105th Congress, 1st Session – – – – – – – – – – – – House Document 105–140

FEDERAL NAVIGATION PROJECT AT SANTA BARBARA HARBOR, CALIFORNIA

COMMUNICATION

FROM

THE ACTING ASSISTANT SECRETARY, THE DEPARTMENT OF THE ARMY

TRANSMITTING

A REPORT ON THE FEDERAL NAVIGATION PROJECT AT SANTA BARBARA HARBOR, CALIFORNIA, PURSUANT TO SECTION 101(a)(6) OF THE WATER RESOURCES DEVELOPMENT ACT OF 1996

SEPTEMBER 3, 1997.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE
43–881 WASHINGTON : 1997

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LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

11 AUG 1997

REPLY TO
ATTENTION OF

Honorable Newt Gingrich
Speaker of the House
of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

The Secretary of the Army recommends acquisition and transfer of a dredge and appurtenances to the city of Santa Barbara for the purpose of the city assuming responsibility for maintaining the existing Federal navigation project at Santa Barbara Harbor, California. The proposal is described in the report dated April 26, 1994, from the Chief of Engineers which includes other pertinent reports and comments.

Section 101(a)(6) of the Water Resources Development Act of 1996 authorized the project for navigation at Santa Barbara Harbor substantially in accordance with the plans, and subject to the conditions, described in the Report of the Chief of Engineers dated April 26, 1994.

The views of the State of California and the Departments of the Interior and Transportation are set forth in the enclosed communications.

The plan recommended by the Chief of Engineers includes two interrelated actions. First, the Corps of Engineers would obtain a dredge and appurtenant dredge equipment and transfer ownership to the city of Santa Barbara; and second, the city of Santa Barbara would assume responsibility for maintaining the existing Federal navigation project at Santa Barbara Harbor. The responsibility of the city to maintain the existing Federal navigation channels is in addition to the city's current responsibilities to operate and maintain existing local inner harbor channels, breakwaters, bulkheads, and groins at Santa Barbara Harbor. The maintenance program is expected to include dredging twice a year, with disposal of material on East Beach. Any changes to this program would require coordination with and approval by the Corps of Engineers and Federal and State regulatory agencies. The city would also be responsible for acquiring all permits and complying with any specific provisions of such permits necessary to accomplish maintenance dredging.

The analysis conducted by the Corps shows that acquisition of a dredge, and subsequent maintenance of the

Federal navigation channels by the city of Santa Barbara, can be accomplished at a savings over maintenance of those channels by the Corps of Engineers.

Since non-Federal maintenance is the most cost effective means of maintaining the channels, the recommended plan is the national economic development plan. Based on October 1996 prices, the estimated total first cost of the recommended plan is $5,990,000. The Federal share of the first cost of the recommended plan is about $4,790,000, and the non-Federal share is estimated at $1,200,000. The estimated non-Federal average annual cost for maintenance of the Federal navigation channels, and for the operation, replacement and repair of the dredge, is about $708,000.

The Secretary of the Army supports the recommendations of the Chief of Engineers subject to several modifications as described herein. In paragraph 2 of the report, the Chief of Engineers describes the recommended plan as the acquisition of a dredge with appurtenant dredge equipment. That description is expanded to include the delineation of the existing Federal navigation channels the city of Santa Barbara would be required to maintain. The channels to be maintained include the existing authorized 300-foot-wide and 1,200-foot-long entrance channel at a depth of -20 feet mean lower low water (MLLW); tapering to a 150-foot-wide and 1,500-foot-long inner harbor channel at depth of -15 feet MLLW. In addition, the city would be responsible for advanced maintenance dredging consistent with recent Corps maintenance dredging that includes widening and deepening the entrance channel to a width of 400 feet and a depth of -35 feet MLLW, and widening and deepening a portion of the inner harbor channel to a width of 300 feet and a depth of -28 feet MLLW.

In paragraph 6 of the report, the Chief of Engineers describes certain non-Federal cost sharing, financing, and other applicable provisions of local cooperation. The recommended local cooperation item described in subparagraph 6(g) is being replaced with the following provision:

"(g) Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project related betterments, and from any failure to operate, maintain, repair, replace or rehabilitate the entrance and inner harbor channels, except for damages due to the fault or negligence of the Government or the Government's contractors,"

In paragraph 6 of the report, the Chief of Engineers describes certain non-Federal cost sharing, financing, and other applicable provisions of local cooperation. Added to that paragraph are two further provisions:

"(q) Take all steps necessary to ensure that the entrance channel and inner harbor channel will be maintained during emergency situations at no cost to the Federal Government;"

"(r) Develop, at no cost to the Federal Government, a contingency plan for channel maintenance in the event the dredge might not be available."

Further, the Secretary recommends that the existing Federal navigation project at Santa Barbara Harbor, California, authorized by the River and Harbor Act of 1935, as amended, be deauthorized as a Federal project upon transfer of the dredge and appurtenances to the city of Santa Barbara Harbor as provided for in Section 101(a)(6) of the Water Resources Development Act of 1996. Draft legislation which will deauthorize the existing Santa Barbara Harbor project upon transfer of the dredge to the city of Santa Barbara is enclosed.

The Office of Management and Budget advises that there is no objection to the submission of the report to the Congress, with the condition that the existing Santa Barbara Harbor project be deauthorized upon the acquisition and transfer of a dredge and appurtenances to the city of Santa Barbara. Failing project deauthorization, the Administration does not support Federal Government acquisition and transfer of the dredge to the city of Santa Barbara. A copy of its letter is enclosed in the report.

Sincerely,

John H. Zirschky
Acting Assistant Secretary of the Army
(Civil Works)

Enclosures

SANTA BARBARA HARBOR, CALIFORNIA, DRAFT LEGISLATIVE LANGUAGE

ACT LANGUAGE:

Santa Barbara Harbor, California. - The project for navigation, Santa Barbara Harbor, California, authorized by the River and Harbor Act of 1935, as amended, shall be deauthorized as a Federal project upon the transfer of the dredge and appurtenances to the City of Santa Barbara as provided in Section 101(a)(6) of the Water Resources Development Act of 1996.

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

MAY 27 1997

The Honorable H. Martin Lancaster
Assistant Secretary of the
Army for Civil Works
Pentagon - Room 2E570
Washington, D.C. 20310-0103

Dear Mr. Lancaster:

As required by Executive Order 12322, we have completed our review of your recommendation for the report on the acquisition and transfer of title of a dredge to the City of Santa Barbara for the Santa Barbara Harbor, California, project. The report was enclosed with your letter dated July 14, 1994.

The recommendation for this project is consistent with the program of the President, with the condition that the existing Santa Barbara Harbor project be deauthorized upon the acquisition and transfer of a dredge and appurtenances to the City of Santa Barbara. Failing project deauthorization and with present budget constraints, we do not support Federal Government acquisition and transfer of the dredge to the City of Santa Barbara. The Office of Management and Budget does not object to submission of this report to Congress with the above stipulation.

We note that this project has been at OMB for review well beyond our normal review time. We regret any difficulties that this extended review might have created.

Sincerely,

T.J. Glauthier
Associate Director
Natural Resources,
Energy, and Science

COMMENTS OF THE STATE OF CALIFORNIA

PETE WILSON
GOVERNOR

State of California
GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

LEE GRISSOM
DIRECTOR

916/445-0613

TO: U. S. Army Corps of Engineers
Washington Level Review Center
Attn: CEWRC-WLR-E (SA)
Kingman Building
Fort Belvoir, Virginia 22060-5576

DATE: December 16, 1993

FROM: Office of Planning and Research
State Clearinghouse

RE: Final Feasibility Report, Santa Barbara Harbor, Santa Barbara County, California (SCH 93104012)

As the designated "Single Point of Contact" for the State of California, pursuant to Executive Order 12372, the Office of Planning and Research transmits the attached comments as the State Process Recommendation.

Initiation of the "accommodate or explain" response by your agency, therefore, is in effect. If you have any questions, please contact Michael Chiriatti at the above-listed number.

Sincerely,

Lee Grissom
Director

x

COMMENTS OF THE STATE OF CALIFORNIA

The Resources Agency

Pete Wilson
Governor

Douglas P. Wheeler
Secretary

of California

California Conservation Corps • Department of Boating & Waterways • Department of Conservation
Department of Fish & Game • Department of Forestry & Fire Protection • Department of Parks & Recreation • Department of Water Resources

December 16, 1993

U. S. Army Corps of Engineers
Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
Kingman Building
Fort Belvoir, Virginia 22060-5576

Dear Mr. Banashek:

The State has reviewed the Final Feasibility Report, Santa Barbara Harbor, Santa Barbara County, California, submitted through the Office of Planning and Research.

We coordinated review of this document with the California Coastal, and State Lands Commissions; the Central Coast Regional Water Quality Control, Integrated Waste Management, and State Water Resources Control Boards; and the Departments of Boating and Waterways, Fish and Game, Health Services, Parks and Recreation, and Transportation.

None of the above-listed reviewers has provided a comment regarding this document. Consequently, the State will have no comments or recommendations to offer.

Thank you for providing an opportunity to review this document.

Sincerely,

for William G. Shafroth
Assistant Secretary,
Land and Coastal Resources

cc: Office of Planning and Research
1400 Tenth Street
Sacramento, CA 95814
(SCH 93104012)

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

DEC 17 1993

ER 93/833

Mr. Donald A. Banashek
Director
Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
Kingman Building
Fort Belvoir, Virginia 22060-5576

Dear Mr. Banashek:

The Department of the Interior has completed its review of the Chief of Engineer's proposed report for Santa Barbara Harbor, California. We have no objection to the proposed plan and have no comments or recommendations.

Sincerely,

Jonathan P. Deason
Director
Office of Environmental Policy
and Compliance

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
United States Coast Guard

Commandant
U.S. Coast Guard

2100 Second St. S.W.
Washington, DC 20593-0001
Staff Symbol: G-MEP-3
Phone: (202) 267-0500

16452

DEC 1 1993

Mr. Donald A. Banashek
Director
Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
Kingman Building
Fort Belvoir, Virginia 22060-5576

Dear Mr. Banashek:

This is in response to your letter of October 06, 1993, in which you transmitted the proposed report of the Chief of Engineers, and the report of the district engineer on Santa Barbara Harbor, California. We have reviewed the reports and have no comments to offer.

We appreciate the opportunity to review the above reports.

Sincerely,

J. C. Jackson
B. A. RUSSELL
Commander, U.S. Coast Guard
Chief, Environmental Coordination Br.
By direction of the Commandant

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

STATE OF CALIFORNIA—BUSINESS TRANSPORTATION AND HOUSING AGENCY PETE WILSON, Governor

DEPARTMENT OF TRANSPORTATION
P.O. BOX 6114
SAN LUIS OBISPO, CA 93403-6114
TELEPHONE: (805) 549-3111
FAX (805) 549-3259

November 16, 1993

5-SB-225-VAR
Santa Barbara Harbor
Feasibility Report
SCH # 93104012

Mr. Milton Hunter
Brigadier General, U.S. Army
Washington Level Review Center, Ki-oman Bldg.
Fort Belvoir, Virginia 22060-5576

Dear General Hunter:

Thank you for the opportunity to comment on the above-referenced document. Caltrans District 5 staff has reviewed this document and no comments were generated. If you have any questions, please contact me at (805) 549-3683.

Sincerely,

Lawrence C. Newland
District 5
Intergovernmental Review Coordinator

Santa Barbara Harbor, California

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

CECW-PW (10-1-7a)

26 APR 1994

SUBJECT: Santa Barbara Harbor, California

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on Santa Barbara Harbor, California. It is accompanied by the reports of the district and division engineers. These reports are in response to a review of the authorized navigation project for Santa Barbara Harbor, California contained in House Document Number 518, 87th Congress, 2nd session, Public Law 87-874, in light of changed conditions and renewed local interest.

2. The reporting officers considered various alternative plans for resolving the severe shoaling problem in Santa Barbara Harbor. They recommend a plan that consists of the U.S. Army Corps of Engineers acquiring a 16-inch electric powered dredge plant with a full stock of required spare parts. Additional appurtenant equipment would include a workboat and skiff, pipelines, shore support equipment such as levee dozer and crane, and electrical support gear including reel barge and power cable. The dredge would be able to handle normal shoaling of at least 325,000 cubic yards per year, with the capability to pump up to 8,000 cubic yards per day for a maximum of about 650,000 cubic yards throughout the six month dredging cycle. The dedicated dredge and appurtenant equipment would be turned over to the city of Santa Barbara for the purpose of dredging and maintaining the existing Federal navigation project. The city, in addition to being solely responsible for operating, maintaining, repairing, replacing and rehabilitating the dredge and appurtenant equipment, would assume sole responsibility for dredging and maintaining the existing Federal channel. The channel maintenance program is expected to include dredging twice a year, with disposal on East Beach. Any changes to this program would require coordination with and approval by regulatory agencies. The city of Santa Barbara would be responsible for acquiring all permits and complying with any specific provisions of such permits necessary to accomplish maintenance dredging.

3. Based on October 1993 prices, the total estimated first cost of the recommended plan is $5,530,000, of which $4,420,000 is Federal and $1,110,000 is non-Federal. Based on a 50-year period of analysis and a discount rate of 8 percent, the average annual costs with the new system in place are $1,160,000, including $700,000 for operation and maintenance. The annual costs for

continued Corps maintenance of the Federal channel would be $1,170,000. Therefore, the recommended plan results in a $10,000 net annual savings over the current practice of Federal channel maintenance by the Federal Government and provides the most cost effective means for continuing maintenance of the harbor channels. The recommended plan is the national economic development (NED) plan.

4. Washington level review finds that the proposed plan for Santa Barbara Harbor is economically justified, engineeringly feasible, and environmentally acceptable. The views of interested parties, including Federal, State, and local agencies have been considered.

5. I concur in the findings, conclusions, and recommendations of the reporting officers. I recommend implementation of the proposed project with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to the cost sharing, financing, and other applicable requirements of Public Law 99-662, including Federal responsibility for:

(a) Preparation of design requirements for the dredge system including performance specifications for all features of the system. The Federal Government does not warrant the suitability of the dredge and appurtenant equipment for the project;

(b) Acquiring a dredge and appurtenant equipment suitable for maintaining the dredged depths in the entrance channel and the inner harbor channel, and turning them over to the city of Santa Barbara;

(c) Providing advice and assistance to the city of Santa Barbara during the testing, and acceptance of the dredge and appurtenant equipment; and

(d) Funding 80 percent of the total first cost of acquiring the dredge and appurtenant equipment, including design, procurement, testing, acceptance, and other technical assistance the Federal Government provides in support of this acquisition, currently estimated to be $4,420,000, plus an amount equal to any credit the city of Santa Barbara receives for lands, easements, rights-of-way, relocations and suitable borrow and dredged or excavated material disposal areas it provides.

6. In addition, my recommendation is subject to the non-Federal sponsor agreeing to comply with the applicable Federal laws and

policies, and with the following requirements to:

(a) Operate, maintain, repair, replace, and rehabilitate a dredge and appurtenant equipment suitable for maintenance of the dredged depths in the entrance channel, and the inner harbor channel;

(b) Provide all lands, easements, and rights-of-way, and suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(c) Provide or pay to the Government, during the period of construction, the cost of providing all retaining dikes, wastewiers, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project;

(d) Provide, prior to the Federal Government's acquisition of the dredge and appurtenant equipment, a cash contribution equal to 20 percent of the total first cost of acquiring the dredge and appurtenant equipment, including design, procurement, testing, acceptance, and other technical assistance the Federal Government provides in support of this acquisition; except that this contribution requirement shall be reduced by a credit, equal to no more than 10 percent of said total cost, for the value of lands, easements, rights-of-way, relocations and suitable borrow and dredged or excavated material disposal areas the city of Santa Barbara provides prior to the Federal Government's acquisition of the dredge and appurtenant equipment;

(e) Operate, maintain, repair, replace, and rehabilitate all project features in accordance with regulations or directives prescribed by the Government including maintaining the entrance channel and the inner harbor channel to the dredged depth authorized by Congress;

(f) Grant the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project;

(g) Hold and save the Government free from all damages arising from the construction, operation, maintenance, repair,

replacement, and rehabilitation of the project and any project related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors;

(h) Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs;

(i) Perform, or cause to be performed, such investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §601-9675, in, on, or under any lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project except that the non-Federal sponsor shall not perform such investigations on lands easements or rights-of-way that the Federal Government determines to be subject to the navigation servitude without prior specific written direction by the Federal Government;

(j) Operate, maintain, repair, replace, and rehabilitate the project to the maximum extent practicable in a manner that will not cause liability to arise under CERCLA;

(k) Assume complete financial responsibility, as between the Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, under lands, easements, or rights-of-way that the Government determines to be necessary for the construction, operation, and maintenance of the Project.

(l) Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance, of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act;

(m) Comply with all applicable Federal and State laws and regulations, including section 601 of title VI of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of

Handicap in Programs and Activities Assisted or Conducted by the Department of the Army";

(n) Comply with requirements, procedures, and standards related to environmental protection and quality control that may be prescribed pursuant to responsibilities of the laws and policies of the Federal Government;

(o) Comply with safety, labor, and contracting requirements as established by Federal and State laws and policies; and

(p) Take such actions as may be necessary to ensure that the dredge not be used outside the boundaries of the city without the written consent of the Assistant Secretary of the Army for Civil Works.

7. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the State of California, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

ARTHUR E. WILLIAMS
Lieutenant General, USA
Chief of Engineers

Santa Barbara Harbor Feasibility Report

ADDENDUM

March 1994

CHANGES RESULTING FROM WASHINGTON LEVEL REVIEW PROCESS

This Addendum includes the required changes to the August 1993 Santa Barbara Harbor Feasibility Report resulting from the Washington Level Review Process. It is intended to be part of the final report and also to be an integral part of the planning process. The August 1993 Report, as supplemented by this Addendum, is intended to serve as the basis for project authorization by Congress.

This Addendum includes five Attachments, as follows:

Attachment 1. Real Estate Supplement. This is a new report which details LERRD requirements and additional real estate costs.

Attachment 2. Revised Cost Estimate. The revised cost estimate includes additional cost items for real estate requirements, an increase of $88,000 in project first costs, from $4,455,000 to $5,533,000. The increase includes $77,000 in LERRD and $11,000 in PED real estate costs, which are described in Attachment 1.

Attachment 3. Project Economic Analysis. The revised project economic analysis reflects an increase in annual costs for the recommended plan from $1,146,700, shown in the report, to $1,156,600. Primary reasons for the increase include the addition of $12,000 in environmental commitments, and a change in the discount rate from 8.25% to 8%.

Attachment 4. Financial Plan. This attachment is a February 8, 1993 letter from the City of Santa Barbara Waterfront Director, which explains the City's financial plan for participating in the recommended plan.

