on December 17, 2009. It was compiled from government data last released on July 21, 2008. The data were obtained from the U.S. EPA's RCRA Information System database (RCRIS).

Resizing

Notice: Undefined index: D in **/var/data/php/report5.php** on line **1380**

Search Criteria Used	
Handler Zip Code	70461*
Handler State	LA
Handler Types	All Handlers
Sort Order	
Level of Detail	0
Type of Report Output	T

APPENDIX C
EPA ENFORCEMENT & COMPLIANCE HISTORY ONLINE

C-1: 70085 ST. BERNARD
C-2: 70032 ARABI
C-3 : 70040 BRAITHWAITE
C-4: 70043 CHALMETTE
C-5: 70075 MERAUX
C-6: 70117 NEW ORLEANS
C-7: 70126 NEW ORLEANS
C-8: 70129 NEW ORLEANS
C-9: 70092 VIOLET
C-10: 70461 SLIDELL

C-1
70085 ST. BERNARD

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

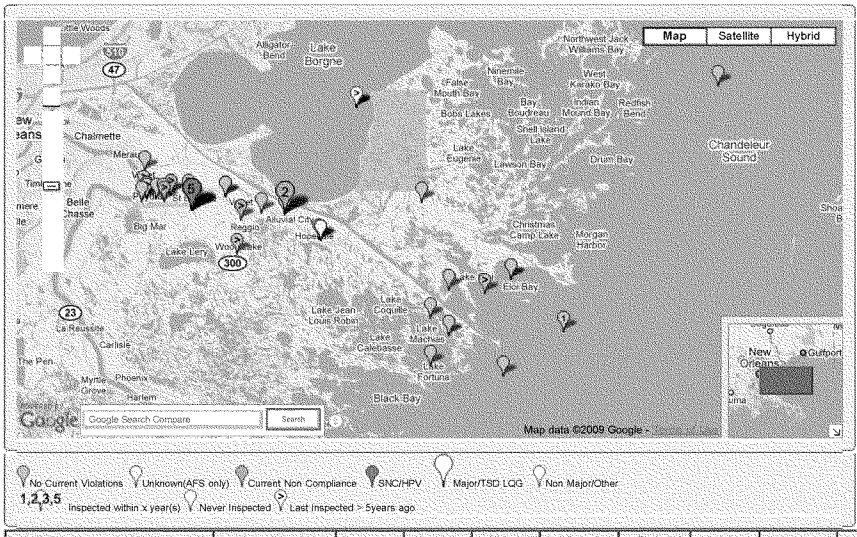
Enforcement & Compliance History Online (ECHO)

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ECHO Enforcement and Compliance History Online

Search Results (Multimedia)

Help



No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last Inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
AQUATERRA CONTRACTING INC FLORISSANT LEVEE REPAIRS ST. BERNARD, LA700 FRS ID: 110031271585	CP: LAR10E335		n/a	n/a		0			
BAYOU BILOXI PRODUCTION FACILITY #3 HOPEDALE, LA700 FRS ID: 110021025371	CP: LA0120090		n/a	n/a	1	0			
BAYOU BILOXI PRODUCTION FACILITY #1 11.5 MI NE OF HOPEDALE, LA700 FRS ID: 110015977856	AFS: 2208700093	0	n/a	n/a		0			
	AFS: 2208700085	0	n/a	n/a		0			
BELLSOUTH TELECOMMUNICATIONS ON SARO LANE, OFF ST BERNARD H ST BERNARD, LA700 FRS ID: 110009914801	CP: LAG530709		n/a	n/a		0			
BRETON SOUND AREA 1A PRODUCTION FACILITY 0.1 MI S OF	AFS: 2208700057	0	n/a	n/a		0			

Map Results

HOPEDALE, LA700 FRS ID: 110007296469									
BRETON SOUND BLOCK 18 PRODUCTION FACILITY HOPEDALE, LA700 FRS ID: 110035783475	ICP: LAG33A748	1	n/a	n/a					
BRETON SOUND STATE LEASE 5670-1 FACILITY 18 MI FROM HOPEDALE, LA700 FRS ID: 110007303649	AFS: 2207500219		n/a	n/a					
CFI PLATFORM - ELOI BAY FIELD ELOI BAY FIELD YSCLOSKEY, LA700 FRS ID: 110007083328	AFS: 2208700024 AFS: 2208700022		n/a n/a	n/a n/a					
CHADELEUR SOUND BLOCK 32 PRODUCTION FACILITY HOPEDALE, LA700 FRS ID: 110038178782	ICP: LAG33A677		n/a	n/a					
CHANDELEUR SOUND BLOCK #71 PRODUCTION FACILITY 20 MI E OF DELACROIX, LA700 FRS ID: 110007291525	AFS: 2208700030		n/a	n/a					
CHANDELEUR SOUND BLOCK 32 FACILITY 33 MI SE OF HOPEDALE, LA700 FRS ID: 110007298076	AFS: 2208700039		n/a	n/a					
CHANDELEUR SOUND BLOCK 85 PRODUCTION FACILITY 41.5 MILE OF HOPEDALE, LA700 FRS ID: 110013390197	AFS: 2208700062		n/a	n/a					
CHANDELEUR SOUND BLOCK 40 PRODUCTION FACILITY HOPEDALE, LA700 FRS ID: 110030444650	ICP: LAG33A125		n/a	n/a					
CHANDELEUR SOUND BLOCK 69 SL 18798 #1 WELL HOPEDALE, LA700 FRS ID: 110030444525	ICP: LAG33A592	1	n/a	n/a					
CHANDELEUR SOUND BLOCK 73 PRODUCTION FACILITY HOPEDALE, LA700 FRS ID: 110030442055	ICP: LAG33A445 ICP: LAG33A544		n/a n/a	n/a n/a					
CHANDELEUR SOUND 73 FACILITY CHANDELEUR SOUND HOPEDALE, LA700 FRS ID: 110030444685	ICP: LAG33A134		n/a	n/a					
CHERISHED PETS CREMATORIUM 721 BAYOU RD ST. BERNARD, LA700 FRS ID: 110012155899	AFS: 2208700057		n/a	n/a					
CONTRERAS DIRT ENTERPRISES 3500 LA HWY 46 VERRET, LA700 FRS ID: 110029818840	AFS: 2208700299 ICP: LAG450063 ICP: LAR10F492		n/a n/a n/a	n/a n/a n/a					
COSTILLACHANDELEUR SOUND/7 MILES SE OF DELACROIX, LA700 FRS ID: 110007302822	AFS: 2208700043		n/a	n/a					
COX OPERATING LLC 14MILE OF HOPEDALE HOPEDALE, LA700 FRS ID: 110022809067	ICP: LA0121479		n/a	n/a	1				
COX OPERATING, LLC									

Map Results

HALF MOON LAKE PRODUCTION FAC SAINT BERNARD, LA700 FRS ID: 110012807588	ICP: LA0110849		n/a	n/a	1	1			
COX OPERATING, LLC CF-1 PLATFORM HOPEDALE, LA700 FRS ID: 110022914104	ICP: LA0121487		n/a	n/a	1	1			
DYNEGY MIDSTREAM SVCS LP/YSCLOSKEY 1901 FLORISSANT HWY. ST BERNARD, LA700 FRS ID: 110000545544	AFS: 2208985969			no		1			
	ICP: LA0001582	1	n/a	n/a	1	1			
	RCR: LAR000018846			no		1			
ELOI BAY CF-3 PLATFORM .5 MI N OF YSCLOSKEY, LA700 FRS ID: 110007291616	AFS: 2208700026		12	yes	1	1			
ELOI BAY PLATFORM #1 15 MI SE OF HOPEDALE, LA700 FRS ID: 110013729019	AFS: 2208700026	1	12	yes	1	1			
ENTERPRISE GAS PROCESSING, LLC TOCA GAS PLANT ST. BERNARD, LA700 FRS ID: 110009919230	ICP: LA0001465	1	n/a	n/a	1	1			
FANZ TRAILER PARK UNKNOWN , LA000 FRS ID: 110011168976	ICP: LAG560051		n/a	n/a		1			
GULF OUTLET RESOURCES LLC - STATE LEASE 4909 COMMU 10 MI SE OF HOPEDALE, LA700 FRS ID: 110022400196	AFS: 2208700289		n/a	n/a		1			
HALF MOON LAKE PRODUCTION PLATFORM 12 MI SE OF HOPEDALE, LA700 FRS ID: 110017781854	AFS: 2208700025		12	yes	1	1			
KCS MEDSL 4909 PF SE 13M ON SH46 TO YSCLOSKEY, 21M SE TO FACILITY ST BERNARD, LA700 FRS ID: 110007305861	AFS: 2208700050		n/a	n/a		1			
KERR MCGEE CORP HOPEDALE BASE RT 1 BOX 612 E ST BERNARD, LA700 FRS ID: 110006021287	RCR: LAD980865349			no		1			
LA OFFICE OF STATE PARKS ST. BERNARD STATE PARK ST. BERNARD, LA700 FRS ID: 110024822209	ICP: LAG560252		n/a	n/a		1			
MAIN PASS BLOCK 1 SL 16386 NO. 1 WELL HOPEDALE, LA700 FRS ID: 110000444754	ICP: LAG33A126		n/a	n/a		1			
MAIN PASS BLOCK 10 PLATFORM A FACILITY IN GULF OF MEXICO LA TERRITORI HOPEDALE, LA700 FRS ID: 110037562892	AFS: 2208700310		n/a	n/a		1			
MAIN PASS BLOCK 10 PLATFORM A MAIN PASS FIELD HOPEDALE, LA700 FRS ID: 110032834572	ICP: LAG33A890		n/a	n/a		1			
	AFS: 2208700058		n/a	n/a		1			
	AFS: 2208700059		n/a	n/a		1			
MANTI OPERATING FIELD	AFS: 2208700060			no		1			

Map Results

10.8 MI NE OF ALLUVIAL CITY, LA700 FRS ID: 110013390151	ICP: LAU003699		n/a	n/a	1	A			
	ICP: LAU003700		n/a	n/a	1	A			
	ICP: LAU003701		n/a	n/a	1	A			
	ICP: LA0119906		n/a	n/a	1	A			
	ICP: LA0119916		n/a	n/a	1	A			
PALMER PIT II 1025 FLORISSANT HWY ST. BERNARD, LA700 FRS ID: 110031270032	ICP: LAG490071		n/a	n/a		A			
POGO BRETON SD BLK 2 SE HWY 46 TO YSCLOSKEY, THEN 24M E TO PROD PLFM POYDRAS, LA700 FRS ID: 110007302070	AFS: 2208700040		n/a	n/a		A			
PORT SHIP SERVICES INC SENCO ROAD POYDRAS, LA700 FRS ID: 110012674034	ICP: LA0116327		n/a	n/a	1	A			
PROGRESSIVE CONSTRUCTION HWY LA 46 ST. BERNARD, LA700 FRS ID: 110037466983	ICP: LAR10F234		n/a	n/a		A			
RICORDS OIL SVC 7915 E ST BERNARD HWY POYDRAS, LA700 FRS ID: 110003363011	RCR: LAR000031427			no		A			
SAFEWAY USED OIL 7915 E ST BERNARD HWY ST BERNARD, LA700 FRS ID: 110003360434	RCR: LAR000026138			no		A			
SPECIAL K PROFESSIONAL HAND CA 1881 JOSEPH DR ST BERNARD, LA700 FRS ID: 110011185737	ICP: LAG750128		n/a	n/a		A			
ST. RITA'S NURSING FACILITY 1422 EAST LA HWY 46 ST. BERNARD, LA700 FRS ID: 110008746388	ICP: LAG541021		n/a	n/a	1	A			
	ICP: LAU609214		n/a	n/a	1	A			
STATE LEASE 16065 #1 PRODUCTION FACILITY - LAKE BO 18.5 MI NE OF ST. BERNARD, LA700 FRS ID: 110022400203	AFS: 2208700290		n/a	n/a		A			
STATE LEASE 18315 PRODUCTION FACILITY - 24 MI NE OF HOPEDALE, LA700 FRS ID: 110033125499	AFS: 2208700300		n/a	n/a		A			
STUARAD'S BLUFF PRODUCTION FACILITY HOPEDALE, LA700 FRS ID: 110030443492	ICP: LAG33A543		n/a	n/a		A			
TARGA MIDSTREAM SERVICES LP - YSCLOSKEY GAS PLANT HWY 46 ALONG BAYOU LALOUTRE YSCLOSKEY, LA700 FRS ID: 110007063444	AFS: 2208700014	3		no	1	A			
TENNESSEE GAS PL STA 529 1801 FLORISSANT HWY ST BERNARD, LA700 FRS ID: 110003266108	RCR: LAD000755801			no		A			
TLC BOAT RENTAL INC 4924 EAST LA 46 ST BERNARD, LA700 FRS ID: 110011166745	ICP: LAG750001		n/a	n/a		A			

Map Results

TOCA GAS PROCESSING PLANT 2300 BAYOU ROAD ST BERNARD, LA700 FRS ID: 110000530186	AFS: 2208700003	1		no		1			
	AFS: 2208700013			no		2			
	AFS: 2208700019	2	12	yes	1	3			
	ICP: LAG750314		n/a	n/a	1	4			
	ICP: LA0005428		n/a	n/a	1	5			
	RCR: LAD008194771			no		6			
	RCR: LAD980796791	1		no		7			
	RCR: LAR000038570	1		no		8			
US ARMY CORPS OF ENGINEERS NEW ORLEANS DISTRICT VERRET, LA700 FRS ID: 110033016803	ICP: LAR10E611		n/a	n/a		9			
WOOD CHANDELEUR SOUN BLK 25 1 25 MI E OF HOPEDALE, LA700 FRS ID: 110022403852	AFS: 2208700016	10	n/a	n/a		11			

Last updated on Friday, December 4th, 2009.
http://www.epa-echo.gov/cgi-bin/ideaotis.cgi
Print AS-IS

Last updated on December 4th, 2009

C-2
70032 ARABI

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

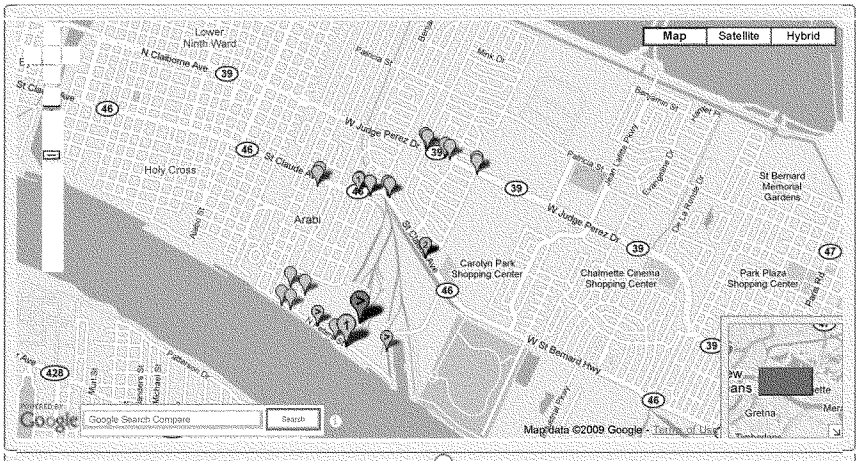
Enforcement & Compliance History Online (ECHO)

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ECHO Environmental and Compliance History Online

Search Results (Multimedia)

Help



No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last Inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
AMERICAN SUGAR REFINING INC 7417 N PETERS ST ARABI, LA700 FRS ID: 110009575762	AFS: 2208700009		5	yes		1			
	ICI: 08-2009-0015			no		1			
	ICP: LA0005665	2	7	no	1	1			
	RCR: LAD008162364			no		1			
	TRI: 70032MSTRS7417N			no		1		nr	
ARABI CAR CARE 7710 W JUDGE PEREZ ARABI, LA700 FRS ID: 110003347897	RCR: LAR000003673			no		1			
ARABI CLNRS 7548 W JUDGE PEREZ DR ARABI, LA700 FRS ID: 110003332616	RCR: LAD985207794			no		1			
ARABI TERMINAL 8000 W. ST. BERNARD HWY ARABI, LA700 FRS ID: 110012752674	ICP: LAR05N247	2	n/a	n/a	1	1			
ARGO MARINE INC									

Map Results

1104 LEBEAU ST. ARABI, LA700 FRS ID: 110035769861	ICP: LA0123188	1	n/a	n/a					
ASSOCIATED TERMINALS OF ST. BERNARD LLC ARABI, LA700 FRS ID: 110036110098	ICP: LA0124141		n/a	n/a					
ASSOCIATED TERMINALS OF ST BERNARD LLC 8000 ST BERNARD HWY ARABI, LA700 FRS ID: 110024430864	AFS: 2208700004			no	1				
	ICP: LA0108120	1	n/a	n/a	1				
	RCR: LAR000059162	1		no					
BLUE CIRCLE CEMENT 6979 N PETERS ST ARABI, LA700 FRS ID: 110007040139	AFS: 2208700020		n/a	n/a					
BOASSO INTERNATIONAL 7300 NORTH PETERS STREET ARABI, LA700 FRS ID: 110001316344	AFS: 2208700044		n/a	n/a					
	RCR: LAD982759813	1		no					
BOYD BREAUX'S ENGINE SVC 7713 W JUDGE PEREZ DR ARABI, LA700 FRS ID: 110003299908	RCR: LAD981522527			no					
BULK MATERIAL TRANSFER, INC. NORTH BANK MISS RIVER ARABI, LA700 FRS ID: 110007063417	ICP: LAR05N208		n/a	n/a	1				
CAROLYN PARK SHELL 701 PERRIN DR ARABI, LA700 FRS ID: 110003262558	RCR: LA0000855668			no					
CHALMETTE SLIP DOCK NO 2 8000 ST. BERNARD HWY ARABI, LA700 FRS ID: 110015680729	ICP: LAG531448	1	n/a	n/a	1				
CRESCENT SHIP SERVICE INC PO BOX 148 ARABI, LA700 FRS ID: 110011182634	ICP: LAG530154		n/a	n/a					
CRESCENT SHIP SERVICE INC PO BOX 148 ARABI, LA700 FRS ID: 110009014020	ICP: LAG530155		n/a	n/a					
CRESCENT SHIP SVC INC PO BOX 148 ARABI, LA700 FRS ID: 110011182643	ICP: LAG530156		n/a	n/a					
CRESCENT SHIP SVC INC 332 AYCOCK ST ARABI, LA700 FRS ID: 110003353549	RCR: LAR000013094			no					
D & MS AUTOMOTIVE REPAIR INC 223 FRISCOVILLE AVE ARABI, LA700 FRS ID: 110003262086	RCR: LA0000593285			no					
DUTCHMANS (GOLDEN CLEANERS 7461 ST BERNARD HWY ARABI, LA700 FRS ID: 110003310603	RCR: LAD982552788			no					
EXXON CO USA 52065 7415 JUDGE PEREZ DR ARABI, LA700 FRS ID: 110003323207	RCR: LAD985194364			no					
GULF STATES INTERMODAL INC 7300 N PETERS STE A	RCR: LAR000017079			no					

Map Results

ARABI, LA700 FRS ID: 110009583744									
K & A AUTO SVC 6720 ST CLAUDE AVE ARABI, LA700 FRS ID: 110003292801	RCR: LAD981520653			no		1			
LAKE BORGNE BASIN LEVEE DIST LOC @ INTERSECTION LA 46 & ARABI, LA700 FRS ID: 110012752093	ICP: LAR106945		n/a	n/a	1	1			
METAL MENDERS INC 7308 ST CLAUDE AVE BAY A ARABI, LA700 FRS ID: 110003317107	RCR: LAD985184456			no		1			
MOODY AUTOMOTIVE 7429 W ST BERNARD HWY ARABI, LA700 FRS ID: 110003334080	RCR: LAD985210004			no		1			
PORT SHIP SERVICE, INC 7121 N PETERS ST ARABI, LA700 FRS ID: 110003260177	ICP: LA0116092 RCR: LA0000239616		n/a	n/a no	1	1 1			
PORT SHIP SERVICES INC SENCO ROAD POYDRAS, LA700 FRS ID: 110012674034	ICP: LA0116327		n/a	n/a	1	1			
PORT SHIP SVC INC 102 AYCOCK ST ARABI, LA700 FRS ID: 110003295700	RCR: LAD981587447			no		1			
QUALITY MOBILE AUTO RPR 1111 LEBEAU ST ARABI, LA700 FRS ID: 110003360880	RCR: LAR000026690			no		1			
SPECIAL TS 7308 ST CLAUDE AVE STE H ARABI, LA700 FRS ID: 110003350196	RCR: LAR000007351			no		1			
ST BERNARD PARISH SCHOOL BOARD 6601 N ROCHEBLAVE ST ARABI, LA700 FRS ID: 110003296004	RCR: LAD981588049			no		1			
STAR ENT 7571 W JUDGE PEREZ DR ARABI, LA700 FRS ID: 110003325474	RCR: LAD985197573			no		1			
TIRE KINGDOM DBA LUCAS TIRE 183 6707 ST CLAUDE AVE ARABI, LA700 FRS ID: 110003300669	RCR: LAD981608805			no		1			

Last updated on Friday, December 4th, 2009.
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Last updated on December 4th, 2009

C-3
70040 BRAITHWAITE

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

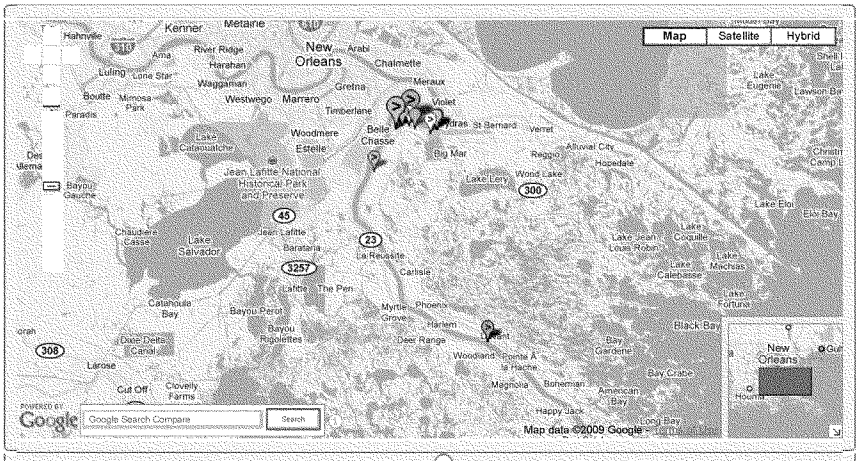
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No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last Inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
AMAX METALS RECOVERY INCORPORATED 3607 ENGLISH TURN ROAD BRAITHWAITE, LA700 FRS ID: 110000446831	ICP: LAR05P122		n/a	n/a		1			
	RCR: LAD058472721			no		1			
	TRI: 70040MXMTLLAHWY			no		1		nr	
AMAX NICKEL IND LA STATE HWY 3137 BRAITHWAITE, LA700 FRS ID: 110011461784	AFS: 2207500211	1	n/a	n/a		1			
AMAX/NICKEL REFINING H39/LEFT BK 76.5 AH BRAITHWAITE, LA700 FRS ID: 110022408330	AFS: 2207500017	1	n/a	n/a		1			
ASPEN BIOFUELS NEW ORLEANS LLC - NEW ORL ENGLISH TURN RD BRAITHWAITE, LA700 FRS ID: 110031156040	AFS: 2207500375	1	n/a	n/a		1			
BASS GRAVOLET 2 PE OFF H39 2M NORTH OF	AFS: 2207500278	1	n/a	n/a		1			

Map Results

POINTE A LA HACH, LA700 FRS ID: 110007224404									
RENDER SHIPYARD INC 1674 HWY 39 BRAITHWAITE, LA700 FRS ID: 110006020224	RCR: LAD080818840			no		1			
ELEVATING BOATS INC 900 SAINT BERNARD PARKWAY BRAITHWAITE, LA700 FRS ID: 110001245439	AFS: 2208700029			no		1			
	ICP: LAG480278		n/a	n/a		1			
	ICP: LAU003941		n/a	n/a	1	1			
	RCR: LAD981612583			no		1			
	TRI: 70040LVTNG900ST			no		1		nr	
SEMCO INC - BRAITHWAITE FACILITY 1672 HIGHWAY 39 BRAITHWAITE, LA700 FRS ID: 110006926731	AFS: 2207500329		n/a	n/a		1			
	AFS: 2207500336			no		1			
	ICP: LAU009150		n/a	n/a	1	1			
SHALLOW DRAFT ELEVATING BOATS, INC BRAITHWAITE, LA700 FRS ID: 110020157970	ICP: LAR05N589		n/a	n/a	1	1			
ST CLAIR LAND LLC ST CLAIR ESTATES BRAITHWAITE, LA700 FRS ID: 110017360372	ICP: LAG541171		n/a	n/a	1	1			
ST. BERNARD STATE PARK 501 ST. BERNARD PKWY BRAITHWAITE, LA700 FRS ID: 110038517735	ICP: LAG541683		n/a	n/a		1			
STOLTHAVEN NEW ORLEANS LLC - BRAITHWAITE FACILITY 2444 ENGLISH TURN RD BRAITHWAITE, LA700 FRS ID: 110003368463	AFS: 2207500304			no		1			
	RCR: LAR000043521	2	11	no	2	1			
STOLTHAVEN NEW ORLEANS, LLC BRAITHWAITE TERMINAL BRAITHWAITE, LA700 FRS ID: 110011138401	ICP: LA0114405	1	n/a	n/a		1			
TESCO BULK TERMINAL LLC 14537 HWY 15 DAVANT, LA700 FRS ID: 110006020162	AFS: 2207500052			no		1			
	ICP: LA0070802		n/a	n/a	1	1			
	ICP: LA0116998		n/a	n/a	1	1			
	RCR: LAD058469222			no		1			
UNITED CEMENT BRAITHWAITE FACILITY BRAITHWAITE, LA700 FRS ID: 110031275064	ICP: LAR05N855		n/a	n/a	1	1			

Last updated on Monday, December 7th, 2009.
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C-4
70043 CHALMETTE

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

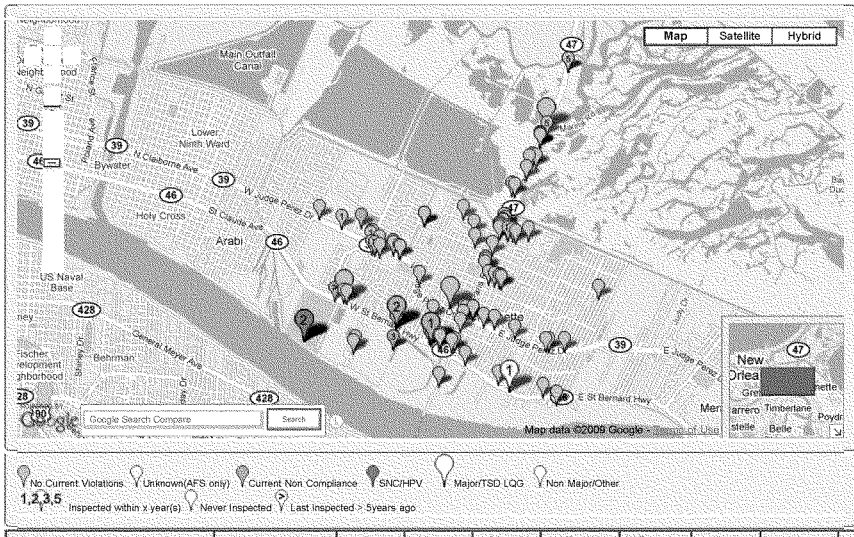
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Facility Information *Select Name to Read Report* *Select ⬚ to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
ABEAR ALIGNMENT CO INC 2820 BUFFON ST CHALMETTE, LA 70043 FRS ID: 110003263619	RCR: LA0000918003			no		1			
ADVANCE AUTO PARTS #8787 400 E JUDGE PEREZ DR CHALMETTE, LA 70043 FRS ID: 110023046755	RCR: LAR000058719			no		1			
AJ LAUNDRY & DRYCLEAN 2403 PARIS RD CHALMETTE, LA 70043 FRS ID: 110003347147	RCR: LAR000002170			no		1			
ALL SERVICE MACHINE SHOP DI BLDG 9000 W ST BERNARD HWY BLDG 55 CHALMETTE, LA 70043 FRS ID: 110009583520	RCR: LAR000013037			no		1			
AUTO & MARINE SVC 5405 PARIS RD CHALMETTE, LA 70043	RCR: LAD985207091			no		1			

Map Results

FRS ID: 110003332091									
AUTO MASTERS AUTOMOTIVE LLC 112 E MAGISTRATE CHALMETTE, LA700 FRS ID: 110003302505	RCR: LAD981901218			no					
BELLSOUTH TELE #2208 305 W MOREAU ST CHALMETTE, LA700 FRS ID: 110003286275	RCR: LAD980629978			no					
BEND ALL MUFFLER & SVC CNTR 1005 E JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003318302	RCR: LAD985186147			no					
BILL HOFFERS CHALMETTE EXXON 2530 PARIS RD CHALMETTE, LA700 FRS ID: 110003315127	RCR: LAD985173921			no					
BOASSO AMERICA CORP - CHALMETTE FACILITY 100 INTERMODAL DR CHALMETTE, LA700 FRS ID: 110015977636	AFS: 2208700064		n/a	n/a					
BOASSO AMERICA CORPORATION 9000 WEST STREET BERNARD HIGHWAY CHALMETTE, LA700 FRS ID: 110014370509	ICP: LA0117099 RCR: LAR000048256	1 2	n/a 3	n/a no	1 1				
BOB COLLISION CNTR 3805 PARIS RD CHALMETTE, LA700 FRS ID: 110003334632	RCR: LAD985210772			no					
BOB OUTBOARD 8517 ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110003296120	RCR: LAD981588361			no					
BOBS COLLISION CTR 4024 PARIS RD CHALMETTE, LA700 FRS ID: 110003261283	RCR: LA000463604			no					
BRANDT CAR CARE 3370 PARIS RD CHALMETTE, LA700 FRS ID: 110003337540	RCR: LAD985215615			no					
CAR CRAFT INC 1101 E ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110003279808	RCR: LAD086562881			no					
CEMBELL INDUSTRIES INC 5417 PARIS RD CHALMETTE, LA700 FRS ID: 110003358063	RCR: LAR000020875			no					
CHALMETTE COKE PLANT & ST TERMINAL CHALMETTE, LA700 FRS ID: 110037936795	ICP: LAG532995		n/a	n/a					
CHALMETTE MEDICAL CENTER 801 VIRTUE STREET CHALMETTE, LA700 FRS ID: 110013945687	RCR: LAD010394419			no					
CHALMETTE MEDICAL CNTRS 9001 PATRICIA ST CHALMETTE, LA700 FRS ID: 110003338380	RCR: LAD985218015			no					
CHALMETTE ORTHOPAEDIC CLINIC 401 W GENIE ST CHALMETTE, LA700 FRS ID: 110003319677	RCR: LAD985187970			no					

Map Results

CHALMETTE REF LLC MS RIV LEFT BK HWY 46 CHALMETTE, LA700 FRS ID: 110007294775	AFS: 2208700052		n/a	n/a					
	AFS: 2208790052		n/a	n/a					
CHALMETTE REFINING LLC - CHALMETTE REFINERY 500 W ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110029511758	RCP: LAR05N973	1	n/a	n/a					
CHALMETTE TERMINAL LLC CHALMETTE FACILITY 100 COKE PLANT RD CHALMETTE, LA700 FRS ID: 110007083426	AFS: 2208700008		n/a	n/a					
CHALMETTE TIRE INC 2615 BUFFON ST CHALMETTE, LA700 FRS ID: 110003354432	RCR: LAR000014795			no					
CHALMETTE TRANSMISSION 3344 LAFITTE COURT CHALMETTE, LA700 FRS ID: 110003296390	RCP: LAU003016		n/a	n/a	1				
	RCR: LAD981588676			no					
CII CARBON LLC 700 COKE PLANT ROAD CHALMETTE, LA700 FRS ID: 110003275866	RCP: LA0081363	2	n/a	n/a	1				
	RCR: LAD060839727			no					
	TRI: 70043CHLMT7CKEP			no				0	
CII CARBON LLC/CHALMETTE COKE PLANT 1200 ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110012818497	AFS: 2208700006	2	8	no	1	1	30,000		
COASTAL GRAPHICS INC 8903 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003359678	RCR: LAR000024067			no					
COASTAL GRAPHICS INC 600 BONITA ST CHALMETTE, LA700 FRS ID: 110003366072	RCR: LAR000037275			no					
CONTAINER ENTERPRISE INC - CHASSIS & CONTAINERS RE 3900 PARIS RD CHALMETTE, LA700 FRS ID: 110009484946	AFS: 2208700049		n/a	n/a					
	RCR: LAD040772881			no					
CORNES BLACK GOLD OIL SVC 217 E VIRTUE ST CHALMETTE, LA700 FRS ID: 110003312460	RCR: LAD982759193			no					
CREWBOATS SHIP PAINT 5425 PARIS RD CHALMETTE, LA700 FRS ID: 110001315862	AFS: 2208700034		n/a	n/a					
	RCR: LAD061249140			no					
	TRI: 70044CRWBT5425P			no				nr	
CURES CLNRS INC 311 W ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110003346175	RCR: LAD985229509			no					
CUSTOM BODY SHOP INC 3019 JEAN LAFITTE PKWY CHALMETTE, LA700 FRS ID: 110003331804	RCR: LAD985206689	1		no					
CUSTOM CYCLE 8517-A W ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110003276499	RCR: LAD075084467			no					
CYPRESS GARDEN CREMATORY LLC 8310 LAFITTE COURT	AFS: 2208700081		n/a	n/a					

Map Results

CHALMETTE, LA700 FRS ID: 110013390188									
D & J AUTOMOTIVE 3909 PARIS RD CHALMETTE, LA700 FRS ID: 110003294578	RCR: LAD981585359			no		1			
D & M BODY & PAINT 516 MAGISTRATE ST CHALMETTE, LA700 FRS ID: 110003362405	RCR: LAR000030569			no		1			
DE LA RONDE FAMILY PRACTICE CNTR 9000 PATRICIA ST STE 100 CHALMETTE, LA700 FRS ID: 110003274858	RCR: LAD054550439			no		1			
DISCOUNT TIRE CITY INC 105 E GENIE ST CHALMETTE, LA700 FRS ID: 110003279452	RCR: LAD083551630			no		1			
DON FOS PROCESSOR SVC INC 2416 VICTOR ST CHALMETTE, LA700 FRS ID: 110003291580	RCR: LAD981519200			no		1			
DREW WRIGHT TESAB RK 1012 SN 05-1067-326 LA700 FRS ID: 110013358985	AFS: 2277700401		n/a	n/a		1			
DSS LE AND MUI FAMILY MEDICINE ASSO 9020 W JUDGE PEREZ CHALMETTE, LA700 FRS ID: 110003293604	RCR: LAD981522071			no		1			
DUCOTES AUTO RPR 1904 JUDGE PEREZ CHALMETTE, LA700 FRS ID: 110003332572	RCR: LAD985207752			no		1			
DW PRICE VACUUM TRUCK SVCS INC 102 PLEASURE ST CHALMETTE, LA700 FRS ID: 110003301123	RCR: LAD981612526			no		1			
EQUIVA SERVICES LLC SHELL RETAIL SCRV. STATION #44 CHALMETTE, LA700 FRS ID: 110008977009	ICP: LAG750334		n/a	n/a	1	1			
EXPRESS AUTOMOTIVE 9200 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003280823	RCR: LAD093541514			no		1			
EXXONMOBIL REFINERY COMPLEX 500 WEST SAINT BERNARD HIGHWAY CHALMETTE, LA700 FRS ID: 110000449131	AFS: 2208700005	8		no	1	2	500,000		
	ICI: 06-2001-3715			no		1	500,000		
	ICI: 06-2004-5053			no		1	5,000		
	ICP: LA0004260	4	4	no		1			
	RCR: LAD008179707	5		no		1			
	TRI: 70143TNNCL500WE			no		1		1,142,454	
FIRESTONE STORE 7721 8615 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003281289	RCR: LAD096045182			no		1			
FRADELLAS COLLISION CNTR INC 4839 PARIS RD CHALMETTE, LA700 FRS ID: 110003316215	RCR: LAD985175413			no		1			
GENUINE PARTS CO, ST BERNARD PARISH 2620 DELILE ST	RCR: LAR000059238			no		1			

Map Results

CHALMETTE, LA700 FRS ID: 110024430935									
GORMAN TRANSPORT INC 2009 BARCELONA ST CHALMETTE, LA700 FRS ID: 110003356207	RCR: LAR000017780			no					
GULF OUTLET MARINA ESTATES PARISH ROAD CHALMETTE, LA700 FRS ID: 110017886983	ICR: LAG541139	1	n/a	n/a	1				
H BEASLEY TRUCKING SVC 109 AGRICULTURE ST CHALMETTE, LA700 FRS ID: 110003294596	RCR: LAD981585375			no					
HERCHLER METAL BLDG 205 E PLEASURE ST CHALMETTE, LA700 FRS ID: 110003267410	RCR: LAD005850486			no					
HOME DEPOT #6373 8601 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003327294	RCR: LAD985200112			no					
JIFFY LUBE INTL INC 835 110 E JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003349403	RCR: LAR000005751			no					
KEITH GUY INC 8407 PARK PLACE CHALMETTE, LA700 FRS ID: 110003342954	RCR: LAD985225333			no					
KERN CHIROPRACTIC 124 W JUDGE PEREZ CHALMETTE, LA700 FRS ID: 110003301506	RCR: LAD981899024			no					
LA DOTD ON LA 46 CHALMETTE, LA700 FRS ID: 110024409536	ICP: LAR10C852		n/a	n/a	1				
LABOURDETTE AUTO COLLISION 205 E VIRTUE ST CHALMETTE, LA700 FRS ID: 110003294765	RCR: LAD981585557			no					
LDH ENERGY OLEFINS LLC - CHALMETTE GAS P 1701 PARISH RD GATE 50 CHALMETTE, LA700 FRS ID: 110007392151	AFS: 2208700055 AFS: 2208790055		n/a n/a	n/a n/a					
LIL JAKE'S CARWASH & SELF STOR 8589 WEST ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110011165069	ICR: LAG750223		n/a	n/a					
MEL'S CAR CARE 1910 LEBLANC RD CHALMETTE, LA700 FRS ID: 110003339860	RCR: LAD985220946			no					
MIDAS MUFFLER 547 E JUDGE PEREZ CHALMETTE, LA700 FRS ID: 110003318080	RCR: LAD985185875			no					
MOTIVA ENTERPRISES LLC SAP#137431 2600 PARIS RD CHALMETTE, LA700 FRS ID: 110003318749	RCR: LAD985186733			no					
MUSCLE CARS UNLIMITED 132 E MOREAU ST	RCR: LAD985211713			no					

Map Results

CHALMETTE, LA700 FRS ID: 110003335258									
NUCLEAR CARDIOLOGY INSTITUTE 9000 PATRICIA ST CHALMETTE, LA700 FRS ID: 110009581951	RCR: LAD985212729			no					
ORLEANS DODGE CHRYSLER JEEP COLLISION 4004 PARIS RD CHALMETTE, LA700 FRS ID: 110003315136	RCR: LAD985173939			no					
PACE AUTOMOTIVE INC 3216 LAPLACE ST CHALMETTE, LA700 FRS ID: 110003333438	RCR: LAD985209097			no					
PACKENHAM BR SVC 301 ST BERNARD HWY CHALMETTE, LA700 FRS ID: 110003296648	RCR: LAD981587363			no					
PARETTI TRANSMISSION SVC 301 W ST BERNARD CHALMETTE, LA700 FRS ID: 110009583548	RCR: LAR000013235			no					
PEI 8360 LAFITTE CT CHALMETTE, LA700 FRS ID: 110003347735	RCR: LAR000003459			no					
PENSKE AUTO CTR 8601 W JUDGE PEREZ DR STE B CHALMETTE, LA700 FRS ID: 110009583441	RCR: LAR000012088			no					
PEP BOYS #1 8736 W JUDGE PEREZ DR NEW ORLEANS, LA700 FRS ID: 110008391454	RCR: LAD985206358			no					
PORT SHIP SVC SHIPYARD 6325-A PARIS RD CHALMETTE, LA700 FRS ID: 110003343123	RCR: LAD985225580			no					
PRO TECH AUTO 5020 PARIS RD CHALMETTE, LA700 FRS ID: 110003329256	RCR: LAD985202936			no					
QUALITY BODY & FENDER WORKS INC 2005 PARIS RD CHALMETTE, LA700 FRS ID: 110003335891	RCR: LAD985212844			no					
RICHS BODY WORKS INC 2618 BUFFON ST CHALMETTE, LA700 FRS ID: 110003356582	RCR: LAR000018259			no					
RICORD OIL SVC 3521 LENA DR CHALMETTE, LA700 FRS ID: 110003367534	RCR: LAR000041509			no					
RITE AID: HURRICANE KATRINA ST BERNARD PARISH CHALMETTE, LA700 FRS ID: 110023046096	RCR: LAR000058669			no					
RONALD A SPORL RACING ENT INC 317 E VIRTURE ST CHALMETTE, LA700 FRS ID: 110003297931	RCR: LAD981593411			no					
RONALD SPORL RACING 3212 LA PLACE ST CHALMETTE, LA700	RCR: LAD985223130			no					