Attachment 5. Clean Air Act Conformity. This attachment provides the District's coordination pursuant to the Clean Air Act.

Attachment 1.

Santa Barbara Harbor Feasibility Report Addendum

REAL ESTATE SUPPLEMENT

Real Estate Supplement
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REAL ESTATE SUPPLEMENT

This supplement presents the real estate requirements to support the Harbor project at Santa Barbara Harbor in Santa Barbara County, California.

1. **Project Description.** The project area is located on the southern California coast about 90 miles northwest of Los Angeles. The harbor is a small craft harbor that serves recreational and commercial interests. Approximately 1,100 vessels homeport at the Santa Barbara Harbor. The recommended plan for the project is as described in the Final Feasibility Report, dated August 1993, in chapter 5, on page 5-1.

2. **Acreage, Estates & Ownerships:** Given the unusual nature of the project, no "construction" is contemplated. However, the real property described below is required to support operation and maintenance of the project by the City of Santa Barbara, California, the project sponsor.

a. Work and Storage Area: The sponsor currently owns fee title to a approximately 33,000 square foot tract of land known as the Waterfront Storage Yard that is located less than a half mile southeast of Santa Barbara Harbor at 712 Cacique Street in the City of Santa Barbara. Approximately .25 acre of this tract is required to support the project for mooring, storage & maintenance of the dredge as well as for storage & maintenance of dredge-related equipment & supplies. No additional real property interests are required. For value estimate and credit purposes,

the minimum estate required for the project is a Permanent Work Area Easement on .25 acre.

b. Disposal Area: Real property interests will also be required to support disposal of material dredged from the Harbor during the course of project operation and maintenance. The selected site consists of 10 acres on and along the Santa Barbara East Beach. The City of Santa Barbara owns approximately 6 miles of beach area granted to them in trust by the California State Lands Commission.* The disposal site lies within the area granted to the City. For value estimate and credit proposes, the minimum estate required for disposal is a Permanent Work Area Easement which includes the right to deposit the material dredged from the harbor. Since the disposal area was owned by the sponsor prior to the contemplation of the project, it must be appraised using the Federal rules of compensation [see para. 12-13e.(2), ER 405-1-12 (draft Ch.12)]. In accordance with the Federal rule of offsetting benefits, the benefits which will accrue from the deposit of dredged material will exceed the value of the disposal easement. Therefore, the value (and credit) of the 10 acre disposal area is $0.00.

* Under the Tidelands Trust Doctrine (Statues of California, (1925) Ch. 78, P.182) the State of California granted to the City of Santa Barbara all rights, title and interest it held by virtue of its Sovereignty, to the subject property for harbor purposes.

3. **PL 91-646 Relocations.** NONE

4. **Minerals.** NONE

5. **Facility and Utility Relocations.** NONE

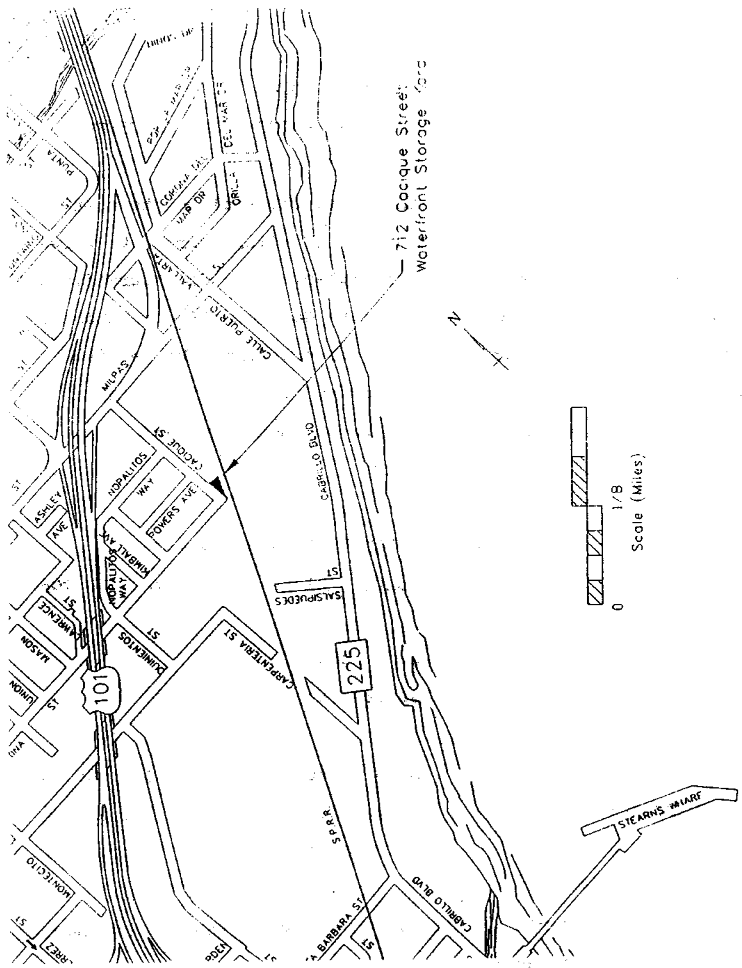
6. **Sponsor's Ability to Acquire.** NO ACQUISITION REQUIRED

7. **Initial Real Estate Cost Estimate.** The real estate cost estimate is based on a general survey of similar property types applying recognized appraisal principles. The Administrative and Contingency estimates are based on the Government's and sponsor's estimates of labor costs involved with providing the required lands, easements, rights-of-way and dredged material disposal areas including providing supporting documentation and certification of land availability.

COST ESTIMATE FOR REAL ESTATE

	SPONSOR COST	FEDERAL COST
Lands and Damages		
Disposal Site (10 acre)	$ 0.00	
Storage Area (.25 acres)	$65,000.00	
ADMINISTRATIVE COSTS:	$ 5,000.00	$10,000.00
CONTINGENCIES: 10%	7,000.00	1,000.00
TOTAL COST:	$77,000.00	$11,000.00

8. **Hazardous, Toxic and Radioactive Wastes (HTRW):** No known or suspected HTRW issues.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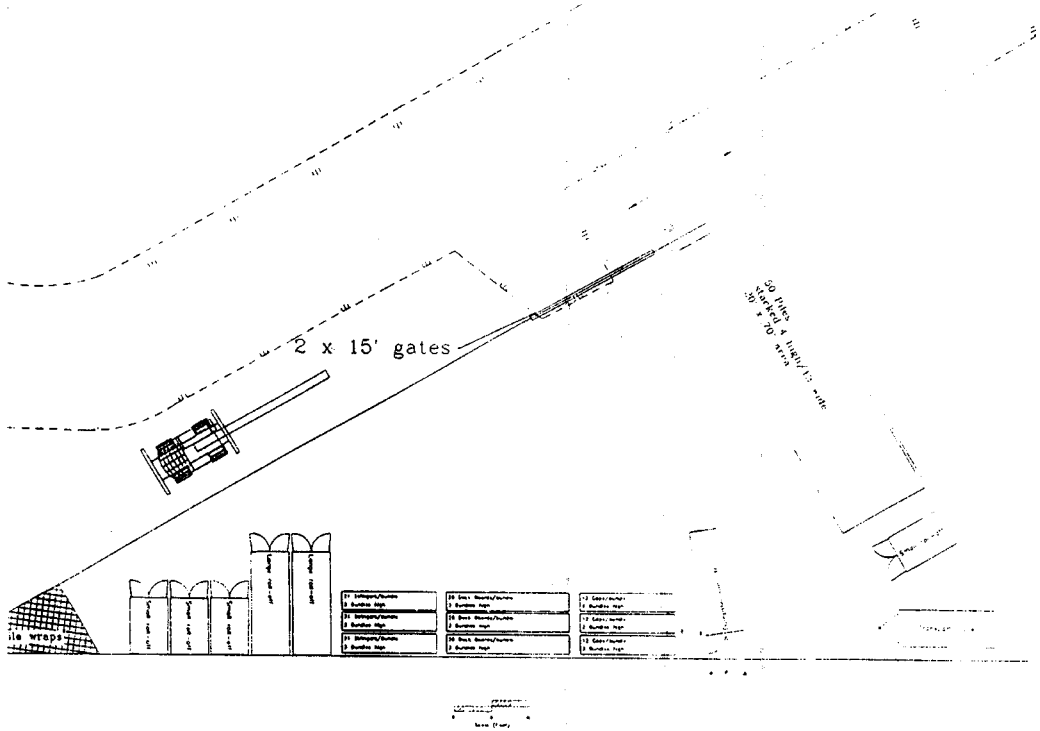

Cacique Street Lot

Attachment 2.

Santa Barbara Harbor Feasibility Report Addendum

REVISED COST ESTIMATE

Cost Estimate for Dedicated Dredge and Equipment

Cost in October 1991 Dollars

Account Code	Item Description	Quantity	Unit	Unit Price	Amount	Contingency (in Acct # 20.0.2) Percent	Total
20	Permanent Operating Equipment						
20.0.1	Office Equipment/Trailer	1	LS	$30,000	$30,000	$6,000 20%	$36,000
20.0.2	Shop Equipment						
	Welding machine	1	EA	$10,000	$10,000	$2,000 20%	$12,000
	Cutting tools	1	LS	$2,000	$2,000	$400 20%	$2,400
	Hand tools	1	LS	$5,000	$5,000	$1,000 20%	$6,000
	Electric tools	1	LS	$1,500	$1,500	$300 20%	$1,800
	Compressor	1	EA	$1,500	$1,500	$300 20%	$1,800
	Rigging Supplies	1	LS	$20,000	$20,000	$4,000 20%	$24,000
	Misc. (lumber, nuts/bolts)	1	LS	$20,000	$20,000	$4,000 20%	$24,000
20.0.4.	Radios	1	LS	$10,000	$10,000	$2,000 20%	$12,000
20.0.5	Maintenance Work Equipment						
20.0.5.L	16 " Hydraulic Suction Dredge w/1000 Kw electric motor ABS design; start up incl	1	EA	$2,000,000	$2,000,000	$500,000 25%	$2,500,000
20.0.5.L	Spare Parts 5% of dredge cost Incl pumps, valves, fittng, bearings, hoses, specializd	1	EA	$100,000	$100,000	$20,000 20%	$120,000
20.0.5.L	Dredge Tender and Skiff Wrkboat 40'X14',2 dsl A frm Skiff -- steel w/ outboard	1	EA	$420,000	$420,000	$84,000 20%	$504,000
20.0.5.L	Reel barge (20 ft by 40 ft)						
	Hull & Fittings	1	LS	$71,000	$71,000	$14,200 20%	$85,200
	Reel	1	EA	$6,500	$6,500	$1,300 20%	$7,800
	Reel Drive	1	EA	$7,000	$7,000	$1,400 20%	$8,400
	Transformer	1	EA	$33,000	$33,000	$6,600 20%	$39,600
	House & Misc	1	LS	$16,000	$16,000	$3,200 20%	$19,200
	Wiring	1	LS	$9,500	$9,500	$1,900 20%	$11,400
	Disconnect Switch Gear	1	LS	$4,500	$4,500	$900 20%	$5,400
	Secondary Transformer	1	EA	$16,000	$16,000	$3,200 20%	$19,200
20.0.5.L	Power Cable	4,000	LF	$12.50	$50,000	$10,000 20%	$60,000
20.0.5.L	Shore Power Gear Construct switch gear/house and conduit	1	LS	$40,000	$40,000	$10,000 25%	$50,000

Cost Estimate for Dedicated Dredge and Equipment (Cont)

[illegible] in October 1993 Dollars 14 Feb 94

20.0.5.5 Pipeline							
Floating Steel Pipeline	[illegible]	LF	$10	$[illegible]	$[illegible]	20%	$43,200
Unload & Install Pontoons	20	EA	$100	$2,000	$400	20%	$2,400
Ball Joints	21	EA	$3,800	$79,800	$16,000	20%	$95,800
Weld Ball Joints (Incl Supplies)	42	EA	$188	$8,000	$1,600	20%	$9,600
40 Pontoons @ $3,000	40	EA	$3,000	$120,000	$24,000	20%	$144,000
Submerged Steel Pipeline	1,200	LF	$30	$36,000	$7,200	20%	$43,200
Weld sections	60	EA	$100	$6,000	$1,200	20%	$7,200
Subline pontoon w Saddle	1	LS	$10,000	$10,000	$2,000	20%	$12,000
Air Compressor	1	EA	$15,000	$15,000	$3,000	20%	$18,000
Shoreline Plastic Pipeline	6,000	LF	$18	$108,000	$21,600	20%	$129,600
Fuse and flange	150	EA	$100	$15,000	$3,000	20%	$18,000
Couplings	150	EA	$100	$15,000	$3,000	20%	$18,000
Anchor barge 30'X15' w/winc	1	LS	$90,000	$90,000	$18,000	20%	$108,000
20.0.5.6 Shore Support Equipment							
Levee Dozer w/blade & winch	1	EA	$60,000	$60,000	$12,000	20%	$72,000
Boomcruck/flatbed	1	EA	$20,000	$20,000	$4,000	20%	$24,000
Trailers (Dozer, ecc)	1	EA	$6,000	$6,000	$1,200	20%	$7,200
Forklift	1	EA	$50,000	$50,000	$10,000	20%	$60,000
Storage shed	1	EA	$50,000	$50,000	$10,000	20%	$60,000
20 ton crane	1	EA	$110,000	$110,000	$22,000	20%	$132,000
20.0.5.7 Dredge Haul Out- Air bags	1	LS	$75,000	$75,000	$15,000	20%	$90,000
Real Estate	1	LS	$70,000	$70,000	$7,000	10%	$77,000
Subtotal, Dredge & Equipment				$3,855,300	$866,100		$4,721,400

Cost Estimate for Preconstruction Engineering and Design

Costs in October 1993 Dollars

14 Feb 94

Account Code	Description	Quantity	Unit	Unit Price	Amount	Contingency (In Acct # 30 --.Z-)	Percent	Total
30	Preconstruction Engineering & Design							
30 C	Project Cooperative Agreement	1	LS	$25,000	$25,000	$5,000	20%	$30,000
30 D	Env'l and Regulatory Support	1	LS	$10,000	$10,000	$2,000	20%	$12,000
30 G	Design Memorandum	1	LS	$167,000	$167,000	$33,400	20%	$200,400
30 H	Plans and Specifications	1	LS	$75,000	$75,000	$15,000	20%	$90,000
30 J	Engineering During Constr	1	LS	$20,000	$20,000	$4,000	20%	$24,000
30 M	Cost Engineering	1	LS	$10,000	$10,000	$2,000	20%	$12,000
30 P	Project Management	1	LS	$110,000	$110,000	$22,000	20%	$132,000
	Real Estate	1	LS	$10,000	$10,000	$1,000	10%	$11,000
	Subtotal, Preconstruction Engineering & Design				$427,000	$84,400		$511,400

Cost Estimate for Construction Management

Costs in October 1993 Dollars

14-Feb-94

Account Code	Description	Quantity	Unit	Unit Price	Amount	Contingency (In Acct # 31 --.Z.-)	Percent	Total
31	Construction Management (S & I)							
31 A	Constr Mgmt (S & I) Prior to	1	LS	$200,000	$200,000	$40,000	20%	$240,000
31 P	Project Management	1	LS	$50,000	$50,000	$10,000	20%	$60,000
	Subtotal, Construction Management				$250,000	$50,000		$300,000

TOTAL FIRST COST		$5,532,800
	SAY	$5,533,000

Attachment 3.

Santa Barbara Harbor Feasibility Report Addendum

PROJECT ECONOMIC ANALYSIS

Table 12-3
Summary of Annualized First Cost

Item		First Cost
20.-.-.-	Dredge and Equipment	$4,721,400
30.-.-.-	PED Activities	$511,400
31.-.-.-	Construction Support	$300,000
	Total First Cost	$5,532,800 $5,533,000
	Interest During Construction	$18,000
	Total Investment Cost	$5,551,000

Summary of Total Annual Costs, Dedicated Dredge

Annualized First Cost	$453,700
Insurance	$45,000
Annual Staff Costs (Santa Barbara)	$15,000
Annual Operating Costs (50 days @ $11,000/day)	$550,000
Replacement Fund	$80,900
Environmental Requirements	$12,000
Grand Total	$1,156,600
Corps Operating Costs	$1,164,800
Net Annual Cost Savings	$8,200
Ratio of Costs	1.01

Attachment 4.

Santa Barbara Harbor Feasibility Report Addendum

FINANCIAL PLAN

Attachment 4

CITY OF SANTA BARBARA

WATERFRONT DEPARTMENT

TELEPHONE (805) 564-5519
FAX (805) 564-5542

POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990

February 8, 1994

Mr. Stephen Fine
Coastal Resources Branch
US Army Corps of Engineers
300 N. Los Angeles St.
Los Angeles, Calif. 90012

Dear Mr. Fine:

This letter is written to explain possible funding sources for the City of Santa Barbara share of capital costs and operations and maintenance costs associated with the proposed dredge purchase and operations by the City.

A number of years ago the Santa Barbara City Council established the Harbor Preservation Trust Fund to set aside money for potential future dredge costs or other financial uncertainties related to the Santa Barbara Harbor. A $250,000. appropriation was established each year in the Harbor Operating Budget until this fund reached a total of $5 million. The fund will reach $5 million during fiscal year 1994-95 and no further appropriations will be budgeted. A portion of these funds could be used for initial capital expenditures.

The City has been planning for possible assumption of the operation and maintenance costs of dredging in future years. We recently completed a Master Plan for the Harbor that includes several projects that will generate new revenue sources in future years. With a current operating budget in excess of $4 million and the promise of future new sources of revenue, the operation and maintenance costs can be accommodated as part of our routine budget process.

I hope that this adequately responds to concerns expressed relative to our Feasibility Study. Should there be any addition questions, or need for additional information, do not hesitate to contact me.

Very truly yours,

R. B. Bouma
Waterfront Director

Attachment 5.

Santa Barbara Harbor Feasibility Report Addendum

CLEAN AIR ACT CONFORMITY

EXEMPTION FROM CONFORMITY DETERMINATION REQUIREMENTS

SANTA BARBARA HARBOR FEASIBILITY STUDY

SANTA BARBARA COUNTY, CALIFORNIA

The Draft Santa Barbara Harbor Feasibility Study and Environmental Assessment were completed in June, 1993. The recommended alternative entails the purchase of an electric dredge, and transfer of harbor maintenance responsibility to the City of Santa Barbara. The Washington Level Review Center has requested a determination of the proposed project's conformity with the Clean Air Act. Specifically, the Clean Air Act, as amended in 1990, 42 U.S.C. 7476(c), requires Federal actions to conform to any State Implementation Plan approved or promulgated under Section 110 of the Act.