Map Results

FRS ID: 110003341303									
RT AUTOMOTIVE INC 3204 LAPLACE ST CHALMETTE, LA 700 FRS ID: 110003304978	RCR: LAD981908080			no		1			
SEABREEZE BOAT BLDS INC 9000 W ST BERNARD HWY BLDG 93 CHALMETTE, LA 700 FRS ID: 110029513678	AFS: 2208700047	99	n/a	n/a		1			
	RCR: LAR000017640			no		1			
SERIOUS SHINE 214 E PROSPER CHALMETTE, LA 700 FRS ID: 110003261121	RCR: LA0000453456			no		2			
SHERWIN WILLIAMS - HURRICANE KATRINA ST BERNARD PARISH CHALMETTE, LA 700 FRS ID: 110022923871	RCR: LAR000058479			no		1			
SHIPYARD FACILITY 8325 A PARIS RD CHALMETTE, LA 700 FRS ID: 110020661859	ICP: LAG480922	1	n/a	n/a	1	1			
SON L CORP DBA MEINEKE MUFFLER 1700 E JUDGE PEREZ DR CHALMETTE, LA 700 FRS ID: 110003340830	RCR: LAD985222504			no		1			
ST BERNARD AUTO RPR 8615 W ST BERNARD HWY CHALMETTE, LA 700 FRS ID: 110003349234	RCR: LAR000005561			no		1			
ST BERNARD PAR WATER & SEWER DIV 1111 E ST BERNARD HWY CHALMETTE, LA 700 FRS ID: 110003366349	ICI: 05-2005-1883			no		1			
	ICI: 05-2008-2056			no		1			
	ICI: 05-2003-2057			no		1			
	ICP: LAL040177			no		3			
	ICP: LAL040975			no		2			
	ICP: LA0040177	5	12	yes	1	1			
	ICP: LA0040975	4	12	yes	1	1			
	RCR: LAR000037622			no		1			
ST BERNARD PARISH GOVT LOC WIN NEW ORLEANS CHALMETTE, LA 700 FRS ID: 110014393209	ICP: LAR040003		n/a	n/a	1	1			
ST BERNARD PARISH GOVT 120 W AGRICULTURE RD CHALMETTE, LA 700 FRS ID: 110003367482	RCR: LAR000041442			no		1			
ST BERNARD PORT HARBOR & TERM 9000 W ST BERNARD HWY CHALMETTE, LA 700 FRS ID: 110003346763	ICP: LA0000876	2	n/a	n/a		1			
	RCR: LAR000001180			no		1			
STAR ENTERPRISE 2601 PARIS RD CHALMETTE, LA 700 FRS ID: 110003325250	RCR: LAD985197268			no		1			
STEVES ALIGNMENT SVC 115 VIRTUE ST NO A CHALMETTE, LA 700 FRS ID: 110003283072	RCR: LAD114282072			no		1			
SUBURBAN ATHLETE SPORTING GOODS INC 1620 E JUDGE PEREZ DR CHALMETTE, LA 700 FRS ID: 110003281127	RCR: LAD094921699			no		1			
T & T MARINE RPR									

Map Results

MARINA RD AT CITY LIMITS CHALMETTE, LA700 FRS ID: 110006367959	RCR: LAD981608524			no					
T & T MARINE WORLD INC 5441 PARIS RD CHALMETTE, LA700 FRS ID: 110003345942	RCR: LAD985229202			no					
TEXACO SVC STATION 8920 W JUDGE PEREZ CHALMETTE, LA700 FRS ID: 110003325385	RCR: LAD985197409			no					
THE ALBACH CO 302 E PROSPER ST CHALMETTE, LA700 FRS ID: 110003348912	RCR: LAR000005116			no					
TIMES PICAYUNE INC ST BERNARD BUR 9000 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003350515	RCR: LAR000007765			no					
TONYS AUTO REPAIR INC 3901 PARIS RD CHALMETTE, LA700 FRS ID: 110003283232	CP: LAU004018		n/a	n/a					
	RCR: LAD117421958			no					
VEOLIA WATER NORTH AMERICA OPERATING SERVICES LLC 500 BONITA DR CHALMETTE, LA700 FRS ID: 110007007826	AFS: 2208700055		n/a	n/a					
VIRTUE STREET TRUCK MAINTENANCE & PARKING FACILITY CHALMETTE, LA700 FRS ID: 110038180599	CP: LAR05P083		n/a	n/a					
W W AUTOMOTIVE ENGINE EXCH 301 E VIRTUE ST CHALMETTE, LA700 FRS ID: 110003363413	RCR: LAR000032391			no					
WALGREENS CO: HURR KATRINA: ST BERNARD ST BERNARD PARISH CHALMETTE, LA700 FRS ID: 110022923916	RCR: LAR000056537			no					
WALGREENS 1846 3350 PARIS RD CHALMETTE, LA700 FRS ID: 110012262416	RCR: LAR000045849			no					
WALMART STORE #908 8333 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110003296530	RCR: LAD981588973	1		no					
WALMART SUPERCENTER #485 37000 HWY 3089 DONALDSONVILLE, LA703 FRS ID: 110021002476	RCR: LAR000057331			no					
WALMART SUPERCENTER #908 8101 W JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110021009237	RCR: LAR000057356			no					
WINN DIXIE 1432 3300 PARIS RD CHALMETTE, LA700 FRS ID: 110003361246	RCR: LAR000027660			no					

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C-5
70075 MERAUX

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

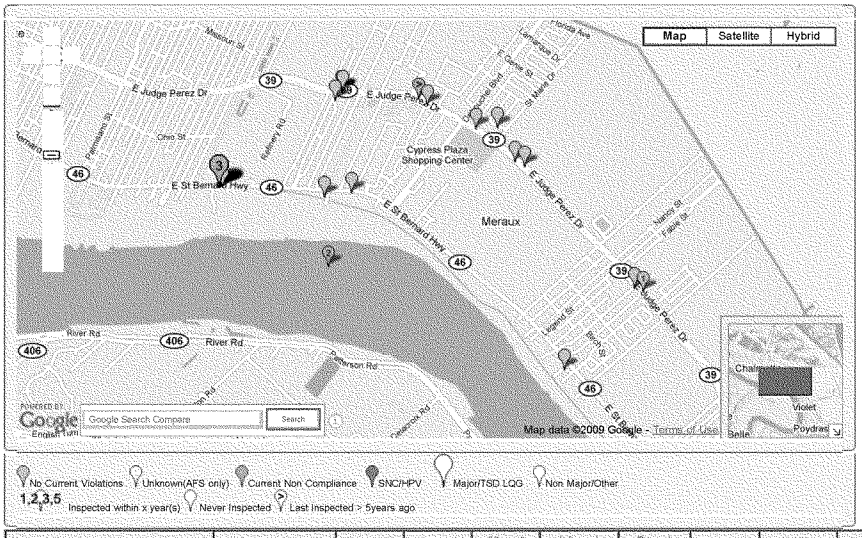
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No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
BRETON SOUND 1B PRODUCTION FACILITY 42 MI SW OF MERAUX, LA700 FRS ID: 110007040264	AFS: 2208700035		n/a	n/a					
CHALMETTE COLLISION 2817 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003332055	RCR: LAD985207059			no					
D & D PRESSURE CLEAN, LLC 2701 EARL DR MERAUX, LA700 FRS ID: 110013404280	ICP: LAG758348		n/a	n/a	1				
DAVIE MEAUX JR ET AL #2 PRODUCTION FACILITY HWYS 896 & 343 JCT GO S 0.6 MEAUX, LA700 FRS ID: 110007392180	AFS: 2211300216		n/a	n/a					
EXXONMOBIL OIL CORP #50251 4141 E JUDGE PEREZ DR									

Map Results

MERAUX, LA700 FRS ID: 110003362922	RCR: LAR000031302			no		1			
FUTURE AUTO RPR INC 3014 E ST BENARD MERAUX, LA700 FRS ID: 110003305343	RCR: LAD981909765			no		1			
HENRYS BODY SHOP 1925 TUSA ST MERAUX, LA700 FRS ID: 110003336943	RCR: LAD985214469			no		1			
JESSES AUTO RPR 2324 E ST BERNARD HWY MERAUX, LA700 FRS ID: 110003314930	RCR: LAD985173582			no		1			
JOE MENANTS BODY SHOP 3405 E ST BERNARD HWY MERAUX, LA700 FRS ID: 110003356163	RCR: LAR000017723			no		1			
L A LUCK LLC, MOVIE PRODUCTION 3810 E JUDGE PEREZ MERAUX, LA700 FRS ID: 110021009157	RCR: LAR000057299			no		1			
MIKES OUTBOARD RPR INC 3101 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003285025	RCR: LAD148278484			no		1			
MURPHY OIL USA INC - MERAUX REFINERY 2500 EAST SAINT BERNARD HIGHWAY MERAUX, LA700 FRS ID: 110000448837	AFS: 2208700001	2	12	yes		3			
	AFS: 2208700027	2	n/a	n/a		1			
	AFS: 2208780027			no		1			
	ICI: 06-2004-0919			no		1	1,000		
	ICP: LAR10B710	2	n/a	n/a	1	1			
	ICP: LAR109884	2	n/a	n/a	1	1			
	ICP: LAR10C032	2	n/a	n/a	1	1			
	ICP: LAR10D812		n/a	n/a		1			
	ICP: LA0003646	3	9	no	1	1			
	RCR: LAD008058471	3		no		1			
	TRI: 70075MRPHY2500E			no		1		201,801	
SANCHEZ OIL CO 3600 E JUDGE PEREZ DR CHALMETTE, LA700 FRS ID: 110011184685	ICP: LAG750256		n/a	n/a		1			
SEARS 2385 8557 ROEBUCK & CO 4300 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003332108	RCR: LAD985207109			no		1			
SMITTYS TIRE 4333 E JUDGE PEREZ MERAUX, LA700 FRS ID: 110003342927	RCR: LAD985225309			no		1			
SPARROW INCORPORATED ST BERN HWY&DETWILLE MERAUX, LA700 FRS ID: 110007083462	AFS: 2208700017		n/a	n/a		1			
SUN RISE PLAZA 4715 E. JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110022484162	ICP: LAG681822	2	n/a	n/a	1	1			
TURN SERVICES, INC. MERAUX FACILITY MERAUX, LA700 FRS ID: 110024580723	ICP: LA0121932	2	n/a	n/a	1	1			
U.S. MARITIME SVCS., INC.									

Map Results

MISSISSIPPI RIVER OPERATIONS MERAUX, LA700 FRS ID: 110013400499	ICP: LA0116033		n/a	n/a	1				
US ENV SVCS LLC 2809 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003361772	RCR: LAR000029413			no					
US INDUSTRIAL SVCS 2821 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003364047	RCR: LAR000033571			no					
WINN DIXIE 1438 4700 E JUDGE PEREZ DR MERAUX, LA700 FRS ID: 110003362576	RCR: LAR000030783			no					

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C-6
70117 NEW ORLEANS

Map Results

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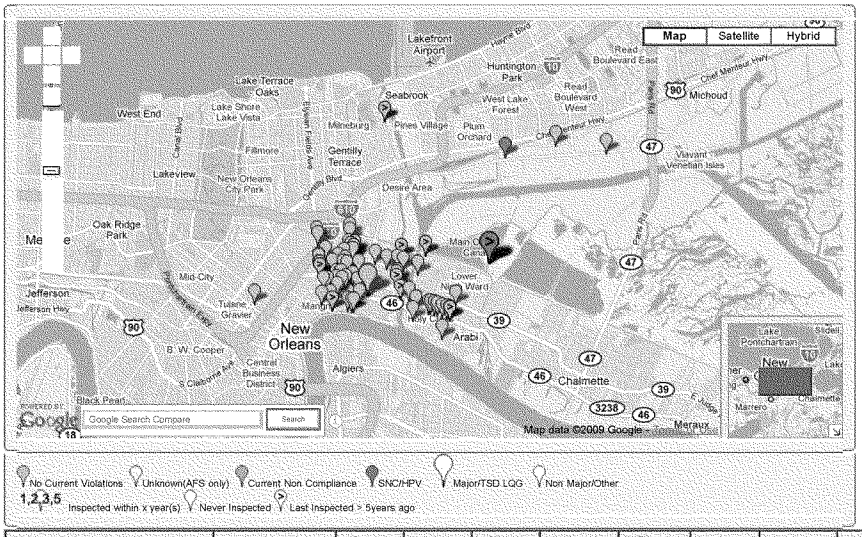
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ADVANCE AUTO PARTS #9788 5523 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110023046764	RCR: LAR000058727			no		1			
ADVANCE POLYBAG INC 2800 N JOHNSON ST NEW ORLEANS, LA701 FRS ID: 110003280609	RCR: LAD092681741			no		1			
ALL STAR CLEANERS 1525 ELYSIAN FIELDS AVENUE NEW ORLEANS, LA701 FRS ID: 110003280146	AFS: 2207160028	1	n/a	n/a		1			
	RCR: LAD088923461			no		1			
ASHER CLNRS & LNDRY 1309 MUSIC ST NEW ORLEANS, LA701 FRS ID: 110003271432	RCR: LAD034368522			no		1			
BEARDS AUTO INC 2301 ST CLAUDE AVE NEW ORLEANS, LA701	RCR: LAD985215995			no		1			

Map Results

FRS ID: 110003337700									
BILL'S TEXACO 5401 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003298111	CP: LAU003467		n/a	n/a	1	1			
	RCR: LAD981588353			no		1			
BLANCHARDS BODY SHOP INC 2014 MANDEVILLE ST NEW ORLEANS, LA701 FRS ID: 110003329029	RCR: LAD985194083			no		1			
BV WATER CLEANERS INC 3217 BURGUNDY ST NEW ORLEANS, LA701 FRS ID: 110003286282	RCR: LAD981058449			no		1			
BYWATER WOODWORKS 936 FRANKLIN AVE NEW ORLEANS, LA701 FRS ID: 110003364270	RCR: LAR000034363			no		1			
C & R ENGINE SVC 6100 N CLAIBORNE NEW ORLEANS, LA701 FRS ID: 110003259544	RCR: LA0000188169			no		1			
CHEVRON NO 108931 1601 FRANKLIN AND CLAIBORNE NEW ORLEANS, LA701 FRS ID: 110008391392	RCR: LAD985205780			no		1			
CHEVRON STATIONS INC # 108951 1610 ELYSIAN FIELDS NEW ORLEANS, LA701 FRS ID: 110003331270	RCR: LAD985206069			no		1			
CHIEF BODY & FENDER WORKS 2132 PORT ST NEW ORLEANS, LA701 FRS ID: 110003263156	RCR: LA0000885574			no		1			
CLAUDE BEANS BODY SHOP 2110 POLAND AVE NEW ORLEANS, LA701 FRS ID: 110003261470	RCR: LA0000491092			no		1			
CORDELLS AUTO WORKS 2818 FLORIDA AVE NEW ORLEANS, LA701 FRS ID: 110003348208	RCR: LAR000004085			no		1			
COTTMAN TRANSMISSION 1535 ELYSIAN FIELDS AVE NEW ORLEANS, LA701 FRS ID: 110003295372	RCR: LAD981586563			no		1			
COURSEAULTS MOBILE SVC 2642 ELYSIAN FIELDS AVE NEW ORLEANS, LA701 FRS ID: 110003262022	RCR: LA0000593186			no		1			
D & G BODY SHOP 2231 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003283759	RCR: LAD122624042			no		1			
D & G BODY SHOP INC 1636 ST ROCH AVE NEW ORLEANS, LA701 FRS ID: 110018693269	RCR: LAR000055731			no		1			
DAVID O SIBURDEN MD 5624 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003310113	RCR: LAD982549800			no		1			
DECATUR STREET SERVICES INC - DECATUR STREET SERVI 2520 DECATUR NEW ORLEANS, LA701 FRS ID: 110001245215	AFS: 2207100036		n/a	n/a		1			
	AFS: 2207100094		n/a	n/a		1			

Map Results

DINVAULTS TRUCKING SVC INC 2534 DEERS ST NEW ORLEANS, LA701 FRS ID: 110003359758	RCR: LAR000024695			no		1			
DUCROS AUTOMOTIVE BODY & PAINT SHOP 2613 URQUHART ST NEW ORLEANS, LA701 FRS ID: 110003334712	RCR: LAD985210905			no		1			
GEAST RANK WASTEWATER TREATMENT PLANT 6501 FLORIDA AVENUE NEW ORLEANS, LA701 FRS ID: 110000538080	ICI: 08-2005-2147			no		1			
	ICI: 08-2006-Y852			no		1			
	ICP: LAL038091			no	1	1			
	ICP: LA0038091	9	12	yes	1	1			
	RCR: LAR000054866			no		1			
ELDRIGES AUTO RPR 2045 ALVAR ST NEW ORLEANS, LA701 FRS ID: 110003294266	RCR: LAD981584493			no		1			
EVERKLEEN CLNRS 5110 ST CLAUDE AVENUE NEW ORLEANS, LA701 FRS ID: 110001274925	AFS: 2207116E021		n/a	n/a		1			
	RCR: LAD125467702			no		1			
EXPRESS AUTO PARTS 2501 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003302667	RCR: LAD981901812			no		1			
EXXON CO USA 58055 1601 ELYSIAN FIELDS AVE NEW ORLEANS, LA701 FRS ID: 110003323458	RCR: LAD985194703			no		1			
F & S AUTO 4961 ST CLAUDE NEW ORLEANS, LA701 FRS ID: 110003260122	RCR: LA0000239517			no		1			
FRESH START AUTOMOTIVE 1809 ARTS ST NEW ORLEANS, LA701 FRS ID: 110003346745	RCR: LAR000001131			no		1			
HIGH TECHNOLOGY CAR CARE 1641 POLAND AVE NEW ORLEANS, LA701 FRS ID: 110003324411	RCR: LAD985196096			no		1			
HOLY CROSS SCHOOL 4950 DAUPHINE ST NEW ORLEANS, LA701 FRS ID: 110012573731	RCR: LAR000049262			no		1			
INDUSTRIAL MATERIALS MGMT INC 1400 MONTEGUT ST 2ND FL NEW ORLEANS, LA701 FRS ID: 110003354717	RCR: LAR000015131			no		1			
JAMES BROS & PRISCOE AUTO REPAIR 2645 N MERO ST NEW ORLEANS, LA701 FRS ID: 110003297165	RCR: LAD981589799			no		1			
JOHNSON AUTOMOTIVE 401 N GALVEZ NEW ORLEANS, LA701 FRS ID: 110003263307	RCR: LA0000886358			no		1			
KERN CHIROPRACTICS FAMILY HEALTH CNTR 6001 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003257751	RCR: LA0000046144			no		1			
LAFARGE NORTH AMERICA INC - NEW ORLEANS TERMINAL	AFS: 2207100009		n/a	n/a		1			

Map Results

2315 FRANCE STREET NEW ORLEANS, LA701 FRS ID: 110001245144	ICP: LAU003609		n/a	n/a	1	1			
	RCR: LAD008155996			no		1			
M & M DRYCLEANERS 3400 N GALVEZ ST NEW ORLEANS, LA701 FRS ID: 110003279130	RCR: LAD082004219			no		1			
M I DRILLING MAGCOBA 6101 FRANCE ROAD NEW ORLEANS, LA701 FRS ID: 110001245224	AFS: 2207100037		n/a	n/a		1			
	AFS: 2207100095		n/a	n/a		1			
	TRI: 70186MDRLL6101F			no		1		nr	
MAGEE & SONS AUTO SALVAGE 7900 ALMONASTER ST NEW ORLEANS, LA701 FRS ID: 110013740247	ICP: LAR05N947		n/a	n/a	1	1			
MINI MTRS 2713 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003295540	RCR: LAD981587256			no		1			
MODERN AUTO WRECKERS INC 1741 POLAND AVE NEW ORLEANS, LA701 FRS ID: 110020140827	ICP: LAR05B314		n/a	n/a	1	1			
	ICP: LAR05M794		n/a	n/a	1	1			
NEAPOLEN AUTO SVC 3014 N DERBIGNY ST NEW ORLEANS, LA701 FRS ID: 110003291811	RCR: LAD981519481			no		1			
NEEB KEARNEY CO INC 4500 N GALVEZ NEW ORLEANS, LA701 FRS ID: 110003286541	RCR: LAD980698609			no		1			
NEW ORLEANS STEVEDORING CO 3023 CHARTRES NEW ORLEANS, LA701 FRS ID: 110003258199	RCR: LA0000056705			no		1			
NORFOLK SOUTHER CORP ALABAMA GREAT SOUTHERN RAILRD NEW ORLEANS, LA701 FRS ID: 110015316501	ICP: LAR05B344		n/a	n/a	1	1			
	ICP: LAR05M811		n/a	n/a	1	1			
NORFOLK SOUTHERN RAILWAY CO 2101 ST FERDINAND ST NEW ORLEANS, LA701 FRS ID: 110020123141	RCR: LAR000056044			no		2			
OCEAN TECHNICAL SVC INC 2100 SUREKOTE RD ID847 NEW ORLEANS, LA701 FRS ID: 110009577270	RCR: LAD122613847			no		1			
OLINKRAFT/CONTAINER 3113 CHARTRES STREET NEW ORLEANS, LA701 FRS ID: 110001375184	AFS: 2207100040		n/a	n/a		1			
P & P COLLISION CNTR 2200 ST FERDINAND ST NEW ORLEANS, LA701 FRS ID: 110003263628	RCR: LA0000920520			no		1			
PARKVIEW DRY CLEANERS 5425 ST CLAUDE AVENUE NEW ORLEANS, LA701 FRS ID: 110001274834	AFS: 220716E022		n/a	n/a		1			
PAULS SVC CNTR 1717 FRANKLIN AVE NEW ORLEANS, LA701 FRS ID: 110003298182	RCR: LAD981593726			no		1			
POLAND SCRAP METAL 1741 POLAND AVE	ICP: LAR05N926		n/a	n/a		1			

Map Results

NEW ORLEANS, LA701 FRS ID: 110033171494									
PRESS CRAFT PRINTING CO 2208 & 10 ROYAL ST NEW ORLEANS, LA701 FRS ID: 110008390044	RCR: LAD985174119			no		4			
PROFESSIONAL AUTO RPR 3113 MARAIS ST NEW ORLEANS, LA701 FRS ID: 110003295728	RCR: LAD981587462			no		4			
QUINCY SOYBEAN CO - VEGETABLE OIL STORAGE VEGET OIL STO/CADIZ NEW ORLEANS, LA701 FRS ID: 110007298423	AFS: 2207100104		n/a	n/a		4			
R & E AUTO RPR & CAR WASH 1940 FRANKLIN AVE NEW ORLEANS, LA701 FRS ID: 110003336603	RCR: LAD985213941			no		4			
R & G IMPORTS & SPORT 1439 DESIRE ST NEW ORLEANS, LA701 FRS ID: 110003292099	RCR: LAD981519812			no		4			
RAISINMAN TOWING 9801 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110033171515	ICP: LAR05N930		n/a	n/a		5			
REDS RADIATOR SPECIALITY 1841 ELYSIAN FIELDS NEW ORLEANS, LA701 FRS ID: 110003349555	RCR: LAR000005934			no		4			
REISINGS SUNRISE BAKERY INC 6117 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003268320	RCR: LAD008182396			no		4			
RONALD GETTRIDGE 6116 DOUGLAS ST NEW ORLEANS, LA701 FRS ID: 110003265154	RCR: LA0001017391			no		4			
ROYAL ST FOREIGN CAR 2430 ROYAL ST NEW ORLEANS, LA701 FRS ID: 110003335338	RCR: LAD985211861			no		4			
SC CRUSHING LLC 11000 ALMONASTER AVE NEW ORLEANS, LA701 FRS ID: 110033171421	ICP: LAR08N908		n/a	n/a		4			
SHELL CHEMICAL 2201 ST FERDINAND ST NEW ORLEANS, LA701 FRS ID: 110017221674	RCR: LAR000053918			no		4			
SOUTHERN SCRAP MATERIAL CO LLC 4801 FLORIDA AVE NEW ORLEANS, LA701 FRS ID: 110001379598	AFS: 2207100076 ICP: LA0073091 RCR: LAD006947972		n/a	no n/a no	1	4 5 4			
ST CLAUDE MED CNTR 3419 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110009575879	RCR: LAD010405983			no		5			
STAR COLLISION CENTER 3137 CHARTRES NEW ORLEANS, LA701 FRS ID: 110003323038	RCR: LAD985194109			no		4			
STAR ENTERPRISE 2727 S CLAIBORNE AVE	RCR: LAD985196914			no		4			

Map Results

NEW ORLEANS, LA701 FRS ID: 110003324956									
THE GREEN PROJECT INC 2831 MARAIS ST NEW ORLEANS, LA701 FRS ID: 110003336266	RCR: LAD985213388			no		4			
TOMMY NYES TRUCK RPR 2401 ELYSIAN FIELD AVE BLDG 2 NEW ORLEANS, LA701 FRS ID: 110009580774	RCR: LAD985175579			no		4			
TONTI BODY & FENDER WORKS INC 2120 PORT ST NEW ORLEANS, LA701 FRS ID: 110003271744	RCR: LAD034428474			no		4			
TURNER & SON 1801 ELYSIAN FIELDS NEW ORLEANS, LA701 FRS ID: 110003330057	RCR: LAD985204098			no		4			
US ARMY CORPS OF ENGN INNER HARBOR NAV 4635 URQUHART ST NEW ORLEANS, LA701 FRS ID: 110003265378	RCR: LA3960027263			no		4			
US COAST GUARD 4640 URQUHART STREET NEW ORLEANS, LA701 FRS ID: 110006369438	RCR: LA4690310871			no		4			
WIZ AUTOMOTIVE 5800 ST CLAUDE AVE NEW ORLEANS, LA701 FRS ID: 110003338996	RCR: LAD985219526			no		4			

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70126 NEW ORLEANS

Map Results

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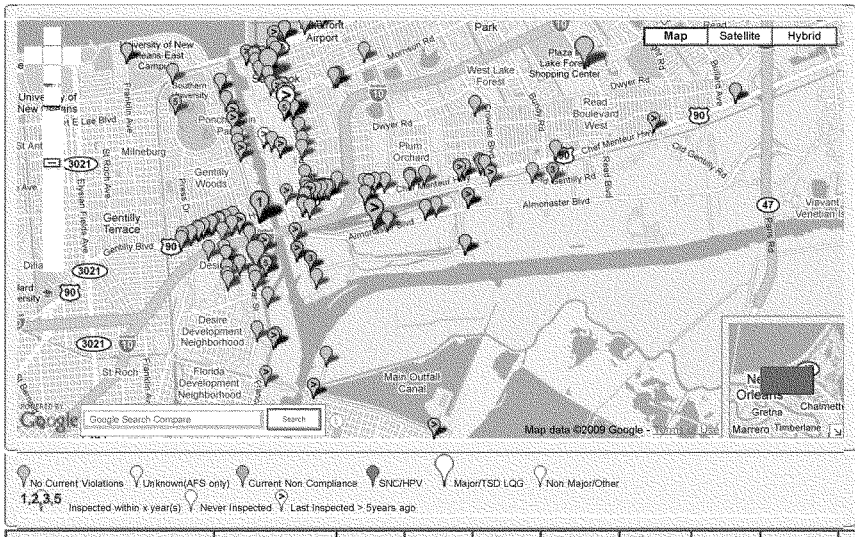
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A+ AUTO SALVAGE 8100 ALMONASTER BLVD NEW ORLEANS, LA701 FRS ID: 110038921110	RCR: LAR000064386	2	12	no		2			
ABA 3947 LOUISA ST STE B NEW ORLEANS, LA701 FRS ID: 110003263165	RCR: LA0000885624			no		1			
ABRAMSON MARION HIGH SCHOOL 5552 READ BLVD NEW ORLEANS, LA701 FRS ID: 110026646315	RCR: LAR000067033			no		1			
ACE PRECISION FRAM & BODY 6017 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003324340	RCR: LAD985196021			no		1			
ADVANCE AUTO PARTS #6796 7323 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110023045916	RCR: LAR000058636			no		1			

Map Results

ADVANTAGE TIRE SVC 3803 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003308705	RCR: LAD982294936			no					
AERO SVCS INTERNATIONAL S SHO HARBOR DR 75YD E DOWNMAN NEW ORLEANS, LA701 FRS ID: 110008386326	RCR: LAD981513369			no					
AIR REDAN INC 8219A LLOYD STEARMAN DR NEW ORLEANS, LA701 FRS ID: 110003368258	RCR: LAR000043133			no					
ALMONASTER AUTO SALVAGE 7979 ALMONASTER AVENUE NEW ORLEANS, LA701 FRS ID: 110012691088	ICP: LAR05N220	1	n/a	n/a	1				
	ICP: LAU000056		n/a	n/a					
	ICP: LAU000217		n/a	n/a					
	ICP: LAU000218		n/a	n/a					
	ICP: LAU004951		n/a	n/a					
ALS QUAL CLNRS GENTILLY WDS 4201 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003287586	RCR: LAD981050974			no					
AMERICAN WHOLESALE FENCE CO INC 5501 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003316938	RCR: LAD985184217			no					
ASSOCIATED HOSPITAL SERVICES INC 7639 TOWNSEND PL NEW ORLEANS, LA701 FRS ID: 110024252011	RCR: LAR000058990			no					
ATLANTIC TECHNICAL SVCS 4001 ALVAR ST NEW ORLEANS, LA701 FRS ID: 110003261261	RCR: LAD096044144			no					
ATLANTIC TECHNICAL SVCS INC 4401 FRANCE RD PKWY NEW ORLEANS, LA701 FRS ID: 110003327329	RCR: LAD985200146			no					
ATLANTIC TECHNICAL SVCS SHOP 2 5701 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110003331733	RCR: LAD985206580			no					
B.G. BARTWELL BAYSIDE CAMPGROUND PORT VINCENT, LA707 FRS ID: 110033832969	ICP: LAG532558		n/a	n/a					
BANNER CHEVROLET INC 5950 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003274242	RCR: LAD050902618			no					
BAROID NEW ORLEANS GRINDING PLANT 8000 JOURDAN RD NEW ORLEANS, LA701 FRS ID: 110003346326	AFS: 2207100053		n/a	n/a					
	RCR: LAD990885618		9	no					
	TRI: 70126NLBRD8000J			no				nr	
BARRIERE CONSTRUCTION CO LLC - PLANT #640 5050 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110001957945	AFS: 2277790102		n/a	n/a					
	AFS: 2277700102		n/a	n/a					
	RCR: LAD982756785			no					
BELARUS MACHINERY 5101 CHEF MENTAUR HY NEW ORLEANS, LA701 FRS ID: 110001249186	AFS: 2207100106		n/a	n/a					

Map Results

BERGERON MARINE SERVICE INC 3410 JOURDAN RD NEW ORLEANS, LA701 FRS ID: 110001274228	AFS: 2207100138		n/a	n/a					
	RCR: LAR000010819			no					
BEL CRESCENT ACRES 6599 FLORIDA AVE NEW ORLEANS, LA701 FRS ID: 110003313897	AFS: 2207100084			no					
	ICP: LAR05N676		n/a	n/a	1				
	RCR: LAD985172246			no					
BIG EASY TRAVEL PLAZA 5000 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003273243	ICP: LAG750523		n/a	n/a	1				
	ICP: LAU003503		n/a	n/a	1				
	RCR: LAD042882399			no					
BOARD OF COMMISSIONERS OF THE ORLEANS LEVEE DISTRI 6001 STARS & STRIPES BLVD NEW ORLEANS, LA701 FRS ID: 110007015880	AFS: 2207100086		n/a	n/a					
BOARD OF COMMISSIONERS ORLEANS LEVEE DIS 6701 S SHORE HARBOR BLVD NEW ORLEANS, LA701 FRS ID: 110003309054	RCR: LAD982306532			no					
BOH BROS CONST CO ASPHALT BATCH PL 4045 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110009577619	AFS: 2277100113		n/a	n/a					
	RCR: LAD980304331			no					
BOLLINGER GULF REPAIR LLC 3900 JOURDAN ROAD NEW ORLEANS, LA701 FRS ID: 110009578420	AFS: 2207100133		n/a	n/a					
	ICP: LAG108375	1	n/a	n/a	1				
	RCR: LAD981586134	2		no					
	TRI: 70126BLLNG3900J			no				5,322	
BUDGET AUTO CAR CARE CENTER 10838 CHEF MENTEUR NEW ORLEANS, LA701 FRS ID: 110003265010	ICP: LAU003512		n/a	n/a	1				
	RCR: LA0001017201			no					
BUNNY BREAD 5646 LEWIS RD NEW ORLEANS, LA701 FRS ID: 110001273915	AFS: 2207100140	1	n/a	n/a	1				
	RCR: LAD008204604			no					
C & L AUTO REPAIR 3736 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003293748	RCR: LAD981522337			no					
CAJUN CAMPING 7531 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003303292	RCR: LAD981903446			no					
CAPITOL TIRE SYSTEMS 3801 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003301070	RCR: LAD981612468			no					
CAUSEY BUS SVC 8050 CHEF HWY NEW ORLEANS, LA701 FRS ID: 110003321566	RCR: LAD985191063			no					
CBS OUTDOOR 8001 TOWNSEND PLACE NEW ORLEANS, LA701 FRS ID: 110003282723	RCR: LAD108205493			no					
CHEF & 110 SHELL 6700 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003273966	RCR: LAD049047335			no					
CHEVRON SS 108553 4046 CHEF MENTEUR	RCR: LAD985206176			no					

Map Results

NEW ORLEANS, LA701 FRS ID: 110003331369									
CHEVRON SS 109015 6601 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003363191	RCR: LAR000031658			no		3			
CHEVRON USA INC NO LAKEFRONT AIRPT 6301 GUISEPPE BELANCA ST NEW ORLEANS, LA701 FRS ID: 110003272823	RCR: LAD039432364			no		1			
CHUCKS AUTO REPAIR SHOP 3728 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003302328	RCR: LAD981900814			no		1			
COLEMANS AUTO SALVAGE 6160 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110010775296	CP: LAR058332		n/a	n/a	1	1			
CON WAY SOUTHERN EXP 4801 ALMONASTER NEW ORLEANS, LA701 FRS ID: 110003293347	RCR: LAD981521453			no		1			
CSX INTERMODAL 7801 ALMONASTER AVE STE 1 NEW ORLEANS, LA701 FRS ID: 110009582246	RCR: LAD985220854			no		1			
CSX TRANSFLO 6688 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110001267502	AFS: 2207100030		n/a	n/a		3			
CSX TRANSPORTATION, INC 6701 ALMONASTER RD NEW ORLEANS, LA701 FRS ID: 110011152279	CP: LA0065307 RCR: LAD982564601		n/a	n/a no	1	1 1			
DELGADO COMM COLL AIRCRAFT SCH 8550 LLOYD STEARMAN DR ST 141 NEW ORLEANS, LA701 FRS ID: 110003361031	RCR: LAR000027433			no		1			
DICKSON GMP INTL INC NO 5 YD 3044 HARBOR RD NEW ORLEANS, LA701 FRS ID: 110003364546	RCR: LAR000034702			no		1			
DON HINGLES BODY SHOP INC 3718 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003311309	RCR: LAD982556942			no		1			
DUCROS AUTO 9330 CHEF HWY NEW ORLEANS, LA701 FRS ID: 110003293356	RCR: LAD981521461			no		1			
DUPUY STORAGE & FORWARDING CORP 4300 JOURDAN RD NEW ORLEANS, LA701 FRS ID: 110029511614	RCR: LAD008161275			no		1			
E N BISSO ENG 101 JUNCTION LEAKE AND SOUTH FRONT NEW ORLEANS, LA701 FRS ID: 110002071081	AFS: 2207100116		n/a	n/a		3			
EAGER AVIATION CORP JIMMY WEDELL HANGER SHORE HARB NEW ORLEANS, LA701 FRS ID: 110006381054	RCR: LAD056031701			no		2			
EAST BANK AUTOMOTIVE 7911 CHEF MENTEUR HWY	RCR: LAD985174101			no		1			

Map Results

NEW ORLEANS, LA701 FRS ID: 110003315243									
EASTSIDE AUTO & TRUCK RPRS 4000 LOUISA ST NEW ORLEANS, LA701 FRS ID: 110003332803	RCR: LAD985208024			no		1			
EBERTS ENGINE SVC INC 5880 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003329238	RCR: LAD985202910			no		1			
ENTERGY NEW ORLEANS INC - PATERSON PLANT 5400 DWYER RD NEW ORLEANS, LA701 FRS ID: 110001245162	AFS: 2207100015			no		2	1,172		
	RCP: LA0004316		n/a	n/a	1	1			
	RCR: LAD000757641			no		1			
EQUIPMENT MAINT CITY OF NO 3800 ALVAR ST NEW ORLEANS, LA701 FRS ID: 110003350711	RCR: LAR000008052			no		1			
ETC GULF SOUTH 6801 PRESS DR EAST BUILDING NEW ORLEANS, LA701 FRS ID: 110003338193	RCR: LAD985217751			no		1			
EXXON CO USA # 85511 4500 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003323467	RCR: LAD985194711			no		1			
FAITH INC COLLISION SERVICE 5800 MORRISON RD NEW ORLEANS, LA701 FRS ID: 110003310239	RCR: LAD982550253			no		1			
FIRESTONE STORE 013617 4603 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003307118	RCR: LAD982287039			no		1			
FIRST RECOVERY 6666A GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003346843	RCR: LAR000001784			no		1			
FOLGER COFFEE CO 5900 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110009544404	AFS: 2207100056		n/a	n/a		1			
	RCR: LAR000030809			no		1			
GENTILLY SUPER SVC 4200 LOUISA ST NEW ORLEANS, LA701 FRS ID: 110003336120	RCR: LAD985217652			no		1			
GEORGIA PACIFIC 7500 ALMONASTER AVE NEW ORLEANS, LA701 FRS ID: 110003292419	RCR: LAD981520216			no		1			
GLY-TECH SERVICES 7366 TOWNSEND PLACE STE B NEW ORLEANS, LA701 FRS ID: 110013289262	RCR: LAR000049617			no		1			
GOODYEAR AUTO SVC CNTR 4126 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003269114	RCR: LAD010409548			no		1			
GULF STATES ENG CO INC 252 HARBOR CIRCLE NEW ORLEANS, LA701 FRS ID: 110003300847	RCR: LAD981609993			no		1			
GULF STATES ENGINEERING CO INC 201 HARBOR CIRCLE NEW ORLEANS, LA701	RCR: LAD118981463			no		1			

Map Results

FRS ID: 110003283438									
HARVEY PRESS LLC 246 HARBOR CIRCLE NEW ORLEANS, LA701 FRS ID: 110001375226	AFS: 2207100093		n/a	n/a		1			
	RCR: LAR000029348			no		1			
HBH INC NEW ORLEANS 6301 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110003361497	RCR: LAR000028951			no		1			
HEAVY MACHINES INC 7801 ALMONASTER NEW ORLEANS, LA701 FRS ID: 110003331715	RCR: LAD985208564			no		1			
HEISSER FOREIGN CAR PARTS 7914 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003328532	ICP: LAR05A331		n/a	n/a	1	1			
	RCR: LAD985201896			no		1			
HEISSER FOREIGN CAR PARTS 2914 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110015811068	ICP: LAR05M229		n/a	n/a		1			
HERTZ EQUIP RENTAL CORP 8010 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003281573	RCR: LAD098170368			no		1			
HOLCIM INC - NEW ORLEANS WEST TERMINAL 6301 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110003322921	AFS: 2207100042		n/a	n/a		1			
	RCR: LAD985193937			no		1			
HOLNAM INC/CEMENT 6201 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110001937192	AFS: 2207700110		n/a	n/a		1			
HOME DEPOT USA #HD0340 4700 GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110031377800	RCR: LAR000064154			no		1			
HOUSING AUTHORITY OF 7800 TOWNSEND PL NEW ORLEANS, LA701 FRS ID: 110022422467	ICP: LAR10C467		n/a	n/a	1	1			
	ICP: LAR100014		n/a	n/a	1	1			
	ICP: LAU003743		n/a	n/a	1	1			
	RCR: LAD981585441			no		1			
IMPERIAL AUTOMOTIVE 6904B DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003333054	RCR: LAD985208370			no		1			
INDUSTRIAL AIR & HYDRAULICS INC 7400 TOWNSEND PL NEW ORLEANS, LA701 FRS ID: 110003320941	RCR: LAD985190073			no		1			
JOHNNY CLARK HYUNDAI 6101 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003271619	ICP: LAU009130		n/a	n/a	1	1			
	RCR: LAD034397075			no		1			
KANSAS PACKING 148 HARBOR CIRCLE NEW ORLEANS, LA701 FRS ID: 110003333134	RCR: LAD985208479			no		1			
KENILWORTH EXXON CO USA #50799 6501 I10 SVC RD NEW ORLEANS, LA701 FRS ID: 110003300375	RCR: LAD981608391			no		1			
LA TECH COLL - SIDNEY N COLLIER 3727 LOUISA ST NEW ORLEANS, LA701	RCR: LAD982286437			no		1			

Map Results

FRS ID: 110003306994									
LA NATL GUARD AASF 1 6401 S SHORE HABOR B BLDG 101 NEW ORLEANS, LA701 FRS ID: 110003287899	RCR: LAD981054489			no		1			
LA POWER HOUSE 7196 FLORITA CT NEW ORLEANS, LA701 FRS ID: 110003297281	RCR: LAD981589946			no		1			
LAFARGE NORTH AMERICA INC - NEW ORLEANS EAST PLANT 11900 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110002529697	AFS: 2277700236	50	n/a	n/a		4			
	RCR: LAD981520448			no		1			
	TRI: 70126LFRGN119CH			no		4		0	
LAFON NURSING HOME 6900 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110037393781	RCR: LAR000067124			no		1			
LEADER BUICK GMC TRUCKS 4600 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003271566	RCR: LAD034389734			no		1			
LEE DINETT 8020 DOWNMAN RD ID526 NEW ORLEANS, LA701 FRS ID: 110003290527	RCR: LAD981513526			no		1			
M I DRILLING MAGCOBA 8101 FRANCE ROAD NEW ORLEANS, LA701 FRS ID: 110001245224	AFS: 2207100037	50	n/a	n/a		4			
	AFS: 2207100095	50	n/a	n/a		4			
	TRI: 70186MDRLL6101F			no		1		nr	
MACFRUGALS 3501 JOURDAN RD NEW ORLEANS, LA701 FRS ID: 110003329309	RCR: LAD985203017			no		1			
MCMILLIANS AUTO & TRUCK RPR 8910 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003315412	RCR: LAD985174465			no		1			
MD SPECIALTIES 7171 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003318507	RCR: LAD985186428			no		1			
MECHANICAL EQUIPMENT CO INC 3855 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110003317740	RCR: LAD985185412			no		1			
MEINEKE DISCOUNT MUFFLER 6801 CHEF MENTEUR NEW ORLEANS, LA701 FRS ID: 110003329023	RCR: LAD985202571			no		1			
MIKE & JERRYS PAINT & SUPPLY 3913 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003353246	RCR: LAR000012658			no		1			
MILLION AIRE OF NEW ORLEANS 5500 LAKESHORE NEW ORLEANS, LA701 FRS ID: 110003303005	RCR: LAD981902208			no		1			
MILPARK DRILLING FLUIDS NEW ORLEANS BARITE GRINDIN 5100 JOURDAN RD NEW ORLEANS, LA701 FRS ID: 110001375137	AFS: 2207100108	50	n/a	n/a		4			
	AFS: 2207182108			no		1			
	AFS: 2207100150	50	n/a	n/a		4			
	TRI: 70186MLPRK5100J			no		1		nr	
MORRISON & 10 SHELL 6500 MORRISON RD NEW ORLEANS, LA701	RCR: LAD985208495			no		1			