I have determined that the proposed project is exempt from demonstrating conformity to State or Federal Implementation Plans, in view of the fact that an electric dredge produces essentially no emissions, and would result in no forseeable direct or indirect impacts to air quality. This determination has been made in recognition of 40 CFR Part 51, dated November 15, 1993, entitled "Determining Conformity of General Federal Actions to State or Federal Implementation Plans." Section 51.853(c) discusses applicability of these requirements to specific Federal actions, as follows:

Sec. 51.853 Applicability.

(c) The requirements of this subpart shall not apply to:

(1) Actions where the total of direct and indirect emissions are below the emissions levels specified in paragraph (b) of this section.

(2) The following actions which would result in no emissions increase or an increase in emissions that is clearly de minimis:

(ix) Maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site...

(xix) Actions (or portions thereof) associated with transfers of land, facilities, title, and real properties through an enforceable contract or lease agreement...where the Federal agency does not retain continuing authority to control emissions associated with the lands, facilities, title, or real properties.

"Conformity" is defined in Section 176(c) of the 1990 Clean Air Act Amendments as conformity to the State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and

achieving expeditious attainment of such standards, and that the activities will not:

1. Cause or contribute to any new violation of any standard in any area; or
2. Increase the frequency or severity of any existing violation of any standard in any area; or
3. Delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The Environmental Protection Agency, the Santa Barbara County Air Pollution Control District (APCD), and the California Air Resources Board were also consulted regarding the need for a written conformity determination for this project. Persons contacted expressed no concerns with the proposed project. The APCD, furthermore, determined the proposed action to be exempt from air quality rules, regulations, and permitting requirements.

The purchase of an electric dredge by the Corps of Engineers, to be used for maintenance dredging by the City of Santa Barbara, meets the above criteria for conformity with Federal and/or State Implementation Plans. This project, as proposed, is exempt from requirements for a written conformity determination.

For further information, please contact Ms. Hayley Lovan, Project Environmental Coordinator, at (213)894-0237.

18 March 1994
DATE

R. L. VanAntwerp
Colonel, Corps of Engineers
District Engineer

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office

DATE: 2/2/94 - 2/9/94

SUBJECT OF CONVERSATION: SANTA BARBARA FEASIBILITY STUDY: WASHINGTON LEVEL REVIEW CENTER COMMENTS

INCOMING CALL		
PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION
PERSON CALLED	OFFICE	PHONE NUMBER AND EXTENSION

OUTGOING CALL		
PERSON CALLING: HAYLEY LOVAN	OFFICE: CESPL-PD-RQ	PHONE NUMBER AND EXTENSION: (213) 894-0237
PERSON CALLED: VARIOUS STAFF MEMBERS	ADDRESS: ENVIRONMENTAL PROTECTION AGENCY	PHONE NUMBER AND EXTENSION: (415) 744-XXXX

SUMMARY OF CONVERSATION:

Date? - Doug Eisinger - Chief, Mobile Sources SectionX-1230
Mr. Eisinger suggested I call John Kennedy, Chief of Compliance & Oversight Section 2/2/94 or 2/3/94 - John Kennedy - X-1154.

Mr. Kennedy returned my earlier call. He could not answer my questions. He told me he would contact the office that coordinates Environmental Assessments.

2/8/94 - John Kennedy called. He told me that Brian Ross is the person I should contact.

2/8/94 - Brian Ross - Federal Projects Coordinator, Wetlands and Coastal Planning X-1987.

Mr. Ross requested a fax of the WLRC comments. He was not familiar with those air quality regulations. He suggested we may need to write a letter to the EPA stating that our project is in compliance with the SIP or FIP, and then the EPA would concur (or not) with or determination. He said he would review the comments with other staff members, and have someone call me back. When I sent the fax, I asked him to send me a sample of a compliance letter, if one is necessary.

2/9/94(?) - Dave Farrell - Federal Activities Branch - 744-1574
Mr. Farrell called me about the comments I faxed to Brian Ross. He was not aware of any requirements for the EPA to provide a "coordination letter".

No one I contacted expressed any concerns with the project.

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office

DATE: 2/3/94 - 2/7/94

SUBJECT OF CONVERSATION: SANTA BARBARA FEASIBILITY STUDY - WASHINGTON LEVEL REVIEW CENTER COMMENTS

INCOMING CALL		
PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION
PERSON CALLED	OFFICE	PHONE NUMBER AND EXTENSION

OUTGOING CALL		
PERSON CALLING: HAYLEY LOVAN	OFFICE: CESPL-PD-RQ	PHONE NUMBER AND EXTENSION: (213) 894-0237
PERSON CALLED: STEVE STERNER	ADDRESS: AIR POLLUTION CONTROL DISTRICT	PHONE NUMBER AND EXTENSION: (805) 961-8896

SUMMARY OF CONVERSATION

Mr. Sterner thinks a State Implementation Plan must have been submitted, but he doesn't know if it has been approved by the EPA. An electric dredge is not subject to APCD rules and regulations. It is an exempt operation, so it would be exempt from the SIP requirements. (Permit exemptions are approved in the SIP). He requested a fax of the WLRC comments, and said he would try to get back to me with more details.

2/4/94: I sent him the fax again. He never received the first copy.

2/7/94: Mr. Sterner told me that the SIP does not apply to this project, because electric dredges don't emit pollutants and don't require permits.

TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office

DATE: 2/15/94

SUBJECT OF CONVERSATION:

SANTA BARBARA FEASIBILITY STUDY: WASHINGTON LEVEL REVIEW CENTER COMMENTS

INCOMING CALL

PERSON CALLING	ADDRESS	PHONE NUMBER AND EXTENSION
PERSON CALLED	**OFFICE**	**PHONE NUMBER AND EXTENSION**

OUTGOING CALL

PERSON CALLING	OFFICE	PHONE NUMBER AND EXTENSION
HAYLEY LOVAN	CESPL-PD-RQ	(213) 894-0237
PERSON CALLED	**ADDRESS**	**PHONE NUMBER AND EXTENSION**
JIM NYERADY	AIR RESOURCES BOARD	(916) 323-5184

SUMMARY OF CONVERSATION:

Mr. Nyerady said that the California State Implementation Plan consists of the individual rules of local agencies, such as the Air Pollution Control Districts, Air Quality Management Districts, and the Air Resources Board. (The Air Resources Board has responsibility for vehicles, mobile equipment). The EPA reviews each agency's rules. If the local agencies don't enforce their rules, the EPA may get involved. Revisions of the rules are also reviewed, but the EPA is far behind.

US Army Corps
of Engineers
Los Angeles District

Final Feasibility Report

SANTA BARBARA HARBOR
Santa Barbara County, California

Main Report

August 1993

SYLLABUS

The Santa Barbara Harbor Feasibility Study was conducted to determine the Federal interest in improvements to reduce undesirable shoaling in the entrance channel, and also in a desire by the City of Santa Barbara to take over responsibility for maintenance dredging. This is a "Review of Deferred Projects" category study to review the project authorized by the River and Harbor Act of 1962, and subsequently inactivated in 1969. The Feasibility Cost Sharing Agreement was signed on August 30, 1988.

The Feasibility Study included an investigation of the historic shoaling problem, an assessment of past and current maintenance dredging operations -- with recent advanced maintenance increases, and a look at the potential for beginning dredging operations to begin earlier in the fiscal year. The findings indicate that the modified dredging program should reduce the shoaling problem. As a result, the Study focused on the plan desired by the City of Santa Barbara to acquire a dredge system, and assume total responsibility for the Federal maintenance dredging program.

The "deferred project," authorized in the 1962 River and Harbor Act, was considered early in the study process and, because of a continuing lack of public support, including opposition from Santa Barbara City officials, was eliminated from further consideration.

The Recommended Plan consists of Federal Government participation in the acquisition of a dredge system, including a 16-inch electric hydraulic dredge, workboat and skiff, pipelines, and spare parts, shore support equipment, electric support gear and associated spare parts.

The total first cost of the recommended dredge system is estimated to be $5,445,000, of which the Federal Government would provide 80%, or $4,356,000, and the City of Santa Barbara 20%, or $1,089,000. The City of Santa Barbara will be responsible for 100% of the cost of operating and maintaining the equipment, including replacement costs, and would assume total responsibility for maintaining the Federal channel at Santa Barbara Harbor. The City's annual cost for operation and maintenance, and replacement would be an estimated $688,800.

An economic analysis of the Recommended Plan indicates that $18,000 in annual savings would result from the implementation of the Recommended Plan. However, even though these savings are small, the Recommended Plan would allow the City to be more responsive to shoaling, and result in overall Federal Government savings of more than $9 million over the life of the project.

The Environmental Assessment indicates that no significant adverse environmental impacts will result from the implementation of the recommended plan, and operation of the dredge by the City would be consistent with the accepted Federal maintenance dredging program at Santa Barbara.

In view of the savings to the Federal Government and the desires of the City of Santa Barbara to take over entrance channel maintenance, the District Engineer recommends that the recommended plan as presented in this report be authorized for implementation.

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Chapter 1. The Feasibility Study

The Santa Barbara Harbor Feasibility Study was conducted under the Corps of Engineers' "Review of Deferred Projects" study category.

A proposed project for Santa Barbara Harbor was authorized in the River and Harbor Act of 1962, House Document Number 518, 87th Congress, 2d Session. In 1969, however, the City of Santa Barbara withdrew their support for the project, indicating that it was no longer acceptable to the community because it included major Harbor expansion. As a result, the authorized project was placed in an inactive status.

In a January 1981, the City requested that the project be reactivated. In view of the renewed local support, the project was reclassified to the "deferred" category. In 1987, Congress appropriated funds to conduct Reconnaissance Studies under the "Review of Deferred Projects" category study for determining the Federal interest in the authorized, but unconstructed, project, or modifications thereto.

The Reconnaissance Report indicated a Federal interest in modifications to improve navigation at Santa Barbara, as well as an interest in the plan desired by the City of Santa Barbara to take over total responsibility for maintenance of the existing Federal navigation project. The Reconnaissance Report was certified to proceed to the Feasibility Phase by the Office of the Chief of Engineers in April 1988 and a cost sharing agreement for the Feasibility Phase was signed by the Corps of Engineers and the City of Santa Barbara in August 1988. This Feasibility Study was initially funded as a cost-shared study in Fiscal Year 1989.

Purpose and Scope

This study examined the feasibility of modifying Santa Barbara Harbor and the maintenance program to improve navigability of the entrance channel by reducing the shoal within the entrance channel. Waves break across the channel due to the rapidly forming shoal at the Harbor entrance causing damage to vessels and loss of revenues to water-related businesses. These conditions inhibit the use of the Harbor and its facilities for all boaters, and reduce its desirability as a harbor of refuge.

The study also addressed the Federal interest in a plan desired by the City of Santa Barbara to take over maintenance responsibility for the existing Federal navigation project.

As a result of investigations conducted as part of this study, measures including earlier dredging and provision of advanced maintenance areas that significantly reduce the historic shoaling problem have been incorporated into the Corps of Engineers maintenance program for Santa Barbara Harbor under current operations and maintenance authorities as contained in Engineer Regulation 1130-2-307. Consequently, this report focuses on determining the Federal interest in a plan desired by the City of Santa Barbara to take over responsibility for maintaining the Federal channel through acquisition of a dredge and associated equipment for operation by the City.

The study was conducted and the report prepared in accordance with Principles and Guidelines for Water Resources and other authorities which establish and define the goals and procedures for water resources planning as contained in Engineer Regulation 1105-2-100. Alternatives are examined for their feasibility in consideration of engineering, economic, environmental and other criteria. A determination of the extent of Federal interest in accordance with present laws and policies is also included.

Study Management and Coordination

In accordance with section 105(a) of the Water Resources Development Act of 1986, and ER 1105-2-100, this study has been conducted under a Feasibility Cost Sharing Agreement executed on August 30, 1988 between the Corps of Engineers and the non-Federal sponsor, the City of Santa Barbara. The Los Angeles District Corps of Engineers was responsible for conducting and coordinating the overall study, compiling and consolidating data from studies of other agencies, and preparing this report. Los Angeles District personnel worked closely and coordinated with appropriate Federal, State, County and local agencies, public and private organizations, and interested individuals. These interests provided pertinent data to the study. The government agencies included in the coordination process were:

Federal Agencies

(1) U.S. Coast Guard
(2) U.S. Environmental Protection Agency
(3) U.S. Fish and Wildlife Service
(4) U.S. National Marine Fisheries Service

State Agencies

(1) California Coastal Commission
(2) Department of Fish and Game
(3) California Regional Water Quality Control Board
(4) Office of Historic Preservation
(5) California Wildlife Conservation Board
(6) California Department of Boating and Waterways

Local Agencies

(1) City of Santa Barbara
(2) Central Coast Air Quality Management District
(3) Santa Cruz Harbor District

History of Project

In 1927-28, local interests constructed an 1,800-foot-long detached breakwater to provide a protected harbor at Santa Barbara. In 1930, the westerly end of the breakwater was extended to shore at Point Castillo to control the shoaling at the west end of the Harbor. In 1934, shoaling on the west side of the breakwater had created Leadbetter Beach, and littoral material was bypassing the breakwater, creating a shoal at the east end of the breakwater in the Harbor entrance.

In 1935, Congress authorized maintenance dredging by the Corps of Engineers at Santa Barbara Harbor, with a limit of $30,000 annually. Dredging was performed approximately biannually between 1935 and 1952. In 1959, the City of Santa Barbara assumed responsibility for maintenance dredging, using a City-owned dredge, operating under an annual Federal reimbursement of up to $30,000.

Section 114 of the Rivers and Harbors Act of 1970 transferred the responsibility for dredging and maintaining the Harbor to the United States. In 1972, the Corps of Engineers assumed responsibility for maintaining a channel -15 feet MLLW deep and 300 feet wide for 1,500 feet inside the Harbor, and -20 feet MLLW deep and 400 feet wide for about 1,200 feet from the inner Harbor to the seaward edge of Stearns Wharf.

The sandbar eroded and collapsed in 1973, prompting the City of Santa Barbara to construct an 880-foot-long timber bulkhead along the sandbar crest. Subsequent damage in 1978 and 1983 was repaired with a rubblemound breakwater placed over the bulkhead in 1983.

The City of Santa Barbara constructed a 240-foot rubblemound extension to the sandspit to provide additional protection against wave penetration into the Harbor in 1986.

Prior Reports and Activities

Since the Santa Barbara Harbor was first built in 1928, there have been numerous studies of harbor expansion, the shoaling problem and associated downcoast beach erosion. Study findings and recommendations are shown in the following paragraphs. A review of these reports showed that the harbor entrance shoaling problem has been recognized since shortly after the connection of the breakwater to Castillo Point in 1930.

1. Beach Erosion at Santa Barbara, California, January 15, 1938 H.R. Doc. No. 552, 75th Cong., 3rd Sess. (1938).

The purpose of this study was to determine the causes of serious erosion of the beaches from Santa Barbara Point to the mouth of Carpinteria Creek and to find the best method of restoring the beaches and protecting further erosion. The study recommended that materials dredged from Santa Barbara Harbor in connection with its maintenance be deposited along the shore to the east; local interests to bear costs in excess of $30,000 per year; surveys and photographs to be repeated every three months for one year.

2. Reexamination of Santa Barbara Harbor, California, August 6, 1941, H.R. Doc. No. 348, 77th Cong., 1st Sess. (1941).

The purpose of this study was to review the reports on Santa Barbara Harbor, with a view to ascertaining the advisability of changing the method of maintenance of the existing project. The study recommended that the existing project for Santa Barbara Harbor be modified to permit maintenance of the harbor by means of a fixed sand intercepting plant provided and operated by and at the expense of local interests; the United States to make available for the operation of the plant an amount not exceeding $30,000 annually. Public Law 14-79th Cong., Ch. 19, 1st Sess., Sec. 2, approved March 2, 1945; H.R. Doc. No. 348, 77th Cong.

3. Santa Barbara, California, Beach Erosion Control Study, December 22, 1948, H.R. Doc. No. 761, 80th Cong., 2nd Sess. (1948).

The purpose of this study was to determine the effectiveness of the adopted program initiated in 1938 for beach restoration by artificial nourishment and the advisability of instituting further measures to increase its effectiveness. The study recommended continuation of the adopted plans of artificial beach nourishment in connection with Santa Barbara Harbor maintenance and that no additions or other changes in existing protection structures on the beaches be made at that time.

4. Review Report for Navigation, Santa Barbara Harbor, California, USACE, October 1, 1961.

The purpose of the review was to determine the engineering feasibility and economic justification for expanding navigation facilities in Santa Barbara by a) modifying the existing harbor; or b) constructing another harbor at either Goleta or Carpinteria, CA.

It was recommended that the existing project for Santa Barbara Harbor be modified to provide for the construction of the extension to the existing West Breakwater built by the City of Santa Barbara, an East Breakwater, a detached breakwater, an entrance channel, a turning basin, an East Channel, Center Channel, a West Channel, and an L-shaped anchorage.

5. Santa Barbara Harbor, California, August 13, 1962, H.R. Doc. No. 518, 87th Cong., 2nd Sess. (1962).

The purpose of this study was a review of reports on Santa Barbara Harbor, California, requested by resolutions of the Committee on Public Works, House of Representatives, adopted 19 March 1946 and 11 June 1952 to determine the engineering feasibility and economic justification for modifying the existing harbor or constructing another harbor in the area at either Goleta or Carpinteria. The report recommended modification of the existing project for Santa Barbara Harbor to provide for improvement and enlargement of the harbor by breakwater construction and channel and basin dredging.

6. River and Harbor Act of 1970, H.R. Rep. 19877, 91st Cong.(P.L. 91-611, Sec. 114, December 31, 1970.

This Act modified the project for Santa Barbara Harbor, California, authorized by the River and Harbor Act approved March 2, 1945, to provide that the dredging and maintenance of such project shall be the responsibility of the United States.

7. Special Study of Santa Barbara Harbor Operation and Maintenance on Cost Analysis of Present and Alternative Dredging Practices, USACE, 1974 (unpublished).

The current dredging practices were compared to six alternative dredging systems. The comparison was made based on economics only, and concluded that a stationary sand bypass system would improve the current dredging practices.

8. The Santa Barbara County Streams (Mission Creek) Study, USACE, 1986.

This Federal study resulted in a feasibility report, submitted in August 1986, on Lower Mission Creek. The Creek, which flows through the City of Santa Barbara and into the Pacific Ocean at the Harbor, poses a serious flood threat to the City. Channel improvements are proposed for Mission Creek.

9. The Coast of California Storm and Tidal Wave Study, USACE,In-progress.

This study is a response to the critical need for information and systematic analysis of the changing California shoreline. This information can be used by planners and coastal engineers to protect property and develop stable low-maintenance harbor and shore-protection facilities. The study area has been divided into six regions and Santa Barbara County is in the South Central Region. A study has been made of the San Diego Region, and the priority and schedule of the remaining regions is currently being established.

10. Santa Barbara County Beach Erosion and Storm Damage Reconnaissance Study, USACE, 1990.

The study examined alternatives to reduce the erosion and storm damage along problem areas within Santa Barbara County. Efforts included wave data collection, aerial photography, shoreline profiles, sediment sampling, river sediment discharge measurement, and other studies related to evaluating and predicting shoreline changes.

11. The Coastal Sand Management Plan, BEACON, July 1989.

This report examined the coastal reach between Santa Barbara and Ventura County to determine status of the shoreline and sediment flow, and provides recommendations for a sand management strategy.

Chapter 2. The Study Area

Santa Barbara Harbor is located on the Southern California coast about 90 miles northwest of Los Angeles and 320 miles southeast of San Francisco, as shown in Figure 2-1. It is located in Santa Barbara County. The closest neighboring harbors are Ventura Harbor, about 30 miles downcoast, and Port San Luis, some 107 miles upcoast.

Existing Federal Project

Santa Barbara Harbor is a smallcraft harbor that serves recreational and commercial interests. Approximately 1,100 vessels homeport at Santa Barbara, including 157 commercial fishing vessels. Businesses that rely on Harbor facilities include commercial fishermen, boat rental and charter fishing operations, boats serving offshore oil platforms, service businesses, and retail shops and restaurants located around the Harbor and on Stearns Wharf.

The Harbor is protected by the 2,300-foot long rubblemound west breakwater, the sandbar breakwater which includes a 750-foot long rubble protected timber bulkhead and a 240-foot long rubble extension to the timber bulkhead breakwater, and a groin located inside of the harbor. All of these protective structures are maintained by local interests. The 300-foot-wide, 1,500-foot-long inner entrance channel was dredged to a control depth of -15 feet MLLW, and the 400-foot-wide, 1,200-foot long outer entrance channel was dredged to a control depth of -20 feet MLLW. Additional deepening of the outer entrance channel to -35 feet MLLW, and a portion of the inner entrance channel to -28 feet MLLW for advanced maintenance was approved by the South Pacific Division, and implemented in Fiscal Year 1993. These new depths are now the control depths for the entrance channel. Federal maintenance responsibility is limited to maintenance of the entrance channel. The Harbor area is shown in Figure 2-2.

Many existing major land uses in the project area are related to the Harbor. These uses consist of Santa Barbara Waterfront Department facilities, Coast Guard facilities, the Santa Barbara Yacht Club, retail stores serving boaters, landside boat storage and repair facilities, parking for the harbor, boat launching facilities, and restaurants and shops located west of the Harbor and on Stearns Wharf.

The harbor area is currently highly developed and little land is available for improvement or expansion without converting beach areas to developed areas. Traffic is also a problem in the area. The City of Santa Barbara recently completed a harbor master plan in 1990.

Figure 2-1. LOCATION MAP

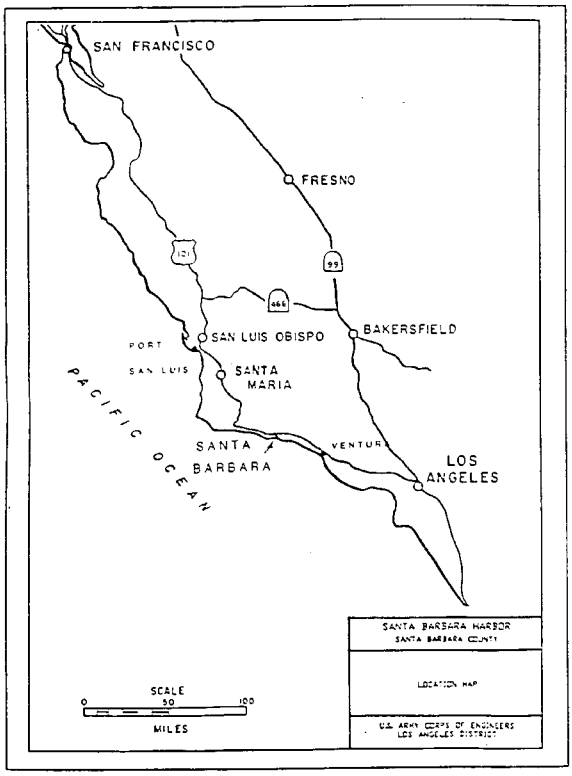
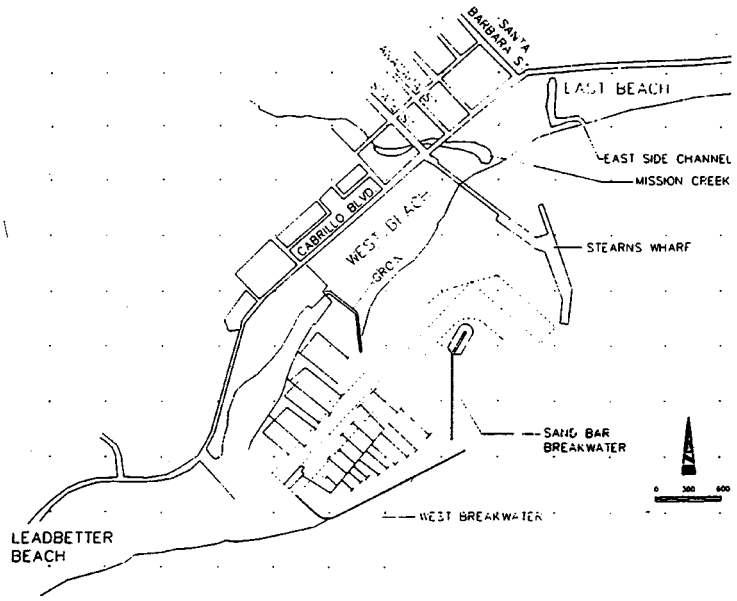


Figure 2-2. SANTA BARBARA HARBOR AREA



FEATURES:

EXISTING MAINTENANCE DREDGING PROGRAM: 3 YEAR - 2 PHASE CONTRACT

PHASE 1 - DECEMBER 1 TO JANUARY 1
PHASE 2 - FEBRUARY 15 TO MARCH 15

Geologic Setting

The City of Santa Barbara occupies a small alluvial plain and a larger bordering terraced area, all about two miles wide, between Mission Ridge on the north and the so-called Mesa on the south. This depression is open to the sea on the southeast. The coast in the vicinity of Santa Barbara is generally rugged with projecting headlands of ledge rock or erosion-resistant accumulations of boulders and cobble stone and intervening coves having cobble or gravel covered shores or sandy beaches. A distinct geologic formation, named younger alluvium, underlies the southern portion of the City of Santa Barbara. This formation extends to a depth of 250 feet below sea level and consists mainly of fine grained clay and silt, and some sand with local bodies and gravel at the base. The younger alluvium rests with marked angular unconformity on the older alluvium formation and all other formations.

Foundation Conditions

Several foundation investigations have been conducted within the general Santa Barbara Harbor area to support the design efforts for the breakwaters and dredging. Investigations indicate that materials in the area are generally granular and cohesionless. The investigations further indicate that sand and silty sand were the predominant materials encountered with the first indication of clay at depths of 25 feet. The core borings taken in 1941 at the sandbar revealed that neither cemented material nor large deposits of cobble were present. Soil borings along the northern limit of the entrance channel off of West Beach contained cobbles and boulders. Discussions between the Corps of Engineers and contractor at the time revealed that in previous years a contractor dumped approximately 20,000 cubic yards of rock in the vicinity. Soil borings conducted by the City in 1980 between West Beach and the entrance channel also indicated a layer of cobbles. The exact depth of the cobble layer is unknown.

Bathymetry

The deepwater bathymetry near the site was last surveyed in 1985 by the National Ocean Survey. The bottom slope immediately offshore of the harbor entrance varies from 1:100 to 1:150. Bottom slopes steepen to 1:50 as one progresses offshore until the Santa Barbara Channel at approximately 200 fathoms. The mouth of the entrance channel now reaches to the project depths at the -20 foot MLLW contour. Inside the harbor, depths range from -15 feet MLLW in the fairway to -8 MLLW under the slips.

Tides

The tides in the Santa Barbara Channel region are classified as mixed, semidiurnal, with diurnal inequalities. The vertical datum plane used in this report for tides and water depths is mean lower low water (MLLW). Tide data for Santa Barbara are presented in **Table 2-1** and were obtained from the National Oceanic and Atmospheric Administration, National Ocean Service. Mean lower low water at Santa Barbara is based on four years of record (1974-1976, 1978).

The record-high water elevation has been attributed to the combination of a perigean spring tide, a rare atmospheric and oceanic anomaly known as El Nino Southern Oscillation (ENSO), and wind stress from strong winds which accompanied intense storms occurring concurrently. According to the National Weather Service and Scripps Institution of Oceanography, this ENSO caused a general rise in sea level in Southern California of about 6 to 9 inches. On January 27, 1983, a high water level of +8.0 ft MLLW was recorded at Rincon Island, 12 miles east of Santa Barbara. This elevation is assumed to be representative of the conditions at Santa Barbara.

Table 2-1. TIDE DATA FOR SANTA BARBARA HARBOR 1960-1978

Highest Tide Observed (January 1983)	8.0 feet MLLW
Mean Higher High water (MHHW)	5.4 feet MLLW
Mean High Water (MHW)	4.6 feet MLLW
Mean Tide Level (MTL)	2.8 feet MLLW
National Geodetic Vertical Datum of 1929 (NGVD)	2.7 feet MLLW
Mean Low Water (MLW)	1.0 feet MLLW
Mean Lower Low Water (MLLW)	0.0 feet MLLW
Lowest Tide Observed (Dec. 17, 1933)	-2.6 feet MLLW

Waves

Santa Barbara is directly exposed to waves from two main windows: the southeast (120 degrees to 145 degrees) and the west (240 degrees to 280 degrees). These exposure windows are illustrated in Figure 2-3.

The predominant meteorological conditions associated with waves arriving at Santa Barbara typically consist of intense extratropical cyclones which develop in the northeast Pacific and travel east towards the west coast of North America. Storm winds preceding the low pressure center of the extratropical cyclone blow from the southerly quadrant and winds behind the center blow from the westerly quadrant. These storm systems can be very severe, having the capability of generating wind speeds greater than 50 knots.

The predominant waves affecting Santa Barbara are swell from the west which enter the Santa Barbara Channel between San Miguel Island and Point Conception. Deepwater wave heights can range up to 18 feet but the average daily waves are about three feet. Deepwater is defined as water so deep that surface waves are not affected by the ocean bottom. The periods associated with these waves are typically 12 to 14 seconds, but range from 8 to 20 seconds. Southeasterly waves generated from the preceding winds of extratropical cyclones originate in the Santa Barbara Channel between the mainland and the Channel Islands. Although the southeasterly waves are limited by a short fetch, deepwater wave heights may range from 8 to 16 feet with typical wave periods of 8 to 12 seconds.

Figure 2-3. SANTA BARBARA WAVE EXPOSURE WINDOWS

Swell is generated in the southern hemisphere by extratropical cyclones and arrives at Santa Barbara from the southeast. This swell rarely exceeds heights of four feet in deepwater, however, with periods reaching 22 seconds these waves can reach breaker heights of twice the deepwater height.

Extreme Wave Statistics

In the report, Santa Barbara County Beach Erosion and Storm Damage Reconnaissance Study, (USACE, 1990) extreme wave statistics for the Santa Barbara Channel vicinity prepared by Pacific Weather Analysis were compiled and are presented in Table 2-2. Although the hindcast covers the period from 1905 through 1988, only the period from 1972 through 1988 was analyzed to correspond to the Federal dredge program. The maximum significant wave height, period, direction, and decay distance were taken from existing records of extreme storms occurring at a fully-exposed deepwater site off Point Conception. The wave information is generally derived from hindcast procedures using historical weather maps. For the period after 1981, when a deepwater wave buoy became operational off Point Conception, the wave information reflect a combination of buoy data and hindcast results.

In the case of the local seas, wave heights and directions were estimated for a deepwater site south of Santa Barbara inside the channel. This information is based upon weather maps, newspaper accounts and local observations, and is considered only approximate in nature.

Monthly Wave Conditions

As a part of this feasibility study, Pacific Weather Analysis prepared a detailed monthly hindcast of wave conditions at a nearshore site in the vicinity of Santa Barbara Harbor. Since September 1969, detailed records of wind and wave conditions in the Santa Barbara Channel have been kept in the forecast lab of Pacific Weather Analysis. Over the 21 year hindcast period all wave trains were classified as to their source.

Monthly data was prepared for 12 normal months and 12 severe months. Severe months were selected according to the greatest number of days with waves above two feet in each category. During the summer the southeast waves consisted of tropical storm and southern hemisphere swell, while in the winter, local southeast sea conditions were tabulated. The significant wave height and period were found at the 30 foot depth contour and presented by percent occurrence for each month. The monthly wave data are presented in the Coastal Processes Appendix.

The monthly deepwater waves were refracted from the 30 foot depth contour using diagrams prepared in other studies (National Marine Consultants, 1963) and shoaled to the 18-foot depth contour. The nearshore waves shoreward of the 18-foot depth contour were transformed to breaking conditions assuming straight and parallel bottom contours.

Table 2-2. EXTREME WAVE CHARACTERISTICS, 1972-1988

Date	Deepwater H_o (feet)	T (seconds)	Deepwater Azimuth (degrees)	$K_d K_r$	-25 feet MLLW K_s		H_b (feet)
Jan 17, 1973	11	8	135	0.424	0.90	0.96	4.1
Jan 7, 1974	16	8	135	0.424	0.90	0.96	5.9
Jan 9, 1978	6	6	135	0.424	0.96	0.92	2.2
Jan 15-16, 1978	5	6	135	0.424	0.96	0.92	1.8
Dec 31, 1979	16	17	277	1.000	0.42	1.27	6.8
Jan 12-15, 1980	11	15	260	1.000	0.47	1.20	5.0
Jan 12-15, 1980	4	6	135	0.424	0.96	0.92	1.5
Feb 17-22, 1980	17	14	255	1.000	0.50	1.17	8.0
Feb 17-22, 1980	12	8	135	0.424	0.90	0.96	4.4
Jan 22, 1981	16	17	265	1.000	0.42	1.27	6.8
Jan 28, 1981	21	17	262	1.000	0.38	1.27	8.1
Jan 28, 1981	6	6	135	0.424	0.96	0.92	2.2
Nov 13, 1981	2	6	135	0.424	0.96	0.92	0.8
Oct 22-23, 1982	8	12	270	1.000	0.26	1.10	1.8
Jan 24-25, 1983	13	18	272	1.000	0.44	1.31	6.0
Jan 24-25, 1983	5	6	135	0.424	0.96	0.92	1.8
Jan 24-25, 1983	17	17	278	1.000	0.42	1.27	7.3
Jan 27, 1983	21	18	279	1.000	0.44	1.31	9.7
Jan 27, 1983	8	6	135	0.424	0.96	0.92	3.0
Jan 28, 1983	11	14	279	1.000	0.36	1.17	3.7
Jan 28, 1983	16	8	135	0.424	0.90	0.96	5.9
Feb 13, 1983	17	18	269	1.000	0.44	1.31	7.8
Feb 20-21, 1983	16	17	279	1.000	0.42	1.27	6.8
Feb 27-28, 1983	12	16	262	1.000	0.44	1.24	5.2
Feb 27-28, 1983	10	6	135	0.424	0.96	0.92	3.7
Mar 1-2, 1983	25	18	258	1.000	0.38	1.31	9.9
Mar 1-2, 1983	12	8	135	0.424	0.90	0.96	4.4
Dec 3, 1983	3	6	135	0.424	0.96	0.92	1.1
Feb 1-3, 1986	21	18	276	1.000	0.44	1.31	9.7
Feb 15, 1986	20	17	253	1.000	0.38	1.27	7.7
Feb 15, 1986	13	8	135	0.424	0.90	0.96	4.8
Mar 11, 1986	20	18	280	1.000	0.44	1.31	9.2
Feb 25-26, 1987	11	19	275	1.000	0.46	1.34	5.4
Dec 16, 1987	11	12	270	1.000	0.26	1.10	2.5
Dec 16, 1987	15	8	135	0.424	0.90	0.96	5.5
Jan 17, 1988	19	15	265	1.000	0.38	1.20	7.0

1/ Angular Spreading Coefficient.
Source: U.S. Army Corps of Engineers, 1988

Currents

There have been no formal studies of currents or current velocities within the harbor, as no problems have been encountered with navigation by this source. Rip currents along the sand bar and breakwater have a significant effect on shoaling patterns in the harbor entrance.

Coastal Processes

The coastal processes in Santa Barbara Harbor are heavily influenced by the sediment driven by wave action and interface with harbor structures. The following sections provide information on these processes.

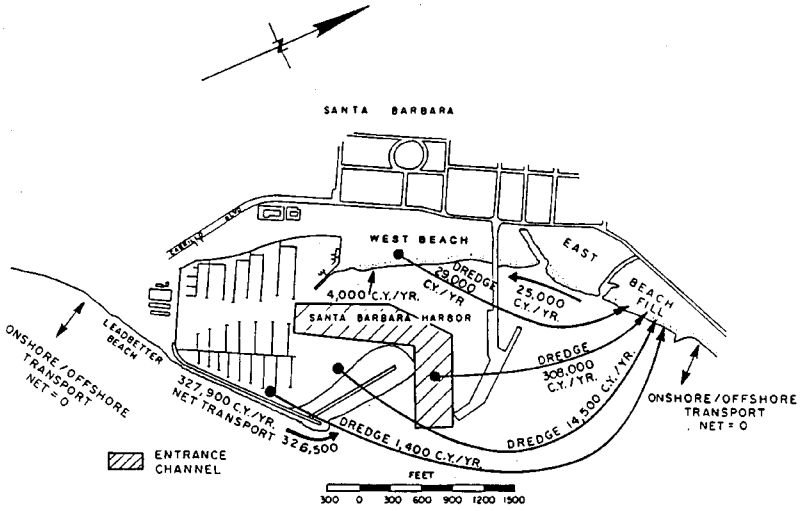
Littoral Drift Sources

Sediment moves downcoast from Leadbetter Beach along the breakwater to the sand bar. Some sediment leaks through the breakwater and into the harbor; this source of shoaling has been decreased since the breakwater voids have been grouted with concrete since 1975. Sediment moves around the breakwater sand bar and into the entrance channel. During southeast wave conditions, sediment moves upcoast from East Beach and is impounded by the groin on West Beach. Eventually the West Beach shoreline and breakwater shoal advance to the point that sediment shoals the entrance channel.