Map Results

FRS ID: 110003333152									
NATIONAL LINEN SVC 3831 LOUISA ST NEW ORLEANS, LA701 FRS ID: 110003363280	RCR: LAR000032185			no					
NEW ORLEANS BIDS TERMINAL 6666 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003359683	RCR: LAR000024893			no					
NEW ORLEANS DEPOT SERVICES INC, YARD 2 8100 TERMINAL RD NEW ORLEANS, LA701 FRS ID: 110037489205	ICP: LAR05N863		n/a	n/a					
	ICP: LAU004955		n/a	n/a	1				
	RCR: LAR000048959	1	11	no		1			
NEW ORLEANS DRAYAGE CO INC 3801 ALVAR ST NEW ORLEANS, LA701 FRS ID: 110003280556	RCR: LAD092105188			no					
NEW ORLEANS LAKEFRONT AIRPORT 6001 STARS & STRIPES BOULEVARD NEW ORLEANS, LA701 FRS ID: 110011184275	ICP: LAG480316		n/a	n/a	1				
	RCR: LAR000054221			no					
NEW ORLEANS MARINE CONTRACTORS 3501 FRANCE ROAD NEW ORLEANS, LA701 FRS ID: 110011144644	RCR: LAD031637374			no					
NPR INC 4000 FRANCE RD PKWY NEW ORLEANS, LA701 FRS ID: 110003349092	RCR: LAR000005389			no					
ONE HOUR CLEANERS 7907 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003283009	RCR: LAD112780663			no					
OPTA MINERALS 2 ELAINE ST NEW ORLEANS, LA701 FRS ID: 110001375299	AFS: 2207100085			no					
	ICP: LAU004960		n/a	n/a	1				
ORLEANS LEVEE DISTRICT 5920 FRANKLIN AVE NEW ORLEANS, LA701 FRS ID: 110000794604	AFS: 2205116E001		n/a	n/a					
	RCR: LAD981903578			no					
	RCR: LAD982306508			no					
ORLEANS MATERIALS & EQUIPMENT CO INC 5501 FRANCE RD NEW ORLEANS, LA701 FRS ID: 110001439319	RCR: LAD985209071			no					
ORLEANS PARISH SCH BD/CENTRAL SVC GARAGE 4300 ALAMONASTER AVE NEW ORLEANS, LA701 FRS ID: 110003289673	RCR: LAD981511512			no					
OVERLAND EXPRESS 9298 OLD GENTILLY NEW ORLEANS, LA701 FRS ID: 110003363592	RCR: LAR000032623	1	11	no		1			
PEARL RIVER NAVIGATION INC - NEW ORLEANS FAST FACI 19731 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110022422742	AFS: 2207100159			no					
	ICP: LAR05N645		n/a	n/a	1				
PICHONS AUTOMOTIVE 4346 MAJESTIC OAKS DR NEW ORLEANS, LA701 FRS ID: 110003353371	RCR: LAR000012864			no					

Map Results

PONTCHARTRAIN MATERIALS CORP 3819 FRANCE ROAD NEW ORLEANS, LA701 FRS ID: 110009576477	AFS: 2207100077			no					
	ICP: LAR05N432	1	n/a	n/a	1				
	RCR: LAD060835964			no					
PRECISION BODY SHOP INC 6904E DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003325955	RCR: LAD985198159			no					
PROFESSIONAL AUTO SALES & SVC 7334 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003348397	RCR: LAR000004333			no					
QUALITY RECONDITIONING SVC INC 3947 LOUISA ST NEW ORLEANS, LA701 FRS ID: 110009576039	RCR: LAD034430884			no					
REGIONAL TRANSIT AUTHORITY 3900 DESIRE ST NEW ORLEANS, LA701 FRS ID: 110003337309	RCR: LAD985215243			no					
REILY FOODS CO - LUZIANNE COFFEE PLANT 5601 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110001245135	AFS: 2207100004		n/a	n/a					
REP FLYING SVC CAJUN AVIATION 5500 LAKESHORE DR STE 101 NEW ORLEANS, LA701 FRS ID: 110009582111	RCR: LAD985215383			no					
RING ELECTRIC CO 264 HARBOR CIRCLE NEW ORLEANS, LA701 FRS ID: 110003334552	RCR: LAD985210681			no					
ROADWAY EXPRESS 3761 LOUISA ST NEW ORLEANS, LA701 FRS ID: 110003275296	RCR: LAD057119976			no					
RYDER TRANSPORTATION 6100 CHEF MENTUER HWY NEW ORLEANS, LA701 FRS ID: 110003272663	RCR: LAD039168968			no					
RYDER TRUCK SCARIANOS 7850 TOWNSEND PL SHOP B NEW ORLEANS, LA701 FRS ID: 110003342865	RCR: LAD985225234			no					
RYDER TRUCK SCARIONO 7803 TOWNSEND PLACE NEW ORLEANS, LA701 FRS ID: 110003348725	RCR: LAR000004848			no					
SCANA CHANDELEUR PLK 51.35 MI. E OF NEW ORLEANS, LA701 FRS ID: 110007301927	AFS: 2208700038		n/a	n/a					
SEABROOK MARINE LLC 5901 FRANCE ROAD NEW ORLEANS, LA701 FRS ID: 110016696262	ICP: LAG480432		n/a	n/a	1				
	ICP: LAU004087		n/a	n/a	1				
	RCR: LAR000053512	2		no					
SHELL OIL CO 3901 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003286812	RCR: LAD980698831			no					
SHELL OIL CO MOTIVA ENTERPRISES 4940 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003272985	RCR: LAD040777401			no					

Map Results

SIMMONS PLATING & METAL FINISHING 4216 FLORIDA AVE NEW ORLEANS, LA701 FRS ID: 110003268213	RCR: LAD008178766			no		1			
SOUTH CENTRAL BELL, NWORLACH 6230 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003284712	RCR: LAD138097902			no		1			
SOUTHERN HOLDINGS 5500 LAKESHORE DR HANGER 1 NEW ORLEANS, LA701 FRS ID: 110003341553	RCR: LAD985223437			no		1			
SOUTHERN SCRAP MATERIAL CO LLC 4801 FLORIDA AVE. NEW ORLEANS, LA701 FRS ID: 110001379598	AFS: 2207100076			no		1			
	ICP: LA0073081		n/a	n/a	1	2			
	RCR: LAD006947972			no		1			
SOUTHERN UNIVERSITY OF NEW ORLEANS 6400 PRESS DRIVE NEW ORLEANS, LA701 FRS ID: 110001246278	RCR: LAD982756781	1		no		1			
SPARKEYS AUTO RPR 4819 DOWNMAN NEW ORLEANS, LA701 FRS ID: 110003329737	RCR: LAD985203710			no		1			
SPEEDEE OIL CHANGE & TUNE UP 4456 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110008392097	RCR: LAD985217894			no		1			
STAN TRANSMISSION 5127 CHEF MENTEUR NEW ORLEANS, LA701 FRS ID: 110003263717	RCR: LA0000920942			no		1			
STAR ENT 6500 DOWNMAN RD NEW ORLEANS, LA701 FRS ID: 110003325045	RCR: LAD985197037			no		1			
STAR ENTERPRISE 6711 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003324974	RCR: LAD985196930			no		1			
SUPERIOR AUTO RPR 4949 LAINE AVE NEW ORLEANS, LA701 FRS ID: 110003329644	RCR: LAD985203835			no		1			
SUWEST AIRWAYS INC 8219 LLOYD STEARMAN DR STE A NEW ORLEANS, LA701 FRS ID: 110003361950	RCR: LAR000029934			no		1			
TAYLOR ENERGY 6101G BELLANCA ST. NEW ORLEANS, LA701 FRS ID: 110003317438	RCR: LAD985184910			no		1			
TEEDS AUTOMOTIVE 7040 BAMBERRY NEW ORLEANS, LA701 FRS ID: 110003305183	RCR: LAD981908650			no		1			
THE OCCUPATIONAL HEALTHCENTERS 4311 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003357698	RCR: LAR000020396			no		1			
THE REAL INDUSTRIAL AUTO WRECKERS, INC NEW ORLEANS, LA701 FRS ID: 110033641138	ICP: LAR05N943		n/a	n/a		1			

Map Results

TIRE TOWN STORES INC 4020 OLD GENTILLY RD NEW ORLEANS, LA 70126 FRS ID: 110003338479	RCR: LAD985218130			no					
TIRE WAREHOUSE 4200 CHEF HWY NEW ORLEANS, LA 70126 FRS ID: 110003300856	RCR: LAD981610082			no					
TMC AUTO REPAIR LLC 4330 LAINE AVE NEW ORLEANS, LA 70126 FRS ID: 110003314093	RCR: LAD985172527			no					
TOP QUALITY AUTO SVC 4624 DOWNMAN RD NEW ORLEANS, LA 70126 FRS ID: 110003301365	RCR: LAD981898679			no					
TOYOTA OF NEW ORLEANS 4700 CHEF MENTEUR HWY NEW ORLEANS, LA 70126 FRS ID: 110003300311	RCR: LAD981808318			no					
TRINITY YACHTS LLC 4325 FRANCE ROAD NEW ORLEANS, LA 70126 FRS ID: 110000670114	AFS: 2207100078		n/a	n/a					
	AFS: 2207182078			no					
	ICI: 06-2007-0507			no		1	48,409		
	RCR: LAD065459463	1	2	no	1	2			
	TRI: 70126QTBLD4325F			no				nr	
TRIPLE E TRANSPORT INC 6000 JOURDAN RD NEW ORLEANS, LA 70126 FRS ID: 110003258956	RCR: LA000102996			no					
TURNER MARINE BULK INC 1 ELAINE ST NEW ORLEANS, LA 70126 FRS ID: 110009581782	RCR: LAD985209733			no					
TXI OPERATIONS LP - CTR #2 6401 FRANCE RD NEW ORLEANS, LA 70126 FRS ID: 110001878408	AFS: 2277700260		n/a	n/a					
	AFS: 2277700265		n/a	n/a					
	AFS: 2207100135		n/a	n/a					
U HAUL 74774 6210 CHEF MENTEUR HWY NEW ORLEANS, LA 70126 FRS ID: 110003344391	RCR: LAD985227297			no					
UNITED PARCEL SVC 5700 MORRISON RD NEW ORLEANS, LA 70126 FRS ID: 110003293542	RCR: LAD981521719			no					
US GYPSUM CO 5701 LEWIS ROAD NEW ORLEANS, LA 70126 FRS ID: 110001245153	AFS: 2207100011			no					
	ICI: 06-2008-4358			no		1	400		
	RCR: LAD082497306			no					
	TRI: 70126SGYPS5701L			no				5	
VAN AUTO RPR 4101 DOWNMAN RD NEW ORLEANS, LA 70126 FRS ID: 110003283811	RCR: LAD122692783			no					
VIZZINI PRINTING 6035 CHEF MENTEUR HWY NEW ORLEANS, LA 70126 FRS ID: 110015591215	RCR: LAR000003962			no					
	RCR: LAR000052001			no					
WASTE MANAGEMENT OF NEW ORLEANS COMMERL 3750 ALVAR ST NEW ORLEANS, LA 70126 FRS ID: 110009582816	RCR: LAD990884462			no					
WILTZ AUTOMOTIVE									

Map Results

8332 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003290073	RCR: LAD981512791			no					
10 MINUTE OIL CHANGE									
6541 I10 SERVICE RD NEW ORLEANS, LA701 FRS ID: 110003301258	RCR: LAD981612740			no					

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C-8
70129 NEW ORLEANS

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

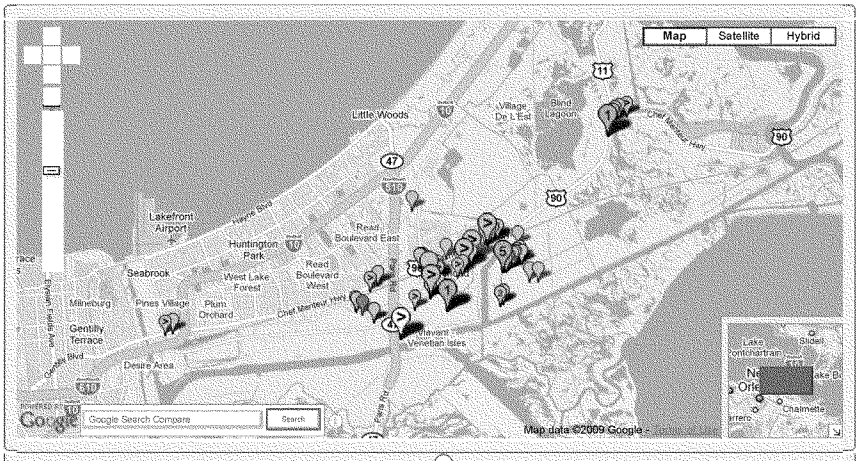
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No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last Inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NCVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
	AFS: 2207100016	3		no		1	3,560		
	AFS: 2207180016			no		1			
ROAR PRODUCTS & CHEMICALS INC - INDUSTRIAL GAS PROD	ICP: LAR05N094	2	n/a	n/a	1	1			
14700 INTRACOASTAL DRIVE NEW ORLEANS, LA701 FRS ID: 110000449113	ICP: LA0003280	2	10	no		1			
	RCR: LAD041222365			no		1			
	RCR: LAD980873145	2		no		1			
	TRI: 70129RPRDC14700			no		1		162,507	
AMERICAN WASTE & POLL CTRL REST QTY	AFS: 2207100127	1	n/a	n/a		1			
15140 INTERCOASTAL DR NEW ORLEANS, LA701 FRS ID: 110003308826	RCR: LAD982546950			no		1			
AMID TRAVEL PLAZA									
12170 OLD GENTILLY ROAD NEW ORLEANS, LA701 FRS ID: 110012672330	ICP: LA0041084		n/a	n/a	1	1			
BAYOU SALVAGE BOAT LIFT INC									
19601A CHEF MENTEUR HWY									

Map Results

NEW ORLEANS, LA701 FRS ID: 110003368169	RCR: LAR000042374			no		1			
BELLSOUTH J2213 14726 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003286266	RCR: LAD980628960			no		2			
BOC GASES 15200 INTRACOASTAL DRIVE NEW ORLEANS, LA701 FRS ID: 110000449104	AFS: 2207100031		n/a	n/a		1			
	RCR: LAD008189417			no		1			
	TRI: 70129RCNDS15200			no		1		nr	
BRANDT CAR CARE 13311 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003275544	RCR: LAD058672684			no		1			
BRIDGE TERMINAL SERVICES 13100 OLD GENTILLY ROAD NEW ORLEANS, LA701 FRS ID: 110000927071	ICP: LAU009074		n/a	n/a	1	1			
	RCR: LAR000022509			no		1			
C & J DELIVERY 3941 INDUSTRIAL PKWY NEW ORLEANS, LA701 FRS ID: 110003299305	RCR: LAD981599665			no		1			
CARLO DITTA, INC. 11838 CHEF MENTAUR NEW ORLEANS, LA701 FRS ID: 110007224379	AFS: 2207100141			no		1			
	ICP: LA0110104		n/a	n/a	1	1			
CERTECH 16362 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003268437	RCR: LAD008195174			no		1			
CHEMICAL EXPRESS 15100 INTERCOASTAL DR STE B NEW ORLEANS, LA701 FRS ID: 110003280907	RCR: LA0000451054			no		1			
CHEVRON SS 109005 13301 CHEF MENTEUR & MICHOUD NEW ORLEANS, LA701 FRS ID: 110008393639	RCR: LAR000031641			no		1			
DELGADO COMM COLL FIRE SCH 13200F OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003361022	RCR: LAR000027417			no		1			
DELGADO FIRE SCHOOL-NEW ORLEAN OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110011145411	ICP: LA0091201	1	n/a	n/a	1	1			
DELUXE CHECK PRINTERS INCORPORATED 4375 MICHOUD BLVD. NEW ORLEANS, LA701 FRS ID: 110002129081	RCR: LAD043430503			no		1			
	TRI: 70129DLXCH4375M			no		1		nr	
DUKE ENERGY ORLEANS LLC - ORLEANS ENERGY FACILITY ADJ TO INTRACOASTAL WATERWAY NEW ORLEANS, LA701 FRS ID: 110013391132	AFS: 2207100151		n/a	n/a		1			
ENGINE WORLD 13370 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003314075	RCR: LAD985172493			no		1			
ENTERGY NEW ORLEANS INC. - MICHOUD PLANT 3601 PARIS ROAD NEW ORLEANS, LA701 FRS ID: 110001248891	AFS: 2207100014			no		2			
	ICP: LA0004324	2	4	no	1	3			
	RCR: LAD000757567			no		1			
	TRI: 70129NTRGY3601P			no		3		0	

Map Results

EXCO OF LOUISIANA INC 4330 POCHE COURT WEST NEW ORLEANS, LA701 FRS ID: 110001271846	AFS: 2207166001	3	n/a	n/a		4			
	AFS: 2207100149	3	n/a	n/a		4			
	RCR: LAD981057359			no		4			
ERGON TRUCKING 3863 INDUSTRIAL PKWY NEW ORLEANS, LA701 FRS ID: 110003281975	RCR: LAD102431426			no		4			
EXXON CO USA 53377 13245 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003323476	RCR: LAD985194728			no		4			
FEDERAL RESERVE BANK 525 ST CHARLES AVE NEW ORLEANS, LA701 FRS ID: 110001246599	RCR: LAD985181197			no		4			
FEDEX FREIGHT INC 4099 INDUSTRIAL PKWY NEW ORLEANS, LA701 FRS ID: 110003294033	RCR: LAD981522725			no		4			
FOLGER COFFEE CO 5500 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110009584404	AFS: 2207100056	3	n/a	n/a		4			
	RCR: LAR000030809			no		4			
00FOLGER COFFEE CO - GENTILLY PLANT 14601 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003267321	AFS: 2207100005	4		no		1	80,000		
	CP: LAG480244		n/a	n/a	1	4			
	RCR: LAD004473153			no		4			
GARNER ENVIRONMENTAL SVCS INC 19701 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003351603	RCR: LAR000009530			no		4			
GENERAL DYNAMICS LAND SYSTEM 13801 OLD GENTILLY RD ID168 NEW ORLEANS, LA701 FRS ID: 110009580104	RCR: LAD982302168			no		4			
GILLS CRANE & DOZER SVC INC 19601B CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003368212	RCR: LAR000042440			no		4			
GULF WIRE CORP 13901 OLD GENTILLY ROAD NEW ORLEANS, LA701 FRS ID: 110000449060	AFS: 2207100092	3	n/a	n/a	2	4			
	RCR: LAD982552028			no		4			
	TRI: 70129GLFWR18901			no		4		nr	
HOLNAM INC NEW ORLEANS TERMINAL 15100 INTRACOASTAL NEW ORLEANS, LA701 FRS ID: 110001375173	AFS: 2207100041	3	n/a	n/a		4			
	RCR: LAD047290648			no		4			
HURST TRUCKING INC 4075 INDUSTRIAL PKWY NEW ORLEANS, LA701 FRS ID: 110003367874	RCR: LAR000041962			no		4			
INNER HARBOR NAVIGATION CANAL HURRICANE PROTECTION SYSTEM NEW ORLEANS, LA701 FRS ID: 110038180704	CP: LAR10F426		n/a	n/a		4			
IRISH BAYOU TRAVEL CTR HWY 11 @ I-10 EXIT 254 NEW ORLEANS, LA701 FRS ID: 110017881041	CP: LAG541227		n/a	n/a	1	4			
JOHN HARLAND CO NEW ORLEANS LA 4283 MICHOUD BLVD NEW ORLEANS, LA701	RCR: LAD008156291			no		4			

Map Results

FRS ID: 110003267684									
KYE INC 14860 INRACOASTAL DR NEW ORLEANS, LA701 FRS ID: 110003383958	RCR: LAR000033431			no					
LA BULK CARRIERS INC 14991 INTRACOASTAL DR NEW ORLEANS, LA701 FRS ID: 110003276749	RCR: LAD065477861			no					
LAFARGE NORTH AMERICA INC - NEW ORLEANS EAST PLANT 11900 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110022525697	AFS: 2277700236		n/a	n/a					
	RCR: LAD981520448			no					
	TRI: 70126LFRGN119CH			no				0	
7ELONE STAR INDUSTRIES INC DBA BUZZI UNICEM USA - NE 14900 INTRACOASTAL DRIVE NEW ORLEANS, LA701 FRS ID: 110000449079	AFS: 2207100038	1	7	no	3	4	3,230		
	NCP: LA0003298		n/a	n/a	1				
	RCR: LAD007361504			no					
	TRI: 70129LNSTR14600			no				nr	
MARINE INDUSTRIAL CABLE CORP 14201 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110012268009	RCR: LAR000043828			no					
NEW ORLEANS CEMENT 13201 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003301891	NCP: LAG110086		n/a	n/a	1				
	RCR: LAD981900004			no					
NEW ORLEANS E PROF DRY CLEANERS 13344 CHEF MENTEUR HWY STE F NEW ORLEANS, LA701 FRS ID: 110009584707	RCR: LAR000037606			no					
NEW ORLEANS MUNICIPAL TRAINING ACADEMY 13400 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110015706253	RCR: LAR000052696			no					
NM CRC NOLA TRAINING SYSTEMS SCH 13200 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003360504	RCR: LAR000026211			no					
OLIVIER CELCURE WOOD PRES CORP 4300 MICHOUD BLVD NEW ORLEANS, LA701 FRS ID: 110003266340	RCR: LAD000757674			no					
OMERO INC 13801 OLD GENTILLY RD STE 201 NEW ORLEANS, LA701 FRS ID: 110009577010	RCR: LAD087647590			no					
ORTHODONTIC RECONDITION CO 13344 CHEF MENTEUR HWY STE K NEW ORLEANS, LA701 FRS ID: 110003364172	RCR: LAR000034249			no					
OSMOSE TRANSPORT 12301 OLD GENTILLY NEW ORLEANS, LA701 FRS ID: 110039565413	RCR: LAR000060491			no					
PEARL RIVER NAVIGATION INC - NEW ORLEANS EAST FACI 19731 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110022422742	AFS: 2207100159			no					
	NCP: LAR05N645		n/a	n/a	1				
PETROCHEM INSPECTION SERVICES 4400 POCHE COURT W NEW ORLEANS, LA701 FRS ID: 110017619816	RCR: LAR000054320			no					

Map Results

PRODUCTION MGMT STRUCTURAL SYSTEMS INC 15160 INTRACOASTAL DR NEW ORLEANS, LA701 FRS ID: 110003345675	RCR: LAD985228899			no		A			
RICHARD'S DISPOSAL INC 11600 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003364613	ICP: LAU004946		n/a	n/a	1	A			
	RCR: LAR000035055			no		A			
RICORD OIL SVC 16728 CHEF HMENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003319258	RCR: LAD985187400			no		A			
RIVER ROAD CONSTRUCTION INC 16800 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003352782	RCR: LAR000011650			no		A			
SEARS ROEBUCK & CO 4330 MICHOUD BLVD NEW ORLEANS, LA701 FRS ID: 110003289094	RCR: LAD981147747			no		A			
SFJ MANAGEMENT INCORPORATED 12301 LAKE FOREST BOULEVARD NEW ORLEANS, LA701 FRS ID: 110003368533	RCR: LAR000043620			no		A			
SHELL SVC STA 13250 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110003286685	RCR: LAD980744536			no		A			
SMITH TECHN CORP 14101 GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003275624	RCR: LAD059121715			no		A			
SPECTRUM CONTROL TECHNOLOGY 4100 MICHOUD BLVD. NEW ORLEANS, LA701 FRS ID: 110000449122	ICP: LAU009198		n/a	n/a	1	A			
	RCR: LAD980874093			no		A			
	TRI: 70129SPCTR4100M			no		A		nr	
TANO CORP 4301 POCHE COURT WEST NEW ORLEANS, LA701 FRS ID: 110003286881	RCR: LAD980809644			no		A			
TEXTRON MARINE & LAND SYSTEMS 19401 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110009577458	AFS: 2207100117			no		A			
	ICP: LA0063002	1	n/a	n/a	1	A			
	RCR: LAD148744493	1		no		A			
	TRI: 70129TXTRN19401			no		A		nr	
TONY'S AUTO SPR 11636 OLD GENTILLY BLVD NEW ORLEANS, LA701 FRS ID: 110003366731	RCR: LAR000038158			no		A			
TRANSWOOD LOGISTICS INC 475 INDUSTRIAL PKWAY NEW ORLEANS, LA701 FRS ID: 110003367525	RCR: LAR000041491			no		A			
TRANSWOOD LOGISTICS INC 4075A INDUSTRIAL PKWAY STE 101 NEW ORLEANS, LA701 FRS ID: 110003367981	RCR: LAR000042188			no		A			
U HAUL 187 4445 MICHOUD BLVD NEW ORLEANS, LA701 FRS ID: 110003327506	RCR: LAD985200385			no		A			
UPS FREIGHT 4201 INDUSTRIAL PKWY NEW ORLEANS, LA701 FRS ID: 110003313423	RCR: LAD985171149			no		A			

Map Results

US E-WASTE RECYCLING INC 4471 MICHOUD BLVD NEW ORLEANS, LA701 FRS ID: 110024430953	RCR: LAR000059329	1		no		1			
US FILTER RECOVERY SERVICES 14890 INTRACOASTAL DRIVE NEW ORLEANS, LA701 FRS ID: 110001375146	AFS: 2207100109			no		1			
	RCR: LAG679102		n/a	n/a	1	1			
	ICP: LAR05N249		n/a	n/a	1	1			
	RCR: LAD092096106	3		no	1	2			
US MARINE INC - FRP BOATS FACILITY 19807 CHEF MENTEUR HIGHWAY NEW ORLEANS, LA701 FRS ID: 110000449097	AFS: 2207100086			no		1			
	RCR: LAD985216449			no		1			
	TRI: 70129NTDST19807			no		1		nr	
USUS NASA MICHOUD ASSEMBLY FACILITY 13800 OLD GENTILLY ROAD NEW ORLEANS, LA701 FRS ID: 110000449088	AFS: 2207100083			no	2	2	1,500		
	ICP: LA0052256	5	6	no	2	1			
	RCR: LA4170099937			no		1			
	RCR: LA4800014587	5	3	no	2	1			
	TRI: 70129MCHDS13800			no		1		3,202	
	TRI: 70129NSMCH13800			no		1		3,202	
WASTE MANAGEMENT OF NEW ORLEAN 17000 CHEF MENTEUR HWY NEW ORLEANS, LA701 FRS ID: 110009577546	ICP: LAR05N105	1	n/a	n/a	1	1			
	RCR: LAD096947569			no		1			
WHITNEY'S INDUSTRIAL AUTO WRECKERS, INC. NEW ORLEANS, LA701 FRS ID: 110030773897	ICP: LAR05M787		n/a	n/a	1	1			
YELLOW FREIGHT NEW ORLEANS 12169 OLD GENTILLY RD NEW ORLEANS, LA701 FRS ID: 110003320282	RCR: LAD985188663			no		1			

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C-9
70092 VIOLET

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

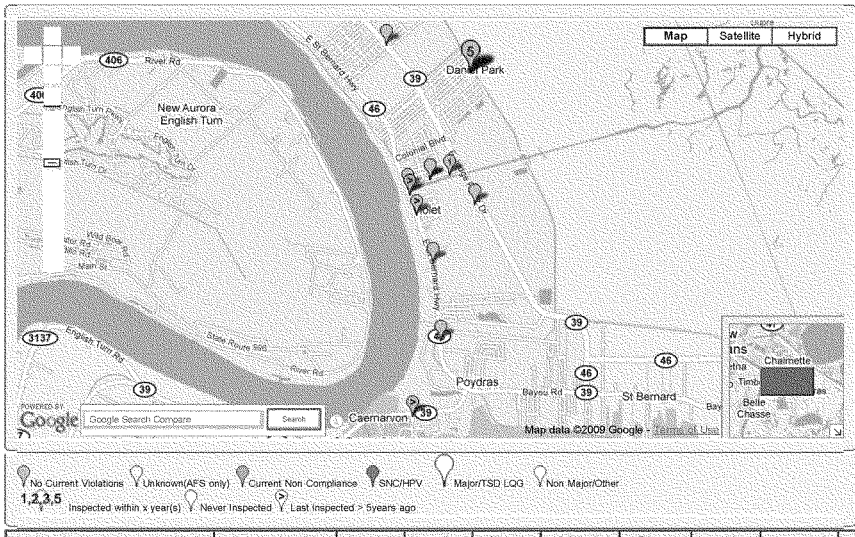
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Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
A & A CUSTOM ENGINES 4929 E JUDGE PEREZ DR VIOLET, LA 700 FRS ID: 110003259045	RCR: LA0000109298			no		1			
ADVANCE HEAD MACH INC 5442B E JUDGE PEREZ DR VIOLET, LA 700 FRS ID: 110003293711	RCR: LAD981522287			no		1			
AMERICAN OVERSEAS MARINE VIOLET DOCK 7000 ST BERNARD HWY VIOLET, LA 700 FRS ID: 110012269393	RCR: LAR000044230			no		1			
CURE OIL & DIESEL INC 2601 PACKENHAM RD VIOLET, LA 700 FRS ID: 110009580514	RCR: LAD985169408			no	1	1			
ENTERPRISE GAS PROCESSING - TOCA BARGE LOADING DOC 8 MI FROM TOCA GAS PLANT	AFS: 2208700041		n/a	n/a		1			

Map Results

VIOLET, LA700 FRS ID: 110010403410									
GOLF SOAP CORP PO BOX 25 @ ARABI VIOLET, LA700 FRS ID: 110010325790	AFS: 2206700007		n/a	n/a		1			
LA DEPT OF CULTURE, REC & TOUR PO BOX 534 VIOLET, LA700 FRS ID: 110011179443	ICP: LAG540415		n/a	n/a		1			
MOORE & MOORE TRUCKING LLC 6201 E ST BERNARD HWY., STE D VIOLET, LA700 FRS ID: 110031385454	RCR: LAR000063618			no		1			
ORLEANS ACQUISITIONS 2521 PACKENHAM ROAD VIOLET, LA700 FRS ID: 110011157960	ICP: LA0036153	1	n/a	n/a	1	1			
PIERS IN VIOLET HWY 610 VIOLET, LA700 FRS ID: 110022828797	RCR: LAR000058313			no		1			
RICORDS OIL SVC 2601 PACKENHAM ST W VIOLET, LA700 FRS ID: 110003312530	RCR: LAD982760324			no		1			
RICORDS OIL SVC 6449 E ST BERNARD HWY VIOLET, LA700 FRS ID: 110003359053	RCR: LAR000022707			no		1			
SAMS AUTO REPAIR 7637 E ST BERNARD HWY VIOLET, LA700 FRS ID: 110003340670	RCR: LAD985222256			no		1			
ST BERNARD PARISH VIOLET WWTP (LA0040169) 3400 STACIE DRIVE VIOLET, LA700 FRS ID: 110002046223	ICI: 08-2005-1883 ICI: 08-2008-2058 ICP: LAL040169	 1	 	no no no	 	1 1 2	 	 	
VIOLET CHEVRON 6205 E. ST. BERNARD HWY. VIOLET, LA700 FRS ID: 110008992643	ICP: LAG531277 ICP: LAL003647		n/a n/a	n/a n/a	1 1	1 1			

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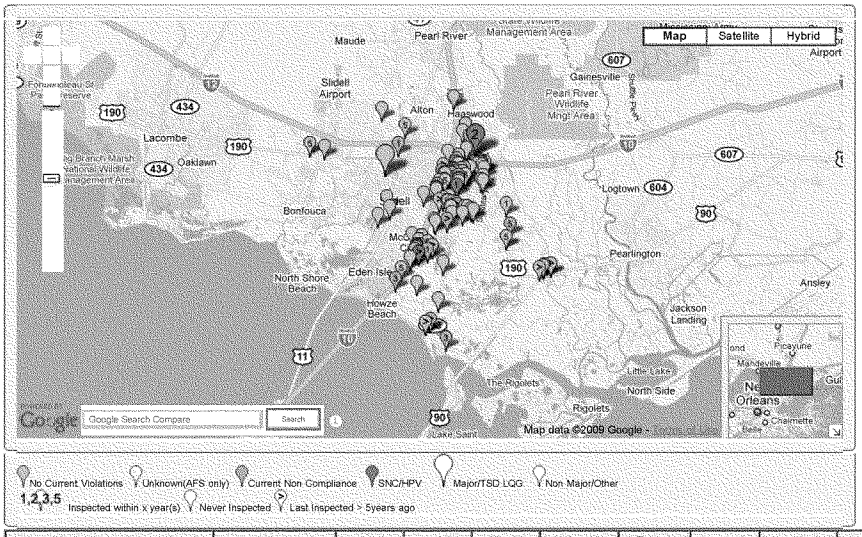
C-10
70461 SLIDELL

Map Results

U.S. ENVIRONMENTAL PROTECTION AGENCY

Enforcement & Compliance History Online (ECHO)

Search Results (Multimedia)



No Current Violations | Unknown(AFS only) | Current Non Compliance | SNC/HPV | Major/TSD LQG | Non Major/Other

1,2,3,5 Inspected within x year(s) | Never Inspected | Last Inspected > 5years ago

Facility Information *Select Name to Read Report* *Select to view map information*	Program ID#	Inspections (5 yrs)	Qtrs in Non Compliance (3 yrs)	Alleged Current Significant Violations	Informal Enforcement Actions/NOVs (5 yrs)	Formal Enforcement Actions (5 yrs)	Penalties (5 yrs)	TRI Chemical Releases(lbs)	Percent Minority (3 mile radius)
AARON OIL CO INC 39484 HWY 190 E SLIDELL, LA704 FRS ID: 110006030703	RCR: LAR000032698	2		no		0			
ADRIAN VEGAS SLIDELL FORD L M NISSAN 400 HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110003265225	RCR: LA0001017805			no		0			
ADVANCE AUTO PARTS #5797 509 PONTCHARTRAIN DR SLIDELL, LA704 FRS ID: 110022923933	RCR: LAR000058552			no		0			
AIRGAS GULF STATES 417 SOUTH STREET SLIDELL, LA704 FRS ID: 110035770449	ICP: LAG532659		n/a	n/a		0			
ALEX GONZALEZ COMMERCIAL BUILDING 680 I-10 SERVICE RD	ICP: LAG533155		n/a	n/a		0			

Map Results

SLIDELL, LA704 FRS ID: 110039178332									
ALEXS BODY SHOP 900 I10 SERVICE RD SLIDELL, LA704 FRS ID: 110003286810	ICP: LAU003530		n/a	n/a	1	1			
	RCR: LAD009692724			no		1			
ALL AMERICAN CARGO ELEVATORS, LLC SLIDELL, LA704 FRS ID: 110037490417	ICP: LAG532770		n/a	n/a		1			
ALL STAR TOYOTA 309 HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110003361740	ICP: LAG470008		n/a	n/a		1			
	RCR: LAD985223726			no		1			
AMBER ASSOCIATES INC. 59040 AMBER ST. SLIDELL, LA704 FRS ID: 110009010284	ICP: LAG531050		n/a	n/a	1	1			
	ICP: LAG532937		n/a	n/a		1			
AMSOUTH BANK OF SLIDELL 2170 GAUSE BLVD SLIDELL, LA704 FRS ID: 110015605193	ICP: LAG531444		n/a	n/a	1	1			
ATCHAFALAYA HOMES INC DBA GULF COAST HOME BUILDERS SLIDELL, LA704 FRS ID: 110033176774	ICP: LAG532488		n/a	n/a		1			
AUTO EXCELLENCE 61069 N MILITARY SLIDELL, LA704 FRS ID: 110003281875	ICP: LAU004493		n/a	n/a	1	1			
	RCR: LA0000522752			no		1			
AUTOMOTIVE CENTER OF SLIDELL 40355 HWY 190 E SLIDELL, LA704 FRS ID: 110020557422	ICP: LAG470208		n/a	n/a	1	1			
B & C DBA JADE LANDSCAPE HARDEN RD .25 M FREMAUX AVE SLIDELL, LA704 FRS ID: 110008383132	RCR: LAD098594914			no		1			
BELARUS MACHINERY INC 3 M E SLIDELL E OF I10 SLIDELL, LA704 FRS ID: 110008387281	RCR: LAD981588445			no		1			
BELLE GARDENS SALMEN AVENUE & SLIDELL, LA704 FRS ID: 110027365535	ICP: LAR100714		n/a	n/a		1			
BOBS APARTMENTS WWTP 41931 HWY 190 E SLIDELL, LA704 FRS ID: 110024579814	ICP: LAG570366	1	n/a	n/a		1			
	ICP: LAU004664		n/a	n/a		1			
BOYET JUNIOR HIGH SCHOOL 59295 REBEL DR SLIDELL, LA704 FRS ID: 110013289253	RCR: LAR000049791			no		1			
BRIAN HARRIS FONT BUICK GMC INC 293 HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110003297245	RCR: LAD981589880			no		1			
BROWNS VILLAGE ROAD SAND PIT 369005 BROWN VILLAGE RD SLIDELL, LA704 FRS ID: 110014335549	ICP: LAG490031		n/a	n/a	1	1			
CAJUN ENCOUNTERS SWAMP TOURS 55345 HWY 90 EAST SLIDELL, LA704 FRS ID: 110017699347	ICP: LAG531575	1	n/a	n/a	1	1			

Map Results

CFW, JR., LLC D/B/A RIDZ KLUB HOUSE SLIDELL, LA704 FRS ID: 110013178468	ICP: LAG531023	1	n/a	n/a	1	5			
CHARLES ON-SITE SVC 2528 STATE HWY 433 SLIDELL, LA704 FRS ID: 110016752502	ICP: LAG470180	1	n/a	n/a	1	5			
CHARLES CHAPMAN 119 DEVEREUX DR SLIDELL, LA704 FRS ID: 110003302809	RCR: LAD981901978			no		5			
CHUCK MCCARTHY 705 SOUTHLAKE WASHINGTON CT SLIDELL, LA704 FRS ID: 110003261531	RCR: LA0000543363			no		5			
CJS REAL ESTATE LLC 310 HOWZE BEACH LN SLIDELL, LA704 FRS ID: 110013740498	ICP: LAR10C074		n/a	n/a	1	5			
CLARKS MARINE RPR SVC INC (RONALD & KENN 61027 W MILITARY RD SLIDELL, LA704 FRS ID: 110003334286	RCR: LAD985210251			no		5			
COASTAL MARINE CONTRACTORS - SLIDELL FACILITY 55126 HWY 90 SLIDELL, LA704 FRS ID: 110022422724	AFS: 2210300067			no		5			
	ICP: LAR05N844		n/a	n/a	1	5			
CORDES SHOPPING CENTER MILITARY RD & SLIDELL, LA704 FRS ID: 110097489875	ICP: LAG532607		n/a	n/a		5			
COUNTRY LANE PATIO HOMES ON VOTERS ROAD SLIDELL, LA704 FRS ID: 110030780139	ICP: LAR10E193		n/a	n/a		5			
CROSS GATES UTILITY, INC. TAYLOR TRACE SLIDELL, LA704 FRS ID: 110022290457	ICP: LAG541284	1	n/a	n/a	1	5			
CUT RITE 7249 HAYES RD SLIDELL, LA704 FRS ID: 110003296479	RCR: LAD981588783			no		5			
D & S LAWNMOWER & BIKE SHOP 1282 BROWNSWITCH RD SLIDELL, LA704 FRS ID: 110003363832	RCR: LAR000032920			no		5			
DELGADO COMMUNITY COLLEGE 320 HOWZE BEACH LN SLIDELL, LA704 FRS ID: 110022458302	ICP: LAG532258	1	n/a	n/a		5			
	ICP: LAU004381	1	n/a	n/a	1	5			
	RCR: LAR000027425			no		5			
DOLLAR GENERAL STORE 2440 HWY 190 WEST SLIDELL, LA704 FRS ID: 110020156249	ICP: LAG531717	1	n/a	n/a		1			
	ICP: LAU004382	1	n/a	n/a	1	5			
DON WOLSIFFER OFFICE/WAREHOUSE SLIDELL, LA704 FRS ID: 110022914177	ICP: LAG531887		n/a	n/a	1	5			
DORR'S AUTOMOTIVE(72-103-6E002) 2770 E. GAUSE BLVD. SLIDELL, LA704 FRS ID: 110037248608	AFS: 2210306E002	1	n/a	n/a		5			