Sand entering the entrance channel becomes trapped because the forces of wave action within the dredged channel are too low to transport a significant amount of sediment. In this way, therefore, the harbor behaves like a sediment trap or sink. Maintenance dredging is required to return the sediment to the active littoral zone downcoast. Dean et al (1982) conducted a profiling study to examine the trap-like behavior of Santa Barbara Harbor by measuring the relative change in the offshore contours. During storm episodes in 1969, 1978 and 1983 the entrance channel filled in completely, thus allowing sediment to bypass the harbor. These are the only known times that the significant amounts of bypassing occurred since it was completed in 1937.

A sediment budget was developed for the shoreline reach in the immediate vicinity of Santa Barbara Harbor as shown in **Figure 2-4**. In this reach of shoreline the only significant sediment source is longshore transport and the only significant sediment sink is harbor dredging. Sediment discharge from Mission Creek may supply additional material to the Santa Barbara Harbor area. No quantitative information was available for the creek. Based on a current watershed study for the Corps of Engineers, the sediment discharge is insignificant compared to the amount of longshore transport.

Figure 2-4. SEDIMENT BUDGET FOR SANTA BARBARA HARBOR



SEDIMENT BUDGET FOR
SANTA BARBARA HARBOR

Numerous investigators have examined longshore transport in the Santa Barbara area, which exhibits a strong west-to-east net transport. O'Brien (1936) estimated the littoral transport rate at Santa Barbara by examination of sand entrapment due to the construction of the breakwater. He estimated a daily accumulation of 800 cubic yards, or approximately 292,000 cubic yards per year (BEACON, 1989). The accretion of sand updrift of the breakwater resulted in the formation of what is now known as Leadbetter Beach. Figure 2-5 shows the progressive growth of Leadbetter Beach.

Table 2-3 summarizes the littoral transport rates reported by various investigators. In each case, the littoral transport rate was based upon a volumetric analysis of sand accumulation within the Harbor. The 280,000 cubic yards per year rate reported by Johnson (1953) is an average value over a 19-year period during which the maximum littoral transport rate was 400,000 cubic yards per year and the minimum was 205,000 cubic yards per year.

Table 2-3. LONGSHORE TRANSPORT RATE ESTIMATES

Source	Record Period	Net Annual Transport (CY)
U.S. Congress (1938)	1930-1937	70,000
Johnson (1953)	1932-1951	280,000
USACE (1961)	1930-1937	300,000
Dean (1982)	1979-1980	377,000

Based on the estimated littoral transport rate of 280,000 cubic yards per year by Johnson, the average daily rate of littoral transport is about 765 cubic yards per day. However, the actual values of the daily littoral transport rate at Santa Barbara have been shown to vary considerably. Figure 2-6 presents a histogram of daily transport rates from April 1950 to December 1961 from Wiegel (1959). The average daily littoral transport rate varied from 98 to 4,643 cubic yards per day. Approximately from May through October, the average daily littoral transport rate varied from about 100 to 900 cubic yards per day. The period from November through March is characterized by short periods of high daily littoral transport rates from 2,000 cubic yards per day to about 4,600 cubic yards per day. These short periods of large daily littoral transport rates are attributed to intense winter storms.

Littoral transport rates have also been calculated using the wave data collected by Scripps Institute of Oceanography (USACE, 1990) at the Santa Barbara Gage located off Leadbetter Beach. Using this data, Castel and Seymour (1986) calculated daily and cumulative transport rates using semi-empirical relationships. The results for 1980 are plotted in Figure 2-7. The 1980 results were found to be typical of the results for 1981 and 1982, which were the other complete years the wave gage was in operation. Several trends are evidenced in the plots as follows (USACE, 1990):

Figure 2-5. LEADBETTER BEACH GROWTH

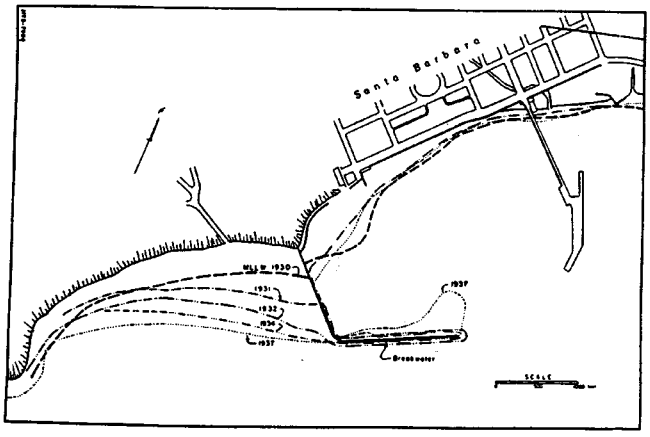
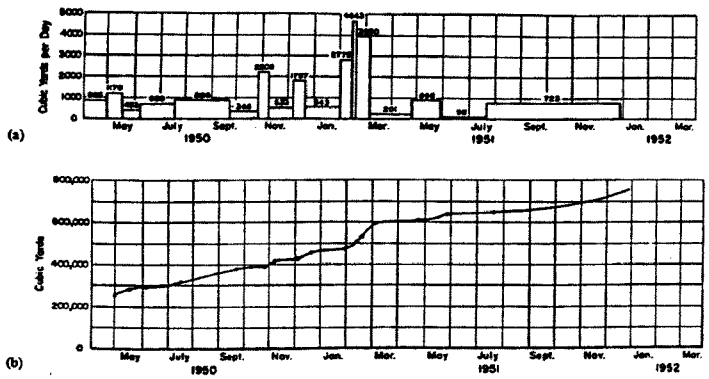
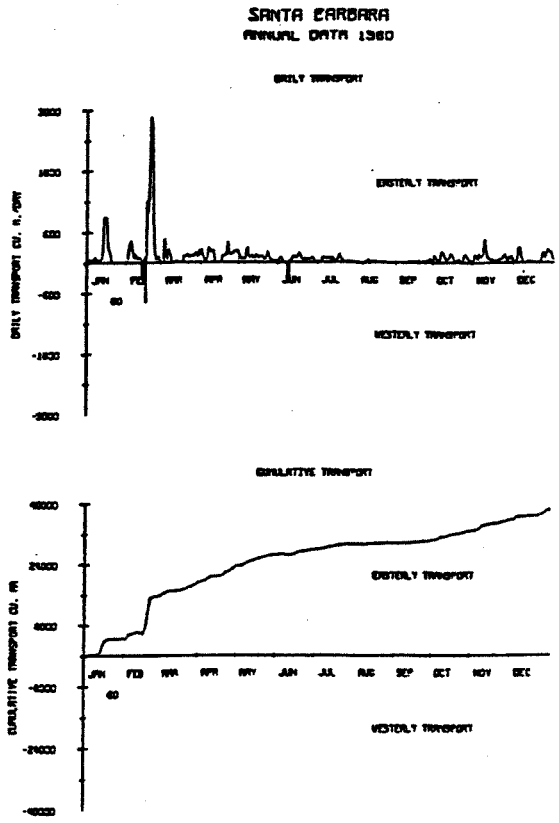


Figure 2-6. SANTA BARBARA LITTORAL TRANSPORT, 1950-1951



(a) Rates of harbor accretion from June 28, 1949, to December 28, 1951; (b) Cumulative volume of harbor accretion from April 28, 1950 to December 28, 1951 (after Wiegel, 1959)

Figure 2-7. LEADBETTER BEACH SAND TRANSPORT, 1980



REFERENCE: CASTEL AND SEYMOUR (1986)

NOTE: 1 CU. M. = 35.3 CY
QUANTITIES LOW BY A FACTOR OF 2

1. Easterly transport is predominant, and westerly transport occurs infrequently.

2. The majority of the transport occurs during winter months.

3. Storm events, evidenced by sharp increases in transport rate, account for about 40% to 50% of the annual transport.

The assumption of complete entrapment of littoral drift material in the harbor entrance was reviewed by analysis of historic bathymetric surveys (BEACON, 1989). Surveys conducted by the National Ocean Service in 1933 and 1978 were compared to characterize the accumulation of sediment versus natural bypassing around the harbor. The 1933 data was assumed to be representative of pre-harbor conditions. **Figure 2-8** shows a comparison between the chart data. The two surveys reveal no noticeable offshore accumulations or sediment fans which might suggest a deeper alongshore transport zone or diversion east of the Harbor.

Littoral Transport Rates

The average easterly transport rate along Leadbetter Beach from west-southwest swells is estimated to be 325,000 cubic yards per year based upon wave energy flux methods. The average westerly transport rate along Leadbetter Beach from southeast swells and seas is approximately 23,000 cubic yards per year. This resulted in an average gross transport rate along Leadbetter Beach of 348,000 cubic yards per year and an average net transport rate of 302,000 cubic yards per year. Since there is no significant easterly transport along West Beach due to wave shadow created by the harbor breakwater, the gross and net transport will be equal. The average gross and net transport rate along West Beach was calculated to be 25,000 cubic yards per year.

Littoral transport rates along Leadbetter Beach were calculated for normal and severe monthly wave conditions. The results are presented in **Table 2-4**, which presents the results of the distribution for each month for return intervals of 5, 10, 25, 50 and 100 years. In order to establish probabilities associated with monthly shoaling rates, the 21-year period of hindcast record was analyzed by assigning a 21-year recurrence interval to the severe condition to simulate the period of record, and a 2-year recurrence to the normal conditions which corresponds to the normal yearly summation. A best fit curve using a Weibull distribution was then applied to these two recurrence intervals to obtain shoaling rates for a range of recurrence intervals.

Figure 2-8. BATHYMETRY COMPARISON OFFSHORE

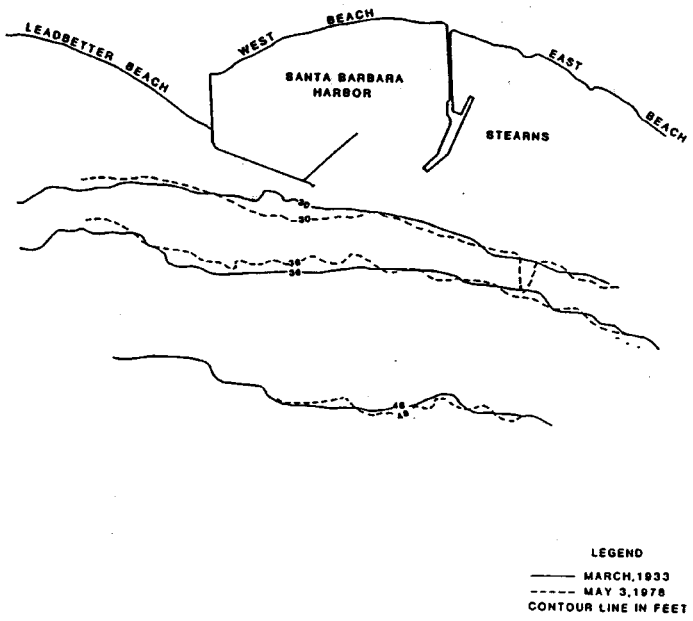


Table 2-4. SANTA BARBARA MONTHLY SHOALING DISTRIBUTION

	Recurrence Interval (Years)						
	5	10	25	50	100	Normal	Severe
Jan	94,000	143,000	213,000	269,000	326,000	40,000	200,000
Feb	103,000	154,000	223,000	278,000	333,000	46,000	210,000
Mar	85,000	139,000	221,000	290,000	363,000	31,000	205,000
Apr	42,000	47,000	52,000	55,000	58,000	33,000	51,000
May	33,000	37,000	41,000	43,000	45,000	27,000	40,000
Jun	25,000	25,000	25,000	26,000	26,000	26,000	25,000
Jul	18,000	22,000	26,000	28,000	30,000	13,000	25,000
Aug	14,000	14,000	15,000	16,000	16,000	12,000	15,000
Sep	13,000	17,000	21,000	24,000	26,000	8,000	20,000
Oct	25,000	28,000	31,000	32,000	34,000	20,000	30,000
Nov	43,000	52,000	62,000	69,000	75,000	29,000	60,000
Dec	94,000	143,000	213,000	269,000	326,000	40,000	200,000

The results support the seasonal variation in entrance shoaling previously discussed. The greatest longshore transport occurs in the winter months from November through March with the least shoaling occurring during the summer months of May through October. This finding is supported by the monthly dredge volumes reported for the City-operated dredge. The months of December and January were averaged together, since the weather conditions causing the severe shoaling activity may occur at any time during this period, and the lower January values were not consistent with actual observations by the harbor staff. In order to simplify the possible number of combinations from month to month during the winter period of December through March, a common shoaling rate was established. This consists of an average of the return intervals over the four month period. Since the values for the winter months do not vary considerably and the accuracy of the individual values are not exact, the averaged rates appear reasonable. These values will be used to establish criteria for shoal reduction measures and are shown on Table 2-5.

Table 2-5. AVERAGED MONTHLY WINTER STORM TRANSPORT
1972-1989

Return Period (Years)	Transport Rate CY/Month
100	325,000
50	275,000
25	225,000
10	150,000
5	100,000

The littoral transport rates were also estimated for each hindcast storm for the period 1972 to the present. A statistical analysis was performed to determine the shoaling rate recurrence interval associated with storms from the west-southwest and from the southeast. Table 2-6 summarizes the estimated return periods for easterly storm driven littoral transport, and Table 2-7 summarizes the estimated return periods for westerly storm driven littoral transport. The storm waves were adjusted for shoaling, refraction, island sheltering, and duration. The shoaling rates were calculated using methods presented in the Shore Protection Manual (USACE, 1984) as calibrated from records of harbor dredging. These results indicate that the majority of storm driven transport is the result of storms entering the westerly exposure window. The rates reflect potential contributions from a single storm event over a 24-hour period.

Table 2-6. EASTERLY STORM DRIVEN TRANSPORT 1972-1989

Return Period (Years)	Transport Rate (CY/Day)
100	95,000
50	83,000
25	72,000
10	57,000
5	45,000

Table 2-7. WESTERLY STORM DRIVEN TRANSPORT 1972-1989

Return Period (Years)	Transport Rate (cy/day)
100	16,000
50	13,000
25	10,000
10	6,000
5	4,000

Economic Development

Santa Barbara Harbor is a 140-acre development, of which 65 acres are usable water area. It is located in Santa Barbara County within the City of Santa Barbara. Managed by the City of Santa Barbara Waterfront Director, the Harbor and surrounding area provides a water-oriented commercial and recreational focal point within the County. Santa Barbara is known as a retirement community, although colleges, including the University of

California at Santa Barbara, attract young people and technological companies. The area is also popular for tourists because of the mild climate and scenic vistas. Future growth of the City is expected to be small because of the lack of available land and water. There is a general trend in the community of anti-growth or development.

Tributary Areas

The area served by Santa Barbara Harbor includes the most urbanized portion of Santa Barbara County. The area includes the coastal communities of Carpinteria, Montecito, Goleta and Gaviota. Because of its cultural resources, the unique features of the historic Spanish mission and its picturesque shoreline, the tourists come from distant locations, and it is a popular destination for individuals from the Los Angeles region and local counties. The local University has an added population that fluctuates with school sessions. The population of Santa Barbara County in 1987 was 342,900 and is expected to rise to 425,000 by the year 2005.

Commerce

Santa Barbara Harbor includes businesses of which restaurants, hotels, and retail establishments comprise the principal economic base of onshore development. The water area includes commercial, recreational and sportfishing boat activity. Major economic activities in Santa Barbara County include agriculture, construction, the oil and gas industry, manufacturing, financial services, tourism, the University, retail trade, and other services and governmental activities. Durable goods manufacturing in the high technology sector has been increasingly important in recent years, with 1987 sales totaling $1.62 billion dollars, or about 15.6% of the total gross regional product. Agricultural production was $381 million in 1987, with strawberries being the top crop with $60.8 million in sales. Broccoli was the second most valuable crop with sales of over $40 million. None of these industries ship any significant amount of product through Santa Barbara Harbor.

The Santa Barbara Channel and the Santa Maria Basin contain 18 offshore oil and gas platforms. In 1987, these platforms produced 64,470 barrels/day for a yearly total of 23.5 million barrels. This represented about 38.3% of the total offshore oil production of the State of California. Ten additional proposed platforms, if built, would increase oil production capacity by 218,000 barrels/day. Crew boats do not regularly use Santa Barbara Harbor, although some supplies needed by the offshore operations are transported through the Harbor.

Commercial Fishing

Commercial fishing is an important economic activity within Santa Barbara Harbor. According to the National Marine Fisheries Service, Santa Barbara was ranked among the top 50 to 60 ports in the United States measured by poundage and value of the catch in 1984. In recent years, it has also ranked sixth out of 36 California ports. California State Fish and Game statistics show that

nearly 10 million pounds of seafood products with a market value of about $8.4 million were landed in Santa Barbara in 1989.

The commercial fishing industry in the study area is characterized by numerous small vessels usually less than 60 feet in length which operate predominantly in coastal waters within 20 miles of shore. The major harbors in the study region are Santa Barbara, Ventura, Channel Islands, Port San Luis and Morro Bay. Ports which may receive fish harvested from the study region, and from which fishermen may come to fish, include Morro Bay, Ventura, Port Hueneme and San Pedro. The Santa Barbara fleet includes one of the largest numbers of diving vessels seeking sea urchins and abalone in this region. Hook-and-line vessels fish principally for salmon, albacore and swordfish. The remainder of the catch comes from trawling, gill netting, and trapping for crabs. Over the last several years, trawling boats from northern California and Oregon have entered the region to fish for dover sole and shrimp since the catch has declined in those areas.

Total landings for the years 1979 to 1989 at Santa Barbara Harbor are given in Table 2-8. These have been updated to October 1991 price levels using the seasonally adjusted fresh and frozen seafood component of the Consumer Price Index.

Table 2-8. FISH LANDINGS AT SANTA BARBARA
(Oct 91 Price Levels)

Year	Pounds	Value
1979	12,476,000	$ 8,598,149
1980	13,685,000	$10,421,551
1981	17,027,000	$12,624,285
1982	12,637,000	$10,601,724
1983	10,255,000	$ 7,869,662
1984	10,235,000	$ 8,974,702
1985	13,281,000	$ 9,659,900
1986	14,995,000	$10,264,551
1987	10,012,000	$ 7,870,818
1988	7,403,000	$ 6,811,838
1989	9,854,000	$ 9,444,374

Representatives of the California Department of Fish and Game and fisheries consultants indicate that there are still opportunities for expanded harvest of existing commercial fishery resources. However, there have been increasing restrictions on certain traditional species and environmental restrictions on gear types and harvest areas, primarily aimed at gill netting and partly motivated by concerns about declines in the sea otter population.

Harvest conditions off the northern California, Oregon, and Washington coast are important. Poor harvest conditions in these areas lead to increased migration of the commercial fleet to central California coastal areas. This

places increased harvest pressures on species predominant in the area. When one species reaches the point of over-exploitation, fishing effort and market demand tend to be transferred to less utilized species. Currently, sea urchins are still being harvested off Santa Barbara in large numbers, although the landings are off somewhat from earlier years. Information from the California Department of Fish and Game indicates that some less utilized species do exist off the central California coast. However, efficient harvesting, processing and marketing techniques have generally yet to be developed for these species. The development work on purple urchins is an example of this kind of activity.