Map Results

DORAS AUTOMOTIVE 125 HWY 190 W SLIDELL, LA704 FRS ID: 110006021606	RCR: LAD981512940			no					
DUNAWAY ICE 39550 HWY 190 EAST SLIDELL, LA704 FRS ID: 110030771662	ICP: LAG532286		n/a	n/a					
DURWARD DUNN INC SLIDELL LA YARD 43564 CAMP RD SLIDELL, LA704 FRS ID: 110003262102	ICP: LA0106372		n/a	n/a	1				
	RCR: LA0000593319			no					
EAGLE SANCTUARY, LLC 55050 LA HWY 90 SLIDELL, LA704 FRS ID: 110016884088	ICP: LAG531256		n/a	n/a	1				
EDS ELECTRICAL SERVICE LOT 8 IN SUBURBAN ACRES SUBDIV SLIDELL, LA704 FRS ID: 110011177975	ICP: LAG530797		n/a	n/a	1				
ENVIRONMENTAL ENTERPRISES 173 COMMERCIAL SQUARE DR SLIDELL, LA704 FRS ID: 110003315001	RCR: LAD985173681			no					
ENVIRONMENTAL ENTERPRISES USA INC 58485 PEARL ACRES RD SLIDELL, LA704 FRS ID: 110003352112	RCR: LAR000010793			no					
ERNIES TRANS & AUTO 1721 GAUSE BLVD E SLIDELL, LA704 FRS ID: 110003350490	RCR: LAR000007740			no					
ERNIES TRANS & AUTOMOTIVE 681 I-10 SVC RD E SLIDELL, LA704 FRS ID: 110003312004	RCR: LAD982564593			no					
EXXONMOBIL OIL CORP. 101 S MILITARY RD SLIDELL, LA704 FRS ID: 110003291198	ICP: LAG750606		n/a	n/a					
	RCR: LAD981515331			no					
FAUST VETERINARY CL 1935 EAST GAUSE BLVD , LA704 FRS ID: 110011177341	ICP: LAG530887	1	n/a	n/a	1				
FORD LINCOLN MERCURY OF SLIDELL 400 E HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110016682044	ICP: LAG470140		n/a	n/a	1				
FRANK'S ACCURATE BODY SHOP 684 E I-10 SVC RD SLIDELL, LA704 FRS ID: 110014449301	ICP: LAG470158	1	n/a	n/a	1				
	RCR: LAR000026856			no					
G.T.B.J. LLC DUNAWAY/DOLLAR GENERAL SLIDELL, LA704 FRS ID: 110015805807	ICP: LAG531418		n/a	n/a	1				
	ICP: LAG531507	1	n/a	n/a	1				
GALLAGHER'S VINTAGE 960 I-10 SERVICE RD , LA704 FRS ID: 110011176663	ICP: LAG530976		n/a	n/a					
GOMEZ MALCOM MR 38327 SALT BAYOU RD SLIDELL, LA704 FRS ID: 110010643795	ICP: LAG530479		n/a	n/a					

Map Results

GRAHAM CABINETS, INC. 58471 PEARL ACRES ROAD SLIDELL, LA704 FRS ID: 110012672535	ICP: LAG531285		n/a	n/a	1	1			
	RCR: LAR000063677			no		1			
GREATER NORTH SHORE FULL GOSPE 39203 VOTERS ROAD SLIDELL, LA704 FRS ID: 110011177591	ICP: LAG530820		n/a	n/a		1			
GYMNASTICS PLUS 58445 PEARL ACRES RD SLIDELL, LA704 FRS ID: 110011182139	ICP: LAG530233		n/a	n/a	2	1			
HONEY ISLAND ELEMENTARY SCHOOL 500 SOUTH MILITARY ROAD SLIDELL, LA704 FRS ID: 110021537719	RCR: LAR000058198			no		1			
INDIAN VILLAGE GARDEN HOMES 334 INDIAN VILLAGE SLIDELL, LA704 FRS ID: 110011181611	ICP: LAG530250	1	n/a	n/a	1	1			
INTERSTATE PLAZA 742 E I-10 SVC RD SLIDELL, LA704 FRS ID: 110017857363	ICP: LAG531610		n/a	n/a	1	1			
JAMES R GOSEY JR MD & CHRIS W KRIEGER JR 1850 GAUSE BLVD STE 302 SLIDELL, LA704 FRS ID: 110003320228	RCR: LAD985188606			no		1			
JBG BURKES OFFICE PARK STP SE CORN OF NELLIE DR & SLIDELL, LA704 FRS ID: 110020843168	ICP: LAG531761		n/a	n/a	1	1			
JOHN BROWN OLDS PON 239 HOWZE BEACH RD , LA704 FRS ID: 110011184137	ICP: LAG470001		n/a	n/a		1			
JOHNNY F SMITH TRUCK & DRAGLINE SERVICE SLIDELL, LA704 FRS ID: 110013741200	ICP: LAG490008		n/a	n/a	1	1			
	ICP: LA0105465		n/a	n/a	1	1			
JOHNNY F. SMITH MEMORIAL BUSINESS SLIDELL, LA704 FRS ID: 110050449934	ICP: LAR10D933		n/a	n/a		1			
JOHNNY F. SMITH TESTAMENTARY TRUST SLIDELL, LA704 FRS ID: 110024485559	ICP: LAG531952	1	n/a	n/a	1	1			
JOHNNY SMITH TRUCKING 310 HOWZE BEACH RD. SLIDELL, LA704 FRS ID: 110003292776	RCR: LAD981520612			no		1			
K'TERI APTS 141 HOOVER DR SLIDELL, LA704 FRS ID: 110011173372	ICP: LAG540404	1	n/a	n/a		1			
KATOBE BODY CTR INC 672 E I-10 SVC RD SLIDELL, LA704 FRS ID: 110003351088	RCR: LAR000008847			no		1			
KNIEPER & SON AUTO AND TRUCK PARTS, INC. SLIDELL, LA704 FRS ID: 110024402831	ICP: LAR05N712	1	n/a	n/a		1			
	ICP: LAR10D273		n/a	n/a		1			

Map Results

LA POWER WASH LLC MULTI-PARISH SLIDELL, LA704 FRS ID: 110020062144	ICP: LAG759339		n/a	n/a	1	1			
LAFARGE LAKESHORE PLANT 470 N HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110032939845	ICP: LAR05N804		n/a	n/a		1			
LAFITTE'S LANDING PATIO HOMES @ HWY 190 WEST & SLIDELL, LA704 FRS ID: 110030759105	ICP: LAR10E188		n/a	n/a		1			
LAKESHORE CHRYSLER 330 HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110002276393	ICP: LAG470010		n/a	n/a		1			
	RCR: LAD064645690			no		1			
LAMB OF GOD LUTHERN CHURCH 57210 ALLEN RD SLIDELL, LA704 FRS ID: 110017857292	ICP: LAG531603		n/a	n/a	1	1			
LAWLESS AUTO DETAIL & CAR WASH 2801 E GAUSE BLVD SLIDELL, LA704 FRS ID: 110012269160	RCR: LAR000043976			no		1			
LEVEL TEN MOTORSPORTS 2280 HWY 190 SLIDELL, LA704 FRS ID: 110017699591	ICP: LAG470187		n/a	n/a	1	1			
LITTLE OAK MIDDLE SCHOOL 59241 REBEL DRIVE SLIDELL, LA704 FRS ID: 110021537522	RCR: LAR000058206			no		1			
LOGANS TRACE HWY 433 SLIDELL, LA704 FRS ID: 110027365544	ICP: LAR10D717		n/a	n/a		1			
LOWES COMPANIES #1894 39184 NATCHEZ DR SLIDELL, LA704 FRS ID: 110024556942	RCR: LAR000059790			no		1			
MARKS AUTO RPR 190 HWY 190E SLIDELL, LA704 FRS ID: 110008387389	RCR: LAD981591332			no		1			
MARLSTONE, INC. 310 HOWZE BEACH RD SLIDELL, LA704 FRS ID: 110022838189	ICP: LAR10D123	1	n/a	n/a	1	1			
MEADOW LAKE STP END OF MEADOW LAKE DR EAST SLIDELL, LA704 FRS ID: 110009018554	ICP: LAG570015	1	n/a	n/a	1	1			
MIKE SHAW MOTORS, INC. HONDA OF SLIDELL SLIDELL, LA704 FRS ID: 110015977578	ICP: LAG470177	1	n/a	n/a	1	1			
MILITARY RD PET HOSPITAL 100 S MILITARY RD STE A SLIDELL, LA704 FRS ID: 110003257742	RCR: LA0000046136			no		1			
MILITARY RD PET HOSPITAL INC 21 HERWIG BLUFF RD SLIDELL, LA704 FRS ID: 110003362361	RCR: LAR000030502			no		1			
MONSTER STORAGE LLC									

Map Results

59218 AMBER STREET SLIDELL, LA704 FRS ID: 110039179000	ICP: LAG533127		n/a	n/a					
NEW ORLEANS EAST KOA 56009 HWY 433 SLIDELL, LA704 FRS ID: 110011158547	ICP: LAG570021		n/a	n/a	1				
NICKEL CREEK SUBDIVISION KENSINGTON PLACE ROAD SLIDELL, LA704 FRS ID: 110023141875	ICP: LAR10D187		n/a	n/a	1				
NORTH SHORE REGIONAL MEDICAL CTR 100 MEDICAL CTR DR SLIDELL, LA704 FRS ID: 110001253571	AFS: 2210300029 RCR: LAD122688732		n/a no	n/a					
NORTHSHORE AUTOMOTIVE INC 180 COMMERCIAL SQUARE SLIDELL, LA704 FRS ID: 110003303023	RCR: LAD981902240			no					
NORTHSHORE FAMILY MED CNTR 1850 GAUSE BLVD STE 101 SLIDELL, LA704 FRS ID: 110009581149	RCR: LAD985191147			no					
NORTHSHORE GOLF CARS, LLC 712 & 716 E I-10 SERVICE ROAD SLIDELL, LA704 FRS ID: 110020158773	ICP: LAG531679	1	n/a	n/a	1				
NORTHSHORE HIGH SCHOOL 100 PANTHER DRIVE SLIDELL, LA704 FRS ID: 110021506707	RCR: LAR000056180			no					
NORTHSHORE UTILITY-NORTH SHORE 90 WOODHAVEN DRIVE SLIDELL, LA704 FRS ID: 110011168857	ICP: LAG570040	1	n/a	n/a					
OAK HARBOR EAST STP 350 N. MILITARY RD SLIDELL, LA704 FRS ID: 110017698472	ICP: LA0117765		n/a	n/a	1				
PARIS PROPERTIES, LLC 101 PRODUCTION DR SLIDELL, LA704 FRS ID: 110015720647	ICP: LAG531466	1	n/a	n/a		1			
PARISH NATL BANK 40377 HWY 190 E SLIDELL, LA704 FRS ID: 110006018335	RCR: LA0000453431			no					
PARR PROSTHETICS LABS 172 COMMERICAL SQUARE SLIDELL, LA704 FRS ID: 110020140462	ICP: LAG531681		n/a	n/a	1				
PEARL ACRES PEDIATICS LLC 59126 N. PEARL DRIVE SLIDELL, LA704 FRS ID: 110011178386	ICP: LAG530092		n/a	n/a	1				
PEARL PLANTATION TOWNHOMES 59219 N. PEARL STREET SLIDELL, LA704 FRS ID: 110011180783	ICP: LAG550410		n/a	n/a					
PERINOS TRUCK & AUTO BODY INC 40167 HWY 190 E SLIDELL, LA704 FRS ID: 110006023356	RCR: LAD982293011			no					
PIKES CLASSICS OF YESTERYEAR 55285 HWY 433	RCR: LAD982558928			no					

Map Results

SLIDELL, LA704 FRS ID: 110006023668									
PINE CREST RV & MHP 2801 OLD SPANISH TRAIL SLIDELL, LA704 FRS ID: 110011186413	ICP: LAG570003	1	n/a	n/a	1	1			
PITTMAN PLACE SUBDIVISION ON PITTMAN ROAD SLIDELL, LA704 FRS ID: 110023141884	ICP: LAR10D193		n/a	n/a	1	1			
POMPANO'S SEAFOOD STEAKHOUSE 2504 OLD SPANISH TRAIL SLIDELL, LA704 FRS ID: 110012872134	ICP: LAG540868		n/a	n/a	1	1			
PUB ZERO NO.2, INC. 1729 E. GAUSE BLVD. SLIDELL, LA704 FRS ID: 110011182870	ICP: LAG530139		n/a	n/a		1			
RAYS AUTOMOTIVE 58455 PEARL ACRES RD SLIDELL, LA704 FRS ID: 110003318561	RCR: LAD985186501			no		1			
RAYS AUTOMOTIVE 38455 PEARL ACRES SLIDELL, LA704 FRS ID: 110003322100	RCR: LAD985192749			no		1			
REPAIR GARAGE 40020 HWY 190 EAST , LA704 FRS ID: 110011176896	ICP: LAG530913		n/a	n/a		1			
SALT BAYOU DOCK 38327 SALT BAYOU ROAD SLIDELL, LA704 FRS ID: 110011180989	ICP: LAG530349		n/a	n/a		1			
SAM'S BAIT SHOP 38634 SALT BAYOU ROAD SLIDELL, LA704 FRS ID: 110011179864	ICP: LAG530480		n/a	n/a		1			
SATURN OF NEW ORLEANS, INC. 298 E. HOWZE BEACH ROAD SLIDELL, LA704 FRS ID: 110012879687	ICP: LAG470058		n/a	n/a		1			
SHELL OIL COMPANY 2307 GAUSE BLVD EAST SLIDELL, LA704 FRS ID: 110020567191	ICP: LAG531734		n/a	n/a	1	1			
SHERWIN WILLIAMS AUTO FINISHES #0719 134 KINGSPOINT BLVD SLIDELL, LA704 FRS ID: 110016746093	RCR: LAR000053827			no		1			
SIGNLITE 1490 E I10 SERVICE RD SLIDELL, LA704 FRS ID: 110003257895	RCR: LA0000046490			no		1			
SLIDELL BIBLE CHAPEL SLIDELL CHRISTIAN ACADEMY SLIDELL, LA704 FRS ID: 110025347587	ICP: LAG531842		n/a	n/a		1			
SNOWCIOUS SNOWBALLS CHINCHAS CREEK DUPLEXES SLIDELL, LA704 FRS ID: 110037493147	ICP: LAG532679		n/a	n/a		1			
SOUTHERN MANOR MHP 60375 N. MILITARY ROAD SLIDELL, LA704	ICP: LAG570093		n/a	n/a	1	1			

Map Results

FRS ID: 110011108146									
SOVEREIGN GRACE FELLOWHIP 2021 GAUSE BLVD. EAST SLIDELL, LA704 FRS ID: 110028925841	ICP: LAG532215		n/a	n/a		4			
ST TAMMANY PARISH CROSS GATES STF SLIDELL, LA704 FRS ID: 110009057858	ICP: LA0048941	4	4	yes	1	1			
SUNNY DAY FINANCIAL DEER CROSS IND PARK SLIDELL, LA704 FRS ID: 110009111718	ICP: LAG530948	2	n/a	n/a	1	1			
TALLOW CREEK NORTH OF HWY 1085 SLIDELL, LA704 FRS ID: 110035773605	ICP: LAR10E918		n/a	n/a		1			
TAMMANY HOLDINGS CORP I-10 S EDEN ISLES SLIDELL, LA704 FRS ID: 110020156917	ICP: LAR10C710		n/a	n/a	1	1			
TAYLOR YACHT SVC 54519 HWY 433 SLIDELL, LA704 FRS ID: 110006027496	RCR: LAD985221571			no		1			
TECH CON SYSTEMS INC 57382 ALLEN RD SLIDELL, LA704 FRS ID: 110003339575	RCR: LAD985220433			no		1			
TESI - RIGOLETS ESTATES 5 MI SE OF SLIDELL, ON HWY 433 SLIDELL, LA704 FRS ID: 110009976618	ICP: LAG570093	2	n/a	n/a		1			
TEXTRON MARINE & LAND SYSTEMS SLIDELL/OPERATION/WAREHOUSE SLIDELL, LA704 FRS ID: 110020842831	ICP: LAG480493		n/a	n/a	1	1			
THE LIONS DEN KARATE ACADEMY SLIDELL, LA704 FRS ID: 110024484612	ICP: LAG531940		n/a	n/a		1			
THE SURGERY SUITE 103 MEDICAL CNTR DR SLIDELL, LA704 FRS ID: 110003290000	RCR: LAD981512601			no		1			
THOMPSON PACKERS INC (22-103-6E001) 560 CARNATION SLIDELL, LA704 FRS ID: 110037249572	AFS: 221036E001	1	n/a	n/a		1			
TIRE KINGDOM #203 2220 E GAUSE BLVD SLIDELL, LA704 FRS ID: 110018893526	RCR: LAR000055863			no		1			
UNISERVICE AMERICAS INC 57174 HARDIN RD SLIDELL, LA704 FRS ID: 110010722067	ICP: LAG531559		n/a	n/a	1	1			
USSI COMPANY HWY 190 E AT SHAMROCK DR SLIDELL, LA704 FRS ID: 110008392060	RCR: LAD985215425			no		1			
VALUE TRAVELINN 58506 YAUPON DRIVE SLIDELL, LA704 FRS ID: 110006647693	ICP: LAG540392	1	n/a	n/a	1	1			

Map Results

VERAS VALET 1975 E GAUSE RD SLIDELL, LA704 FRS ID: 110003310532	RCR: LAD982552051			no		1			
VIC'S TRAILER PARK 39227 HWY 190 E SLIDELL, LA704 FRS ID: 110011171169	CP: LAG540772			n/a	n/a	1			
WALMART SUPERCENTER #583 39142 NATCHEZ DR SLIDELL, LA704 FRS ID: 110020123187	RCR: LAR000056150			no		1			
WAYWARD INC 57350 ALLEN RD SLIDELL, LA704 FRS ID: 110017778350	RCR: LAR000055012			no		1			
WINN DIXIE 1502 2985 GAUSE BLVD E SLIDELL, LA704 FRS ID: 110003354995	RCR: LAR000015511			no		1			

Last updated on Thursday, December 17th, 2009.
http://www.epa-echo.gov/cgi-bin/ideaotis.cgi
Print As-Is

Last updated on December 17th, 2009

APPENDIX D
SITE PHOTOGRAPHS

- **St. Bernard (70085)**



Photo 1: Chevron Plant (formerly Yscloskey Plant)

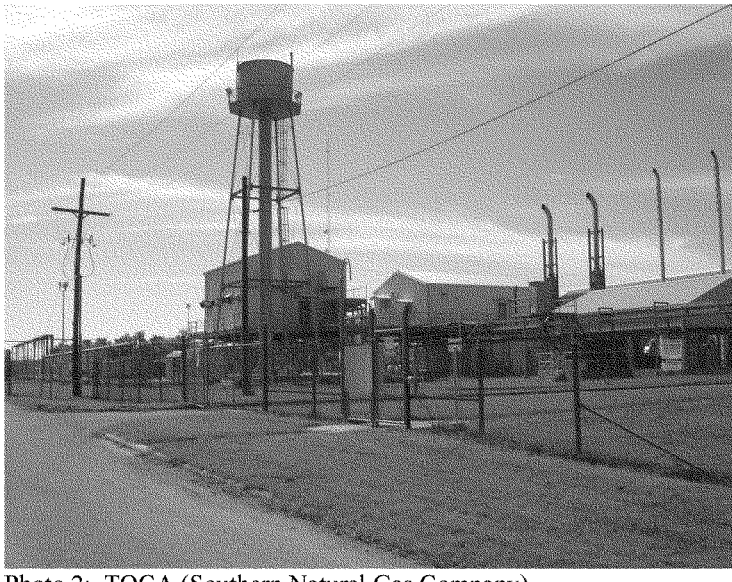


Photo 2: TOCA (Southern Natural Gas Company)

- **Arabi (70032)**



Photo 3: Tate & Lyle North American sugar (Currently Domino Sugar)

- **Braithwaite (70040)**

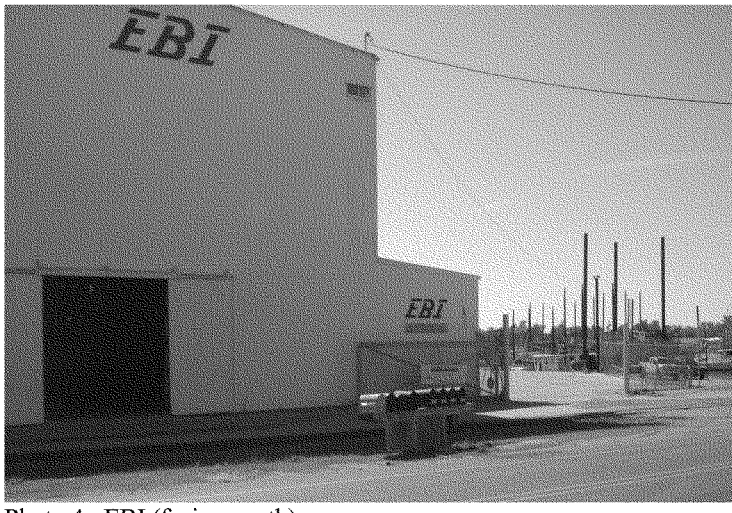
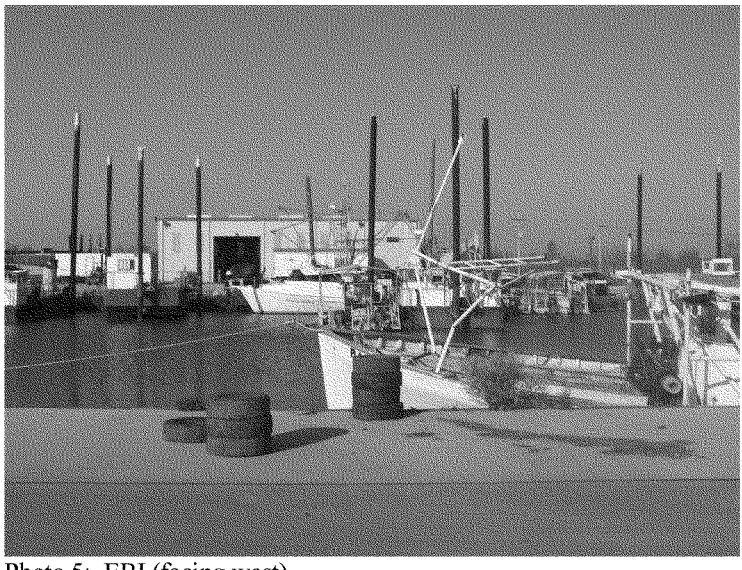


Photo 4: EBI (facing south)


Photo 5: EBI (facing west)

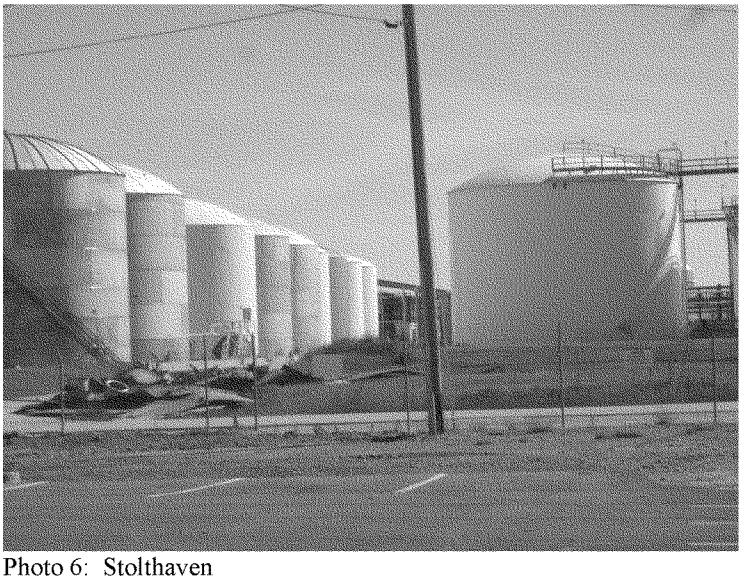


Photo 6: Stolthaven

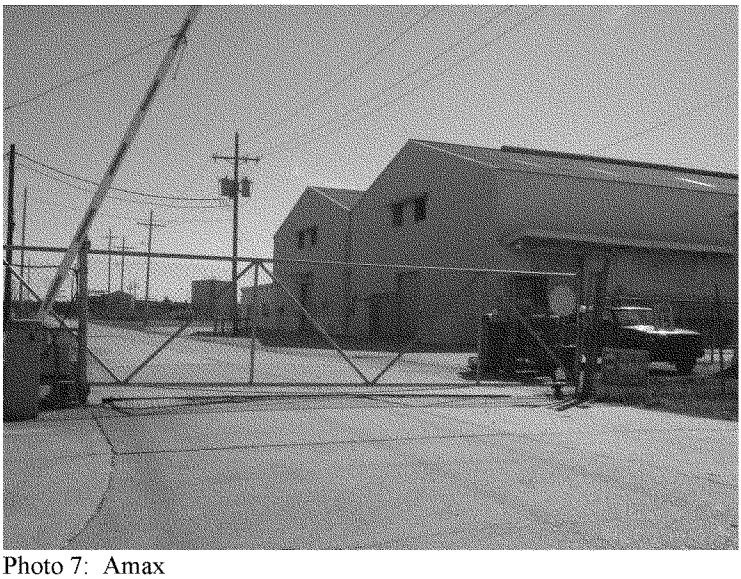


Photo 7: Amax

- **Chalmette (70043)**

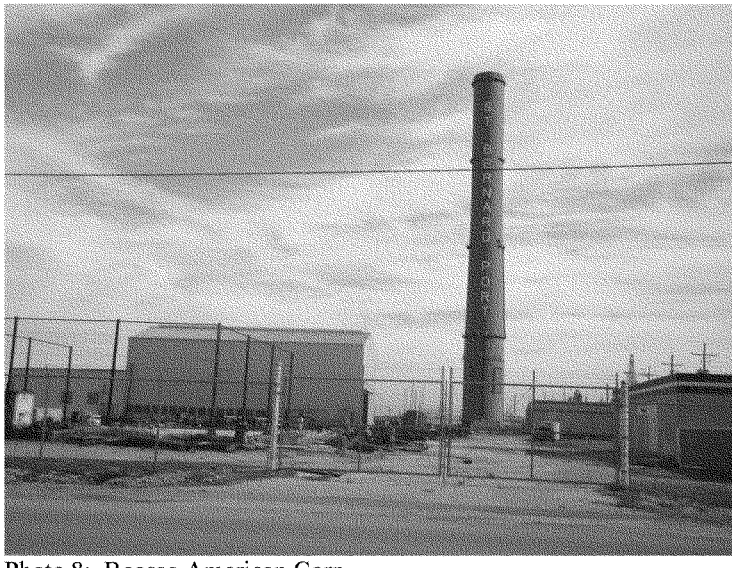


Photo 8: Boasso American Corp

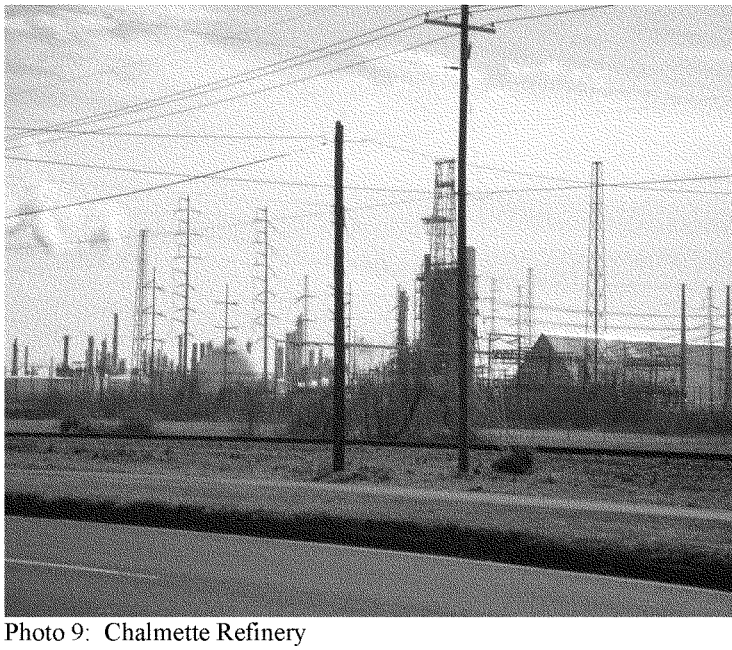


Photo 9: Chalmette Refinery

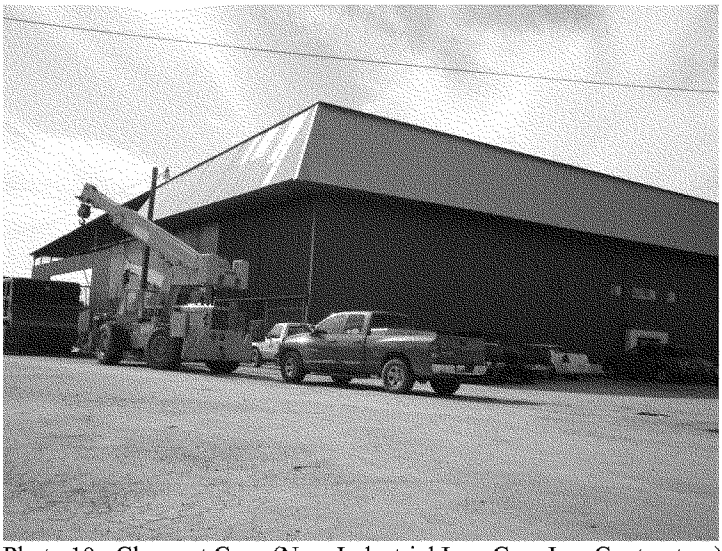


Photo 10: Chemcat Corp (Now Industrial Lou-Con. Inc. Contractors)



Photo 11: Chalmette Medical (empty lot)



Photo 12: Rollins Environmental Services (empty lot)

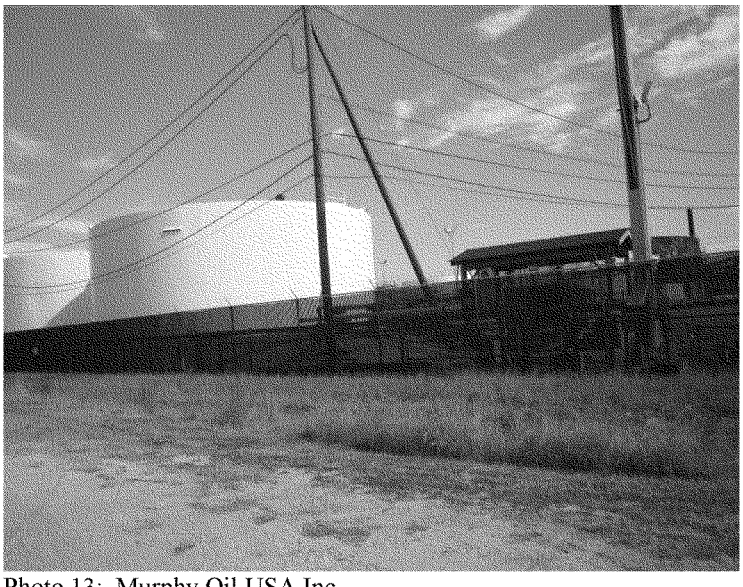


Photo 13: Murphy Oil USA Inc.

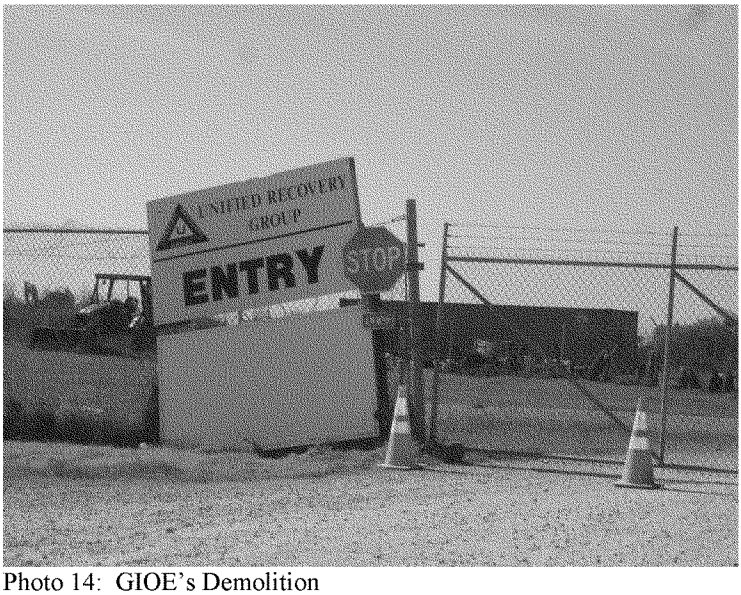
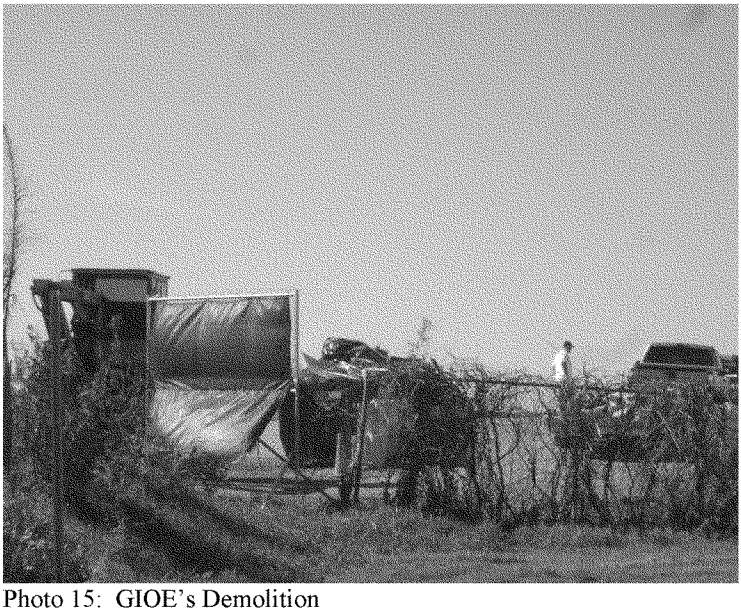


Photo 14: GIOE's Demolition


Photo 15: GIOE's Demolition

- **Meraux (70075)**

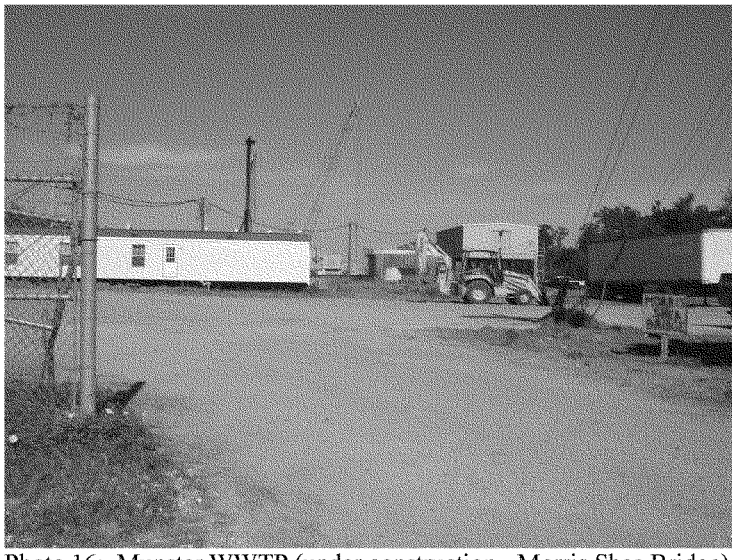


Photo 16: Munster WWTP (under construction - Morris Shea Bridge)

- **New Orleans (70117)**

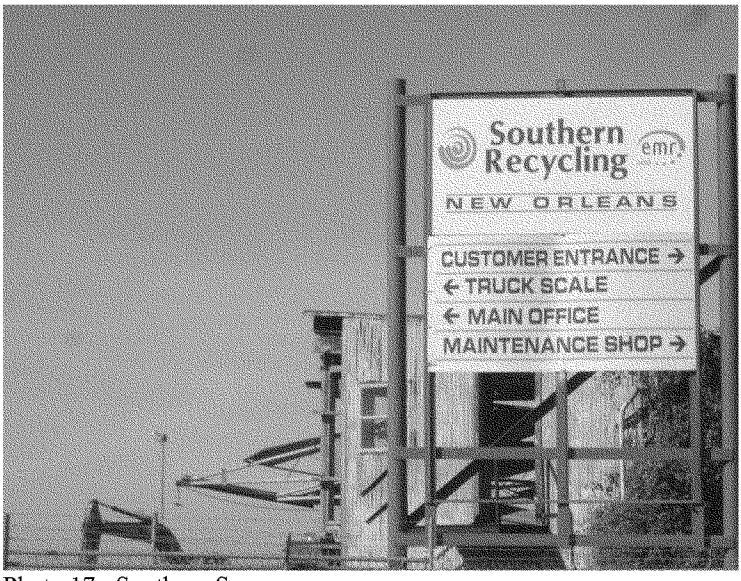
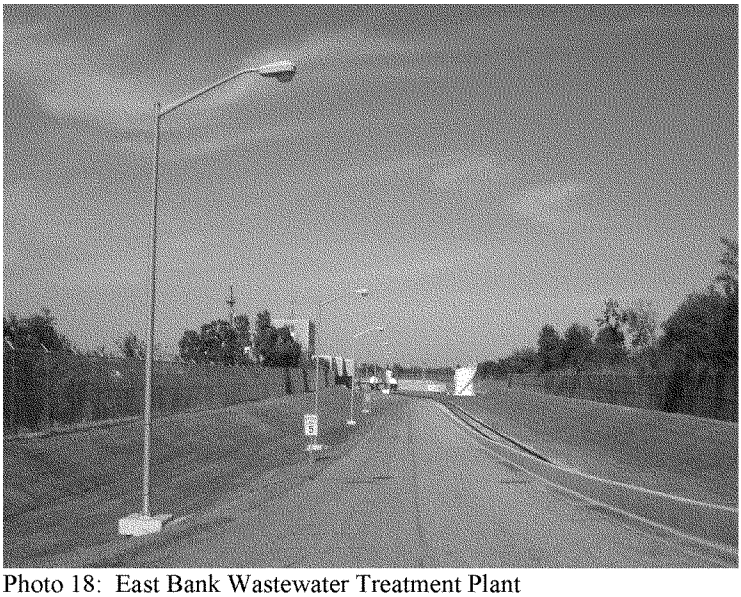


Photo 17: Southern Scrap


Photo 18: East Bank Wastewater Treatment Plant

- **New Orleans (70126)**

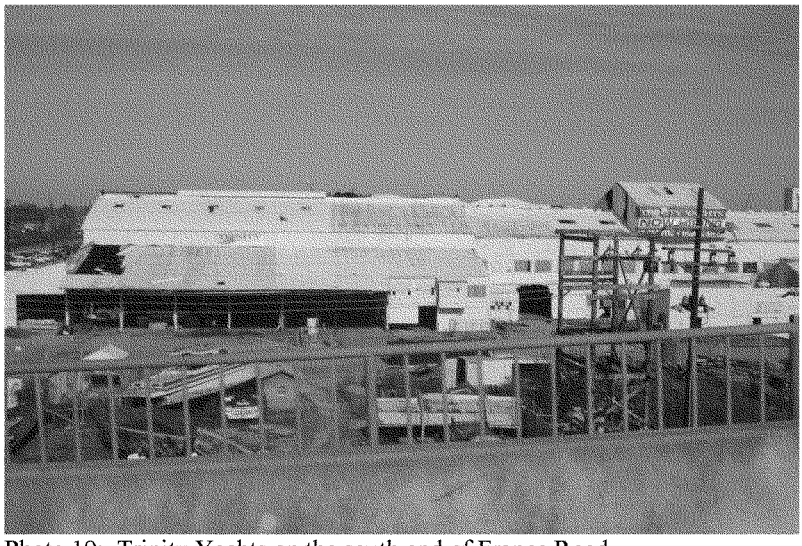


Photo 19: Trinity Yachts on the south end of France Road

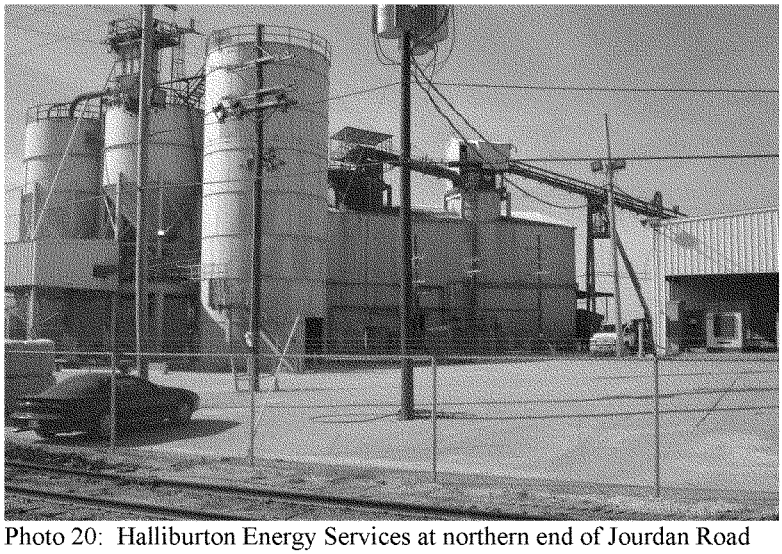


Photo 20: Halliburton Energy Services at northern end of Jourdan Road

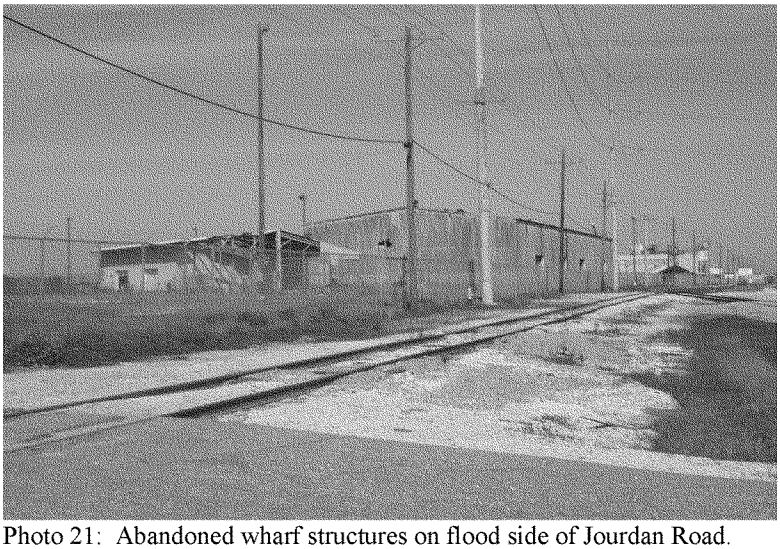


Photo 21: Abandoned wharf structures on flood side of Jourdan Road.

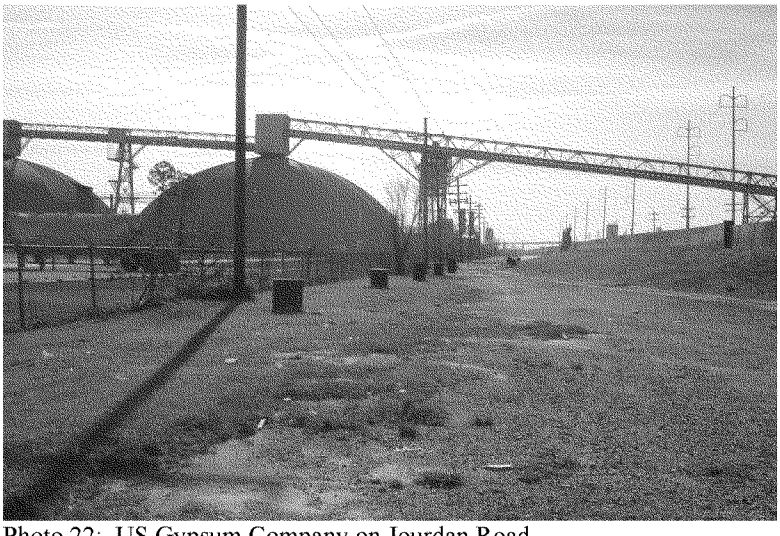


Photo 22: US Gypsum Company on Jourdan Road.

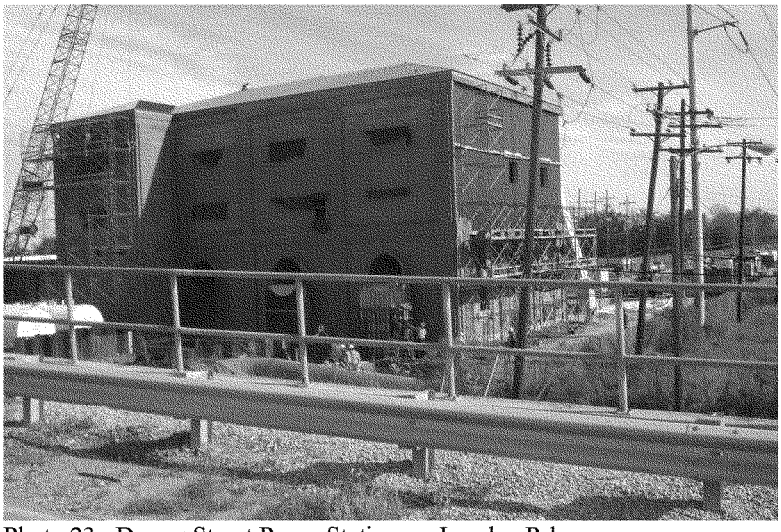


Photo 23: Dywer Street Pump Station on Jourdan Rd.

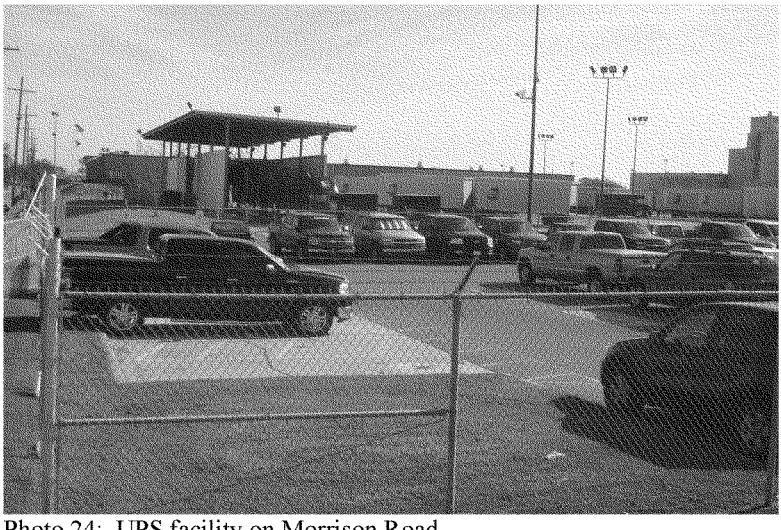


Photo 24: UPS facility on Morrison Road.

- **New Orleans (70129)**



Photo 25: Textron Marine & Land Systems (19401 Chef Hwy)

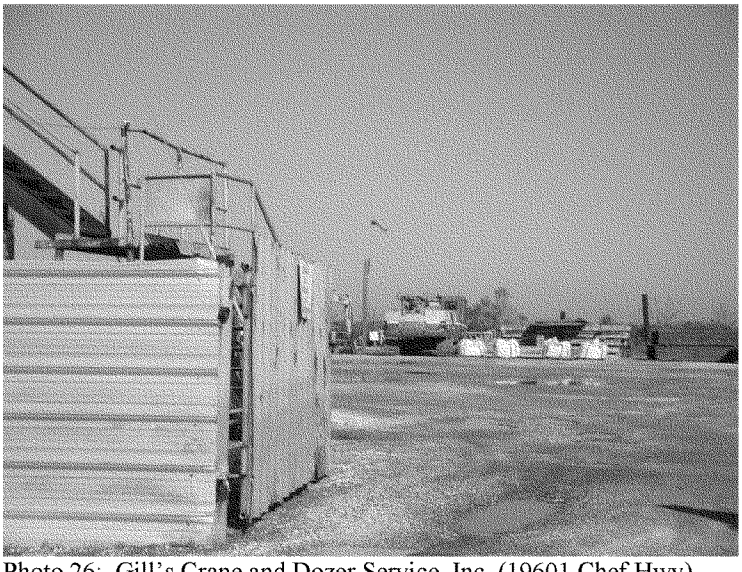


Photo 26: Gill's Crane and Dozer Service, Inc. (19601 Chef Hwy)



Photo 27: Gill's Crane and Dozer Service, Inc. (19601 Chef Hwy)



Photo 28: Folger's Coffee (Chef Hwy)



Photo 29: US Marine Corp. (empty lot)

- **Violet (70092)**

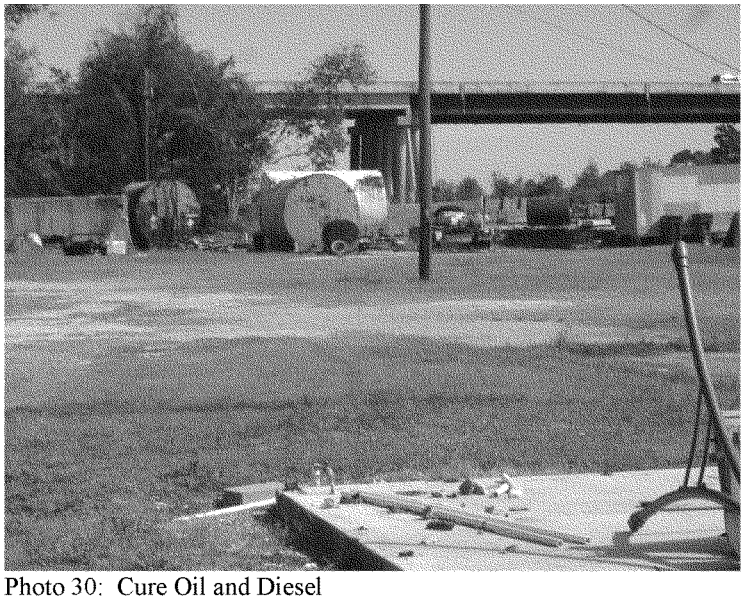


Photo 30: Cure Oil and Diesel

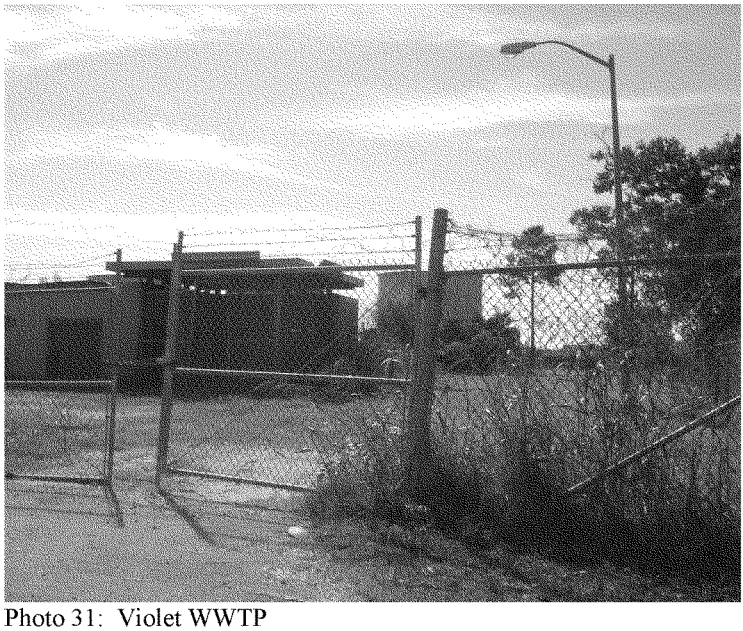


Photo 31: Violet WWTP



Photo 32: Cure's Waste Oil Services (now residential)

- **Slidell (70461)**



Photo 33: Current use of land along Hwy 90 near Lake St. Catherine



Photo 34: Prevost Island (North of Old Spanish Trail Rd)

- **Levees ridden for overview inspection**



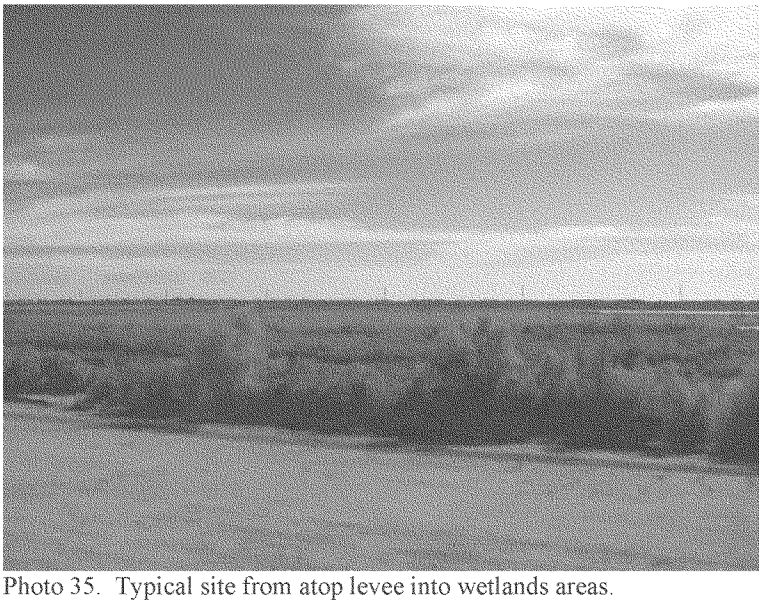


Photo 35. Typical site from atop levee into wetlands areas.

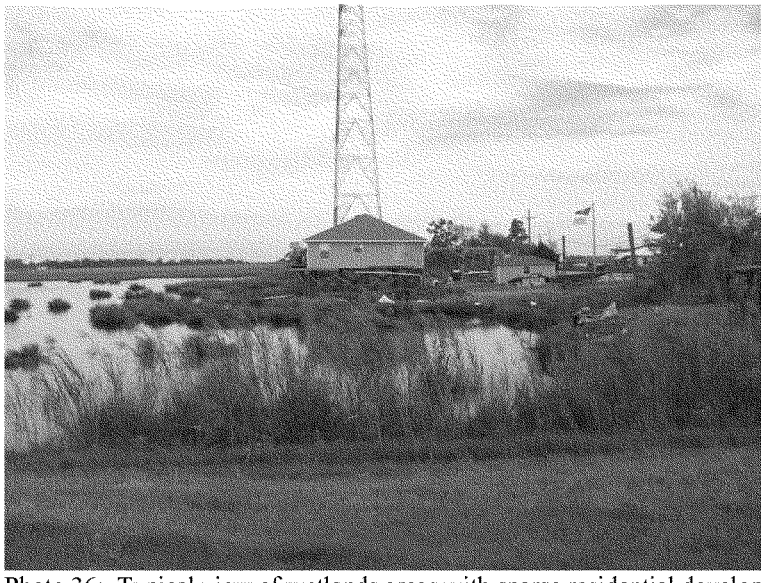


Photo 36: Typical view of wetlands areas with sparse residential development from atop levee.

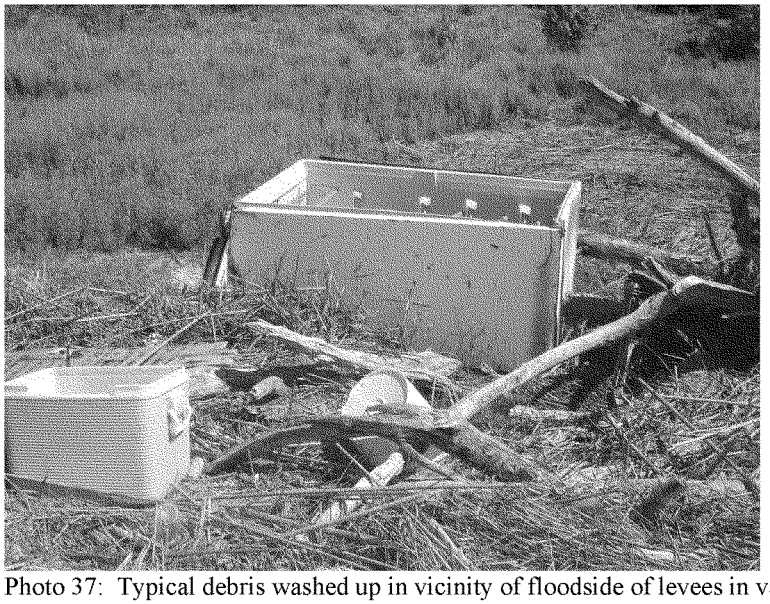
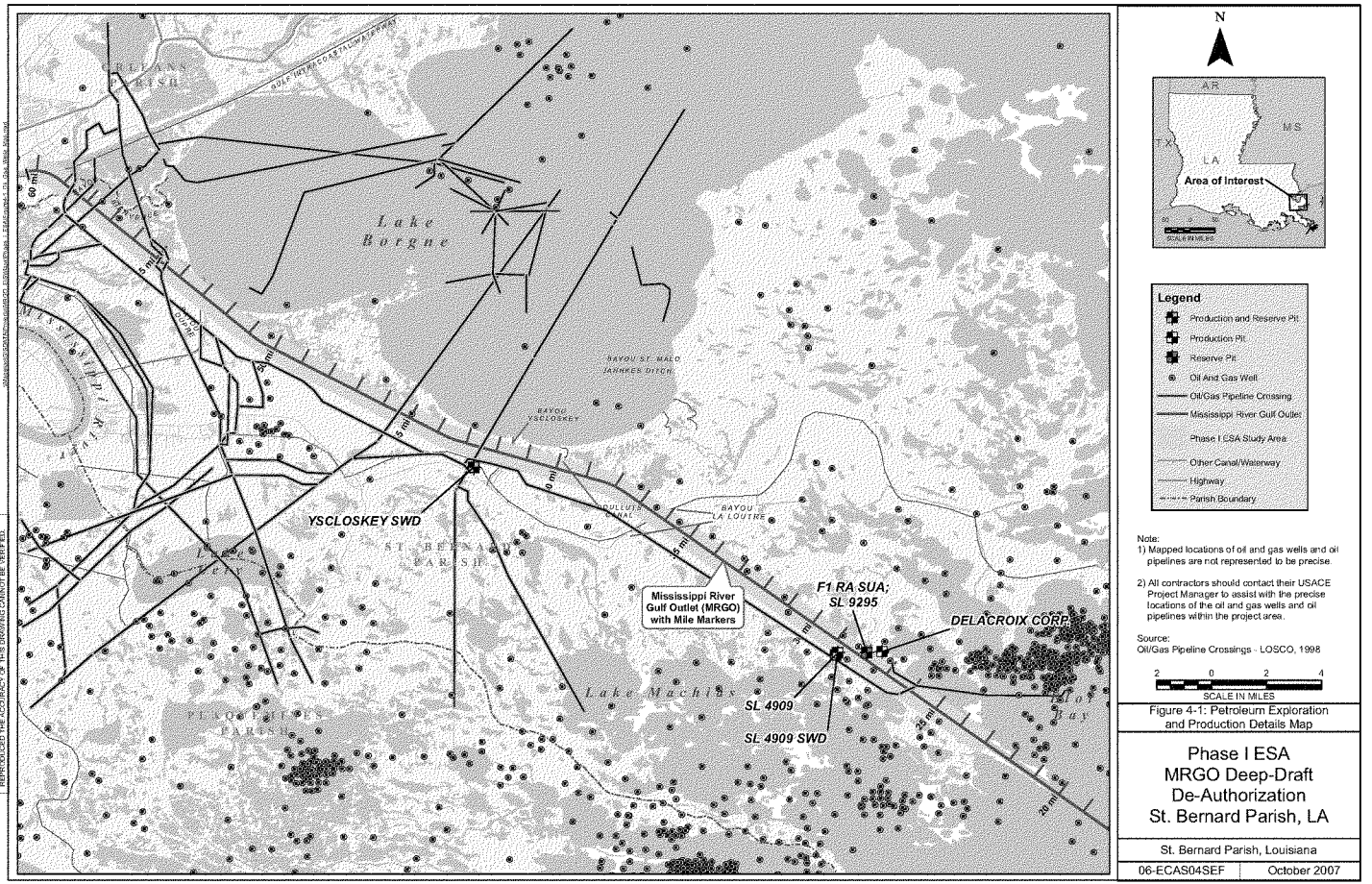


Photo 37: Typical debris washed up in vicinity of floodside of levees in various locations.

APPENDIX E
PETROLEUM EXPLORATION MAP
(BEM SYSTEMS INC. 2007)



THIS MAP AND ALL INFORMATION CONTAINED HEREIN IS AUTHORIZED FOR USE BY CLIENT ONLY. ANY UNAUTHORIZED USE, DISCLOSURE OR REPRODUCTION IS PROHIBITED. THE USER ASSUMES ALL RESPONSIBILITY FOR MISUSE OF THIS MAP OR ANY INFORMATION CONTAINED THEREIN OR FOR FAILURE TO REVIEW THE INFORMATION CONTAINED HEREIN. THE USER ASSUMES ALL RISKS ASSOCIATED WITH RELIANCE ON INFORMATION CONTAINED IN THIS MAP OR DERIVED FROM THIS MAP. THE USER SPECIFICALLY ACKNOWLEDGES THAT THE ACCURACY OF THIS DRAWING CANNOT BE VERIFIED.

Figure 4-1: Petroleum Exploration and Production Details Map

Phase I ESA MRGO Deep-Draft De-Authorization St. Bernard Parish, LA

St. Bernard Parish, Louisiana

06-ECAS04SEF | October 2007

APPENDIX F
LEAKING UNDERGROUND STORAGE TANK (LDEQ)

Master AI	Master AI Name	Physical Address	Municipality	Parish
106167	Proposed Retail Development	Behrman Hwy W side 0.68 Mi S	Algiers	Orleans
77184	Algiers Car Wash	3901 General Degaulle	New Orleans	Orleans
69129	Azeem Discount Store	5201 N Claiborne Ave	New Orleans	Orleans
3381	Bowman Transportation	12301 Old Gentilly Blvd	New Orleans	Orleans
160101	BPH Real Estate LLC	301 N Carrolton Ave	New Orleans	Orleans
75987	Brothers Discount	8500 Lake Forest Blvd	New Orleans	Orleans
15927	Brothers Texaco	3501 General Meyer Ave	New Orleans	Orleans
20504	Buck Kreihs Co Inc	2225 Tchoupitoulas St	New Orleans	Orleans
22944	Bullard Gas Inc	5701 Bullard Ave	New Orleans	Orleans
15877	Canal Blvd Shell	5612 Canal Blvd	New Orleans	Orleans
155778	Chase Bank - Lakefront Branch	1530 Robert E Lee Blvd	New Orleans	Orleans
75357	Chevron Facility #109021	3400 Franklin Ave	New Orleans	Orleans
22941	Chevron USA Inc 175875	7000 Crowder Blvd	New Orleans	Orleans
68627	Claiborn Spur	2727 S Claiborne	New Orleans	Orleans
69261	Claiborne Ave Texaco	1425 S Claiborne Ave	New Orleans	Orleans
84137	Crowder Center	5769 Crowder Blvd	New Orleans	Orleans
20795	Danny's Service Station	2378 Prentiss Ave	New Orleans	Orleans
78940	Downman Spur	5855 Chef Menteur Hwy	New Orleans	Orleans
69121	E Z Serve #7760	2701 Tulane	New Orleans	Orleans
13398	Exxon #55511	4500 Chef Menteur Hwy	New Orleans	Orleans
13401	Exxon #57852	5300 Elysian Fields	New Orleans	Orleans
13396	Exxon Co USA #58088	1600 Robert E Lee Blvd	New Orleans	Orleans
5721	Exxon Co USA 50775	5701 Crowder Blvd	New Orleans	Orleans
9877	Exxon Co USA 51901	704 Howard Ave	New Orleans	Orleans
23844	ExxonMobil #50804	6090 Bullard Ave	New Orleans	Orleans
70953	E-Z Serve #2100	2200 Robert E Lee Blvd	New Orleans	Orleans
70963	Family Ranch Market	11950 Hayne Blvd	New Orleans	Orleans
69128	Former E Z Serve #7415	1820 S Claiborne	New Orleans	Orleans
51515	Former Exxon Retail Store 5-2358	1943 Mirabeau Ave	New Orleans	Orleans
14542	Former Jules Filling Station	301 N Claiborne Ave	New Orleans	Orleans
20798	Franklin & Filmore Shell #137479	5300 Franklin Ave	New Orleans	Orleans
69296	Gauthier Enterprises Inc	3331 Carondelet St	New Orleans	Orleans
69120	General Degaulle EZ Mart	3622 General Degaulle	New Orleans	Orleans
69122	Hania Grocery LLC	7200 Downman Rd	New Orleans	Orleans
15895	Harrison Avenue Shell	932 Harrison Ave	New Orleans	Orleans
70964	Harrison Discount Zone LLC	851 Harrison Ave	New Orleans	Orleans
73499	Holy Cross School	4950 Dauphine St	New Orleans	Orleans
69132	In N Out Discount Market	2201 Canal St	New Orleans	Orleans
85595	Irish Bayou Travel Center	252 Hwy 11	New Orleans	Orleans
69499	Jones Exxon	2201 Orleans Ave	New Orleans	Orleans
77965	Kollins Services, Inc.	5023 Magazine St	New Orleans	Orleans
69065	Kwik & Easy Food Store, Inc	1600 Newton St	New Orleans	Orleans
128512	L F Gaubert (warehouse)	700 S Broad St	New Orleans	Orleans
2175	L&R Montgomery Enterprise Inc	919 St Charles Ave	New Orleans	Orleans

15615	Lake Oaks Shell	6300 Elysian Fields Ave	New Orleans	Orleans
15863	Lake Terrace Shell #137486	1546 Robert E Lee Blvd	New Orleans	Orleans
71541	Majac Pump Inc	2135 Magazine St	New Orleans	Orleans
69502	Mardi Gras Motorhome Park Inc	6050 Chef Menteur Hwy	New Orleans	Orleans
37446	Medical Center of LA at New Orleans	1532 Tulane Ave	New Orleans	Orleans
15930	Morrison & I-10 Shell #137495	6500 Morrison & I-10 Hwy	New Orleans	Orleans
4636	Motiva Enterprises LLC	500 N Rampart St	New Orleans	Orleans
71544	Napoleon Shell Service	3001 Napoleon	New Orleans	Orleans
15805	New Orleans East Chevron	10422 Chef Menteur Hwy	New Orleans	Orleans
72387	New Orleans Flooring Supply Inc	4200 Euphrosine St	New Orleans	Orleans
2724	Parkchester Shell	4840 Paris Ave	New Orleans	Orleans
5032	Regional Transit Authority	201 N Dupre St	New Orleans	Orleans
10319	Rock Roussels Auto Care	4662 General de Gaulle Dr	New Orleans	Orleans
2175	Shell #101204	919 St Charles Ave	New Orleans	Orleans
2175	Shell #101204	919 St Charles Ave	New Orleans	Orleans
70005	Shell #101226	3054 General Degaulle	New Orleans	Orleans
69986	Shell #101235	9232 Chef Menteur	New Orleans	Orleans
88001	Shell #101785	7001 Bullard Ave	New Orleans	Orleans
4635	Shell #137470	2900 Gentilly Blvd	New Orleans	Orleans
71542	Shell #137488	5000 N Claiborne	New Orleans	Orleans
77181	Shell #137489	5401 Crowder Blvd	New Orleans	Orleans
71535	Shell #137494	7358 Read Rd	New Orleans	Orleans
71539	Shell #137500	2707 Orleans Ave	New Orleans	Orleans
77182	Shell #137501	7500 Bullard	New Orleans	Orleans
4686	Shell #137502	13250 Chef Menteur Hwy	New Orleans	Orleans
4638	Shell #137503	3901 Downman Rd	New Orleans	Orleans
77134	Shell #137504	6041 Bullard Ave	New Orleans	Orleans
1885	Shell Oil Co - Upper City Shell	600 S Carrollton Ave	New Orleans	Orleans
13650	Shell Retail Station #101215	2946 Gentilly Blvd	New Orleans	Orleans
10058	Southern University At New Orleans	6400 Press Dr	New Orleans	Orleans
13650	Star Enterprises - Salary Station 44-398-0060	2946 Gentilly Blvd	New Orleans	Orleans
71605	Store #123	1325 Annunciation St	New Orleans	Orleans
69984	Texaco 44-398-0112	6500 Downman Rd	New Orleans	Orleans
70005	Texaco 44-398-0376	3054 General Degaulle	New Orleans	Orleans
77183	Tulane Shell Service	3327 Tulane Ave	New Orleans	Orleans
79049	Value Gas	12930 Chef Menteur Hwy	New Orleans	Orleans
80698	Wagner's Meat	3101 Elysian Fields Ave	New Orleans	Orleans
77867	Washington & Galvez Auto Repair	3422 Washington Ave	New Orleans	Orleans
73627	Triumph Quick Stop	37040 Hwy 23	Buras	Plaquemines
76578	**Fill A Sack - Nairn Store**	**LA Hwy 23 (No Address)**	**Empire**	**Plaquemines**
72288	One Stop Convenience Center Inc	32504 Hwy 23	Empire	Plaquemines
78506	Ellzey Marine & Hardware Inc	42991 Hwy 23 S	Venice	Plaquemines
77136	Venice Seafood LLC	140 Tante Phine Rd	Venice	Plaquemines
13364	Alex's Chevron Inc	7415 W Judge Perez Dr	Arabi	St. Bernard
14840	Carolyn Park Shell	701 Perrin Dr	Arabi	St. Bernard
69123	EZ Serve #7001	101 W St Bernard Hwy	Chalmette	St. Bernard
12604	Shell #137431	2600 Paris Rd	Chalmette	St. Bernard

25239	St Bernard Auto Repair	8429 W St Bernard Hwy	Chalmette	St. Bernard
30152	ExxonMobil Oil Corp #50251	4141 E Judge Perez Dr	Meraux	St. Bernard
76440	Meraux Food Store	3124 E Judge Perez Dr	Meraux	St. Bernard
84382	Sanchez Texaco	3225 E Judge Perez Dr	Meraux	St. Bernard
70946	E-Z Serve #2168	8401 E St Bernard Hwy	Poydras	St. Bernard
52457	Val J Dauterive & Son Inc - Petroleum Bulk Plant	6201G E St Bernard Hwy	Violet	St. Bernard
22953	Chevron Usa Inc #109422	1705 Gause Blvd	Slidell	St. Tammany
70930	CRH - #2174	2100 E Gause Rd	Slidell	St. Tammany
70929	CRH - #2179	1703 W Gause Blvd	Slidell	St. Tammany
13356	ExxonMobil Oil Corp #55516	1675 Gause Blvd	Slidell	St. Tammany
70809	Kangaroo Express #3741	350 Voters Rd	Slidell	St. Tammany
72435	Pantry #3744 dba Kangaroo	101 Brown Switch Rd	Slidell	St. Tammany
70924	Quick Check #206	580 Robert Rd	Slidell	St. Tammany
72687	Quick Serve	626 Old Spanish Trail	Slidell	St. Tammany
71944	RaceTrac #380	1720 Gause Blvd E	Slidell	St. Tammany
51681	Ray's Bull Pen Restaurant Inc	1777 Old Spanish Trail	Slidell	St. Tammany
74007	Speedway #9055	368 Voters Rd	Slidell	St. Tammany
74006	Speedway #9056	1418 Gause Blvd	Slidell	St. Tammany
74116	Thompson Road Handy Store	2301 Covington Hwy	Slidell	St. Tammany
70922	Time Saver Stores, Inc #89	3606 Pontchartrain Dr	Slidell	St. Tammany

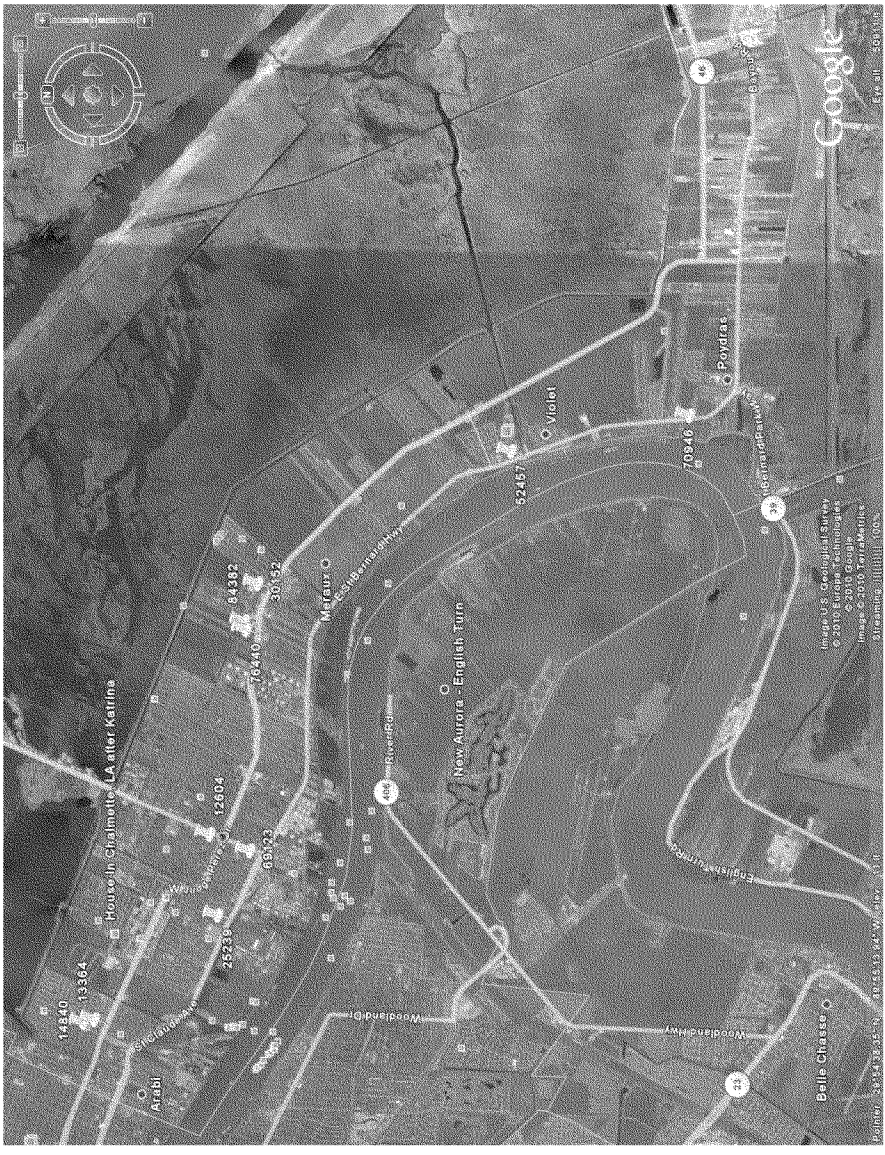


Orleans Parish

Plaquemines Parish



St. Bernard Parish



St. Tammany Parish


Google
Lake Pontchartrain
Lake Catherine
Pearlington
Slidell
Eden Isles
Honey Island
Pearl River
Rigolets
Pearl River Island
Point aux Herbes
Pelican Point
Trestle Islands
Johnson Bay
Heron Island
Bayou Liberty
Bayou Bonfouca
Bayou Lacombe
Bayou Castine
Bayou Sauvage
Bayou Coquille
Bayou Cane
Bayou Cassotte
Bayou Cassotte Island
Bayou Cassotte Island
Bayou Cassotte Island

APPENDIX G
INTERVIEWS

USACE Environmental Site Assessment Interview Form

Address:

Person Interviewed:_Dr. Paul Lo _____ Phone #:___504-368-0568_____

Firm:__Materials Management Group _____Title: _____Principal /Owner _____

Date:__Jan 19, 2010 _____ Time:_____1400_____

The reasons for performing this Phase I Environmental Site Assessment are:
The USACE-MVN is conducting Environmental Assessment on Mississippi River Gulf Outlet and surrounding areas of Orleans and St. Bernard Parishes.

---

1. Is the party aware of any Environmental Liens or Activities Limitation for the Property?

___ YES _X__ NO

---

2. Is the party aware of any previous environmental conditions or specialized knowledge of any environmental issues associated with the property?

_X__ YES ___ NO

---

3. Are there or have there been any valuation reductions due to environmental issues for the Property?

___ YES ___ NO _X__ NA

---

4. Are there any previous environmental assessments or reports that the party is aware of?

__X_ YES ___ NO

Other Discussion or elaboration on question(s)
___See attached

_____

_____

_____

Completed by:_Haekyung Kim _____ Title:_Technical Manager _____

Materials Management Group, Inc has completed environmental investigations and assessments in the study area as listed below:

1. Phase I –ESA at Chef Menteur-Bayou Dupre Corridor (DACW29-03-D-0014 Task Order 24). No REC was found. MMG recommended studying the sediment in the construction area.

2. Phase I –ESA at Michoud Canal-Bayou Bienvenue Corridor (DACW29-03-D-0014 Task Order 24). No REC was found. MMG recommended studying the sediment in the construction area.

3. Phase II –ESA at the closure gates – Seabrook, MRGO-GIWW, Michoud Slip (DACW29-03-D-0014 Task Order 37). The analytical results from the samples collected near Michoud Canal, Bayou Bienvenue, and the levee connector between indicate:

    - Michoud Canal: only herbicides (dichloroprop and MCPP) and metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, sodium, vanadium, and zinc) were detected;
    - Bayou Bienvenue: only TPH-D, TPH-O, and metals (aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc) were detected;
    - Levee connector: TPH-D, one pesticide (Lindane), one herbicide (MCPP), and metals (aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, sodium, vanadium, and zinc) were detected.

4. Phase I –ESA at the Confined Disposal-Staging Facility and Wetland Restoration Site (DACW29-03-D-0014 Task Order 42). No REC was found.

5. Phase I –ESA at the Graving Site near Orleans and St. Bernard Parish (DACW29-03-D-0014 Task Order 42). No REC was found.

6. Phase II – ESA, Sunken Barge at Michoud Canal (W912P8-08-D-0029 Task Order 5). Overall, most of the COCs were detected in all of the barge sludge and in the canal sediment, but there were few COCs detected in the water samples. The detected COCs in the sludge/sediment samples included TPH-D, TPH-O, TPH-G (in a few locations), metals (arsenic, barium, cadmium (in two locations), chromium, lead, and mercury), and oil & grease in barge 2 only. The detected COCs in the water samples included TPH-D (in barge 2), TPH-O, and lead. TPH-D, TPH-O, barium (barge sludge only), and chromium (barge sludge only) are the only contaminants detected above the limiting RECAP screening standards.

USACE Environmental Site Assessment Interview Form

Address: Special Projects Branch (PSPB)
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

Person Interviewed: Dr. George Bacuta Phone #: 301/415-1970

Firm: Nuclear Regulatory Commision Title: Project Manager / Physical Scientist

Date: Jan 15, 2010 Time: 4:00 pm EST

The reasons for performing this Phase I Environmental Site Assessment are:
The USACE-MVN is conducting Environmental Assessment on Mississippi River Gulf Outlet and surrounding areas of Orleans and St. Bernard Parishes.

---

1. Is the party aware of any Environmental Liens or Activities Limitation for the Property?

___ YES X NO @@

---

2. Is the party aware of any previous environmental conditions or specialized knowledge of any environmental issues associated with the property?

X** YES ___ NO

---

3. Are there or have there been any valuation reductions due to environmental issues for the Property? ##

___ YES ___ NO ___ NA

---

4. Are there any previous environmental assessments or reports that the party is aware of?

X++ YES ___ NO

Other Discussion or elaboration on question(s)

@@ Item 1: As a whole region under study, No.

** Item #2: As related to environmental HTRW issues in industrial facilities in various locations of the region under study.

Item #3: There is a general valuation reduction due to the overall environmental condition of the region under study as a result of its geographic/physiographic location on the Gulf Coast (i.e. exposure to the Gulf of Mexico). The study area is along a high energy environment where the land and associated rivers (e.g. Mississippi River), marshes, swamps, freshwater lakes are exposed to interaction with the Gulf waters (coastal processes), and hence there are coastal erosion, storm surges, saltwater intrusion, that may render reductions of value in various portion/section of the region under study.

++ Item #4: For certain specific parts of the region under study.

Completed by: Haekyung Kim Title: Technical Manager

USACE Environmental Site Assessment Interview Form

Address:_____ Project#:_____

Current Owner:_____ Phone #:_____

Current Occupant:_____ Phone #:_____

Person Interviewed: Jeff Corbino Phone #: 504 862-1958

Firm: U.S. Army Corps of Engineers

Date: 15-Dec-09 Time: 8:00

The reasons for performing this Phase I Environmental Site Assessment are:

---

1. Is the party aware of any Environmental Liens or Activities Limitation for the Property?

___ YES X NO

---

2. Is the party aware of any previous environmental conditions or specialized knowledge of any environmental issues associated with the Property?

X YES ___ NO Un-exploded ordinance may be present in Lake Borgne (attachment 1)

---

3. Are there, or have there been, any valuation reductions due to environmental issues for the Property?

___ YES X NO

---

4. Are there any previous environmental assessments or reports that the party is aware of?

X YES ___ NO Several NEPA documents have been prepared for channel O&M (attachment 2)

Other Discussion or Elaboration on Question(s)

See attached maps & list of environmental assessments.

Completed by:_____ Title:_____

Attachment 2

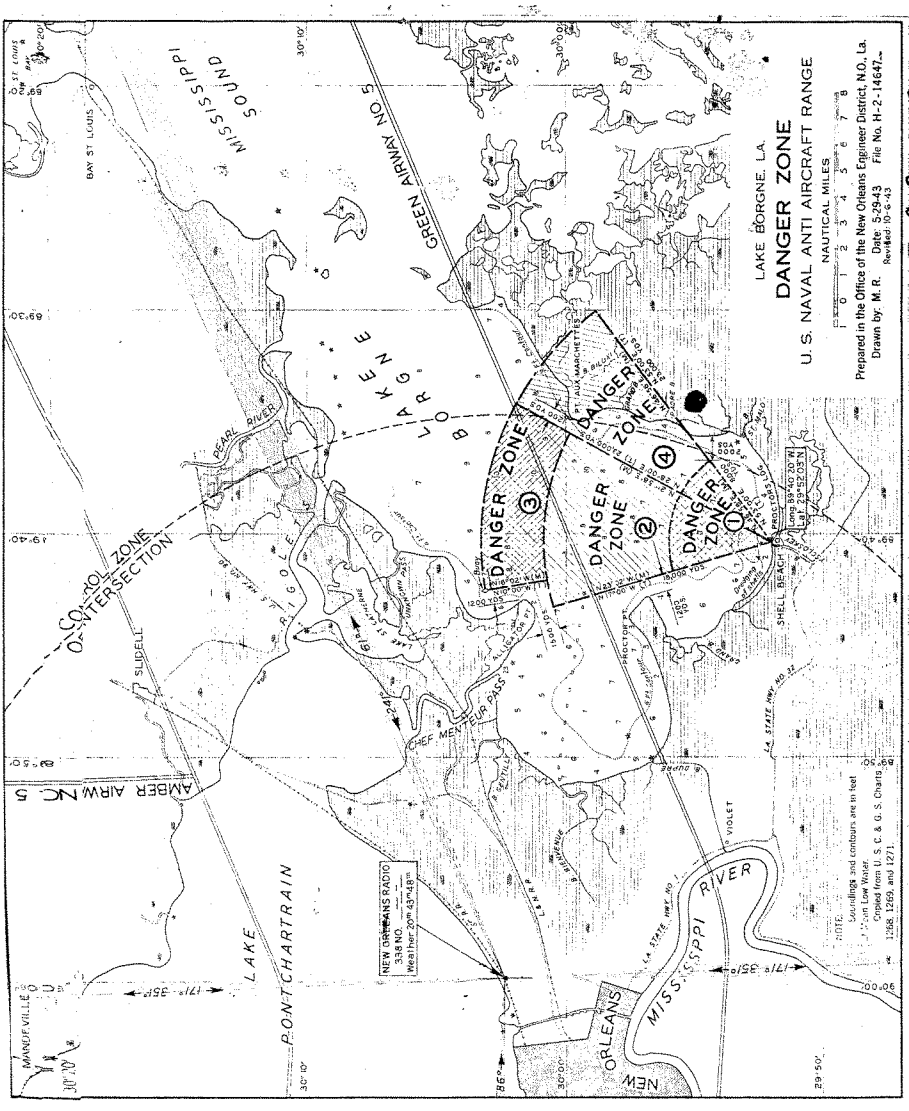
Environmental Assessments and Environmental Impact Statements

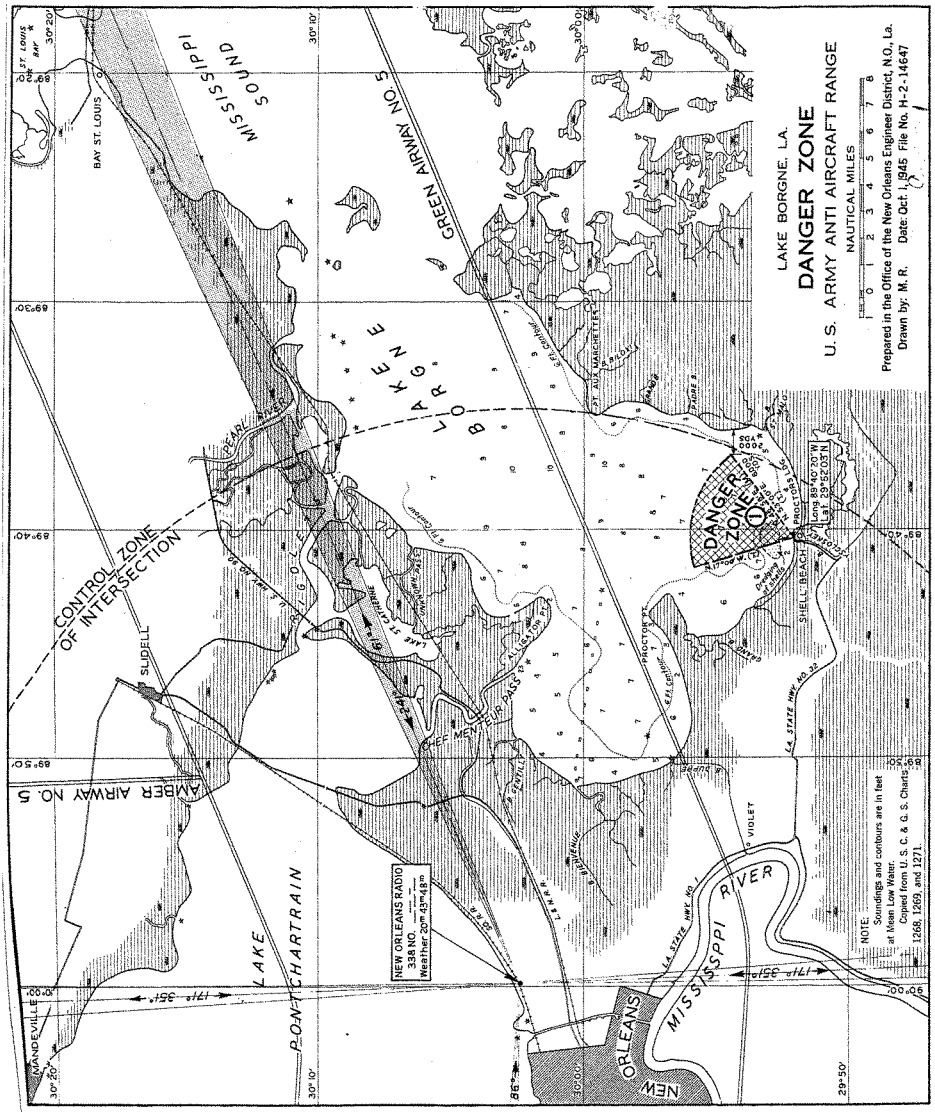
The CEMVN has prepared many Environmental Assessments (EA) and Environmental Impact Statements (EIS) to evaluate potential impacts of project-specific proposed actions in and around the MRGO. These EAs and EISs were prepared in accordance with the NEPA of 1969 and the Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508), as reflected in the USACE Engineering Regulation, ER 200-2-2.