Harbor Fleet

There are 1,080 slips and open water berths in Santa Barbara Harbor, including 12 open water moorings. The difficulty in obtaining an exact slip count is that 23 end ties, which range in length from 56 to 108 feet, can be used to hold from one to three boats each. Some onshore support facilities are also present. The number and size of berths is given in Table 2-9. Forty-three commercial fishing boats use Santa Barbara Harbor on a "visitor" basis, which means they dock there regularly but do not have assigned berths. Some of these vessels have done this for years. In addition, there are other commercial vessels that have permanently assigned berths within the Harbor.

Table 2-9. SLIP DISTRIBUTION IN SANTA BARBARA HARBOR

Commercial Fishing:	
Regular Visitors	43
Permanent	104
Consultant (50%)	10
Total Commercial Fishing	157
Other Commercial:	
Consultant (50%)	9
Sightseeing	1
Towing/Salvage	5
Charter	1
Mariculture	1
Research	2
Unknown	40
Total Other Commercial	59
Recreational	864
TOTAL SLIPS AND MOORINGS	1,080

Several boats operated by government agencies are also stationed at Santa Barbara Harbor. The Coast Guard's 82-foot cutter, the Point Judith, and the City's four Harbor Patrol boats all are maintained within the harbor. Santa Barbara Community College has a Boston Whaler in the Harbor, and the National Oceanic and Atmospheric Administration conducts tours to the Channel Islands National Marine Sanctuary through a concessionaire.

Oil industry boats within the Harbor include the Cyndy Tide, which is a firefighting boat owned by Texaco and is used for offshore oil fire protection. The vessel Mr. Clean and a large barge are moored east of Stearns Wharf and are used to pick up fuel and provisions in the harbor for the offshore drilling operations.

Tables 2-10 shows the harbor fleet broken down by vessel length.

Table 2-10. NUMBER OF BERTHS BY LENGTH

Length	Number
20'	72
25'	243
28'	160
30'	129
35'	220
40'	73
43'	30
45'	18
50'	14
51'	19
60'	14
End Ties: 56' to 84'	21
Side Ties: Various	24
Fisherman Floats:	
30'	3
40'	8
43'	13
CUDA Dock (Urchin Boats)	7
Moorings Near Sandbar	12
TOTAL	1,080

Recreation

Numerous recreational opportunities are available in the area. Boating, fishing, beach-oriented recreation, and aesthetics combine to make Santa Barbara a multi-purpose attraction. Harbor Beach, south of the South Jetty, is a popular location for surfing and other wave related activities. Harbor

Beach and others to the south are very important sources of recreation and a strong attraction for visitors.

The Harbor and Leadbetter and East Beaches are important recreational resources for the region, as well as the local area. The Harbor complex includes Stearns Wharf, administration facilities, resort hotels, parking areas, a commercial fishing center, sport fishing centers, a boat repair yard, numerous restaurants and marine hardware stores. The Harbor's open water area provides channels, turning basins, and mooring areas. Small and mid-size recreational power and sailcraft operate within the Harbor alongside larger commercial fishing boats.

Fishing, boating, jet skiing, hiking, bicycle riding, swimming, photography, and bird-watching are important recreational activities in the area.

The natural accretion of West Beach in the last 10 to 15 years has resulted in an increase in beach suitable for sunbathing activities and a commensurate decrease in the amount of shallow quiet water habitat available in the harbor for windsurfing, paddle-boating, kayaking, etc. Nevertheless, West Beach is not heavily used. The beach nearly reaches out to the navigation channel in the Harbor and thus limits the area where non-motorized recreational activities can be carried out safely.

The accretion of the sand bar has resulted in a popular surfing location. The site is listed in a 1963 surfing guide for California (pers. comm., Reed Wolpert, Surfrider Association).

Public access to the beaches and harbor areas is easy and plentiful due to the area's proximity to parking lots located along the beach and within the City of Santa Barbara. Visitors have automobile and foot traffic access to Stearns Wharf and the West Breakwater around the marina area. Public use of the waterfront areas is heaviest in the summer months; however, these areas are well visited in the winter months. Visitors include both local residents and tourists. The amount of public parking adjacent to the beaches and Harbor area appears to limit access during weekends and summer months.

Transportation

Immediate access to the harbor complex exists from Highway 101, which is located approximately one-quarter mile to the east. Amtrak and Southern Pacific Rail lines are immediately west of and generally parallel to Highway 101.

Environmental Resources

Significant resources and other environmental characteristics that might be affected by any one of the alternative plans are described in the following sections. Environmental resources include the physical, biological and socio-cultural conditions in the study area.

Biological Resources

There is little native vegetation in or around the harbor and the immediate surrounding vicinity. Some of the non-native ornamental plants and grass located in a City-maintained greenbelt above the normal wave reach between the beach and Cabrillo Boulevard do provide some cover for birds that forage within the Harbor. The majority of plants are those which have been introduced as ornamental vegetation by man.

There are a variety of water birds, both migratory visitors and resident breeders/foragers, within the project area. Birds common to the harbor, beaches and vicinity include a variety of gulls, grebes and cormorants, California brown pelican, Least sandpiper, and Sanderling. A complete list of avian wildlife in the area can be found in the environmental assessment conducted as part of the maintenance dredging operations.

Marine life associated with the harbor and nearby beaches consists of a variety of organisms, and is representative of other small Southern California harbors (e.g. fish, sediment dwelling macro-invertebrates and micro-organisms, free floating macro-invertebrates, and zooplankton). Free swimming species found within the harbor include smelt, California corbina, croaker, grunion, and a variety of surfperch. A complete list of free swimming species and sediment dwelling species found in the area also can be found in the environmental assessment completed for the maintenance dredging operations.

Threatened or Endangered Wildlife Species

The California brown pelican is Federally listed as an endangered species and is known to exist in the project area and frequent the immediate area for the purposes of foraging and roosting. Although the California brown pelicans feed in the harbor basin, they will feed anywhere along the coast. They nest mainly on the offshore islands. The California brown pelican may occur throughout the harbor.

The California gray whale and southern sea otters have been observed in the waters near the harbor but are not expected to frequent the entrance channel or harbor basin due to the lack of suitable forage and affinity for deeper waters.

Air Quality and Climate

The air quality is generally very good because of the close proximity to the Pacific Ocean air currents, lack of industrial related air pollutants, and a generally small population located in the area. The quality of the air when measured (ozone, gaseous emissions, suspended particulates) remains good during periods of low vehicular use in the harbor area, and declines during periods of higher use on weekends and the holiday season. Generally, air quality improves during the Winter/Pacific storm season and decreases during the Summer/air stagnation season.

The climate is Mediterranean, with dry summers and mild, moderately wet winters. Rainfall averaging 11 inches per year falls mainly due to winter storms that are predominately from the northwest. The annual average temperature is 61 degrees F.

Water Quality

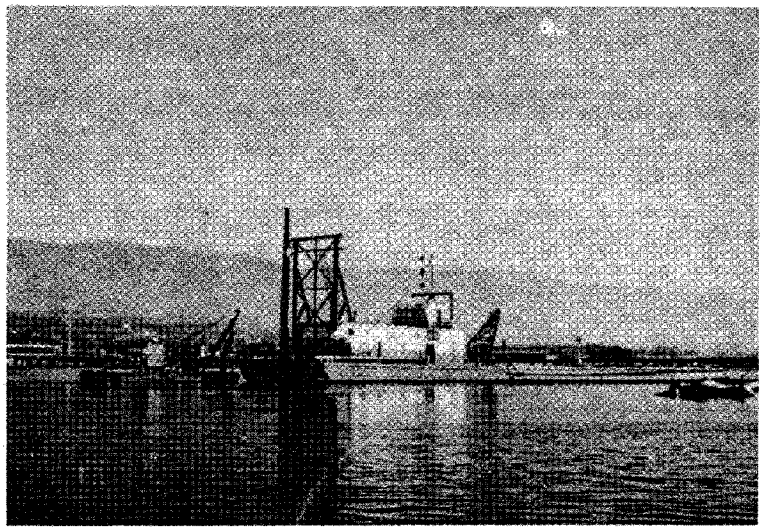
The California Regional Water Quality Control Board currently evaluates the water within the harbor to be of good quality (CRWQCB, 1990). This is a result of water circulation and tidal flushing. This flushing removes deposits of pollution which may collect in the harbor. Pollution that does collect in the harbor has had a small effect on water quality.

Noise

Noise is generated primarily from marine and vehicular traffic. The City of Santa Barbara Noise Ordinance states that no dredging shall be permitted between 8:00 p.m. and 7:00 a.m. if the noise created is 5 dBA over the ambient noise levels of residential areas (i.e. first lot behind Cabrillo). Ambient noise levels on the beach and within the harbor are such that the dredge does not significantly decrease noise quality.

Cultural Resources

The cultural history of Santa Barbara is relatively well-known. The probability of encountering submerged cultural resources is remote because the Harbor has been periodically dredged since the 1960s.



Rapid entrance channel shoaling, caused by Winter storms, requires repeat dredging during late-February, March or April. Harbor operations are frequently hindered by severe shoaling of the entrance channel, especially during severe Winter storm. Shoaling can occur so rapidly, and to such an extent, that access to the Harbor can be severely restricted, particularly to larger vessels.

The most severe impact is the complete closure of the Harbor. This occurred during a severe storm in 1983. The impacts of shoaling limiting access to Santa Barbara Harbor include lost income to the commercial fishing industry -- including the sea urchin fishery, and to Harbor-related businesses. The high costs of the maintenance dredging operation are also a major impact.

The problems and needs related to navigation at Santa Barbara Harbor are determined by reviewing the existing navigation features as compared to present and likely future commercial and recreation fleet characteristics and operations to identify needed modifications. The analysis includes consideration of the desires of the City of Santa Barbara and other public interests.

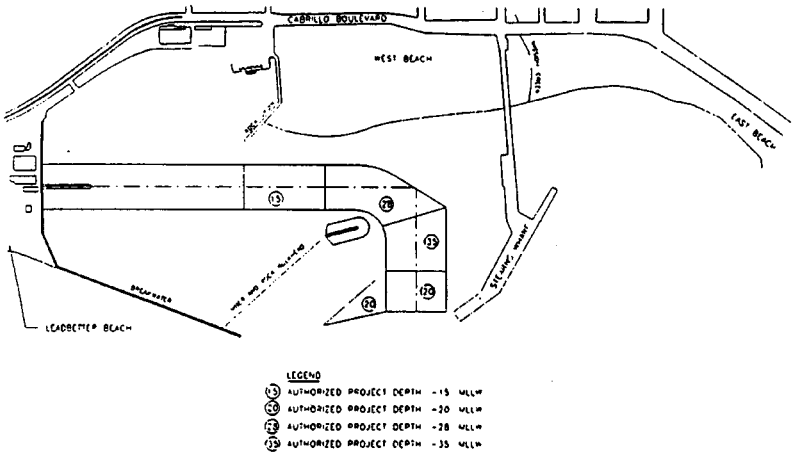
Navigation Channel Requirements

Past and current dredging operations have maintained an entrance channel that has had its limits defined primarily from precedents established by historic dimensions and maintenance operations. Previous legislation associated with maintaining the Santa Barbara Harbor entrance channel focused only on the Corps taking over maintenance of the channel without authorizing any specific dimensions. Contract documents have outlined the historic channel for maintenance operations. The following sections present a review and justification for required navigation channel dimensions and maintenance requirements.

Channel Widths

The design of entrance channels has been addressed in several publications including the Corps of Engineers EM 1110-2-1615,

Figure 3-1. EXISTING PROJECT



Hydraulic Design of Small Boat Harbors, 1984, and Special Report No. 2, Small Craft Harbors: Design, Construction, and Operation, 1974 (SR-2). In addition to these design criteria, the California Department of Boating and Waterways provides layout and design guidelines for small craft berthing facilities, and the Permanent International Association of Navigation Congresses monitors and reports international design criteria.

In Santa Barbara Harbor, approximately 1,100 vessels berth in the harbor. The entrance channel has been defined previously by dredging limits shown on contract documents issued under maintenance operations, the most recent being a three-year contract issued in fiscal year 1990 as shown in **Figure 3-1.** The entrance channel width transitions from 400 feet to 300 feet in the 90-degree bend. This configuration has functioned well historically.

In order to establish a basis for the entrance channel configuration, the design criteria have been reviewed for the existing condition based on current commercial fleet characteristics shown in **Table 3-1.** The design vessel beam and length is 25 and 80 feet respectively to represent the larger commercial fishing craft.

Table 3-1. COMMERCIAL FISHING BOATS

Vessel Length	Number
<20'	3
20' to 30'	68
30' to 40'	46
40' to 50'	14
50' to 60'	10
>60'	4

Using SR-2 criteria, the entrance channel should be a minimum of 5 times the widest beam, or 125 feet for one-way traffic, without provision for sailboat tacking. Considering two-way traffic and estimating a 50% increase for sailboat maneuvering in the outer entrance, the width would be about 450 feet. The SR-2 states that a good practice to follow, where boat traffic is a contributing factor, is to provide a navigable width of 300 feet for the first 1,000 boats, plus an additional 100 feet for every additional 1,000 boats, or fraction thereof, berthed in the Harbor. With Santa Barbara Harbor's 1,100 boats, the entrance channel width would be 300 feet for the first 1,000 boats and an additional 100 feet for the remaining 100 boats making the total navigable width 400 feet.

Using the Corps of Engineers EM 1110-2-1615 criteria, the width is determined as a percentage of beam width and is dependent on vessel controllability. At Santa Barbara Harbor, navigation maneuvering frequently can be extremely poor at the entrance during the winter months due to wave and current conditions moving off shoals at the tip of the breakwater and near the channel. Percentage to apply for two-way traffic in a 90 degree bend under poor maneuvering situations would be: bank clearance (60%) plus bend

maneuvering (490%) plus vessel clearance (80%) plus bend maneuvering (490%) plus bank clearance (60%), for a total of 1,180%. For a straight section similar to the inner channel the maneuvering lane is 200%, or a total of 600%. A design vessel beam of 25 feet yields 295 feet in the outer entrance and 150 feet in the inner channel. Additional width can be provided for local wind and current conditions, or high traffic volumes, which occur frequently at Santa Barbara on weekends. Accordingly, the widths at Santa Barbara Harbor of about 300 feet in the outer entrance and 150 feet in the inner entrance are considered reasonable dimensions for safe navigation.

Channel widths were also evaluated based on examining historic limitations to navigation at Santa Barbara Harbor. This considers the type of impacts and number of vessels affected by narrower channels caused by shoaling. Based on discussions with Santa Barbara Harbor officials and vessel owners and operators, the larger vessels can continue to maneuver through the entrance and inner channels until shoaling narrows channel widths to about 125 feet. This requires one way traffic and slower speeds while moving through the channel, causing some delays in getting in and out of the Harbor.

Based on the above criteria, and upon the analysis of the harbor entrance location, it was determined that the most effective navigation entrance channel would be 300 feet wide at the seaward end tapering to 150 feet within the basin. It is recognized that with these dimensions some shoaling that narrows the channel width can occur which would cause some delays to vessels, with a minimum width of 125 needed before larger vessels are prohibited from getting in and out of the Harbor. The historic channel widths of 400 feet in the outer harbor and 300 feet in the inner harbor provides some advanced maintenance capacity of about 100,000 cubic yards between dredging cycles, which will be discussed in later paragraphs.

Channel Depths

Vessels that use the entrance channel vary in drafts from the fully-laden fishing vessels to the trailerable open day boats. The current navigation channel is maintained to -20 feet MLLW in the entrance channel and -15 feet MLLW in the interior channel. The design depths have been previously addressed in the "Review Report for Navigation" (1961) for proposed modifications for harbor expansion with recommendations of a 20-foot deep entrance channel and a 15-foot depth for interior channels. Local fishing fleet and commercial vessel drafts range from 2 feet for some of the trailerable craft to 13 feet for the fully-loaded purse seiner. The following analysis defines the required entrance channel depth for Santa Barbara Harbor.

The deepest vessel draft expected to use the harbor is 13 feet. Effects due to vessel squat would be an additional one foot. An operational wave height of six feet is selected for the entrance channel. This height is common during storm conditions when vessels are trying to return to the protected harbor area. Accounting for heave and pitch motion for this wave condition, an additional four to five feet below still water level (SWL) is required for navigation. Underkeel safety clearance in sandy material is two feet. The resulting total depth required is about 20 feet below MLLW. For the portion of the entrance channel protected from waves by the breakwater and where vessels move slow in maneuvering to the slip areas, wave and squat

requirements are negligible, and only two feet of underkeel clearance is considered necessary, resulting in a control depth for the inner channel of -15 feet MLLW.

A review of historic shoaling operations and vessel operations indicates that vessels continue to operate using tides of up to three feet when the channel shoals to depths of 17 feet in the outer channel and 12 feet in the inner channel. Delays and vessel groundings are reported when such conditions occur.

Maintenance of the Navigation Channels

Maintenance of the navigation channels at Santa Barbara Harbor has historically been a problem due to frequent and rapid shoaling during winter storm season and limited capacity in channels to accommodate these shoals; and delays in receiving funding for maintenance dredging. Recent actions by the Corps of Engineers for additional advanced maintenance capacity by increasing depths to -35 feet, MLLW in the entrance channel and -28 feet, MLLW in the inner channel, and to use continuing contract to allow for dredging to begin towards the end of September and early October should minimize past shoaling problems.

Dredging History

The uninterrupted flow of sand was transported naturally from the western to the eastern beaches prior to the construction of Santa Barbara Harbor breakwater in 1930. Sand began accumulating west of the breakwater creating what is now known as Leadbetter Beach upon completion of breakwater construction. Eventually sand migrated along the breakwater and deposited in the lee of the structure forming a sand bar. The sandbar created both a navigation problem and a trap for sand which was previously transported downcoast by natural means. A maintenance dredging program was then initiated by the Federal Government in 1935 for placing accumulated material within the harbor on the starved downcoast beaches to prevent further erosion. Approximately 200,000 cubic yards of material was dredged by hopper dredge that same year. An agreement between the City and County of Santa Barbara and the Federal Government was made to dredge the harbor at two-year intervals and deposit the dredged material along the beaches east of the Harbor. The dredging was done by the Corps of Engineers.

In 1955, the City requested that they be permitted to take over the task of harbor dredging. The City wanted to shape the sand bar to provide temporary protection from southeasterly waves. Surplus sand and future accretion in the harbor area would then be pumped to the downcoast beaches. The City of Santa Barbara purchased a hydraulic dredge in 1956; the Federal Government paid the City an annual maximum of $30,000 for part of the maintenance dredging.