- Lake Pontchartrain, LA and Vicinity Hurricane Protection Project Riprap shore protection with openings at Bayous Bienvenue and Dupre, EIS, 1973 and 1974.
- Lake Borgne Vicinity MRGO Bayous La Loutre, St. Malo, and Dupre Final EIS, March 1976.
- EA #15, entitled "Transfer of Land Along Mississippi River – Gulf Outlet Jourdan Road Terminal to Inner Harbor Navigation Channel", with a Finding of No Significant Impact (FONSI) signed on December 15, 1980.
- EA #38, entitled "MRGO, Foreshore Protection Test Section", with a FONSI signed on August 15, 1983.
- EA #47, entitled "MRGO Foreshore Protection", with a FONSI signed on January 23, 1985.
- EA #54, entitled "South Bank Mississippi River – Gulf Outlet – Borrow Site", with a FONSI signed on April 1, 1986.
- EA #72, entitled "MRGO Breton Sound Jetty Repairs", with a FONSI signed on May 26, 1988.
- Mississippi River – Gulf Outlet Ocean Dredged Material Final EIS, May 1989.
- EA #143, entitled "Mississippi River – Gulf Outlet – New Canal, Remedial Dredging", with a FONSI signed on September 11, 1991.
- EA #152, entitled "MRGO St. Bernard Parish, LA, Bank Stabilization, Miles 50.5 to 55.0", with a FONSI signed on November 21, 1991.
- EA #154, entitled "Mississippi River – Gulf Outlet – Major Rehabilitation of the South Jetty in Breton Sound", with a FONSI signed on December 23, 1991 NOTE: no EA available, this is date of Memorandum to discontinue work.
- EA #162, entitled "Mississippi River – Gulf Outlet, St. Bernard and Plaquemines Parishes, LA – Marsh Enhancement/Creation and Berm Construction", with a subsequent FONSI signed on July 10, 1992.
- EA #244, entitled "MRGO Back Dike (CWPPRA), Disposal Area Marsh Protection, Back Dike", with a FONSI signed on July 30,1996 NOTE: disregard erroneous date on heading of August 6, 1996, Commander signed on July 30, 1996.
- EA #247, entitled "MRGO St. Bernard Parish, LA, Bank Stabilization Miles 55.0 to 56.1", with a FONSI signed on September 24, 1996.
- EA #255, entitled "MRGO, LA, Wetland Creation, Miles 15.0 to 23.0, St. Bernard and Plaquemines Parish, LA", with a FONSI signed on February 12, 1997.
- EA #269, entitled "MRGO, LA, South of Lake Borgne Additional Disposal Areas, St. Bernard Parish, LA", with a FONSI signed on March 24, 1998.

- EA #269-B, entitled "MRGO, South of Lake Borgne Additional Disposal Areas plus Deflection Dike and Floatation Channels, St. Bernard Parish, LA", with a FONSI signed on June, 2000.
- EA #269-C, entitled "MRGO, LA, Construction of Flotation Channels Miles 51.0 to 48.0, St. Bernard Parish, LA", with a FONSI signed on October 2, 2001.
- EA #274, entitled "MRGO, Additional Disposal Areas, Hopedale Marshes", with a FONSI signed on July 10, 1998.
- EA #277, entitled "MRGO, LA, Shell Beach Disposal Areas, St. Bernard Parish, LA", with a FONSI signed on September 6, 2001.
- EA #277-A, entitled "MRGO, LA, Construction of Flotation Channels Miles 49.0 to 38.0, St. Bernard Parish, LA", with a FONSI signed on October 2, 2001.
- EA #288, entitled "MRGO Mile 43 to Mile 41 North Bank Stabilization, St. Bernard Parish, LA", with a FONSI signed on November 8, 1999.
- EA #349, entitled "MRGO, Miles 32-27, Additional Disposal Areas - Hopedale Marshes, St. Bernard Parish, LA", with a FONSI signed on August 15, 2002.
- EA #354, entitled "MRGO, Additional Disposal Area Designation Miles 66.0 to 49.0, St. Bernard Parish, LA", with a FONSI signed February 9, 2004.
- EA #355, entitled "MRGO Mile 27.0 to 0", with a FONSI signed on June 30, 2003.
- EA #361, entitled "MRGO, LA, Test Installation of Articulated Concrete Mattressing, Miles 39.0 to38.0", with a FONSI signed on January 29, 2003.
- EA #402, entitled "Lake Borgne – MRGO, Shoreline Protection Project, St. Bernard Parish, LA", with a FONSI signed on December 16, 2004.
- EA #403, entitled "MRGO, Hopper Dredging Miles 27.0 To 66.0", with a FONSI signed on March 22, 2004.
- EA #411, entitled "MRGO, Installation of Articulated Concrete Mattressing, Miles 37.4 to 36.5, St. Bernard Parish, Louisiana", with a FONSI signed on October 19, 2004.

Attachment 1




LAKE BORGNE, LA.
DANGER ZONE
U. S. ARMY ANTI AIRCRAFT RANGE
NAUTICAL MILES
0 1 2 3 4 5 6 7 8
Prepared in the Office of the New Orleans Engineer District, N.O., La.
Drawn by: M. R. Date: Oct. 1, 1945 File No. H-2-14647
DANGER ZONE
Long 89°40'20"W
Lat 29°52'03"N
CONTROL ZONE OF INTERSECTION
AMBER AIRWAY NO. 5
GREEN AIRWAY NO. 5
NEW ORLEANS RADIO
338 KC.
Weather 20m 43m 48m
MISSISSIPPI SOUND
LAKE PONTCHARTRAIN
LAKE BORGNE
MISSISSIPPI RIVER
NEW ORLEANS
BAY ST. LOUIS
PEARL RIVER
SLIDELL
MANDEVILLE
SHELL BEACH
VIOLET
NOTE: Soundings and contours are in feet at Mean Low Water
Copied from U. S. C. & G. S. Charts 1268, 1269, and 1271.

APPENDIX H
QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

Haekyung Kim, Ph.D.
B.S. Environmental Science
Hankuk University of Foreign Studies, Seoul, S. Korea
M.S. and Ph.D. Environmental Engineering
Michigan State University, East Lansing, MI
Visiting Research Professor
Michigan State University, East Lansing, MI
Technical Manager
US Army Corps of Engineers
New Orleans, LA

John Templeton
B.S. Integrated Sciences and Technology (Environmental and Energy Sciences)
James Madison University; Harrisonburg VA (2003)
M.S. Environmental Engineering; Virginia Tech, Blacksburg VA (2008)
US Army Corps of Engineers-Environmental Engineer (July 2008-present)
New Orleans, LA

APPENDIX
R

Basis for Analysis

Following the identification of the tentatively selected plan (TSP), a construction sequence was developed. Assumptions factoring into the construction sequence include production rates for building rock projects, dredge equipment availability, land loss rates, and the limitation of alternating dredging cycles in the lobes of Lake Borgne. The Agency coordination for the MRGO plan was based on this construction sequence and without the incorporation of Operation and maintenance (O&M). However, due to uncertainties associated with the timing and availability of funding for the plan, only those features that are sustainable without the implementation of any other feature (such as a diversion) are recommended for construction at this time. A tiered implementation approach has been developed for the TSP (Table 2-28 of EIS) based on these uncertainties. In addition, O&M has been included in the TSP. The benefits have been recalculated by tier utilizing the previously developed construction sequence and without O&M. Due to the uncertainty of when each feature will be implemented, analysis may require updating in later phases of the project. The USACE will continue to coordinate with the agencies throughout the project study and implementation.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 1	
LS1	47,000 linear feet (8.9 miles) of shoreline protection beginning at the terminus of the Bayou Dupre supplemental shoreline project, extending around Proctor Point to the West of Shell Beach supplemental funding shoreline protection.
MRGO1	3,850 feet of new foreshore protection between MRGO miles 56.6 and 57.4. This stone protection feature is embedded within the limits of MRGO7.
MRGO6	8,132 linear feet of new, non-continuous foreshore protection between MRGO miles 36.0 and 34.2, immediately east of the existing stone closure of the MRGO. MRGO6 ties into an existing foreshore dike immediately downstream.
LM1	3,240 acres of marsh restoration from open water and nourishment of 777 adjacent acres in the Golden Triangle, south of the IHNC Surge Barrier. Approximately 12.8 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 6.
LM4	289 acres of marsh restoration and nourishment of 95 adjacent acres of marsh in the portion of the Golden Triangle bordered by the GIWW, the IHNC Surge Barrier, and the MRGO. Approximately 1.4 million cubic yards of borrow material would be obtained from Lake Borgne Area 6.
LM2	422 acres of marsh restoration and 2,523 acres of marsh nourishment in the area between Proctor Point and the MRGO. Approximately 4.9 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 3.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 2	
BS1	Approximately 51,000 linear feet (9.7 miles) of shoreline protection along the southeast shore of Lake Borgne. This feature begins at the northern terminus of the Biloxi Marsh Shoreline Protection Project (PO-72) south of Point aux Marchettes and extends north to Malheureax Point.
BS2	Approximately 39,600 linear feet (7.5 miles) of artificial oyster reef development on the Chandeleur Sound side of the Biloxi Marsh between Eloi Point and the mouth of Bayou La Loutre.
CC4-A	420 acres of cypress restoration in the Bienvenue Triangle. Approximately 2.9 million cubic yards of material to be obtained from the Mississippi River.
BR1	Approximately 48 acres of ridge restoration on the south bank of Bayou La Loutre. 425,000 cubic yards of silty sand material to be obtained from the Mississippi River.
CM2	795 acres of marsh restoration and 190 acres of marsh nourishment north of Paris Road. 3.3 million cubic yards of material are required, 2.6 million cubic yards of which can be obtained from the adjacent reach of the GIWW. The remaining material would be obtained from the Michoud Canal.
Construction Year 3	
ES1	24,000 linear feet (4.6 miles) of shoreline protection from the south shore of Lake Pontchartrain to the terminus of the existing Bayou Chevee shoreline protection feature.
ES2	30,750 linear feet of shoreline protection in Lake Pontchartrain between Chef Menteur Pass and The Rigolets.
ES3	70,000 feet of foreshore protection along Lake Borgne between Alligator Point and The Rigolets.
Construction Year 4	
HM1	757 acres of marsh restoration and the nourishment of 973 acres of adjacent marsh, located in the Hopedale area bordered by MRGO to the northeast. 4.1 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 2.
TM1	760 acres of marsh restoration and 223 acres of marsh nourishment, requiring approximately 3.2 million cubic yards of material to be obtained from Lake Borgne Borrow Site 2.
TM2	770 acres of marsh restoration and 3,400 acres of marsh nourishment in the vicinity of Lake Ameda. Approximately 7.4 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 2.
MRGO5	188 acres of marsh would be restored behind 14,485 linear feet of vinyl sheet pile wall to establish the shoreline. 2.7 million cubic yards of material would be obtained from Lake Borgne.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO8	200 acres of marsh restoration adjacent to approximately 20,640 linear feet of bank reclamation constructed using vinyl sheet pile wall. 3.2 million cubic yards of material would be obtained from Lake Borgne. Approximately 13,572 linear feet of new foreshore protection would also be included between approximate channel miles 51.0 and 48.3
Construction Year 5	
MRGO7	91 acres of marsh restoration adjacent to approximately 9,700 linear feet of bankline reclamation, consisting of 9,700 linear feet of vinyl sheet pile wall. 1.3 million cubic yards of material would be obtained from Lake Borgne.
EM1	1,175 acres of marsh restoration and nourishment of 2,830 acres of surrounding marsh in the area bounded by the Lake Pontchartrain shoreline, Chef Menteur Pass, and the levee. Approximately 8.1 million cubic yards of material would be obtained from Lake Borgne Borrow Area 6.
Construction Year 6	
LM3	911 acres of marsh creation and 950 acres of marsh nourishment in South Lake Borgne north of Lena Lagoon in the area bounded by the lake, Bayou St. Malo, MRGO, and Doulets Canal. Approximately 4.6 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 2.
BM1	8,295 acres of marsh nourishment along the south shore of Lake Borgne. 10.8 million cubic yards of material would be obtained from Lake Borgne Borrow Area 2.
Construction Year 7	
CM1	1,240 acres of marsh nourishment south of Paris Road between cypress restoration feature CC3 and the Chalmette Loop Levee. Approximately 3.0 million cubic yards of material would be dredged from Lake Borgne Borrow Area 5 for this feature.
CM3	300 acres of marsh restoration and 215 acres of marsh nourishment in the area north of Bayou Dupre and south of MRGO. 1.9 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 5.
CM4	98 acres of marsh restoration and 129 acres of marsh nourishment south of Bayou Dupre. 900,000 cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 4.
CM5	245 acres of marsh restoration and 70 acres of marsh nourishment in the area north of Bayou Bienvenue and Paris Road. 1.2 million cubic yards of material would be obtained from Lake Borgne Borrow Area 4.
Construction Year 8	
TM7	2,255 acres of marsh restoration and up to 3,338 acres of adjacent marsh nourishment on the east side of Bayou Terre aux Boeufs. 11.5 million cubic yards of material would be obtained from Lake Lery if available, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
TM8	1,511 acres of marsh restoration on the east side of Bayou Terre aux Boeufs in the vicinity of Delacroix. 5.5 million cubic yards of material would be dredged from Lake Lery if possible, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.
EM2	1,095 acres of marsh nourishment on Hog Island, located between the west and east mouth of the West Pearl River. Approximately 2.2 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM3	861 acres of marsh restoration and 180 acres of adjacent marsh nourishment in the area bounded by Highway 433, Little Lagoon, Salt Bayou and Highway 90. Approximately 3.5 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM4	2,625 acres of marsh restoration and 1,455 acres of adjacent marsh nourishment in the area bounded by Salt Bayou to the north, the West Pearl River to the east, the Rigolets to the south and Highway 80 to the north. Approximately 10.6 million cubic yards of material would be obtained from Lake Borgne Borrow Area 8.
Construction Year 9	
CC1	1,020 acres of cypress swamp restoration and 953 acres of cypress swamp nourishment in the area north of the existing Violet Canal along the Forty Arpent levee. 8.5 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC2	250 acres of cypress swamp restoration and 250 acres of swamp nourishment to the northeast of CC1. 2.4 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC3	370 acres of cypress swamp restoration and 790 acres of swamp nourishment along the Forty Arpent Levee south of Paris Road. Approximately 5.3 million cubic yards of material to be obtained from Lake Borgne Borrow Area 5.
CC4	1,465 acres of cypress swamp restoration in the open water areas adjacent to the Forty Arpent Levee north of Paris Road, including the Bienvenue Triangle area in Orleans Parish. 11.3 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 6.
Construction Year 10	
CC5	1,120 acres of swamp restoration and 1,645 acres of swamp nourishment south of the Violet Canal along the Forty Arpent Levee and the Chalmette Loop Levee. 9.6 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 4.
CC6	1,028 acres of swamp restoration and 1,540 acres of swamp nourishment in the southwest corner of the Central Wetlands. 11.2 million cubic yards of borrow material would be obtained Lake Borgne Borrow Area 4.
Maintenance As Needed	

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO2	Repair and maintenance of approximately 15,070 linear feet (2.85 miles) of foreshore protection between Mile 44.4 and 39.9 of the MRGO.
MRGO3	Repair and maintenance of existing approximately 10,420 linear feet (1.97 miles) of foreshore protection between approximately Mile 56 to 51 of the MRGO.
MRGO4	Repair and maintenance of approximately 6,690 linear feet (1.27 miles) of existing retention dike MRGO Miles 36.6 to 37.1 and MRGO Miles 33.9 to 32.9.

From: Stiles, Sandra E MVN
To: Gilmore, Tammy H MVN
Subject: Fw: DEQ SOV 101220/2695 USACE - Misissippi River Gulf Outlet Ecosystem Restoration
Date: Tuesday, January 11, 2011 1:18:08 PM
Attachments: image001.png

Message sent via my BlackBerry Wireless Device

From: Beth Altazan-Dixon <Beth.Dixon@LA.GOV>
To: Stiles, Sandra E MVN
Sent: Tue Jan 11 09:43:14 2011
Subject: DEQ SOV 101220/2695 USACE - Misissippi River Gulf Outlet Ecosystem Restoration

January 11, 2011

Joan M. Exnicios, Chief

USACE Environ.Planning Branch

P.O. Box 60267

New Orleans, LA 70160-0267

sandra.e.stiles@usace.army.mil <mailto:sandra.e.stiles@usace.army.mil>

RE: 101220/2695

USACE - Misissippi River Gulf Outlet Ecosystem Restoration

Draft EIS and Feasibility Study

St. Bernard Parish

Dear Ms. Exnicios:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you

should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

· Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.

* If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
* If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
* All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-3181 to determine if your proposed project requires a permit.

· If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit application or Notice of Intent must be submitted no later than June 1, 2011. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx <http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx> or by contacting the LDEQ Water Permits Division at (225) 219- 3181.

* If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
* All precautions should be observed to protect the groundwater of the region.
* Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
* Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
* If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, St. Bernard Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3958 or by email at beth.dixon@la.gov <mailto:beth.dixon@la.gov> .

Sincerely,

Beth Altazan-Dixon

Performance Management

LDEQ/Business and Community Outreach Division
Office of the Secretary

P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301
Phone: 225-219-3958
Fx: 225-325-8148

Email: beth.dixon@la.gov

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

MARCH 28, 2012

REPLY TO
ATTENTION OF

Regional Planning and
Environmental Division, South
Environmental Planning Branch

Beth Altazan-Dixon
LDEQ/Business and Community Outreach Division
Office of the Secretary
P.O. Box 4301 (602 N. 5th Street)
Baton Rouge, LA 70821-4301

Dear Ms. Dixon:

Please reference your email dated January 11, 2011 providing comments on the Mississippi River Gulf Outlet Ecosystem Restoration Draft Environmental Impact Statement (DEIS) and Feasibility Study and the U.S. Army Corps of Engineers Regional Division South New Orleans District (CEMVN) preliminary response letter dated December 12, 2011.

The CEMVN appreciates your input and has addressed your comments. Please see attached the LDEQ comments and CEMVN responses.

If you have any questions or require additional information please contact Ms. Tammy Gilmore at U.S. Army Corps of Engineers; Regional Planning and Environmental Division South; Environmental Planning Branch; CEMVN-PDN-CEP; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Ms. Gilmore can also be reached at (504) 862-1002 or by email at tammy.h.gilmore@usace.army.mil.

Sincerely,

Joan M Exnicios

Joan M. Exnicios
Chief, Environmental Planning Branch

Enclosure

LDEQ comments on and CEMVN responses to
The MRGO Ecosystem Restoration Project

LDEQ Comment #1: Please take any necessary steps to obtain and/or update all necessary approvals and Environmental permits regarding this proposed project.

CEMVN Response #1: all necessary approvals and environmental permits would be obtained.

LDEQ Comment #2: If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.

CEMVN Response #2: Concur. All necessary permits and approval would be obtained.

LDEQ Comment #3: If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.

CEMVN Response #3: Not applicable. This project would not result in a discharge of wastewater.

LDEQ Comment #4: All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has storm water general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-3181 to determine if your proposed project requires a permit.

CEMVN Response #4: A Storm Water Pollution Prevention Plan would be part of the construction contract.

LDEQ Comment #5: If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit application or Notice of Intent must be submitted no later than June 1, 2011. Additional information may be obtained on the LDEQ website at <http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx> or by contacting the LDEQ Water Permits Division at (225) 219- 3181.

CEMVN Response #5: Not applicable. This project would not include a sanitary wastewater treatment facility.

LDEQ Comment #6: If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.

CEMVN Response #6: this is a U.S. Army Corps of Engineers project, therefore a permit would not be required, however a 404 (b)(1) evaluation has been prepared and has gone out for public review. A Water Quality Certification has been obtained from LDEQ.

LDEQ Comment #7: All precautions should be observed to protect the groundwater of the region.

CEMVN Response #7: Concur. All precautions would be taken to protect the groundwater of the region.

LDEQ Comment #8: Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

CEMVN Response #8: Not applicable. this project does not include the use of water softeners.

LDEQ Comment #9: Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.

CEMVN Response #9: Not applicable

LDEQ Comment #10: If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

CEMVN Response #10: LDEQ's SPOC would be notified if any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project. Precautions would be taken to protect workers from these hazardous constituents.

LDEQ Comment #11: Currently, St. Bernard Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

CEMVN Response #11: Concur

APPENDIX
S

Basis for Analysis

Following the identification of the tentatively selected plan (TSP), a construction sequence was developed. Assumptions factoring into the construction sequence include production rates for building rock projects, dredge equipment availability, land loss rates, and the limitation of alternating dredging cycles in the lobes of Lake Borgne. The Agency coordination for the MRGO plan was based on this construction sequence and without the incorporation of Operation and maintenance (O&M). However, due to uncertainties associated with the timing and availability of funding for the plan, only those features that are sustainable without the implementation of any other feature (such as a diversion) are recommended for construction at this time. A tiered implementation approach has been developed for the TSP (Table 2-28 of EIS) based on these uncertainties. In addition, O&M has been included in the TSP. The benefits have been recalculated by tier utilizing the previously developed construction sequence and without O&M. Due to the uncertainty of when each feature will be implemented, analysis may require updating in later phases of the project. The USACE will continue to coordinate with the agencies throughout the project study and implementation.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 1	
LS1	47,000 linear feet (8.9 miles) of shoreline protection beginning at the terminus of the Bayou Dupre supplemental shoreline project, extending around Proctor Point to the West of Shell Beach supplemental funding shoreline protection.
MRGO1	3,850 feet of new foreshore protection between MRGO miles 56.6 and 57.4. This stone protection feature is embedded within the limits of MRGO7.
MRGO6	8,132 linear feet of new, non-continuous foreshore protection between MRGO miles 36.0 and 34.2, immediately east of the existing stone closure of the MRGO. MRGO6 ties into an existing foreshore dike immediately downstream.
LM1	3,240 acres of marsh restoration from open water and nourishment of 777 adjacent acres in the Golden Triangle, south of the IHNC Surge Barrier. Approximately 12.8 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 6.
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Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
Construction Year 2	
BS1	Approximately 51,000 linear feet (9.7 miles) of shoreline protection along the southeast shore of Lake Borgne. This feature begins at the northern terminus of the Biloxi Marsh Shoreline Protection Project (PO-72) south of Point aux Marchettes and extends north to Malheureax Point.
BS2	Approximately 39,600 linear feet (7.5 miles) of artificial oyster reef development on the Chandeleur Sound side of the Biloxi Marsh between Eloi Point and the mouth of Bayou La Loutre.
CC4-A	420 acres of cypress restoration in the Bienvenue Triangle. Approximately 2.9 million cubic yards of material to be obtained from the Mississippi River.
BR1	Approximately 48 acres of ridge restoration on the south bank of Bayou La Loutre. 425,000 cubic yards of silty sand material to be obtained from the Mississippi River.
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ES1	24,000 linear feet (4.6 miles) of shoreline protection from the south shore of Lake Pontchartrain to the terminus of the existing Bayou Chevee shoreline protection feature.
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ES3	70,000 feet of foreshore protection along Lake Borgne between Alligator Point and The Rigolets.
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Measure	**Description**
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Construction Year 5	
MRGO7	91 acres of marsh restoration adjacent to approximately 9,700 linear feet of bankline reclamation, consisting of 9,700 linear feet of vinyl sheet pile wall. 1.3 million cubic yards of material would be obtained from Lake Borgne.
EM1	1,175 acres of marsh restoration and nourishment of 2,830 acres of surrounding marsh in the area bounded by the Lake Pontchartrain shoreline, Chef Menteur Pass, and the levee. Approximately 8.1 million cubic yards of material would be obtained from Lake Borgne Borrow Area 6.
Construction Year 6	
LM3	911 acres of marsh creation and 950 acres of marsh nourishment in South Lake Borgne north of Lena Lagoon in the area bounded by the lake, Bayou St. Malo, MRGO, and Doulets Canal. Approximately 4.6 million cubic yards of borrow to be obtained from Lake Borgne Borrow Area 2.
BM1	8,295 acres of marsh nourishment along the south shore of Lake Borgne. 10.8 million cubic yards of material would be obtained from Lake Borgne Borrow Area 2.
Construction Year 7	
CM1	1,240 acres of marsh nourishment south of Paris Road between cypress restoration feature CC3 and the Chalmette Loop Levee. Approximately 3.0 million cubic yards of material would be dredged from Lake Borgne Borrow Area 5 for this feature.
CM3	300 acres of marsh restoration and 215 acres of marsh nourishment in the area north of Bayou Dupre and south of MRGO. 1.9 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 5.
CM4	98 acres of marsh restoration and 129 acres of marsh nourishment south of Bayou Dupre. 900,000 cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 4.
CM5	245 acres of marsh restoration and 70 acres of marsh nourishment in the area north of Bayou Bienvenue and Paris Road. 1.2 million cubic yards of material would be obtained from Lake Borgne Borrow Area 4.
Construction Year 8	
TM7	2,255 acres of marsh restoration and up to 3,338 acres of adjacent marsh nourishment on the east side of Bayou Terre aux Boeufs. 11.5 million cubic yards of material would be obtained from Lake Lery if available, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
TM8	1,511 acres of marsh restoration on the east side of Bayou Terre aux Boeufs in the vicinity of Delacroix. 5.5 million cubic yards of material would be dredged from Lake Lery if possible, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.
EM2	1,095 acres of marsh nourishment on Hog Island, located between the west and east mouth of the West Pearl River. Approximately 2.2 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM3	861 acres of marsh restoration and 180 acres of adjacent marsh nourishment in the area bounded by Highway 433, Little Lagoon, Salt Bayou and Highway 90. Approximately 3.5 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM4	2,625 acres of marsh restoration and 1,455 acres of adjacent marsh nourishment in the area bounded by Salt Bayou to the north, the West Pearl River to the east, the Rigolets to the south and Highway 80 to the north. Approximately 10.6 million cubic yards of material would be obtained from Lake Borgne Borrow Area 8.
Construction Year 9	
CC1	1,020 acres of cypress swamp restoration and 953 acres of cypress swamp nourishment in the area north of the existing Violet Canal along the Forty Arpent levee. 8.5 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC2	250 acres of cypress swamp restoration and 250 acres of swamp nourishment to the northeast of CC1. 2.4 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC3	370 acres of cypress swamp restoration and 790 acres of swamp nourishment along the Forty Arpent Levee south of Paris Road. Approximately 5.3 million cubic yards of material to be obtained from Lake Borgne Borrow Area 5.
CC4	1,465 acres of cypress swamp restoration in the open water areas adjacent to the Forty Arpent Levee north of Paris Road, including the Bienvenue Triangle area in Orleans Parish. 11.3 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 6.
Construction Year 10	
CC5	1,120 acres of swamp restoration and 1,645 acres of swamp nourishment south of the Violet Canal along the Forty Arpent Levee and the Chalmette Loop Levee. 9.6 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 4.
CC6	1,028 acres of swamp restoration and 1,540 acres of swamp nourishment in the southwest corner of the Central Wetlands. 11.2 million cubic yards of borrow material would be obtained Lake Borgne Borrow Area 4.
Maintenance As Needed	

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO2	Repair and maintenance of approximately 15,070 linear feet (2.85 miles) of foreshore protection between Mile 44.4 and 39.9 of the MRGO.
MRGO3	Repair and maintenance of existing approximately 10,420 linear feet (1.97 miles) of foreshore protection between approximately Mile 56 to 51 of the MRGO.
MRGO4	Repair and maintenance of approximately 6,690 linear feet (1.27 miles) of existing retention dike MRGO Miles 36.6 to 37.1 and MRGO Miles 33.9 to 32.9.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

(318) 473-7751
Fax: (318) 473-7626

January 12, 2011

Tammy Gilmore
Biologist
New Orleans District
U.S. Army Corps Of Engineers

RE: MRGO Ecosystem Restoration Study DEIS
Violet Freshwater Diversion Canal

Dear Tammy:

Per your request, we have reviewed the soils information for the project location as it pertains to prime and unique farmlands. The following soils are prime farmland: Cm-Cancienne silt loam, Co-Cancienne silty clay loam, Sh-Schriever silty clay loam, and Ha-Harahan clay (see attached Farmland Classification map and legend). Please find the attached AD-1006 Farmland Conversion Impact Rating form with our agencies information completed.

Please contact me regarding all future requests at the address shown above.

Respectfully,

Sarah Haymaker

Kevin D. Norton
State Conservationist

Attachment

cc: Sarah Haymaker, Acting State Soil Scientist, Alexandria, Louisiana
Michael Trusclair, District Conservationist, NRCS, Boutte Field Office
Burnell Muse, MLRA Soil Survey Leader, Denham Springs, Louisiana

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 11/17/10
Name Of Project MRGO Ecosystem Restoration Study DEIS	Federal Agency Involved US Army Corps of Engineers
Proposed Land Use Violet Freshwater Diversion Canal	County And State St. Bernard, Louisiana
PART II *(To be completed by NRCS)*	Date Request Received By NRCS 1-11-11

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☒	No ☐	Acres Irrigated	Average Farm Size 232
Major Crop(s) Pasture	Farmable Land In Govt. Jurisdiction Acres: 19,383 8 %		Amount Of Farmland As Defined in FPPA Acres: 18,392 8 %	
Name Of Land Evaluation System Used St. Bernard LESA	Name Of Local Site Assessment System N/A		Date Land Evaluation Returned By NRCS 1-12-11	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	529.0			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	529.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	167			
B. Total Acres Statewide And Local Important Farmland	-			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	.9			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	40			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	ø 91	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	10			
2. Perimeter In Nonurban Use	10	2			
3. Percent Of Site Being Farmed	20	15			
4. Protection Provided By State And Local Government	20	0			
5. Distance From Urban Builtup Area	15	0			
6. Distance To Urban Support Services	15	0			
7. Size Of Present Farm Unit Compared To Average	10	5			
8. Creation Of Nonfarmable Farmland	10	5			
9. Availability Of Farm Support Services	5	0			
10. On-Farm Investments	20	0			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	37	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	37	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	37	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Farmland Classification—St. Bernard Parish, Louisiana



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Soil Ratings
- Not prime farmland
- All areas are prime farmland
- Prime farmland if drained
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated
- Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if irrigated and drained
- Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season
- Prime farmland if subsoiled, completely removing the root inhibiting soil layer
- Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60
- Prime farmland if irrigated and reclaimed of excess salts and sodium
- Farmland of statewide importance
- Farmland of local importance
- Farmland of unique importance
- Not rated or not available

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Map Scale: 1:35,900 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: St. Bernard Parish, Louisiana
Survey Area Data: Version 8, Sep 8, 2009

Date(s) aerial images were photographed: 9/20/2007

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

1088

Farmland Classification

Farmland Classification— Summary by Map Unit — St. Bernard Parish, Louisiana				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
AD	Aquents, dredged, frequently flooded	Not prime farmland	126.6	18.4%
BB	Barbary clay	Not prime farmland	62.5	9.1%
CE	Clovelly muck	Not prime farmland	81.1	11.8%
Cm	Cancienne silt loam	All areas are prime farmland	43.1	6.3%
Co	Cancienne silty clay loam	All areas are prime farmland	26.5	3.9%
CS	Cancienne and Schriever soils, frequently flooded	Not prime farmland	3.9	0.6%
Ha	Harahan clay	All areas are prime farmland	69.0	10.0%
LF	Lafitte muck	Not prime farmland	84.6	12.3%
Sh	Schriever silty clay loam	All areas are prime farmland	28.3	4.1%
W	Water	Not prime farmland	99.4	14.4%
Ww	Westwego clay	Not prime farmland	63.7	9.3%
Totals for Area of Interest			**688.8**	**100.0%**

Description

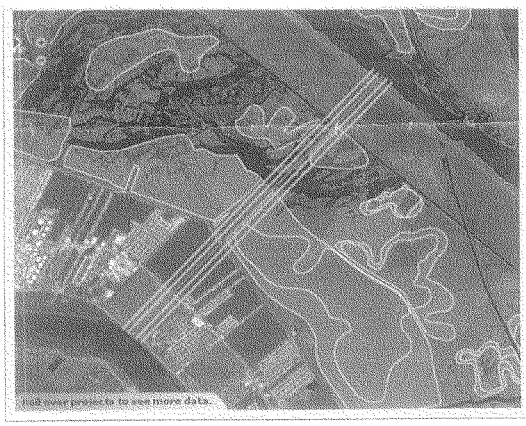
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Proposed Projects



MRGO Document Quick Links

- MRGO History
- MRGO Fact Sheet
- MRGO De-Authorization Study
- MRGO Navigation Channel Closure
- MRGO Ecosystem Restoration Plan Feasibility Study
- MRGO Closure and Coastal Restoration Fact Sheet (PDF; 2.92 MB*)
- MRGO Ecosystem Restoration Fact Sheet (December 2010) (PDF; 573 KB*)

*Adobe Reader or similar software is required to view PDF documents.

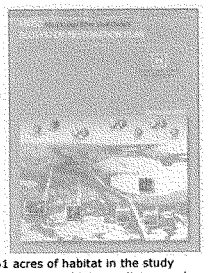
Click the play button (▶) below to view a video about the Mississippi River Gulf Outlet Ecosystem Restoration Plan.



View Older Videos

MRGO Ecosystem Restoration Plan Draft Feasibility Report and Draft Environmental Impact Statement (EIS)

The MRGO Ecosystem Restoration Plan Draft Feasibility Report and Draft Environmental Impact Statement (EIS) prepared by the U.S. Army Corps of Engineers is now available for review and comment.



The Draft Feasibility Report is a supplement to the June 2008 MRGO Deep-Draft De-Authorization Report to fully meet the requirements of the Water Resources Development Act (WRDA) of 2007 Section 7013 (Public Law 110-114). The report describes the planning process undertaken for the development and evaluation of alternative ecosystem restoration plans. A Tentatively Selected Plan (TSP) is identified in the Draft Feasibility Report. The TSP would restore and protect approximately 58,861 acres of habitat in the study area, including 13,950 acres of fresh and intermediate marsh; 33,966 acres of brackish marsh; 10,430 acres of cypress swamp; 466 acres of saline marsh; and 48 acres of ridge habitat. The TSP also recommends approximately 70 miles of shoreline protection (including 7.5 miles of artificial oyster reef development).

The Draft EIS provides a detailed description of the proposed action, the purpose and need, reasonable alternatives, affected environment, and presents analysis of the anticipated beneficial and adverse environmental effects of the alternatives. The forty-five day public comment period for the EIS is 17 December 2010 through 31 January 2011. Comments on the EIS can be submitted by clicking here, by mail to Ms. Tammy Gilmore; US Army Corps of Engineers; Regional Planning and Environmental Division South, New Orleans Environmental Branch; CERPDS-PDN-RS; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Comments can also be submitted over the phone (504) 862-1002, by email to Tammy.H.Gilmore@usace.army.mil, or by fax to (504) 862-2088.

More...

Recent USACE Initiatives

Since Hurricane Katrina, the USACE has engaged in four major initiatives regarding the Mississippi River Gulf Outlet (MRGO):

- **MRGO Operations and Maintenance Appropriation**
- **MRGO Deep-Draft De-Authorization Report**
- **MRGO Channel Closure**
- **MRGO Ecosystem Restoration Plan Feasibility Study**
- **MRGO Final Environmental Impact Statement**

Announcements

Upcoming Events

Comments?

The US Army Corps of Engineers

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

DECEMBER 12, 2011

REPLY TO
ATTENTION OF

Regional Planning and
Environmental Division, South
Environmental Planning Branch

Kevin D. Norton
Natural Resources Conservation Service
3737 Government Street
Alexandria, LA 71302

Dear Mr. Norton:

Please reference your letter dated January 28, 2011 providing comments on the Mississippi River Gulf Outlet Ecosystem Restoration Draft Environmental Impact Statement (DEIS) and Feasibility Study.

The U.S. Army Corps of Engineers Regional Division South, Environmental Planning Branch (CEMVN-PDN-CEP) appreciates your concurrence and input regarding the MRGO Ecosystem Restoration project.

If you have any questions or require additional information please contact Ms. Tammy Gilmore at U.S. Army Corps of Engineers; Regional Planning and Environmental Division South; Environmental Planning Branch; CEMVN-PDN-CEP; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Ms. Gilmore can also be reached at (504) 862-1002 or by email at tammy.h.gilmore@usace.army.mil.

Sincerely,

Joan M. Exnicios
Chief, Environmental Planning Branch

Basis for Analysis

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BM1	8,295 acres of marsh nourishment along the south shore of Lake Borgne. 10.8 million cubic yards of material would be obtained from Lake Borgne Borrow Area 2.
Construction Year 7	
CM1	1,240 acres of marsh nourishment south of Paris Road between cypress restoration feature CC3 and the Chalmette Loop Levee. Approximately 3.0 million cubic yards of material would be dredged from Lake Borgne Borrow Area 5 for this feature.
CM3	300 acres of marsh restoration and 215 acres of marsh nourishment in the area north of Bayou Dupre and south of MRGO. 1.9 million cubic yards of borrow material would be obtained from Lake Borgne Borrow Area 5.
CM4	98 acres of marsh restoration and 129 acres of marsh nourishment south of Bayou Dupre. 900,000 cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 4.
CM5	245 acres of marsh restoration and 70 acres of marsh nourishment in the area north of Bayou Bienvenue and Paris Road. 1.2 million cubic yards of material would be obtained from Lake Borgne Borrow Area 4.
Construction Year 8	
TM7	2,255 acres of marsh restoration and up to 3,338 acres of adjacent marsh nourishment on the east side of Bayou Terre aux Boeufs. 11.5 million cubic yards of material would be obtained from Lake Lery if available, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
TM8	1,511 acres of marsh restoration on the east side of Bayou Terre aux Boeufs in the vicinity of Delacroix. 5.5 million cubic yards of material would be dredged from Lake Lery if possible, but it is currently assumed that material will be obtained from Lake Borgne Borrow Area 2.
EM2	1,095 acres of marsh nourishment on Hog Island, located between the west and east mouth of the West Pearl River. Approximately 2.2 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM3	861 acres of marsh restoration and 180 acres of adjacent marsh nourishment in the area bounded by Highway 433, Little Lagoon, Salt Bayou and Highway 90. Approximately 3.5 million cubic yards of dredged material would be obtained from Lake Borgne Borrow Area 8.
EM4	2,625 acres of marsh restoration and 1,455 acres of adjacent marsh nourishment in the area bounded by Salt Bayou to the north, the West Pearl River to the east, the Rigolets to the south and Highway 80 to the north. Approximately 10.6 million cubic yards of material would be obtained from Lake Borgne Borrow Area 8.
Construction Year 9	
CC1	1,020 acres of cypress swamp restoration and 953 acres of cypress swamp nourishment in the area north of the existing Violet Canal along the Forty Arpent levee. 8.5 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC2	250 acres of cypress swamp restoration and 250 acres of swamp nourishment to the northeast of CC1. 2.4 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 5.
CC3	370 acres of cypress swamp restoration and 790 acres of swamp nourishment along the Forty Arpent Levee south of Paris Road. Approximately 5.3 million cubic yards of material to be obtained from Lake Borgne Borrow Area 5.
CC4	1,465 acres of cypress swamp restoration in the open water areas adjacent to the Forty Arpent Levee north of Paris Road, including the Bienvenue Triangle area in Orleans Parish. 11.3 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 6.
Construction Year 10	
CC5	1,120 acres of swamp restoration and 1,645 acres of swamp nourishment south of the Violet Canal along the Forty Arpent Levee and the Chalmette Loop Levee. 9.6 million cubic yards of borrow material to be obtained from Lake Borgne Borrow Area 4.
CC6	1,028 acres of swamp restoration and 1,540 acres of swamp nourishment in the southwest corner of the Central Wetlands. 11.2 million cubic yards of borrow material would be obtained Lake Borgne Borrow Area 4.
Maintenance As Needed	

Draft Implementation Plan (used to calculate benefits without O&M)	
Measure	**Description**
MRGO2	Repair and maintenance of approximately 15,070 linear feet (2.85 miles) of foreshore protection between Mile 44.4 and 39.9 of the MRGO.
MRGO3	Repair and maintenance of existing approximately 10,420 linear feet (1.97 miles) of foreshore protection between approximately Mile 56 to 51 of the MRGO.
MRGO4	Repair and maintenance of approximately 6,690 linear feet (1.27 miles) of existing retention dike MRGO Miles 36.6 to 37.1 and MRGO Miles 33.9 to 32.9.

BOBBY JINDAL
GOVERNOR

PEGGY M. HATCH
SECRETARY

State of Louisiana

DEPARTMENT OF ENVIRONMENTAL QUALITY
ENVIRONMENTAL SERVICES

FEB 0 2 2012

U.S. Army Corps of Engineers- New Orleans District
P.O. Box 60267
New Orleans, LA 70160-0267

Attention: Tammy Gilmore

RE: Water Quality Certification (WQC 101222-01/AI 101235/CER 20100009)
MRGO Ecosystem Restoration Project
Orleans, St. Bernard & St. Tammany Parishes

Dear Ms. Gilmore:

The Louisiana Department of Environmental Quality (the Department) has reviewed your application to dredge waterbottoms and place spoil and fill material for coastal marsh restoration, at various locations in the vicinity between the Rigolets and Bayou La Loutre.

Based on the information provided in the application, the Department made a determination that the requirements for a Water Quality Certification have been met and concludes that the placement of the fill material will not violate water quality standards of Louisiana as provided for in LAC 33:IX.Chapter 11. Therefore, the Department hereby issues a Water Quality Certification to the U.S. Army Corps of Engineers- New Orleans District.

If you have any questions, please call Jamie Phillippe at 225-219-3225.

Sincerely,

Melvin C. Mitchell, Sr.
Administrator
Water Permits Division

MCM/jjp

APPENDIX
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Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan

Monitoring and Adaptive Management Plan

May 2012



US Army Corps of Engineers
New Orleans District

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1.0 Introduction

This report details the adaptive management and monitoring process for the Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan Feasibility Study (Project). The mission of the Project is to address systemic ecosystem problems and the Congressional mandate for the restoration of the coastal wetlands and other habitats adversely impacted by construction and operation of the recently de-authorized MRGO navigation channel. The overarching goals of the Project are to restore the Lake Borgne ecosystem and the areas affected by the construction and operation of the de-authorized MRGO navigation channel, restore study area biodiversity and function, restore critical geomorphic landscape features that reduce or prevent storm surge, and achieve ecosystem sustainability to the greatest degree possible.

1.1 Project Goals and Objectives

Specific Project restoration goals and objectives have two categories. The first category is related to the goal of geomorphic form and function. If the net acreage of all Project features remaining after 50 years meets or exceeds a net total of 38,000 acres, this Project would be considered a category one success.

The second category of success is habitat specific. The broad goal for category one is to restore critical geomorphic landscape features (such as marsh, swamp and ridge habitats; and critical land bridges) that provide not only ecosystem values and functions, but also hurricane and storm damage risk reduction throughout the study area. The success of a net total of 38,000 acres is determined by success of project specific objectives for category 2 including:

1. Restore historic salinity conditions in the study area to re-establish and maintain historic habitat types; mimic historic hydrologic conditions; increase freshwater, sediment, and nutrient inputs; increase biodiversity; optimize ecosystem services; and decrease stress to vegetation as measured by the monthly salinity targets in the Biloxi Marsh as identified by Chatry et al., 1983 each month a minimum of four years out of ten.

2. Restore native habitat acreages impacted by the MRGO Navigation Channel:

    a. Increase the year round spatial coverage of cypress swamp habitat in the Central Wetlands by at least 9,500 acres by 2065.

    b. Increase the year round spatial coverage of fresh/intermediate marsh in the Central Wetlands, Golden Triangle, MRGO, and South Lake Borgne by at least 6,800 acres by 2065.

    c. Increase the year round spatial coverage of brackish marsh in Bayou Terre aux Boeufs, the Biloxi Marsh, and the East Orleans Landbridge by approximately 18,100 acres by 2065.

    d. Increase the year round spatial coverage of vegetated wetlands in areas adjacent to the channel lost to increased tides and salinity by at least 3,900 acres by 2065.

e. Increase the year round spatial coverage of ridge habitat along Bayou La Loutre by 2065.

3. Increase the year round spatial coverage of critical landscape features that provide hurricane and storm damage risk reduction in the study area (i.e. areas located in the Biloxi Marshes, the East Orleans Landbridge, and forested habitats).

4. Increase awareness and understanding of the significance of resources in the study area through increased recreational and educational opportunities.

1.2 Management and Restoration Actions —Federally Identified Plan

The PDT performed a thorough plan formulation process to identify and restoration and management actions that best meet project goals and objectives. The Corps' Institute for Water Resources (IWR) IWR-PLAN software generated 6,721 alternative plan combinations. Including the No Action plan (Plan A), there were 285 cost-effective plans and 19 Best Buy plans ranging in costs up to $6.5 Billion (see Table 2-10 of the Project Feasibility Report). Three Best Buy plans generated in IWR-PLAN software were selected for the final alternative array; Best Buy plans #2, #7, and #10 (Plans B, C, and D, respectively).

Plan C was chosen as the Federally Identified Plan because it is the lowest cost alternative that meets all of the study goals and objectives and provides a complete plan to restore the remaining portions of the Lake Borgne ecosystem not addressed by existing or authorized restoration projects. Specifically, the Federally Identified Plan would restore and/or protect approximately 58,861 acres of habitat in the study area, including: 13,950 acres of fresh and intermediate marsh; 33,966 acres of brackish marsh; 10,430 acres of cypress swamp; 466 acres of saline marsh; and 48 acres of ridge habitat.

Restoring the hydrologic connection between the Mississippi River and the Project-area wetlands would help to restore the habitat types affected by the construction and operation of the de-authorized MRGO navigation channel by mimicking mimic natural processes and enhancing the sustainability of the ecosystem through the input of freshwater, nutrients, and sediment. Although it is not feasible to restore the Project area to some historic condition, implementation of the Federally Identified Plan would restore necessary natural processes and significantly improve those areas primarily affected.

Implementation of the Federally Identified Plan and its associated restoration features has been phased into 3 tiers.

- Tier 1 includes features that have been developed to a feasibility level of detail and have no benefits derived from a freshwater diversion. Tier 1 features are recommended for construction contingent upon identification of a local sponsor.

- Tier 2 includes features with feasibility level detail that are dependent upon salinity conditions. Tier 2 will be recommended for contingent authorization subject to a decision document showing that necessary conditions have been met and identification of a local

sponsor. The decision document would be subject to the approval of the Chief of Engineers.

- Tier 3 includes further study of the Violet freshwater diversion and contingent authorization of the remaining project features that depend upon the implementation of a freshwater diversion to achieve sustainable salinity conditions. The diversion study would require a cost share sponsor. The remaining 16 projects are authorized for construction pending completion of the diversion study and identification of a local cost share sponsor.

1.3 Introduction to Adaptive Management

Adaptive Management (AM) provides a directed iterative approach to achieving restoration project goals and objectives by focusing on strategies promoting flexible decision making that can be adjusted in the face of uncertainties as outcomes from restoration management actions and other events become better understood. Initiating a formal AM and monitoring process early in the study process enables the PDT to identify and resolve key uncertainties and other potential issues that can positively or negatively influence Project outcomes during every stage of the planning and project implementation process. Hence, early implementation of AM and monitoring will result in a Project that can better succeed under a wide range of uncertain conditions and can be adjusted as necessary. Furthermore, careful monitoring of Project outcomes both advances scientific understanding and helps adjust policies and/or operations as part of an iterative learning process (National Research Council 2004).

This Adaptive Management and Monitoring Plan (AM&M Plan), an integral part of the Mississippi River Gulf Outlet (MRGO) Ecosystem Restoration Plan Feasibility Study, describes the organizational structure for the AM process, identifies key uncertainties, establishes the triggers or thresholds that would initiate a management response, provides potential AM actions, monitoring design proposed to evaluate project progress towards meeting the goals and objectives, and time and cost estimates that will be used to guide Project planning, implementation, and performance.

Many factors such as ecosystem dynamics, engineering applications, institutional requirements, and many other key uncertainties can change and/or evolve over a project's life. The AM&M Plan will be regularly updated to reflect monitoring-acquired and other new information as well as resolution of and progress on resolving existing key uncertainties or identification of as any new uncertainties that might emerge. Specifically, this AM&M Plan will be revised and updated during the pre-construction engineering and design (PED) phase as more detailed project designs are developed and uncertainties are better understood. The AM&M plan will then be used during and after Project construction to adjust the Project, as necessary, to better achieve goals, objectives, and restoration/management outputs/results.

1.4 Authorization

Section 7013(a) of Water Resources Development Act of 2007 (WRDA 2007) stipulates:

> *"...the Secretary shall submit to the Committee on Environment and Public Works of the Senate and the Committee on Transportation and Infrastructure of*

the House of Representatives a final report on the deauthorization of the Mississippi River-Gulf outlet..." that "*shall include— (i) a plan to physically modify the Mississippi River-Gulf Outlet and restore the areas affected by the navigation channel; (ii) a plan to restore natural features of the ecosystem that will reduce or prevent damage from storm surge;(iii) a plan to prevent the intrusion of saltwater into the waterway;(iv) efforts to integrate the recommendations of the report with the program authorized under section 7003 and the analysis and design authorized by title I of the Energy and Water Development Appropriations Act, 2006 (119 Stat. 2247); and(v) consideration of—(I) use of native vegetation; and(II) diversions of fresh water to restore the Lake Borgne ecosystem."*

Section 3083 of Water Resources Development Act of 2007 (WRDA 2007) for the Violet Diversion Project also stipulates:

"The Secretary shall design and implement a project for a diversion of freshwater at or near Violet, Louisiana, for the purposes of reducing salinity in the western Mississippi Sound, enhancing oyster production, and promoting the sustainability of coastal wetlands".

and

"*The project shall be designed to meet, or maximize the ability to meet, the salinity levels identified in the feasibility study of the Corps of Engineers entitled "Mississippi and Louisiana Estuarine Areas: Freshwater Diversion to Lake Pontchartrain Basin and Mississippi Sound" and dated 1984.*"

Additionally, Section 2039 of WRDA 2007 directs the Secretary of the Army to ensure that, when conducting a feasibility study for a project for ecosystem restoration, the recommended project includes a plan for monitoring the success of the ecosystem restoration. The implementation guidance for Section 2039, in the form of a CECW-PB Memo dated 31 August 2009, also requires that AM Plan shall be developed for all ecosystem restoration projects.

1.5 Adaptive Management Framework

The Adaptive Management Framework includes both a Set-up Phase (Figure 1) and an Implementation Phase (Figure 2). The Set-up Phase proceeds concurrently with the USACE's traditional six-step planning process. While planners are identifying problems and opportunities, inventorying and forecasting resource conditions, evaluating and comparing alternative formulations, and selecting a recommended plan, the AM&M Plan for the Project will be developed concurrently. The implementation phase of the Adaptive Management Framework subsequently puts the developed AM&M Plan into action. Projects will be designed, constructed, monitored and assessed to understand responses of the system to implementation of the project relative to stated targets, goals, objectives and success project criteria. Leadership will then decide whether to alter the project and implement AM actions to improve plan performance based on assessment results. Potential AM actions for the Project are identified in Section 6.1 and 6.2.

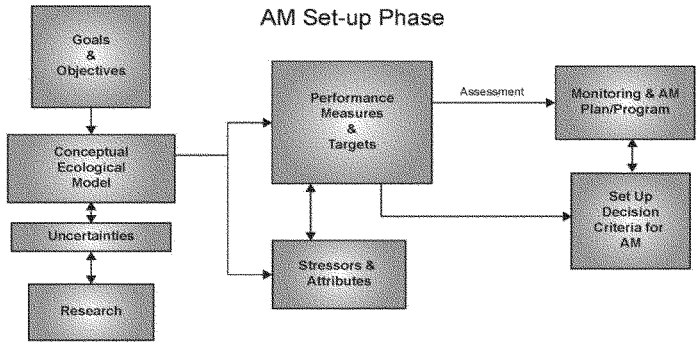


Figure 1. Set-up Phase of Adaptive Management Framework.

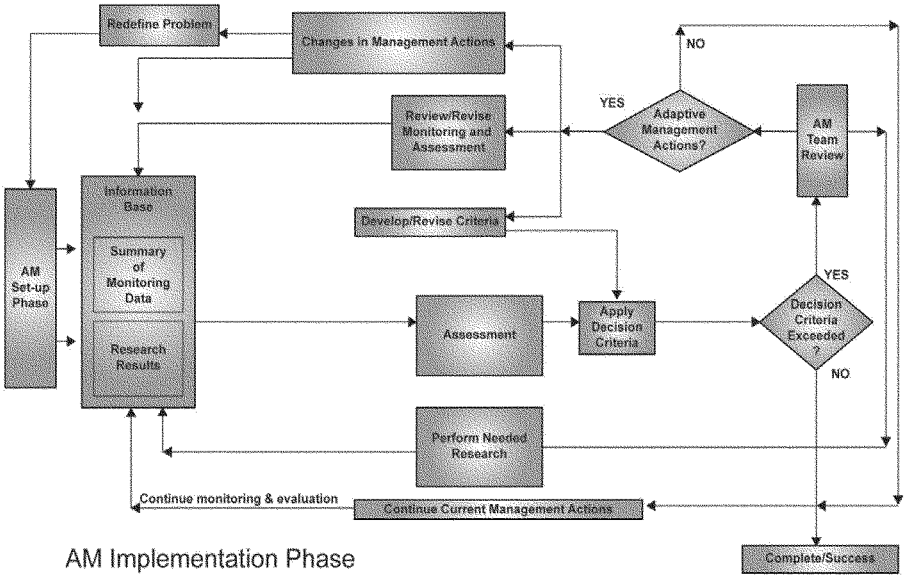


Figure 2. Implementation Phase of the Adaptive Management Framework.

1.6 Communication Structure for Implementation of Adaptive Management

An implementation structure has been identified (Figure 3) to execute an AM and monitoring strategy for the Project. The structure establishes lines of communication that facilitates coordination between Program Management, the PDT, the Adaptive Management and Monitoring Planning Team, the USACE Science Advisor, and stakeholders. Please note that a detailed governance structure and decision making process for AM&M is being developed for both the Federal and State processes. This information once approved will be included in subsequent revisions to this AM&M plan.

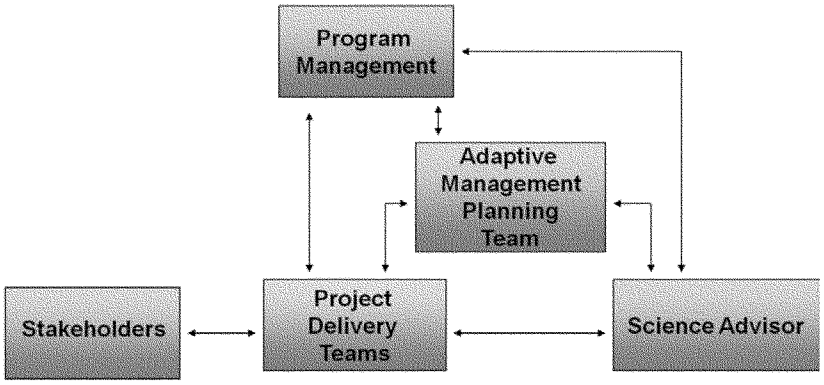


Figure 3. Communication Structure for Implementation of Adaptive Management.

Adaptive Management and Monitoring Team-The Adaptive Management and Monitoring Team (AM&M Team) was established as part of the implementation structure (Figure 3). The AM&M Team was lead jointly by the USACE, Louisiana State Coastal Protection and Restoration Authority (CPRA) and the US Geological Survey (USGS). Members of the AM&M Team included: Tomma Barnes, USACE; Jim Boggs, USFWS; Michelle Boudreaux Meyers, USACE Contractor; Laura Brandt, USFWS; Travis Creel USACE; William Klein USACE; Barbara Kleiss, USACE Mississippi Valley Division (MVD); Pat O'Brien, USACE MVD; Ronnie Paille, USFWS; Carol Parsons Richards, CPRA; Adam Baumgart-Getz, US Geological Survey (USGS), National Wetlands Research Center (NWRC); Greg Steyer, USGS NWRC; Michelle Fischer, USGS NWRC; and John Troutman, CPRA. These team members were selected on the basis of their knowledge of ecosystem restoration, coastal Louisiana ecosystems, and AM and monitoring. The AM&M Team is the liaison between the Program Management Team, the USACE Science Advisor, and the PDT.

The AM&M Team, in collaboration with the PDT, will lead all project and program efforts to determine AM and monitoring recommendations. The AM&M Team is responsible for ensuring that monitoring data and assessments are properly used in the AM decision-making process. If the AM&M Team determines specific AM actions are needed, the AM&M Team will coordinate a path forward with the PDT, Science Advisor and Program Management Team.

Program Management Team- The Program Management Team is composed of the Executive Director of the non-federal sponsor and the District Commander of USACE-MVN. The Program Management Team will vet program and project level issues, consider recommendations for AM actions, make final decisions on whether AM actions are required, and implement recommended final management actions.

Science Advisor- The purpose of the USACE Science Advisor will be to effectively address system-wide coastal ecosystem restoration needs and to provide a strategy, organizational structure, and process to facilitate integration of science and technology into the system-wide planning and the AM process.

Project Delivery Team- It is not necessary that the PDT, Project Managers, Plan Formulators, Environmental Planners or Engineers to become AM and monitoring experts. However, they need a general understanding of AM and monitoring principles as they are key players in the integration of AM into planning and project development and implementation. The PDT is responsible for the development of the AM&M Plans in coordination with the AM&M Team. The PDT is also responsible for integrating Project-level AM activities into Project Management Plans, Feasibility Scoping Meeting and Alternative Formulation Briefing documents, Feasibility Reports, NEPA and permit documents, Project Operating Manuals, and other Project-related documentation.

To accomplish these tasks, the PDT will:

- lead the discovery of uncertainties;
- lead the engagement of stakeholders;
- consult with program management and the AM&M TEAM;
- develop and execute strategies for resolving uncertainties; and
- develop, review, and update the AM&M Plan as necessary.

The PDT will likely be re-established during the Project implementation phase to further refine monitoring, assessment and AM decisions; identify new uncertainties; re-evaluate and re-formulate and implement, as necessary, specific or overall Project performance and management measures and features.

Stakeholders- AM&M will be an integrative process involving key stakeholders, both public and private, as well as active non-governmental organizations (NGOs) in or near the Project area. A modified Delphi process will likely be used to help refine Project objectives and formulation to ensure this Project represents local communities' needs and best serves the public's interest. In doing so, the AM plan creates a seamless connection between AM&M process, PDT planning, and the NEPA process. The cost for this process is estimated for PED, Construction, and Post-Construction in Table 8.

2.0 Project Adaptive Management Planning

The AM&M Team, in collaboration with the PDT, developed the AM&M Plan. The level of detail in this AM&M Plan is based on the best currently available data and information developed as part of the Project feasibility study. Many uncertainties still remain concerning the potential efficacy of Project features, implementation, monitoring elements, and AM opportunities. Components of the AM&M Plan, including costs, were also estimated using the best currently available information. As more information becomes available, in the PED and subsequent Project study and implementation phases, the AM&M Plan will be refined.

Specific guidance for incorporating the required AM&M into the project life-cycle (planning, design, and implementation) is being developed at both the USACE National Level and the Regional Planning Division South level which will help PDTs incorporate and integrated AM&M principles into their projects.

2.1 Conceptual Ecological Model for Monitoring and Adaptive Management

As part of the AM and Project planning process, a conceptual ecological model (CEM; Annex 1; EIS Appendix H) was developed to help explain the general functional relationships among the essential components of the MRGO-impacted ecosystem. CEMs are a means of:

(1) simplifying complex ecological relationships by organizing information and clearly depicting system components and interactions;
(2) integrating to more comprehensively implicit ecosystem dynamics;
(3) Aids in identifying which species will show ecosystem response;
(4) interpreting and tracking changes in restoration/management targets; and
(5) communicating these findings in multiple formats.

This CEM assists with identifying those aspects where the Project can effect change. Specifically, the CEM identifies those major stressors, ecosystem drivers, and critical thresholds of ecological processes and attributes of the natural system likely to respond to restoration features. This Project CEM was used to help identify problems, opportunities, and help refine Project objectives and restoration management actions as well as selecting those attributes to be used as performance measures, modeling for alternative analysis, and monitoring for Project success. The Project CEM represents the current understanding of these factors and will be updated and modified, as necessary, as new information becomes available to assist with developing AM and monitoring during Project planning and implementation. Additionally, the stakeholder involvement outlined in Section 1.6, will provide important information to integrate socio-economic and cultural concerns into the CEM.

2.2 Sources of Uncertainty and Associated Risks

A fundamental tenet underlying AM is decision making and achieving desired Project outcomes in the face of uncertainties. There are many uncertainties associated with restoring the ecosystem impacted by the construction and operation of the de-authorized MRGO navigation channel. Major uncertainties include:

- Climate change, such as drought conditions and variability of tropical storm frequency, intensity, and timing
- Subsidence, accretion salinity, and water level trends:
    - Subsidence rates (+/-) throughout the project life
    - Accretion rates (+/-) throughout the project life
    - Water level trends (+/-) throughout the project life
    - Variable salinities that impact vegetation
- Wetland water, sediment, and nutrient requirements:
    - Magnitude and duration of inundation
    - Magnitude and duration of dry conditions
    - Annual sediment requirements
    - Nutrients required for desired productivity
    - Growth curves based on hydroperiod and nutrient application
    - Litter production based on nutrient and water levels
    - Tree propagation in relation to regulated hydroperiod
- Shoreline breaching
- Socio-economic and cultural
    - Changes to commercial activity
    - Effect on recreational activities
    - Potential impacts to historic and cultural resources
    - Ramifications to traditional activities, especially for indigenous and minority groups
    - Changes to community structure and integrity
- Current local runoff water quantities and quality:
    - Distribution of flow by time and quantity
    - Water quality based on permitted discharges
    - Flow path through channels and swamp
- Mississippi River water quantities and quality:
    - Available river stage to produce desired flows
- Concentrations of sediment and nutrients for diversion. Limitations of existing science, engineering, and technology
- Borrow Area dissolved oxygen conditions
- Operation of the diversion: freshwater flows, nutrients, habitat switching
- Project feature implementation order and schedule

Issues such as climate change, sea level rise, and regional subsidence are significant scientific uncertainties for all coastal Louisiana projects. These uncertainties were incorporated in the plan formulation process and will be monitored by gathering data on water levels, salinities, and land elevation. Specifically, for relative sea level rise (RSLR) USACE EC-1165-2-21 provides an 18-step process for developing a "low", "intermediate" and "high" future relative sea level rise scenario and provides guidance to incorporate these potential effects into project management, planning, engineering, design, construction, operation and maintenance. The PDT evaluated the final array of alternatives under three potential future RSLR scenarios in accordance with EC-1165-(Section 2.8.2 of the Feasibility Report). This information will be assessed and will inform AM actions (see Section 6.2).

Socio-economic and cultural uncertainties can also be addressed with the public engagement outlined in Section 1.6. These uncertainties arise from public meetings and other outreach during the feasibility study. In PED phase, the AM&M Team will work with the PDT and stakeholders to ensure these are incorporated into the project uncertainties, in a manner transparent to the public at large. The major concerns identified by the PDT include, but are not limited to the following:

- Participants at public meetings concerning the diversion indicated they do not want another canal cut through their community.
- Use of the existing Violet Canal has a Church located along the canal that could be impacted.
- Concerns about access impacts to economic resources, such as to professional recreational fisheries (guides, etc.); and to oysters and oyster industry because the diversion would destroy existing oyster reefs thereby destroying the oyster industry in this area. Also concern with impacts of the diversion on the state oyster seed grounds in Lake Borgne.
- Diversion canal not wanted because it would be another Corps "MRGO".
- Culture of wetland resources uses (oysters, fish etc) being destroyed or adversely modified
- Some NGOs would rather see oyster reefs as shoreline protection rather than sheet pile or stone (thousands of form letters)
- Work from the barrier islands first before working interior portions of the Pontchartrain basin if do this first and use all the funding then the impacts by the construction and operation of the de-authorized MRGO navigation channel may not be addressed leaving residents in existing conditions.
- Fill in the MRGO instead of restore areas impacted by the MRGO. The costs of such an undertaking (especially acquiring sufficient borrow) would use most if not all of the available funds and not address other environmental impacts of the construction and operation of the de-authorized MRGO navigation channel.
- Louisiana Public believes proposed action would benefit Mississippi residents at the expense of LA residents.
- Use of alternative fuels that could potentially impact local suppliers of oil and gas
- Implement faster; tired of slow government pace of getting projects on line.
- "Dirty" Mississippi River water pushed into "clean" marsh/swamps/and associated water bodies.
- Be sensitive to community requirements and community dynamics and cohesiveness with respect to diversion.
- Dredging Lake Borgne for restoration features could cause increased storm surges into adjacent inhabited areas.
- Since the MRGO has been closed, the system has started to freshen; hence, constructing a diversion will disrupt local community for no apparent good reason and waste funding that can be used for other restoration efforts.
- A lot of folks suggest getting sediment from the Mississippi River instead of Lake Borgne which will have potential costs increases (i.e., increased distances to pump dredged material from the river results in increased costs). Also issue of sediment availability in the issues.

2.3 Uncertainty and Risk Management

Scientific, technological, socio-economic, engineering, and institutional uncertainties are challenges inherent with any large-scale ecosystem restoration project. For the present Project, three nested approaches are being used to help reduce uncertainty:

1. phased construction (Tiers 1, 2 and 3);
2. restoration feature sequencing within Tiers; and
3. adaptive design of restoration features.

1. Phased Implementation: The Federally Identified Plan is being implemented in three phases: Tier 1, Tier 2 and Tier 3 (see Section 1.2 above and Sections 3.1 and 4.0 of the Feasibility Report). The phasing will allow project features that are less dependent on other project features to be constructed first. Implementation of project features in all phases will, necessarily, be subordinated to construction implementation criteria including, but not limited to the following:

- Engineering constructability.
- Jurisdictional constraints — such as dredging restrictions or construction activity windows in Lake Borgne due to NMFS jurisdictional concerns with potential impacts to designated critical habitat for the threatened gulf sturgeon.
- Institutional constraints — DIVR 1110-1-403, dated 23 March 2011, paragraph 5 indicates: *"MVD/MRCX policy with respect to river diversions is that such diversions will not be designed and constructed by MVD Districts without prior approval of the President, Mississippi River Commission and the Commander, Mississippi Valley Division."* Consequently, more specific implementation guidance will be developed during the PED phase.
- Further study of a freshwater diversion (under WRDA Section 3083) and contingent authorization of features that depend upon the implementation of a freshwater diversion to achieve sustainable salinity conditions.

Consequently, more detailed AM recommendations for Project implementation and phasing will be determined during PED phase when a better understanding of the potential interactions of various implementation constraints is determined.

2. Restoration Feature Sequencing: From an AM perspective restoration features within each Tier with the greatest associated uncertainty would be constructed first. This would enable greater learning and better understanding of restoration performance measures that could then be utilized in modifying the subsequent construction and management of remaining Project restoration features to better accomplish Project goals and objectives.

3. Adaptive Design: Design variability can be incorporated into restoration Project features to better enable the PDT and the AM&M Team to learn which restoration feature components best achieve Project objectives and maximize benefits. Accordingly, restoration feature designs will be modified during each Project planning and implementation phase as the PDT and AM&M Team learns which designs have had the greatest success with minimal adverse impacts. Additionally, as restoration features are constructed, monitoring results are expected to

contribute to a better understanding of ecosystem complexities and dynamics thereby reducing uncertainty.

The following examples of comparison testing provide information that can be used in subsequent planning and implementation of Project restoration features:

- Comparison of marsh restoration in areas with higher versus lower subsidence rates; as well as comparison of areas with higher versus lower soil bulk densities.
    - High subsidence areas (e.g., South Lake Borgne intermediate marsh restoration-LM1 and LM4) versus moderate subsidence areas (e.g., Biloxi Marsh brackish marsh nourishment- BM1, South Lake Borgne intermediate marsh restoration-LM3).
    - Historic fresh marsh bulk density areas (e.g., Central Wetlands Marsh Nourishment-CM1) versus historic swamp bulk density areas (e.g., Central Wetlands Swamp Restoration-CC4). See Table 2-34 of the Project Feasibility Study report for further definition of the identified features

- Vegetative responses to restoration measures would be compared between different habitat types: swamp areas versus fresh/intermediate marsh areas versus brackish/saline marsh areas.

- Shoreline protection features in areas with higher versus lower subsidence rates
- Additional comparison testing will be conducted following implementation of the Violet diversion in Tier 3 of the phased Project construction
    - Comparison of diversion seasonal operating schedules on salinity regimes.
    - Comparison of outfall management measures between the various fresh/intermediate, brackish, saline and swamp vegetation habitats

required for construction and nourishment of many of the Project features will come from dredging Lake Borgne waterbottoms. Because Lake Borgne is designated critical habitat for Gulf sturgeon, the uncertainties associated with dredging must be addressed to ensure compliance with the Endangered Species Act. The greatest uncertainty is how dredging will impact dissolved oxygen (DO) levels in the dredged borrow areas. This uncertainly will be addressed through Adaptive Design of Borrow Pits. See Sections 6.2.1 and Table 2.

Following Project implementation verification of preliminary planning assumptions and analyses will be achieved through analysis of hypotheses testing and monitoring results. It is anticipated that this information will help reduce future analyses errors as well as lead to an increased understanding of the Project ecosystem interactions and the efficacy of Project restoration and management features.

Ultimately, analyzing and managing the uncertainties and their associated risks means that the PDT must be able to discern what constitutes sufficient knowledge to proceed with proposed course of action or how best to adaptively manage. The PDT has evaluated these uncertainties and the risks and determined they are outweighed by the potential benefits of moving ahead. As additional information is received and existing uncertainties and risks are minimized or new uncertainties arise this list will be updated and the risks managed.

2.4 Rationale for Adaptive Management

Several questions were considered to determine if AM should be applied to the Project, given identified uncertainties:

1) Are the ecosystems to be restored sufficiently understood in terms of hydrology and ecology, and can project outcomes be accurately predicted given recognized natural and anthropogenic stressors?
2) Can the most effective project design and operation to achieve project goals and objectives readily identified?
3) Are the measures of this restoration project performance well understood and agreed upon by all parties?
4) Can project management actions be adjusted in relation to monitoring results?

A 'NO' answer to questions 1-3 and a "YES" answer to question 4 qualifies the project as a candidate that could benefit from AM. The AM&M Team and the PDT determined that the MRGO Ecosystem Restoration Project meets these qualifications, and, therefore, is a candidate for AM given the uncertainties associated with ecosystem function and the best design and operation to achieve stated objectives. Using an AM approach during project planning provided a mechanism for building flexibility into project design and for providing new knowledge to better define and achieve anticipated ecological responses.

3.0 Monitoring

Independent of AM, an effective monitoring program is required to determine if the Project outcomes are consistent with original Project goals and objectives. The power of a monitoring program developed to support AM lies in the establishment of feedback between continued Project monitoring and corresponding Project management. A carefully designed monitoring program to test AM hypotheses is central to the implementing the appropriate AM strategies in the face of the Project's key uncertainties.

3.1 Rationale for Monitoring

Achieving monitoring objectives will require focusing on different spatial and temporal scales. Spatially, the Project might achieve localized objectives, but have little or no measurable effects at the ecosystem scale. The monitoring designs should also consider the temporal responses of ecological factors, often measured in decades, it could take to respond to management actions. Additionally, monitoring should be designed to measure the persistence of near-term effects. Effects will generally take longer to develop and longer to detect over a large scale than will localized effects.

Monitoring for ecological-level effects can be more difficult than for local effects because the linkages become more complicated as factors outside the Project boundaries influence processes and biota that affect desired Project outcomes. The benefits of improved habitat in one location may be counteracted by degradation at another location, thus showing no overall benefit at large

scales. For example, increased freshwater inputs for swamp restoration may adversely impact adjacent brackish and saline marsh habitats.

In addition, monitoring over large areas can involve changes in underlying conditions over time or space and will likely be very labor intensive. When possible, specific monitoring should consider the influence of scale. In some cases, monitoring over large areas may be just an extension of local monitoring in space and time, but it may also involve designs and procedures that are separate from site-specific monitoring and extend beyond the purview of the Project teams.

When possible, project monitoring and information needs should be integrated with existing monitoring efforts that are underway in coastal Louisiana. For example, the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) program has been monitoring restoration and coastal wetland protection projects in coastal Louisiana since 1990 (Steyer and Stewart 1992, Steyer et al., 1995). The CWPPRA monitoring program incorporates a system-level wetland assessment component called the Coast-wide Reference Monitoring System (CRMS-Wetlands, Steyer et al., 2003). CRMS-Wetlands provides system-wide performance measures that are evaluated to help determine the cumulative effects of restoration and protection projects throughout much of coastal Louisiana. Consequently, the Project Monitoring Plan will, as should all Louisiana ecosystem restoration and mitigation projects, incorporate existing monitoring networks to the extent practicable and participate in the implementation of CRMS-Wetlands. Such participation can maintain the data consistencies necessary to conduct not only individual restoration project but also coast wide programmatic AM.

3.2 Monitoring Plan for the MRGO Ecosystem Restoration Plan Feasibility Study

The following outlines the major components of the Project Monitoring Plan that will support the Project Adaptive Management Program. Consistent with the CECW-PB Memo dated 31 August 2009, the Project's Monitoring Plan: *"...includes the systemic collection and analysis of data that provides information useful for assessing project performance, determining whether ecological success has been achieved, or whether Adaptive Management may be needed to attain project benefits."*

The Project Monitoring Plan identifies performance measures along with desired outcomes (i.e. targets) in relation to specific Project goals and objectives. A performance measure includes specific attribute(s) to be monitored to determine Project performance. In addition, if applicable, a risk endpoint is identified. Risk endpoints measure undesirable outcomes of a management or restoration action. The monitoring design was established to determine if the desired outcome or risk endpoint is met. A subset of the objectives, desired outcomes and performance measures will need to be identified during the PED phase for each of the discrete project features as they move forward.

Both pre- and post-construction monitoring will be utilized to determine Project success. Monitoring will continue until the trajectory of ecological change and/or other measures of Project success are determined as defined by the Project-specific objectives. This Monitoring Plan includes the minimum monitoring actions determined necessary to evaluate Project success. Section 2039 of the WRDA 2007 allows monitoring to be cost-shared for up to ten years post-

construction. Once ecological success has been achieved, which may occur in less than ten years post-construction, no further monitoring would be performed. Consequently, this Monitoring Plan estimates monitoring costs for the period during PED, construction, and a period of ten years post construction. If ecological success cannot be determined within the ten-year post construction period of monitoring, any additional required monitoring will be a non-Federal responsibility. In either case, as soon as ecological success is determined, monitoring will cease. Additional monitoring is identified as supporting information needs that will help to further understand and corroborate Project effects on the trajectory of ecological changes influenced by restoration and AM measures.

3.3 Monitoring Objectives

Objective 1: Restore historic salinity conditions in the study area to re-establish and maintain historic habitat types; mimic historic hydrologic conditions; increase freshwater, sediment, and nutrient inputs; increase biodiversity; optimize ecosystem services; and decrease stress to vegetation as measured by the monthly salinity targets in the Biloxi Marsh as identified by Chatry et al., (1983) each month a minimum of four years out of ten.

Performance Measure 1: Salinity.

Desired Outcome: meet salinity targets in the Biloxi Marsh as defined in Chatry et al., (1983; see Table 1 below), each month a minimum of four years out of ten.

Monitoring Design: Seven hourly recorders will be deployed to measure salinity, temperature, water level and turbidity at three sites located along the MRGO / Lake Borgne Landbridge, three sites in the Biloxi Marsh, and one site located in the western Mississippi Sound.

Risk Endpoint: Water quality impairment in Lake Borgne.
There are key uncertainties associated with whether Project features and operation of the proposed Violet diversion to meet salinity targets may cause water quality issues in Lake Borne.

Desired Outcome: Do not create or contribute to nitrate loading in Lake Borgne that could result in a Louisiana 303 (d) listing (refers to section of the Federal Clean Water Act). If listed, a total maximum daily load (TMDL) assessment will be considered in coordination with the Louisiana Department of Environmental Quality (DEQ).

Monitoring Design: Water Quality monitoring shall be conducted at 6 sites in Lake Borgne will be sampled on a quarterly basis. The sites will be located near Borrow Sites 2, 3, 4,5, 6, and 8 (see fig. 1, MRGO Ecosystem Restoration Plan, Borrow Sites and Borrow Pits—Map 1). Major environmental events such as extreme drought, hurricanes, or opening the Bonnet Carre' Spillway for flood control purposes may alter the fixed schedule by requiring additional sample collection. All samples will be collected using standard US Geological Survey protocols. Water samples will be depth-integrated. Field blanks and replicates will be taken for quality-control purposes. Additional Nutrient sampling will be designed in coordination with Louisiana Department of Environmental Quality.

Table 1- Monthly Salinity targets at the Chatry line. (ppt.)		
Month	**Mean Optimal Salinity**	**Standard Deviation**
January	16.4	1.04
February	14.4	0.79
March	11.6	1.02
April	8.0	1.27
May	7.0	0.92
June	12.5	0.80
July	12.7	0.57
August	15.7	0.80
September	17.0	1.06
October	16.8	0.87
November	16.1	0.82
December	15.7	0.52

Objective 2a: Restore native habitat acreages impacted by the MRGO. Increase the year round spatial coverage of cypress swamp habitat in the Central Wetlands by at least 9,500 acres by 2065.

Performance Measure 2a: Swamp elevation.

Desired Outcome: Restored swamp elevations are higher than existing swamp elevation after dewatering and settlement (to support restoration and maintenance of cypress swamp habitat).

Monitoring Design: Elevations will be surveyed during one pre-project construction year, two project construction years, and two post-project construction years to access elevation changes over time. NASA's Experimental Advanced Airborne Research Lidar (EAARL), a green wavelength lidar, will be used to map "bare earth" topography and vegetation canopy structure across the Project area's variety of vegetation types. A subset of marsh creation areas will include ground-surveyed elevation

and canopy heights to calculate mean errors between lidar and field-derived points. A monitoring design for measurement of accretion and marsh soil shear strength will be developed.

Performance Measure 2b: Survival and increase in diameter of cypress and tupelo plantings in project area.

Desired Outcome: Planted cypress and tupelo seedlings will have a 70 percent survival rate in target years (TY) 1, 3, and 5, post-construction.

Monitoring Design: A sample of cypress\tupelo seedlings will be counted and measured in TY 1 post-construction and at TY 3 and 5 to access percent survival.

Objective 2b: Restore native habitat acreages impacted by the MRGO. Increase the year round spatial coverage of fresh/intermediate marsh in the Central Wetlands, Golden Triangle, MRGO, and South Lake Borgne by at least 6,800 acres by 2065.

Performance Measure 3a: Marsh elevation.

Desired Outcome: Elevations in the Project area will be restored to the upper elevation limit of functional marsh (about 2.5 foot NAVD 88).

Monitoring Design: Elevations will be surveyed in one pre-Project construction year, at two Project construction years, and two post-project construction years to access elevation changes over time. The USGS Experimental Advanced Airborne Research Lidar (EAARL), which is waveform-resolving, short-pulse, green wavelength lidar, will be used to map "bare earth" topography and vegetation canopy structure across the variety of vegetation types. A subset of marsh creation areas will include ground-surveyed elevation and canopy heights to calculate mean errors between lidar and field derived points.

Performance Measure 3b: Species composition and percent cover for vegetation plantings.

Desired Outcome: Increase in percent cover of fresh/intermediate marsh in random vegetation plots.

Monitoring Design: For each random vegetation sampling plot, determine species composition and percent cover using visual estimates of cover following the Braun-Blanquet cover scale.

Objective 2c: Restore native habitat acreages impacted by the MRGO. Increase the year round spatial coverage of brackish marsh in Bayou Terre aux Boeufs, the Biloxi Marsh, and the East Orleans Landbridge by approximately 18,100 acres by 2065.

Performance Measure 4a: Marsh elevation.

Desired Outcome: Elevations in the Project area will be restored to the upper elevation limit of functional marsh (about 2.5 foot NAVD 88).

Monitoring Design: Elevations will be surveyed in one pre-Project construction year, two Project construction years, and two post-Project construction years to access elevation changes over time. NASA's Experimental Advanced Airborne Research Lidar (EAARL), a green wavelength lidar, will be used to map "bare earth" topography and vegetation canopy structure across the variety of vegetation types. A subset of marsh creation areas will include ground-surveyed elevation and canopy heights to calculate mean errors between lidar and field derived

points. A sample of the field-derived data will be used to improve the vertical accuracy of the bare-earth topography and marsh elevation height derived from the airborne lidar data.

Performance Measure 4b: Species composition and percent cover for vegetation plantings.

Desired Outcome: Increase in percent cover of brackish marsh in random vegetation plots.

Monitoring Design: For each random vegetation plot, determine species composition and percent cover using visual estimates of cover following Braun-Blanquet cover scale.

Objective 2d: Restore native habitat acreages impacted by the MRGO. Increase the year round spatial coverage of vegetated wetlands in areas adjacent to the channel lost to increased tides and salinity by at least 3,900 acres by 2065.

Performance Measure 5: Marsh elevation.

Desired Outcome: Elevations in the Project area will be restored to the upper elevation limit of functional marsh (about 2.5 foot NAVD 88).