In 1963, after construction of a system of floating docks, severe southeast storm waves breached the sandbar causing damage to the recently completed marina facilities.

In December 1970, Congress modified the Federal responsibility for maintenance of the harbor; responsibility for navigation channel maintenance belonged solely to the Federal Government. The City continued to maintain the harbor, but was reimbursed 100% by the Federal Government until September 1972 when the maintenance dredging contract was awarded to a private contractor. Beginning in 1972, a sand trap area near the sand spit was maintained with approximately 200,000 cubic yards removed in 1972 and 1978. Annual contracts for maintenance dredging of the entrance channel were awarded through 1975. In 1976, the Corps of Engineers began to award three-year dredging contracts.

The Corps of Engineers maintenance responsibility is limited to the entrance channel. On occasion, the City has contracted with the Corps dredge contractor for dredging outside the Federal channel. In 1980, the City contracted for dredging the area between West Beach and the entrance channel. Approximately 200,000 cubic yards were dredged between the harbor groin and Stearns Wharf. Prior to 1980, it was estimated by the City that West Beach was last dredged in the late 1960s.

A chronological list of events since 1972, when the Federal Government assumed responsibility for the maintenance dredging program to the present is provided in the Coastal Process Appendix. Construction and other events are listed to provide a brief history of the recent development. Entrance channel shoaling and dredging episodes and volumes are presented for reference or correlation with events.

Historic Dredge Volume Analysis

Since the harbor entrance acts as an efficient trap of littoral drift, analysis of historic dredge volumes can provide a measure of the amount of longshore transport moving along the Santa Barbara coast. **Table 3-2** summarizes annual dredge quantities for the period 1959 through 1972, when the City of Santa Barbara owned and operated their own hydraulic dredge. The City-owned dredge dredged the interior mooring areas of 125,000 cy in 1964, 70,000 cy in 1967, 5,000 cy in 1968, 15,000 cy in 1970, and 5,000 cy in 1971. **Table 3-3** summarizes the annual dredge volumes for the period 1972 through 1991 which were performed under Corps of Engineers contract.

The mean dredge volume for this 20-year period is 304,000 cubic yards. Review of the dredge records for events outside of the normal channel limits provided adjustments for 1980 when the 200,000 cubic yards of West Beach was dredged and 1978 when an estimated 200,000 cubic yards of material in the sand trap near the sand bar was removed. The City also contracted dredging of the mooring area in the lee of the sand bar in 1982, 1983 and 1984 for 50,000, 54,000, and 84,000 cubic yards, respectively. These amounts are not reflected in the volumes cited above. The mean dredge volume is 285,000 cubic yards, after adjusting the 1980 amount by neglecting the West Beach dredging. The dredging records are summarized in **Table 3-4**.

Table 3-2. MAINTENANCE DREDGING HISTORY
CITY OF SANTA BARBARA
(1959-1972)

YEAR	VOLUME (CY)
1959	85,100
1960	522,300
1961	321,200
1962	269,100
1963	462,900
1964	396,700
1965	311,200
1966	371,700
1967	344,600
1968	347,400
1969	339,600
1970	341,400
1971	451,140
1972	405,000
AVERAGE	355,000

Table 3-3. MAINTENANCE DREDGING HISTORY
U.S. ARMY CORPS OF ENGINEERS

YEAR	VOLUME (CY)
1973	365,000
1974	383,300
1975	46,600
1976	395,500
1977	465,800
1978	618,400
1979	214,800
1980	525,500
1981	190,000
1982	367,800
1983	340,000
1984	359,700
1985	70,000
1986	297,000
1987	223,800
1988	260,000
1989	134,600
1990	202,500
1991	306,000
AVERAGE	304,000

Table 3-4. SANTA BARBARA HARBOR DREDGING RECORDS
1959-1991

Year	Cubic Yards	Revised	
	City of Santa Barbara		
1959	85,100	85,100	
1960	522,300	522,300	
1961	321,200	321,200	
1962	269,100	269,100	
1963	462,900	462,900	
1964	396,700	371,700	- Interior Dredge, 25k cy
1965	311,200	311,200	
1966	371,700	371,700	
1967	344,600	337,600	- Interior Dredge, 7k cy
1968	347,400	342,400	- Interior Dredge, 5k cy
1969	339,600	339,600	
1970	341,400	316,400	- Interior Dredge, 25k cy
1971	451,140	446,140	- Interior Dredge, 5k cy
1972	405,000	405,000	- Last dredge, City (Sept)
	US Army Corps of Engineers		
1973	365,000	165,000	- Sand Trap Dredged, 200,000 (est)
1974	383,300	583,300	- Add Sand Trap to 1974
1975	46,600	46,600	
1976	395,500	395,500	
1977	465,800	465,800	
1978	618,400	418,400	- Sand Trap Dredged, 200,000 cy (est)
1979	214,800	414,800	- Add Sand Trap to 1979
1980	525,500	325,500	- West Beach Dredge, 200k cy
1981	190,000	190,000	
1982	367,800	367,800	- Int Dredge, 50k cy (Not incl in COE)
1983	340,000	340,000	- Int Dredge, 54k cy (Not incl in COE)
1984	359,700	359,700	- Int Dredge, 84k cy (Not incl in COE)
1985	70,000	70,000	
1986	297,000	297,000	
1987	223,800	223,800	
1988	260,000	260,000	
1989	134,600	134,600	
1990	202,500	202,500	
1991	306,000	306,000	- Estimated Value, Dredging On-Going

Shoal Volumes and Patterns

Available hydrographic surveys from 1973 to the present were examined to evaluate shoal volumes and patterns. Six combinations of post-dredge and following pre-dredge surveys were studied. **Table 3-5** summarizes the calculated shoal volume associated with each of the six periods of study.

Table 3-5. HISTORIC SHOAL VOLUME ESTIMATES

Survey Period Post-Dredge to Pre-Dredge	Shoal Volume (Cubic Yards)
Jan 1973 -- May 1973	121,000
Aug 1982 -- Feb 1983	218,000
Jun 1983 -- Feb 1984	56,000
Jun 1987 -- Dec 1987	91,000
Mar 1988 -- Nov 1988	140,000
Apr 1989 -- Nov 1989	83,000

Figures 3-2 and 3-3 both illustrate typical shoal patterns for the current harbor entrance configuration. The shoal begins at the tip of the sand bar and progresses northeasterly into the entrance channel. Thus the loss of navigable width of the channel begins along the left side of the channel as viewed facing landward. Figure 3-4 shows the fully shoaled condition of the entrance channel in February 1983.

Shoaling Analysis

In the past, Santa Barbara Harbor completely closed on several occasions including severe events in 1969, 1975, and 1983 when the channels experienced severe shoaling and were impassable for two months. This situation has caused losses in revenue to the fishing industry and businesses dependent on the harbor traffic.

The shoaling mechanism consists of littoral material moving along the breakwater to the sand bar and eventually forming a tip shoal at the bend in the channel. The material is stored on the sandbar and continues to build across the channel from the sandbar toward West Beach until the entire channel has filled. Once the material can no longer be impounded in the channel, bypassing occurs toward East Beach. When storm conditions generate large steep waves from the southwest, the channel can shoal completely closed in a matter of days. This situation causes the greatest economic losses due to the large amount of material that must be removed to provide for navigation. Further information on historic shoaling conditions is presented in the Coastal Processes Appendix.

In recent years, the maintenance program at Santa Barbara Harbor involved awarding a three-year dredging contract with two mobilizations per year. The first mobilization generally occurred during November with channel dredging commencing on December 1. The second mobilization occurred during February and dredging was generally completed by March 15 in order not to conflict with the restricted grunion spawning season. Each dredge phase required approximately one month, including down time.

Figure 3-2. SHOAL ACCRETION CONTOURS, MAR 1988-NOV 1988

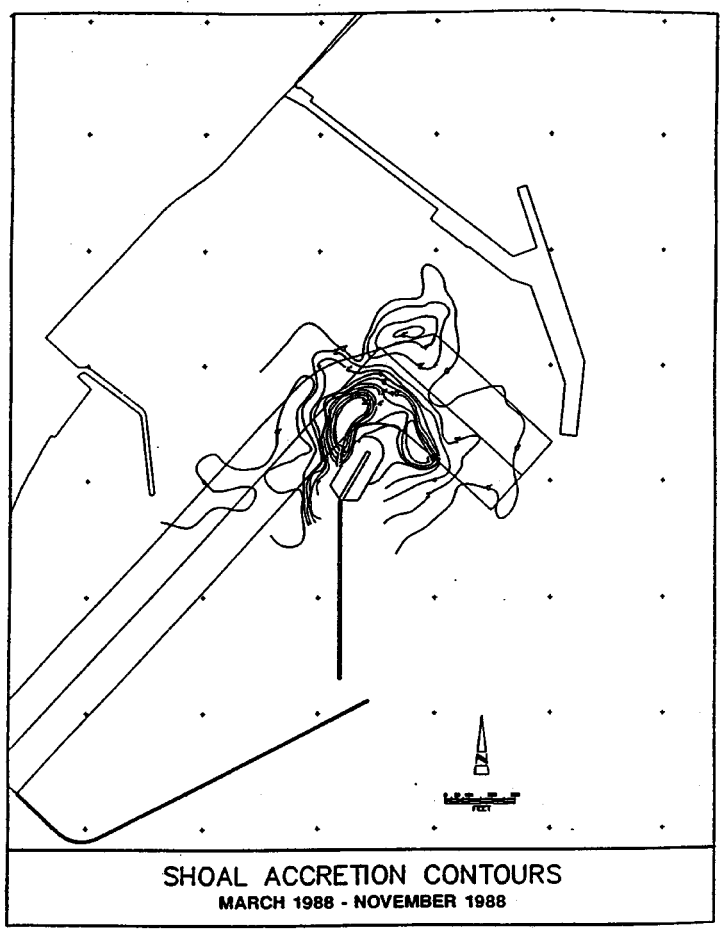


Figure 3-3. SHOAL ACCRETION CONTOURS, APR 1989-NOV 1989

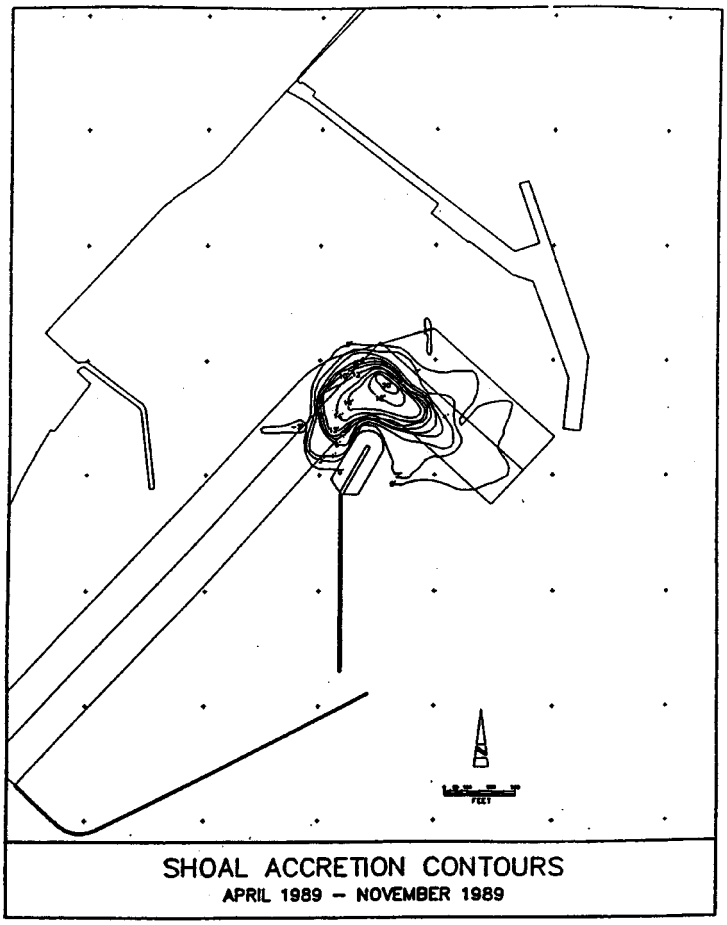


Figure 3-4. ENTRANCE SHOALING SURVEY

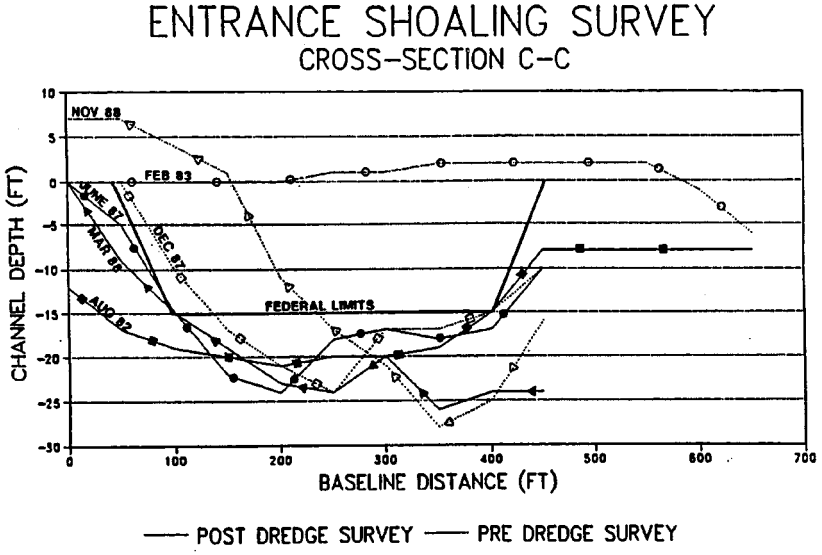


Table 3-6 shows the cumulative monthly littoral transport which is estimated to be deposited in the entrance channel between completion of the second dredging phase of one year and the first dredging phase of the following year. The table shows that the cumulative shoal volume estimated to be in the entrance channel prior to the first dredging phase is approximately 180,000 cubic yards.

Table 3-6. CUMULATIVE MONTHLY SHOAL VOLUMES (Cubic Yard/Month)

	Average Easterly Transport Rate	Cumulative Shoal Volume (After 3/15)
Jan	50,000	-
Feb	46,000	-
Mar	31,000	15,000
Apr	33,000	48,000
May	27,000	75,000
Jun	26,000	101,000
Jul	13,000	114,000
Aug	12,000	126,000
Sep	8,000	134,000
Oct	20,000	154,000
Nov	29,000	183,000
Dec	30,000	-
TOTAL	325,000	

Table 3-7 presents a comparison of historic shoal volumes with the associated controlling depth for navigation for various size vessels. It is noted that shoaling throughout the year also reduces channel width down to one lane or less. The reduced width has caused some delays in traffic movement as well as grounding of vessels.

The results shown in Table 3-7 indicate past maintenance practices caused navigation to be restricted for all vessels with drafts exceeding 10 feet on an annual basis, based upon the 180,000 cubic yards of littoral drift estimated to be moved towards the harbor entrance between March 15 and December 1. Interviews with harbor personnel and vessel owners indicate that only the deepest draft vessels experience restricted navigation on an annual basis. It is estimated that some of the monthly littoral drift being driven toward Santa Barbara Harbor is deposited outside of the Federal entrance channel. Inspection of historic sand bar plan forms, profiles, and aerial photographs indicates that the sand bar tends to store a significant portion of this littoral material outside of the entrance channel during the Spring through Fall months. This material is typically pushed into the entrance channel by seas from the southeast generated by Winter storm conditions. Historic aerial photos demonstrate the growth of the shoal during the Spring through Fall months.

It is estimated that approximately 100,000 cubic yards of the total of the 180,000 cubic yards transported to the vicinity of the entrance channel

between March 15 and December 1 is deposited directly into the entrance channel. The remaining 80,000 cubic yards are assumed to accumulate on the sandbar until Winter southeast seas push this material into the entrance. The estimates of available storm shoal volume for various draft categories summarized in Table 3-7 appear to be consistent with actual experience.

Table 3-7. RESTRICTIVE CHANNEL SHOAL VOLUME VERSUS DRAFT CATEGORY

Draft Category (Feet)	Controlling Depth (Feet\MLLW)	Restrictive Shoal Volume (Cubic Yards)	Pre-Storm Shoal Volume (Cubic Yards)	Avail. Storm Volume (Cubic Yards)
<2	-3.0	210,000	100,000	110,000
2 - 3.9	-4.0	200,000	100,000	100,000
4 - 5.9	-6.0	180,000	100,000	80,000
6 - 9.9	-9.0	110,000	100,000	10,000
>10	-12.0	80,000	100,000	Restricted

The next consideration is the amount of entrance channel shoaling that occurs in the winter between completion of the first dredge phase and commencement of the second dredge phase. Using the average monthly littoral transport rates presented in Table 3-8, the cumulative transport volume between the assumed December 31 completion of the first dredge phase and the February 15 commencement of the second dredge phase is approximately 72,000 cubic yards. Since this transport occurs in the Winter, it is further assumed that this volume is deposited into the Federal channel due to the common occurrence of southeasterly seas during the Winter season.

Table 3-8. EASTERLY STORM DRIVEN TRANSPORT
1972-1989

Return Period (Years)	Transport Rate (CY/Day)
100	95,000
50	83,000
25	72,000
10	57,000
5	45,000

The 72,000 cubic yards of littoral drift estimated to have been deposited within the entrance channel between the two dredge phases is less than the 100,000 cubic yards estimated to be in the entrance channel prior to the first dredge phase. However, interviews with Santa Barbara Harbor personnel indicate that navigation can be significantly restricted prior to both the first and second dredge phases. Inspection of the estimated monthly littoral drift volumes presented earlier indicate a significant increase in transport

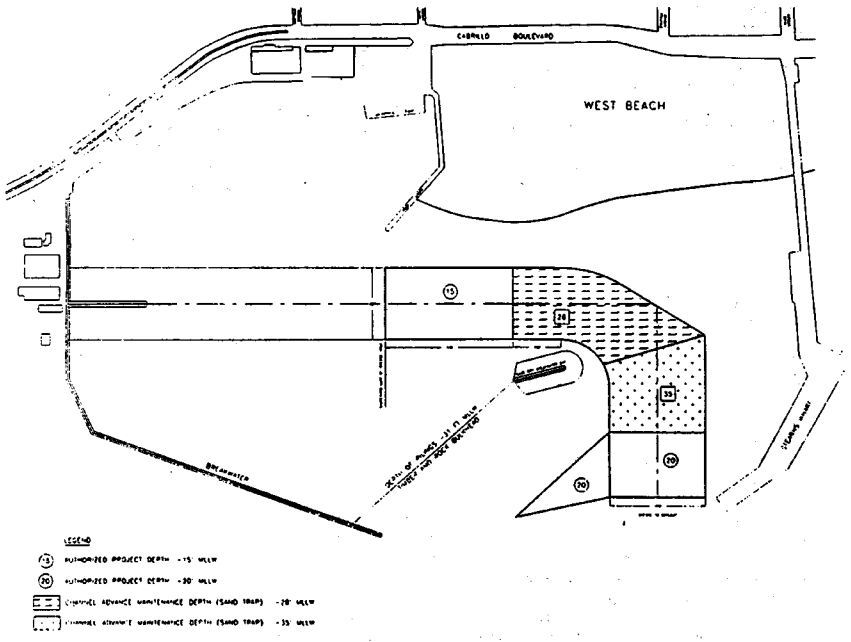
rate variability for winter months compared to summer months. Table 3-8 presents estimates for littoral transport movement associated with various storm events. These events which occur during winter season have significant impact on the variation in shoaling conditions that can occur in any month. For example, the variation in transport rate between a "normal" and "severe" July is approximately 13,000 to 26,000 cubic yards; the variation for February is 45,000 to 220,000. Thus, although the results for average annual conditions indicate greater channel shoaling prior to the first dredge phase, littoral transport rates are highly variable in the winter months and can shoal the channel very rapidly between dredge phases.