Monitoring Design: Elevations will be surveyed in one pre-project construction year, two project construction years, and two post-project construction years to access elevation changes over time. The USGS Experimental Advanced Airborne Research Lidar (EAARL), a green wavelength, waveform-resolving, short-pulse lidar, will be used to map "bare earth" topography and vegetation canopy structure across the variety of vegetation types. A subset of marsh creation areas will include ground-surveyed elevation and canopy heights to calculate mean errors between lidar and field derived points. A sample of the field-derived data will be used to improve the vertical accuracy of the bare-earth topography and marsh elevation height derived from the airborne lidar data.

Objective 2e: Restore native habitat acreages impacted by the MRGO. Increase the year round spatial coverage of ridge habitat along Bayou La Loutre by 2065.

Performance Measure 6a: Pre-construction and post-construction survey.

Desired Outcome: Restored ridge elevations approximately 2-3 ft higher than surrounding or restored marsh elevations (2.5 ft NAVD 88).

Monitoring Design: Elevations will be surveyed in one pre-project construction year, two project construction years, and two post-project construction years to access elevation changes over time. The USGS Experimental Advanced Airborne Research Lidar (EAARL), a green wavelength, short-pulse, waveform-resolving lidar will be used to map "bare earth" topography and vegetation canopy structure across the variety of vegetation types. A subset of marsh creation areas will include ground-surveyed elevation and canopy heights to calculate mean errors between lidar and field derived points.

Performance Measure 6b: Species composition and percent cover for vegetation plantings.

Desired Outcome: Increase in percent cover of random vegetation plots.

Monitoring Design: For each random vegetation plot, determine species composition and percent cover using visual estimates of cover following Braun-Blanquet cover scale.

Objective 3: Increase the year round spatial coverage of critical landscape features that provide hurricane and storm damage risk reduction in the study area (i.e. areas located in the Biloxi Marshes, the East Orleans Landbridge, and forested habitats).

Restore critical landscape features that provide hurricane and storm damage risk reduction in the Project area (i.e. areas located in the Biloxi Marshes, the East Orleans Landbridge, forested habitats, and oyster reefs).

Performance Measure 7a: Habitat and land:water classification

Desired Outcome: Project success in the East Orleans Landbridge and Biloxi Marsh at end of 10 year post-construction monitoring period

Monitoring Design: Habitats will be classified using Landsat TM scenes collected in three pre- and ten post-project years and Digital Orthophoto Quadrangles for one pre-, two construction, and three post-construction years, as well as any available field data in the study area to assess land:water trends and habitat distribution.

Performance Measure 7b: Oyster recruitment on artificial oyster reef.

Desired Outcome: Recruitment is comparable to other LDWF oyster recruitment stations throughout Biloxi Marshes.

Monitoring Design: Oysters will be sampled utilizing Square Meter sampling frame following LDWF Inshore Fisheries Monitoring Plan of September 01, 2010. Sampling will occur annually between June and July on the artificial reef and results will be compared with existing LDWF Square Meter sampling from the LDWF Coastal Area I.

Risk Endpoint Objectives 2, 3: Borrow Area adverse impacts to Essential Fish Habitat (EFH). Much of the material for wetland restoration will be obtained by dredging areas of Lake Borgne water bottoms and have potential to cause WQ impacts to EFH, specifically changes to food items and water quality.

Desired Outcome: Do not contribute to Water quality conditions that may impact listed (threatened or endangered) species, such as the Gulf sturgeon.

Monitoring Design: To address this uncertainty a variable Borrow Pit Design will be implemented. Three pits will be constructed to depths of 5, 10, and 15 feet below lake bottom. Water Quality monitoring shall be conducted at 6 sites in Lake Borgne will be sampled on a quarterly basis. The sites will be located near Borrow Sites 2, 3, 4, 5, 6, and 8 (see Figure 1, MRGO Ecosystem Restoration Plan, Borrow Sites and Borrow Pits—Map 1). Quarterly sampling will be sufficient to assess seasonal changes in nutrient and dissolved oxygen concentrations. Major environmental events such as extreme drought, hurricanes, or opening the Bonnet Carre' Spillway for flood control purposes may alter the fixed schedule by requiring additional sample collection. All samples will be collected using standard US Geological Survey protocols. Water samples will be depth-integrated. Field blanks and replicates will be taken for quality-control purposes.

Desired Outcome: Maintain diverse benthic community assemblages as a food source for (threatened or endangered) species, such as the Gulf sturgeon.

Monitoring Design:. To address this uncertainty a variable Borrow Pit Design will be implemented. Benthic invertebrates will be sampled using a composite of 5 grabs with a Petite

Ponar bottom-material sampler at 6 sites in Lake Borgne. The sites will be located near Borrow Sites 2, 3, 4,5, 6, and 8 (see fig. 1, MRGO Ecosystem Restoration Plan, Borrow Sites and Borrow Pits—Map 1). All samples will be collected using standard US Geological Survey protocols. Constituents sampled twice, once at the beginning of the project and once near the end

Objective 4: Not measured through the monitoring program.

3.4 Monitoring Procedures

The following monitoring procedures will provide the information necessary to evaluate the previously identified project objectives for the MRGO Ecosystem Restoration Plan:

Land:Water and Habitat Classification: Land/water and habitat summaries will be performed on classified Landsat TM scenes for 1985, 1987, 1990, 1998, 1999, 2001, 2002, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, and 2016 in the project area. Linear regression will be used to calculate land change trends based on those years, excluding anomalous data. Post-project trends calculated from Landsat TM scenes classified annually will be compared to the pre-project trends. Digital Orthophoto Quarter Quadrangle (DOQQ) of the project area will need to be flown and habitat analysis completed to capture land cover for one pre-construction, two during construction, and three post-construction years.

Hydrology: Hourly salinity, temperature, water level and turbidity monitoring will be initiated in PED and maintained through construction and 10 years post-construction at seven locations within the project area with multi-parameter water quality sondes. Sondes will be surveyed to a vertical datum (NAVD 88), and marsh elevations in the immediate vicinity of each sonde will also be surveyed. Sondes will be serviced approximately nine times per year. Hydroperiod metrics (depth, duration and frequency of flooding) will be obtained from marsh elevations and recorded water levels.

Vegetation: Vegetation sampling will occur annually following construction at the marsh creation sites. Sampling will occur annually between August and October at each site, and will consist of sampling ten replicate 2 m x 2 m stations located randomly along a transect within both naturally established and planted vegetation areas.

Species composition, percent cover, and stem/canopy height for each station will be determined using visual estimates of cover following the Braun-Blanquet cover scale (Mueller-Dombois and Ellenburg 1974). The 2 meter x 2 meter quadrat will be carefully placed on the vegetation and all vegetation within the quadrat, whether rooted within the station or hanging over the station, will be included in the sample. Species composition and percent cover data will be used to generate a Floristic Quality Index (FQI) score (Steyer et al., 2010) which will be tracked over time. Species composition data will be used to determine in situ marsh habitat classification, which will be used to ground-truth classifications from Land Water and Habitat Classification above.

The EAARL sensor will be used to estimate the percent survival of cypress/tupelo plantings. Additionally, a 5 percent subsample of plantings will be evaluated for percent survival in field to validate EAARL assessment.

Elevation: The EAARL sensor suite includes a raster-scanning, water penetrating, full-waveform adaptive lidar, a down-looking RGB digital camera, a high-resolution multi-spectral color infrared (CIR) camera, two precision dual frequency kinematic carrier-phase GPS receivers, and an integrated miniature digital inertial measurement unit which provides for sub-meter geo-referencing on each laser sample. The EAARL laser provides for a high sample rate up to 10,000 samples per second from a 1.2 nanosecond (or shorter) green pulse. The system can make a range measurement with accuracy on the order of 2 to 5 cm. Detailed methodology on the EAARL system, accuracy assessment studies, and vegetation structure mapping using a small-footprint waveform-resolving lidar can be found in Wright and Brock (2002), Nayegandhi et al (2009) and Nayegandhi et al. (2006).

Marsh Elevation: During EAARL survey years at a subset of marsh creation areas, marsh elevations will be taken using RTK GPS techniques to validate EAARL elevations. Pre-project elevations will be compared to post-project elevations to determine outcome of marsh creation areas from pre-existing elevations to levels that are supportive of native vegetation. To support Cypress-Tupelo seedlings, areas that are to be restored to Cypress swamp will be higher in elevation than existing marsh elevations. Areas that are to be restored to natural ridges will be of adequate elevation to resemble the shape of other natural ridges, support native vegetation and help redefine the limits of Bayou La Loutre.

Oyster Square Meter: The square meter frame is randomly thrown onto the oyster reef. A SCUBA diver removes all oysters, associated macroscopic organisms, and loose surface shell within the frames. All oysters and shells from recently dead oysters are counted and measured in 5 millimeter intervals. Shells from dead oysters are classified as "box" (both valves attached) or "valve" (one valve). Oyster size is determined by measuring the "straight-line" distance from the hinge to the apex of the shell. Live gastropod, crab, and mussel predators are counted. Cultch type and reef condition are noted. A minimum of five replicate samples are taken at each station. Number of stations will be determined based on final design specifications of artificial reef feature BS2.

Water Quality: six (6) sites in Lake Borgne will be sampled on a quarterly basis. The sites will be located near Borrow Sites 2, 3, 4, 5, 6, and 8 (see Figure 1, MRGO Ecosystem Restoration Plan, Borrow Sites and Borrow Pits—Map 1). Quarterly sampling will be sufficient to assess seasonal changes in nutrient and dissolved oxygen concentrations. Major environmental events such as extreme drought, hurricanes, or opening the Bonnet Carre' Spillway for flood control purposes may alter the fixed schedule by requiring additional sample collection. A YSI 6920 or equivalent field meter will be used at all sites to profile water temperature, specific conductance, salinity, dissolved oxygen, percent-saturation of dissolved oxygen, and pH. Readings will be taken at 0.5 meters above the bottom, mid-depth, and 0.5 meters below the water surface to document any stratification, particularly of salinity or dissolved oxygen, in the water column. Secchi-disc measurements will be made at all sites to quantify any changes in light penetration. Nutrients sampling will, including Nitrogen, ammonia as N, nitrogen, ammonia + organic nitrogen, nitrogen, ammonia + organic nitrogen, nitrogen, nitrite, nitrogen, nitrite + nitrate, Phosphorus, filtered, phosphorus, phosphate, ortho, Phosphorus, unfiltered. Chlorophylls, including Chlorophyll A and Pheophytin A will also be measured.

Borrow Area Benthic Communities: Benthic community assemblages will be sampled annually pre and post borrow pit excavation to evaluate changes in community structure towards stress tolerant organisms. All samples will be collected using standard US Geological Survey protocols. Benthic invertebrates will be sampled using a composite of 5 grabs with a Petite Ponar bottom-material sampler.

3.5 Use of Monitoring Results and Analysis

Project monitoring, during the first 10 years post-construction, is the responsibility of both the non-Federal Sponsor and the USACE. However, because of the need to integrate monitoring system-wide for coastal Louisiana restoration and AM, extensive agency coordination is required.

The results of the monitoring program will be communicated to an AM Assessment Team that will use the information to assess system responses to management, evaluate overall project performance, and construct project report cards. Recommended modifications (i.e., adaptation) of the MRGO Ecosystem Restoration Plan will be provided, as appropriate.

4.0 Database Management

Database management is an important component of the monitoring plan and the overall Adaptive Management Program. The methodologies should include descriptions of sampling designs (i.e., locations, frequency) sampling procedures, sample storage and preservation, and processing of samples to generate data. A manual for Standard Operating Procedures (SOP) to be used project monitoring is being developed and once approved will be available for use by project teams to ensure consistency in monitoring parameter procedures across projects. Example SOPs include Hydrologic Data/Water Quality, Rod Surface Elevation Table & Vertical Accretion, Soil Properties, Vegetation, Wildlife and Imagery.

Data will be served using a map services tool, similar to that currently employed by the CRMS-Wetlands project. Data collected with similar data types and collection frequencies as those data collected under the CRMS program will be managed by the Louisiana Strategic Online Natural Resources Information System (SONRIS). Pre-existing standard operating procedures built for SONRIS cover issues such as data upload process and format, quality assurance/quality control (QA/QC), and public data release. Storage of other collected data (spatial or non-spatial) will be handled by the project specific data libraries on www.mrgo.gov.

Where applicable, Open Geospatial Consortium (OGC) standards will be used to facilitate data sharing among interested parties. Data analysis and reporting responsibilities will be shared between project assessments and AM efforts in order to provide MRGO Ecosystem Restoration for the Program Management Team.

Data analysis and reporting responsibilities will be shared between project and programmatic AM efforts in order to provide reports for the MRGO Ecosystem Restoration Assessment Team, project managers, and decision-makers.

5.0 Assessment

The assessment phase of the implementation framework (Figure 2) compares the results of the monitoring efforts to the desired Project performance measures and/or acceptable risk endpoints (i.e., decision criteria) that reflect the goals and objectives of the management or restoration action.

This assessment process will regularly measure the progress of the Project in relation to the stated project goals and objectives. Through and complete assessments are critical to the Adaptive Management Program. The assessments will continue through the life of the Project or until it is decided that the Project has successfully achieved (or cannot achieve) its goals and objectives.

5.1 Assessment Process

During PED, the Assessment Team assigned to the MRGO Ecosystem Restoration Plan will identify a combination of qualitative (i.e., professional judgment) and quantitative methods for comparing the values of the performance measures produced by monitoring with the selected values of these measures that define criteria for decision-making.

Appropriate statistical comparisons (e.g., hypothesis testing, ANOVA, multivariate methods, etc.) will be used to summarize monitoring data and compare these data with the MRGO decision criteria. These continued assessments will be documented as part of the project reporting and data management system.

5.2 Variances and Success

The Project Assessment Team will collaborate with project managers and decision-makers to define magnitudes of difference (e.g., statistical differences, significance levels) between the values of monitored performance measures and the desired values that will constitute variances. Meaningful comparisons between monitoring results and desired performance will require characterization of historical and current spatial-temporal variability that define baseline conditions. Variances (or their absence) will be used to recommend AM actions, including (1) continuation of the project without modification, (2) modification of the project within original design specifications, (3) development of new alternatives, or (4) termination of operation of the MRGO Ecosystem Restoration.

The Conceptual Ecological Model (Annex 1) helps describe the linkages between stressors and performance measures and may be used to further define management actions based on the monitored results. The assessments will help determine if the observed responses are linked to the Project; if the responses are undesirable (e.g., are moving away from restoration goals); or if the responses have met the specified success criteria. If performance measures are not responding as desired, for example because the stressor has not changed enough in the desired direction, then recommendations should be made for modifications to the Project. If the stressor has changed as expected/desired and the performance measure has not, additional research may be necessary to understand why.

5.3 Frequency of Assessments

During the PED phase, the frequency of assessments for the MRGO Ecosystem Restoration Plan would be determined by the relevant ecological scales of each performance measure. The Project technical support staff will identify for each performance measure the appropriate timescale for assessment. An initial project assessment will be completed before construction. There will be post-construction project assessments as needed during the post-construction period; however the level of detail will depend on the timescale of expected responses, and frequency of data collection. The AM&M Team estimates these assessments will be, on average, every other year.

5.4 Documentation and Reporting

The Assessment Team will document each of the performed assessments and communicate the results of its deliberations to the managers and decision-makers designated for the MRGO Ecosystem Restoration Project. The Assessment Team will produce periodic reports that will measure progress towards project goals and objectives as characterized by the selected performance measures. The reporting of monitoring results and AM evaluations will be in the form of both Assessment Reports to include a high level of detail and science and management friendly summary Report Cards.

6.0 Decision-Making

Monitoring for AM is distinguished from more traditional monitoring, in part, through implementation of an organized, coherent, and documented decision making process as more information regarding uncertainties are determined. The major points of this decision-making process for the Project's Adaptive Management Program includes:

(1) anticipation of the kinds of management decisions that are possible within the original project design;
(2) specification of values of performance measures that will be used as decision-criteria;
(3) establishment of a consensus approach to decision making; and
(4) a mechanism to document, report, and archive decisions made during the timeframe of the Adaptive Management Program.

6.1 Decision Criteria

Decision criteria, also referred to as AM triggers, are used to determine if and when AM opportunities should be implemented. These criteria are usually ranges of expected and/or desirable outcomes. They can be qualitative or quantitative based on the nature of the performance measure and the level of information necessary to make a decision. Desired outcomes can be based on reference sites, predicted values, or comparison to historic conditions. Several potential decision criteria/triggers and thresholds are identified below, based on the project objectives for category 2 success, performance measures and currently available information (Table 2). If category 2 criteria cannot be achieved, the PDT and AM&M Team will focus on category one success.

Table 2- Adaptive Management Threshold and Trigger Matrix			
Indicator	**Threshold**	**Trigger**	**Potential Response Options**
Salinity	Threshold set by Snedden and Steyer, in review- Figure 4	Trigger set if marsh types change 2 classes (fresh to brackish) across years or if swamp/fresh meet salinity threshold	Alter freshwater input. Potential options include: bank gapping, salinity barriers, diversion operation, or freshwater management through other projects in the area potentially including Borgne Barrier, Bonne Carre Spillway, Small Diversion at Convent Blind River, Maurepas Swamp Diversion
Plant Mortality – emergent marsh and (plantings)	Threshold set by marsh collapse expert panel; (plantings – 70% survival at year 1)-Table 3	Trigger set at low range of marsh collapse thresholds	Control salinity and or inundation. Potential methods include nourishment to enhance elevation, diversion operation or other method of altering freshwater input into the system, and managed habitat switching (replant with vegetation type suitable for observed conditions- i.e. replant previous brackish marsh area with saline marsh species types)
Land/Water Ratio	Threshold set by WVA	Trigger set if land lost episodic (marsh dieback)	Enhance elevation
Elevation	Threshold set by high inundation depth	Trigger set when elevation by marsh type less than reference	Enhance elevation
Oyster Recruitment	Threshold set on sufficient oyster reef development to protect identified marsh	Presence/absence of oyster settlement at 2-3 years	Seed with juveniles/stock adults
Water Quality	TBD	TBD	Diversion operation, vegetative plantings, enhance elevation
Dissolved Oxygen	TBD by NMFS BO	TBD by NMFS BO	Backfill borrow pits
Benthic Community	TBD by NMFS BO	TBD by NMFS BO	TBD

The switching thresholds for marsh types have been identified based on probability of occurrence of habitat types based on average annual salinity (Figure 4): fresh/intermediate marsh: 1.1 parts per thousand (ppt); intermediate/brackish marsh: 4.1 ppt; and brackish/saline marsh: 8.3 ppt from CRMS data (Snedden and Steyer, in review).

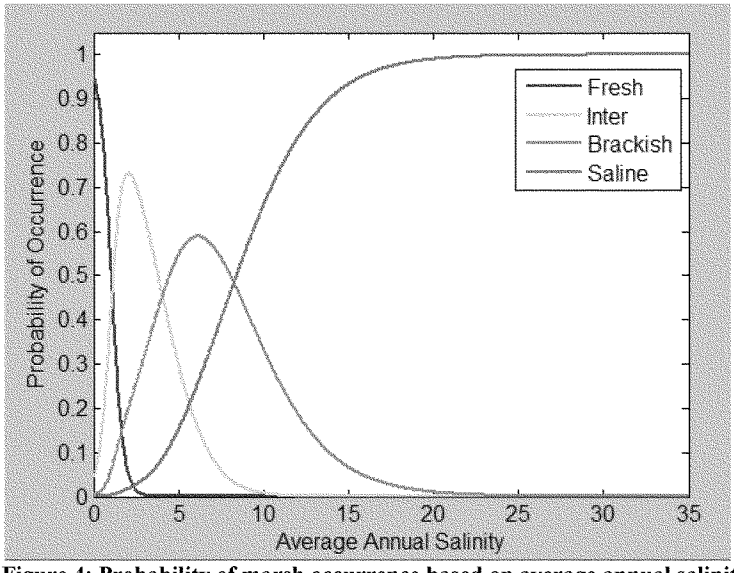


Figure 4: Probability of marsh occurrence based on average annual salinity

Table 3: Marsh collapse/plant mortality threshold identified below by 2012 Master Plan expert panel

Marsh Type	Threshold Type	Threshold Range		Rationale and Justification
		Low	High	
Fresh	Salinity (ppt)	6	8	8 week average – growing season; Panel (per. com.)
Intermediate	Inundation (cm)	30.72	38	30.72-38 cm depth (per supporting documentation); Proposed as 32-38cm (CRMS), 30.72 to 34.26 (RS)
Brackish	Inundation (cm)	20	25.56	20-25.56 cm depth (per supporting documentation); Proposed as 25-20cm (CRMS), 22.02-25.56 (RS)
Saline	Inundation (cm)	16	25	16-25 cm depth (per supporting documentation); Proposed as 16-18cm (CRMS), 20-25 cm (RS)
Swamp	Salinity (ppt)	4	7	8 week average – growing season; Shaffer (per. com.)

Projected acreage targets for each habitat type can also be used to determine if the project is performing as planned during project implementation. These projections are based on meeting project objectives for each habitat type over the 50-year project timeline. The acceptable projected loss rates for each habitat are in Table 4 below, rates beyond these targets may require an adjustment to project performance to achieve stated goals. Assessing this loss at the feature level will be examined during PED. Currently, the loss rate is by habitat and independent of

individual features. The PDT will determine how much each feature can contribute to the overall loss rate in PED.

Table 4. Projected loss rates for each habitat type

Habitat Type	Objectives (Net Acres TY 50)	Total Protect	Total Restore (Create)	Total Nourish	Grand Total	Loss Rate (ac/yr)
Brackish	**18100**	1493	10684	20300	**33671**	300
Fresh-Intermediate	**6800**	983	7959	4949	**13950**	150
Cypress	**9500**	0	4225	6206	**10431**	20

6.2 Potential Adaptive Management Measures

A structured monitoring design will be implemented to provide the feedback necessary to inform decisions about future project adjustments. The Assessment Team may submit recommendations for AM actions to the AM&M Team. The AM&M Team will investigate and further refine AM recommendations and present them to the Program Management Team. During project implementation and operation, it will be up to the District Commander and Non-Federal Sponsor to make a recommended AM action. If Project monitoring determines that a management trigger has been "activated" then there are three possible response pathways:

1. determine that more data is required and continue (or modify) monitoring;
2. identify and implement a remedial action; or
3. modify project goals and objectives (this option would *only* be considered as a last resort and upon careful consideration by and consensus of the Project Management Team).

Potential AM actions for this Project are presented in Table 2 and may include increasing wetland elevation by renourishing existing wetlands, modifying the operation of the diversion structure once implemented, modifying operation of existing outfall management features to account for unexpected environmental conditions and to facilitate meeting project objectives. The triggers identified in Table 2 can be used as the thresholds for implementing the potential AM opportunities.

Adaptive design and implementation can occur using the lessons learned in the first few years of wetland restoration and nourishment projects. For example marsh elevation targets based on amount of compaction and dewatering that occur in different marsh types/soil types/subsidence zones can be refined in out-year measures.

Project planning was based on the historic/low RSLR scenario. Based on the October 2011 guidance below projects adjustments to intermediate and high RSLR fall under AM. Some potential options for AM actions based on RSLR increases have been incorporated into the AM plan such as raising marsh elevation to account for an accelerated rate or changing operation of diversion once implemented to account for salinity (Table 2).

> CECW Guidance Memorandum "Policy Guidance Request for Addressing Sustainability of Ecosystem Restoration Projects in Louisiana" (October 2011), indicates w*hile different levels of RSLR are evaluated during the course of a study to determine the robustness of the proposed solution, our current investment decisions are based on a discrete level of RSLR. Conceptually, if the rate of RSLR exceeds the rate used as the basis for the investment decision, then adaptive management measures above and beyond OMRR&R may be appropriate. This concept will have to be carefully vetted on a project by project basis so as to negate inappropriate transfers of cost from OMRR&R to adaptive management.*

The AM&M Team acknowledges greater detail is required for specific outcomes, AM triggers, and potential AM responses. Table 2 and Table 3 outline example triggers and likely AM responses. The AM guidance states that, if needed, AM actions should continue until these actions can no longer improve the project or until these actions become prohibitively expensive. The actions triggers and responses outlined in Table 2, along with the written descriptions of phased implementation in Section 2.2, provide some guidance as to what AM actions may be needed.

To better ensure successful performance of the implementation wetland restoration and nourishment features the AM&M team evaluated potential future scenarios for the wetland restoration features based on the identified critical uncertainties (hydrology, increased subsidence, reduced accretion, RSLR). The most likely AM action involves wetland renourishment of areas should project monitoring and assessment indicate project goals, objectives and success criteria are not being achieved and a project adjustment is recommended. The AM&M Team developed a best case, worst case and most likely scenario to estimate costs for this potential AM action.

- Best Case – Assume 3% loss of 57,000 acres or 1,700 acres. Replace 1,700 acres at $30,000/acre for $51,500,000
- Worst Case – assume 12% loss of 57,000 acres or 6,600 acres. Replace 6,600 acres at $30,000/acre for $198,000,000.
- Most Likely – Assume approximately 6% loss of the 57,000 acres of wetland created/nourished or 3,300 acres. Replace 3,300 acres at $30,000/acre for $99,000,000 (use $100,000,000).

The AM&M Team's recommendation is for the most likely scenario (i.e. a total of $158,064,500 which includes contingencies) to be allocated to for potential nourishment actions over the life of this project.

Following construction, if operation of Project features, such as the diversion, results in unintended consequences and affects previously unidentified National Register eligible properties that were previously considered in a zone located outside the Project-impact area, then data recovery (e.g., excavation and recordation) would be required. Data recovery would include verification of eligibility, removal of water and sediments from the sites to allow data recovery. Consequently it is estimated that such actions in the Project area, with the numerous potentially eligible sites would cost conservatively about $2 million dollars. This base estimate is just for data recovery and does not include contingency, the potential costs for construction of coffer

dams or other means of preventing further water and sediment intrusion onto the sites. Remaining details and cost estimates for AM responses will be further developed and refined in the PED phase.

6.2.1 Adaptive Actions Related to Dredging Proposed Borrow Area

To address the uncertainty related impacts from borrow pit dredging in coordination with National Marine Fisheries Service (NFMS) test borrow pits, have been included into the proposed action (See EIS for the MRGO Ecosystem Restoration Project, Biological Assessment Appendix G). Water quality and benthic community monitoring has been included in this AM&M plan to complement those efforts. As part of the Project, three test borrow pits would be constructed in Year 1 of Phase 1. The first pit would be constructed to 15' deep below the water surface, the second pit would be constructed to the proposed depth of 20' deep below the water surface, and a third pit would be constructed to approximately 25' deep below the water surface. After the borrow pits are constructed, monthly water quality monitoring would be used to determine if hypoxia formation was occurring within the borrow pits. Once the two years of monitoring is complete, the design of the remaining borrow pits would be adjusted to ensure that hypoxia formation would not result within the remaining borrow pits. The CEMVN believes that the design of the borrow pits, coupled with the proposed water quality monitoring, would ensure that the proposed action would only temporarily impact the water quality of Lake Borgne.

6.3 Project Close Out

Closeout of the AM&M portion of the project would occur when Project objectives have been met, or when it is clear that they will be met based upon the trends for the site conditions and ecological and hydrological processes. Project success for category 1 is based on the trend of achieving 38,000 acres in project year 50. Category 2 success is based upon the habitat trends identified in Table 4.

There may be issues related to the sustainability of the Project that would require some monitoring and management beyond achieving these objectives. Due to the variable nature of the Louisiana coastal zone, the monitoring baseline may change during 50-year period of analysis. Consequently, it may be necessary to consider extending Project specific monitoring and AM beyond ten years post construction.

7.0 Costs for Implementation of Monitoring and Adaptive Management Programs

The costs associated with implementing this AM&M Plan was estimated based on currently available data and information developed during the feasibility study. Because uncertainties remain as to the exact Project features, monitoring elements, and AM opportunities and management actions, costs estimates and the AM&M Plan, will be need to be further refined in the PED phase.

Both pre- and post-construction monitoring will be utilized to determine Project success. Monitoring will continue until the trajectory of ecological change and/or other measures of Project success are determined as defined by the Project-specific objectives. This Monitoring Plan includes the minimum monitoring actions determined necessary to evaluate Project success.

Section 2039 of the WRDA 2007 allows monitoring to be cost-shared for up to ten years post-construction. For cost estimating purposes, the maximum cost-shared period of monitoring was assumed for all features. Some features, such as marsh restoration, may require less than ten years of post-construction monitoring to determine ecological success. Once ecological success has been established, monitoring would cease. Other features, such as ridge restoration and cypress swamp restoration, may require longer monitoring periods to determine ecological success. The need for additional monitoring would be assessed at the end of the cost-shared period, and any additional required monitoring would be a 100 percent non-Federal responsibility.

Table 5 presents the costs estimates for AM&M by Tier. Section 7.1 and 7.2 provide additional breakdown regarding these costs. The cost estimate for set-up and implementing the Monitoring and Adaptive Management Program for the entire project is $ 25,138,500 (Tables 5-8). The estimate for contingency AM actions (nourishment and recovery of unidentified cultural resources) is $161,254,500 (Table 9). The total estimate for the Adaptive Management and Monitoring Program and potential AM actions for all phases of the project is $186,393,000 (Table 5). In accordance with WRDA 2007 Section 2039 Implementation Guidance the total including AM actions are captured in the MII under feature Code 06 Fish and Wildlife were estimated in the project construction costs.

Table 5- Summary of AM&M Costs for the MRGO Ecosystem Restoration Project.

Category	Tier 1	Tier 2	Tier 3	Project Total for AM&M
Set-up and Implementation of the AM&M Program for the Project				
Monitoring Planning and Management	$510,349	$231,977	$185,581	$927,907
Data Collection	$11,478,487	$3,586,244	$2,868,995	$17,933,727
Database Management	$487,733	$221,697	$177,357	$886,787
AM Planning Program Set-up	$1,052,700	$478,500	$382,800	$1,914,000
Management of AM Program	$438,625	$199,375	$159,500	$797,500
Assessment	$412,308	$187,413	$149,930	$749,650
Decision Making	$271,948	$123,613	$98,890	$494,450
Stakeholder Program Set-up	$437,604	$199,375	$159,500	$796,479
Stakeholder Involvement During Construction	$175,450	$79,750	$63,800	$319,000

Table 5- Summary of AM&M Costs for the MRGO Ecosystem Restoration Project.				
Category	**Tier 1**	**Tier 2**	**Tier 3**	**Project Total for AM&M**
Stakeholder Involvement Post Construction	$175,450	$79,750	$63,800	$319,000
Potential AM Actions				
Potential AM Action-Wetland Nourishment	$86,935,475	$39,516,125	$31,612,900	$158,064,500
Potential AM Action- Cultural Data Recovery	$1,754,500	$797,500	$638,000	$3,190,000
TOTAL	**$104,130,628**	**$45,701,318**	**$36,561,054**	**$186,393,000**
Cost Share				
Federal-65%	$67,684,908	$29,705,856	$23,764,685	$121,155,450
Non-Federal-35%	$36,445,720	$15,995,461	$12,796,369	$65,237,550

7.1 Costs for Implementation of Monitoring Program

Both pre- and post-construction monitoring will be utilized to determine Project success. Costs to be incurred for monitoring during the PED and construction phases include drafting of the detailed monitoring plan, monitoring site establishment and pre-construction and construction data acquisition to establish baseline conditions. Monitoring will continue until the trajectory of ecological change and/or other measures of Project success are determined as defined by the project objectives. Cost calculations for the pre-construction baseline are for a two year period and the post-construction monitoring are estimates for a 10-year (maximum) total. If ecological success is determined earlier (prior to ten years post-construction), the monitoring program will cease and costs will decrease accordingly. If ecological success cannot be determined within the ten-year post construction period, any additional required monitoring will be a non-Federal responsibility. Costs for non-federal lead monitoring after the allowable 10-year cost shared period are not included.

It is intended that monitoring conducted in this Project will utilize centralized data management, data analysis, and reporting functions. All data collection activities will follow consistent and standardized processes regardless of the organization responsible for monitoring. Cost estimates include monitoring equipment, monitoring station establishment, data collection, quality assurance/quality control (QA/QC), data analysis, assessment, and reporting for the proposed monitoring elements in Table A1 below. The total estimate for setting up and implementing the monitoring program for all phases of the project is $19,748,420 (Table 6).

Table 6- Cost Estimates for Set-up and Implementation of the Monitoring Program for the MRGO Ecosystem Restoration Project					
Category	**Activities**	**Tier 1**	**Tier 2**	**Tier 3**	**Project AM&M Total**
Monitoring: planning & management (during PED)	Monitoring workgroup, drafting detailed monitoring plan, working with PDTs on performance measures	$510,349	$231,977	$185,581	$927,907
Monitoring: data collection (during PED, Construction and post construction)	Landrights, site construction, and surveying	$99,232	$45,105	$36,084	$180,422
	Land:Water	$39,437	$17,926	$14,341	$71,703
	Wetland Hydrology	$2,534,143	$1,151,883	$921,506	$4,607,532
	Oysters	$3,349,500	N/A	N/A	$3,349,500
	Vegetation Cover	$1,024,586	$465,721	$372,577	$1,862,883
	Wetland Elevation	$327,630	$148,923	$119,138	$595,691
	Advanced Airborne Research Lidar	$1,846,709	$839,413	$671,530	$3,357,652
	Water Quality	$1,579,376	$717,898	$574,319	$2,871,593
	Accretion	$219,313	$99,688	$79,750	$398,750
	Soil Strength	$219,313	$99,688	$79,750	$398,750
	Benthic Surveys	$239,250	N/A	N/A	$239,250
Database Management (during PED, Construction and post construction)	Database development, management, and maintenance, Webpage development for communication of data to stakeholders	$487,733	$221,697	$177,357	$886,787
	TOTAL	**$12,476,571**	**$4,039,919**	**$3,231,933**	**$19,748,420**

7.2 Costs for Implementation of Adaptive Management Program

Costs for the Project Adaptive Management Program were based on level of effort. The current total estimate for implementing the assessment and Adaptive Management Program is $5,390,079 including stakeholder identification, outreach and extensions (Tables 7 & 8). The cost for the potential AM actions (contingency) that could be used after Project construction to adjust the Project, as necessary, to better achieve goals and objectives are presented in Table 9.

Table 7- Cost Estimates for Set-up and Implementation of Adaptive Management Program for the MRGO Ecosystem Restoration Project

Category	Tier 1	Tier 2	Tier 3	Total
Detailed AM Plan and Program Set-up (during PED and Construction)	$1,052,700	$478,500	$382,800	$1,914,000
Implementation				
Management of AM Program (post construction)	$438,625	$199,375	$159,500	$797,500
Assessment (during PED, construction and post construction)	$412,308	$187,413	$149,930	$749,650
Decision Making (post construction)	$271,948	$123,613	$98,890	$494,450
TOTAL	**$2,175,581**	**$988,901**	**$791,120**	**$3,955,600**

Table 8- Cost Estimates for Iterative Stakeholder Identification, Outreach, and Extension

Category	Tier 1	Tier 2	Tier 3	Total
Initial Program Setup (PED)	$437,604	$199,375	$159,500	$796,479
Continuing Stakeholder Involvement (Construction)	$175,450	$79,750	$63,800	$319,000
Continuing Stakeholder Involvement (10 year post-Construction)	$175,450	$79,750	$63,800	$319,000
TOTAL	**$788,504**	**$358,875**	**$287,100**	**$1,434,479**

Table 9- Cost Estimates for Potential AM actions for the MRGO Ecosystem Restoration Project				
Category	**Tier 1**	**Tier 2**	**Tier 3**	**Total**
Wetland Nourishment	$86,935,475	$39,516,125	$31,612,900	$158,064,500
Cultural Resources Data Recovery for Unidentified National Register Eligible Properties	$1,754,500	$797,500	$638,000	$3,190,000
TOTAL	**$88,689,975**	**$40,313,625**	**$32,250,900**	**$161,254,500**

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ANNEX 1. MRGO Ecosystem Restoration Plan Conceptual Ecological Model

Table 1. Effects of MRGO and Selected Ecosystem Restoration Measures on Selected Issues and Drivers in the MRGO Study Area.

Measure / Issue / Driver	MRGO Before Closure[1]	FWOP+ MRGO Closure[2]	FWOP+ Additional Measures[3]	River Diversions[4]	Hydrologic Restoration	Marsh Creation Dredging	Shoreline Protection[1]	Ridge Restoration	Forest Creation/ Restoration	Barrier Islands Restoration	SAV Restoration	Oyster Reefs Creation	Swamp Restoration
Reduced Freshwater, Nutrients, Sediment Input	NA	NA	D↓ I↓	D↓	D↑/↓ I↑/↓	NA	NA	NA	NA	NA	NA	NA	NA
Wetland Losses	D↑ I↑	D↑ I↑	D↑ I↑	I↓	I↓	D↓	D↓	I↓	D↓	D↓ I↓	I↓	I↓	D↓
Saltwater Intrusion	D↑	I↓	D↓ I↓	D↓	D↓ I↓	I↓	NA	I↑/↓	NA	D↓	NA	NA	I↓
EFH Degradation	D↑ I↑	D↑ I↓	D↑ I↓	I↑/↓	D↑/↓ I↑/↓	D↓	D↑/↓	I↑/↓	NA	D↓	D↓	D↓	D↓
Natural Hydrologic Process Degradation	D↑	D↑[6]	D↑[6]	D↓	D↓	I↓	NI	I↓	NA	D↓	NI	NI	I↓
Ridge Habitat Degradation	D↑	D↓	D↑ I↑	NA	I↓	I↓	NI	D↓	NA	I↓	NI	NI	I↓
Barrier Islands Degradation	I↑	I↓	NA	NA	NA	NA	NI	NA	NA	D↓	I↓	NI	NA
Shoreline Erosion	I↑	I↑	I↑	I↓	I↓	I↓	D↓	D↓ I↓	NA	I↓	I↓	I↓	I↓
Subsidence	NA	NA	NA	I↓	I↓	I↑/↓	NA	I↑	NA	NA	NI	NI	I↑/↓
Sea Level Rise	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NI	NA	NA
Storm Surge	NA	NA	NA	I↓	I↓	D↓	NA	D↓	D↓	D↓	I↓	NA	D↓
Marine Habitat Degradation	D↑ I↑	I↓	D↓ I↓	D↓I↓	D↑/↓ I↑/↓	D↑/↓ I↑/↓	I	D↑/↓ I↑/↓	D↑/↓ I↑/↓	D↓	D↓	D↓	D↑/↓ I↑/↓
Freshwater Habitat Degradation	D↑ I↑	I↓	D↓I↓	D↓	D↓	D↓	I↓	I↓	I↓	I↓	D↓	NA	D↓
Lake P. Dead Zone Expansion	D↑ I↑	D↓I↓	D↓I↓	I↓	I↓	NI	NI	NI	NI	NI	NA	NA	NI

DRAFT

Key to Table 8. Cell Codes

NA = Not Applicable or measure not proposed for selected Issue/Driver	↑ Increases rate or amount (*not* "good" or "bad")
NI = Little to No Impact of Measure on Issue/Driver	↓ Decreases rate or amount (*not* "good" or "bad")
D = Direct impact of Measure on Issue/Driver	***Note:*** *Uncertainty, Predictability, and Strength of impact are not indicated in this table*
I = Indirect impact of Measure on Issue/Driver	

Table 8 Footnotes:
[1]MRGO Before Closure
[2]FWOP+ MRGO Closure
[3]FWOP+ Additional Measures
[4]River Diversion Measure Category includes large measures such as Violet Diversion.
[5]Shoreline Protection refers to Marsh, Lake and Channel shorelines only.
[6]Closure of MRGO will not restore natural hydrologic functions and may result in a hypoxic zone within the closed, unfilled MRGO channel due to anticipated reduction in current velocity.

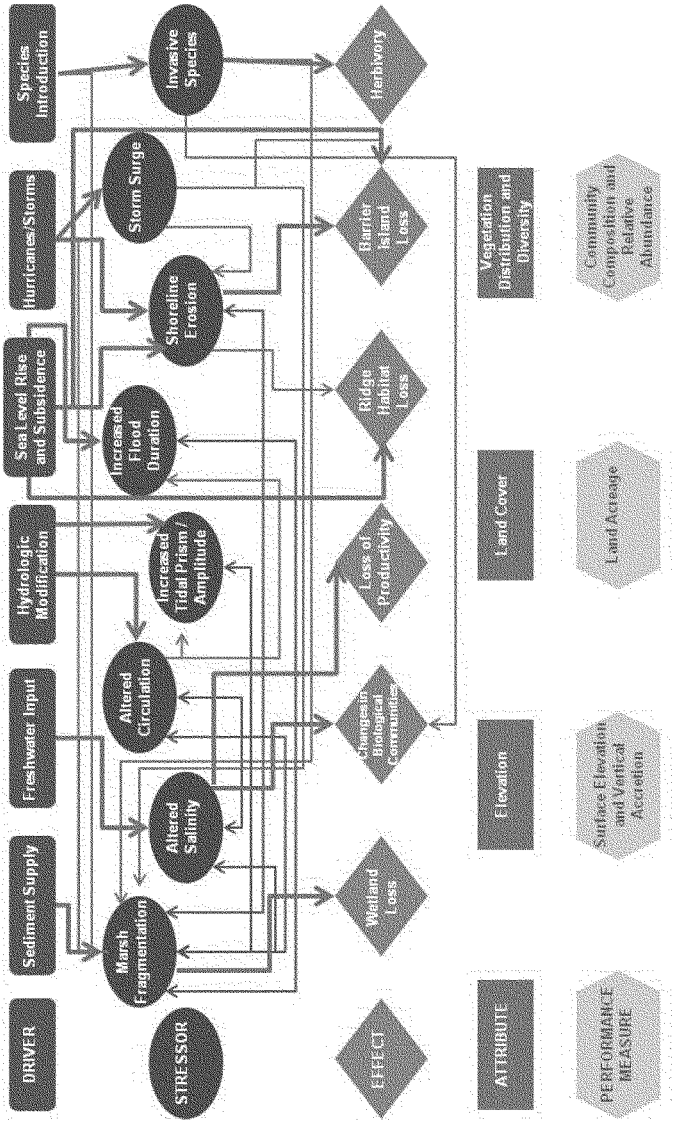


Figure A-1. Conceptual Ecological Model Diagram

FOR CONTINUATION OF HOUSE DOCUMENT 113-78

MRGO ECOSYSTEM RESTORATION PLAN
FEASIBILITY STUDY

SEE PART 5