The maintenance dredging program in the past has been subject to delays in budget availability, processing of necessary contract documents, and condition surveys which have limited the ability of the Corps to respond to a shoaling condition in a timely manner. The months of greatest littoral transport are December through March. During the non-dredging period the channel normally accumulates material such that by December the channel widths have been reduced to approximately 100 feet at depths of 10 to 12 feet, impacting the larger commercial vessels. Dredging begins in either December or January to remove the shoal. Storms may fill the remaining channel and impact additional vessels at any time during this period in as little as three days of high wave activity. When the channel has been cleared, usually in late January or early February, the dredge returns to its anchorage and the crew leaves the area. Depending on the number of storms the channel may then continue shoaling until the channel is again close to closure between February and April. Since the contractor is not mobilized until a condition survey has confirmed the need for a dredge set up, two to three weeks may transpire until results are obtained.

Current Maintenance Program

The maintenance program for Santa Barbara Harbor has recently been modified to allow for earlier initiation of maintenance dredging in late-September, and deepening the outer entrance channel to -35 feet and a portion of the inner entrance channel to -28 feet for additional advanced maintenance of 70,000 cubic yards, as shown in Figure 3-5. The 170,000 c.y. of total advanced maintenance capacity provided by the additional channel depth and the twice a year maintenance dredging cycle in October and February will provide the capacity needed to solve shoaling problems at Santa Barbara Harbor. The 170,000 c.y. advanced maintenance will accommodate the 154,000 c.y. coming into the channel between March and October. After dredging is complete at the end of October, the restored capacity of 170,000 c.y. will accommodate shoaling that occurs between November and February of about 110,000 c.y., with room to accommodate smaller coastal storms. Extreme storm events could still require emergency dredging depending on when the storm occurs relative to the last maintenance dredging.

Figure 3-5. MODIFIED ENTRANCE CHANNEL



Economic Analysis of Maintenance Program

Cost of Maintenance Program

Table 3-9 presents a summary of recent costs for maintenance dredging activities. The maintenance program at Santa Barbara Harbor involving a three year contract, as well as the contractor being allowed to keep his dredge in the harbor have been major factors in minimizing maintenance costs. As shown in Table 3-9, the quantities of material from recent dredging has been less than long term averages, accordingly an adjustment to the costs is shown in the Table to reflect average dredging requirements. The Table also shows dredging costs based on updated salary information and a 15% contingency based on discussions with District Operations staff and industry experts, who indicate that the present equipment being used at Santa Barbara Harbor will need to be replaced, and higher costs are likely to occur. Based on the analysis in Table 3-9, the cost for maintenance dredging at Santa Barbara Harbor is expected to be about $1,165,000 (October 1992 Price Levels) annually, on the long term average.

Benefits

There are over 1,100 vessels that homeport at Santa Barbara Harbor, including 157 commercial fishing vessels that average $9,376,000 in landings a year. Based on operating costs of about 30%, the net revenues from commercial fishing are estimated to be more than $6 million a year. Ventura Harbor and Channel Islands Harbor, some 30 miles and 40 miles downcoast, respectively, operate at or close to capacity year round, as does Morro Bay Harbor, about 100 miles upcoast. These Harbors have little room to accommodate the movement of the Santa Barbara fleet, and fishing vessels at these harbors are generally operating year round and would not make up the difference in landings if Santa Barbara Harbor was to be closed.

The recreation boating fleet at Santa Barbara Harbor is also significant and could not relocate to other harbors. Recreation boating benefits are based on interviews which indicate recreation boating to be about 200 boaters per day during the summer and weekends and 105 per day during the winter season, or an average daily use of about 150 boaters a day. Based on annual recreation boating season of about 350 days, and unit day value of about $5.00 per day, total recreation benefits for maintaining Santa Barbara Harbor are estimated to be about $260,000 per year.

Total benefits are estimated to be about $6.3 million. Other benefits both commercial and recreation are also recognized at Santa Barbara Harbor but have not been quantified include Coast Guard operations, oil platform supply and emergency operations, and the numerous restaurants and other recreation activities that surround the Harbor.

Table 3-9. AVERAGE ANNUAL COST FOR MAINTENANCE DREDGING

CONTRACT	FY87	FY88	FY89	FY90	FY91	FY92	AVERAGE	AVE W/ 325K CY	Contingency 15% Wage Increase 13.1%
Mob/Demob	$318,000	$0	$0	$50,000	$0	$0	$61,333	$61,333	$106,000
Set-up	$5,000	$10,000	$10,000	$15,000	$45,000	$30,000	$19,167	$19,167	$22,042
Subtotal	$323,000	$10,000	$10,000	$65,000	$45,000	$30,000	$80,500	$80,500	$128,042
DREDGING									
Cubic yds	223,800	260,000	134,600	202,500	287,781	240,500	224,864	325,000	325,000
Cost/cy	$2.25	$2.00	$2.00	$2.00	$2.00	$2.00	$2.04	$2.04	$2.35
Subtotal	$503,550	$520,000	$269,200	$405,000	$575,562	$481,000	$459,096	$663,000	$762,450
PROJECT MANAGEMENT									
Surveys	$70,000	$70,000	$80,000	$40,000	$55,000	$80,000	$65,833	$65,833	$84,332
Other E&D	$80,000	$80,000	$75,000	$75,000	$50,000	$130,000	$81,667	$81,667	$104,615
S&A	$80,000	$55,000	$80,000	$80,000	$70,000	$35,000	$66,667	$66,667	$85,400
Subtotal	$230,000	$205,000	$235,000	$195,000	$175,000	$245,000	$214,167	$214,167	$274,348
TOTALS	$1,056,550	$735,000	$514,200	$665,000	$795,562	$756,000	$753,763	$957,667	$1,164,839
BUDGETED AMOUNTS		$905,000	$970,000	$918,000	$750,000	$795,000	$867,600		

NOTES:

1. DOES NOT INCLUDE ADDITIONAL SURVEYS FOR EMERGENCY DREDGING EPISODES.

2. 1986 BUDGET AMOUNTS NOT AVAILABLE.

3. THE SECOND TO THE LAST COLUMN SHOWS WHAT THE AVERAGE COST WOULD BE FOR THE STATISTICAL AVERAGE SHOALING AMOUNT OF 325,000 CY. THE PAST SIX YEARS REFLECT A SMALLER AMOUNT OF DREDGE MATERIAL DUE TO THE MILD, DROUGHT CLIMATE CONDITIONS, AND A LESSER AMOUNT OF MATERIAL THAN USUAL HAS BEEN TRANSPORTED INTO THE ENTRANCE CHANNEL. IN ORDER TO BRING THE OPERATING COSTS TO A COMPARABLE BASIS, THE AVERAGE COSTS FOR THE 325,000 CY IS SHOWN.

4. THE LAST COLUMN SHOWS THE STATISTICAL AVERAGE AMOUNT AT THE JULY 1992 PRICE LEVEL. SIGNIFICANT COST INCREASES, 15%, ARE EXPECTED THIS SEASON DUE TO SIGNIFICANT EQUIPMENT FAILURES DURING FY1992 DREDGING SEASON. ALTHOUGH A CONTRACT MODIFICATION WAS NEVER COMPLETED, THE ESTIMATED COST PER CUBIC YARD FOR ADDITIONAL DREDGING WAS OVER $4.00 PER CUBIC YARD. PROJECT MANAGEMENT COST REFLECT THIS OVERALL INCREASE PLUS AN ADDITIONAL WAGE INCREASE OF 13.1 PERCENT. THE MOB/DEMOB COST HAS BEEN ADJUSTED TO REFLECT A MORE REALISTIC ESTIMATE, BASED UPON 1987 COSTS.

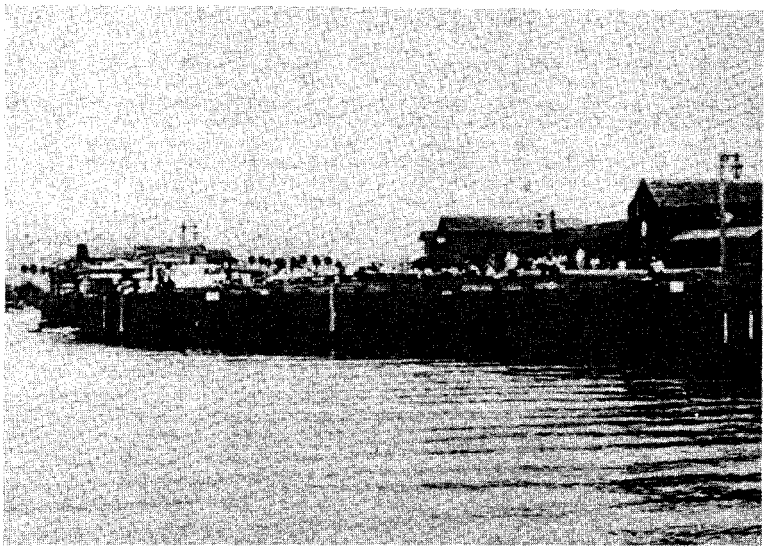
Economic Analysis

Based on the costs and benefits indicated above, continuation of the maintenance program is well justified based on net benefits about $5.1 million and a Benefit-to-Cost ratio of about 6-to-1.

Summary of Problems and Needs

Historic shoaling problems that have occurred at Santa Barbara Harbor include restricted channels in the late Fall and Winter and, restrictions during the Winter from coastal storms are expected to be resolved by recent changes in the Corps of Engineers maintenance dredging program involving earlier initiation of dredging and advanced maintenance capacity provided by channel deepening. Except for initial dredging to create the advanced maintenance areas, the addition of these measures is not expected to cause any increase in the cost of maintaining navigation at Santa Barbara Harbor. Since the navigation channels function as a perfect trap for all littoral material moving east, the quantity of material dredged to maintain the channel is not expected to change as a result of the advanced maintenance deepening. Consideration can be given to reducing the frequency of dredging, or less costly dredging operations.

The City of Santa Barbara is still concerned with the impacts of budget delays, contractor problems, and other factors that could delay maintenance dredging when needed. To avoid these potential problems, they are interested in acquiring a dredge and assuming total responsibility for maintenance of the navigation channels. Accordingly, the remainder of this report examines the advisability and interest of the Federal Government participating in a plan for the acquisition of a dredge by the City of Santa Barbara, and the City being responsible for its operation to maintain the Federal channel.



Chapter 4. Plan Formulation

The development and evaluation of plans was conducted consistent with the planning requirements of the Water Resources Council's Principles and Guidelines, the National Environmental Policy Act of 1969, Sections 904 and 905 of the Water Resources Development Act of 1986 as contained in Engineering Regulation 1105-2-100. The objective of this planning process is to guide planning for the conservation, development, and management of water and related land resources. It requires the systematic preparation and evaluation of alternative ways of alleviating problems and taking advantage of opportunities. This planning process results in information necessary to make effective choices regarding resource management under existing and projected water and land uses, and economic and environmental conditions in the study area.

National Objective

Federal and Federally-assisted water and related land planning is directed towards enhancing National Economic Development (NED) as a national objective. Contributions to NED are increases in the net value of the national output of goods and services expressed in monetary units. Plans are formulated to alleviate problems and take advantage of opportunities in ways that contribute to the NED objective.

Public Concerns

The public perceptions and desires were reviewed for incorporation into study solutions. By soliciting information from the public, subsequent planning efforts were directed to respond to these perceptions and desires. Public concerns were expressed directly at public meetings, and indirectly through government representatives and agencies.

During both the Reconnaissance and the Feasibility Phases, the shoaling problem that has historically existed at Santa Barbara Harbor was a major concern of the City and other harbor interests. Measures recently adopted by the Corps of Engineers, including earlier dredging and the provision of additional advanced maintenance areas are expected to resolve the shoaling problem.

The City of Santa Barbara is still interested in acquiring a dredge and taking over maintenance responsibility of the channel. The City desires to be able to better control the timing of dredging episodes, so that future shoaling problems do not occur as a result of budget or contract delays.

Accordingly, the primary planning objective of this study is to investigate whether more efficient and effective means can be used to maintain the existing Federal channel at Santa Barbara Harbor, specifically to determine the Federal interest in a plan for acquiring a dredge to be operated and maintained by the City of Santa Barbara for maintenance of the existing Federal channel.

Formulation and Evaluation of Criteria

Alternative management measures and plans to improve the efficiency of maintaining the Federal navigation channel at Santa Barbara Harbor were identified during the planning process and evaluated based on:

A. Reviewing existing Federal, state, local and private studies and reports related to Santa Barbara Harbor shoaling;

B. Soliciting public views on measures and plans to address problems and opportunities with respect to water and related land resources within the Santa Barbara Harbor study area; and

C. Coordinating with other Federal, State, and local agencies.

This process identified solutions to be addressed in the study. The following describes the development and screening of project alternatives. This effort resulted in the selection of a recommended plan. Criteria used in selecting the recommended plan are described below.

Economic Criteria

The general economic criteria that apply in formulating and comparing alternatives are summarized as follows:

A. Tangible project benefits must equal or exceed economic costs. The Benefit-to-Cost (B/C) Ratio is a measure of this criterion. The B/C Ratio must exceed 1-to-1 to achieve economic justification.

B. The scale of development should consider maximization of net benefits (benefits minus costs).

C. The objectives cannot be attained by a more economical solution.

Principles and guidelines for Federal water resources planning require that, during plan formulation, a plan be identified that produces the greatest contribution to the National Economic Development (NED). This plan, called the NED plan, is defined as the plan providing the greatest net benefits as determined by subtracting annual costs from annual benefits. The Corps of Engineers policy requires recommendation of the NED plan unless there is adequate justification to do otherwise.

Environmental Criteria

The process in evaluating environmental considerations to formulate and compare alternatives was as follows:

A. Alternatives were evaluated for their potential environmental impact, either beneficial or adverse. The relationship between short-term uses and long-term productivity of impacted resources was determined. Irreversible and irretrievable commitments of resources were explicitly identified.

B. Efforts were made to avoid detrimental environmental effects; when adverse effects were unavoidable, feasible mitigating features were included wherever justified.

C. Consideration was given to public health, safety, and social well-being, including the loss of life.

Deferred Project

Under this "Review of Deferred Projects" study, early consideration was given to a review of the project authorized by the River and Harbor Act of 1962, and subsequently inactivated in 1969. During this review, it was determined that there were still public objections to that plan, because it included major development within Santa Barbara Harbor. As a result it could not be supported by the City of Santa Barbara, and it was eliminated from further consideration.

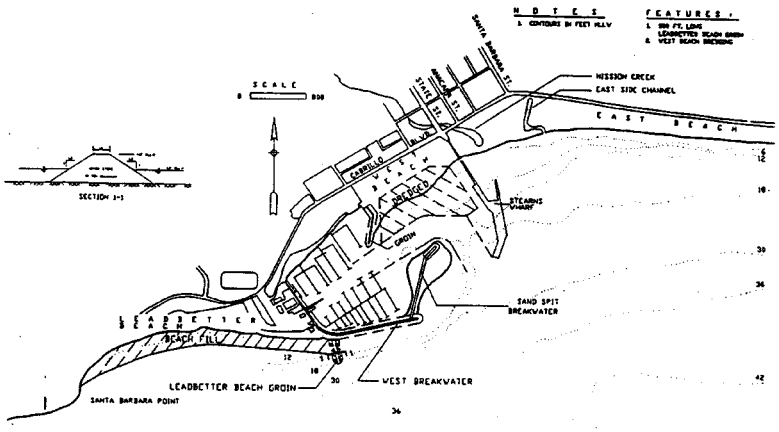
Structural Alternatives

Structural alternatives for providing more effective and efficient means of maintaining the Federal channel by reducing the frequency of maintenance dredging were considered. These included an offshore sand trap, a West Beach groin, dredging the West Beach area, or a sand bypass system.

Structural Sand Trap

Alternative structural plans to increase sand trapping to allow for less frequent and less costly maintenance dredging were investigated. As indicated in Chapters 2 and 3, Santa Barbara Harbor acts as a giant trap for the 325,000 cubic yards that moves into the area through littoral transport. Alternatives such as constructing a jetty at Leadbetter Beach (Figure 4-1) or at the end of the breakwater to trap this quantity of material would be extremely costly as compared to the setup costs for frequent dredging of the existing channel and relatively small advanced maintenance area. Dredging a deeper and wider advanced maintenance (Figure 4-2) to trap additional material at the entrance would require depths below -45 feet MLLW and an additional 100 to 200 feet in channel widths. These depths and widths would result in significant wave energy being transmitted into the Harbor complex, causing damage during coastal storms. Accordingly, the creation of large sand traps was eliminated as a means to reduce the cost of maintaining Santa Barbara Harbor channels.

Figure 4-1. LEADBETTER BEACH GROIN



West Beach Groin

The West Beach groin alternative (Figure 4-3) includes the construction of a 700-foot-long concrete and sheetpile groin along the west side of Stearns Wharf. The groin would reduce transport of sand from the east toward West Beach, and would stabilize the shoreline to the east and decrease the accumulation of sand to the west. West Beach could be dredged to allow for a wider entrance channel and provide an area for small craft recreation facilities. This feature would reduce the amount of material moving into the Harbor from the west that can be pumped using the equipment in the Harbor. First costs associated with this feature are over $3.2 million. Benefits are limited to increased recreation use at $1,800, so the project was not considered further.

West Beach Dredging

The City of Santa Barbara has dredged West Beach back about 200 feet from the navigation channel about once every 10 years, allowing the transport of some 35,000 cubic yards a year to buildup on the beach rather than move into the channel. This limited quantity would not effect the cost of annual maintenance dredging; however, preventing this material from entering the channel would assist in minimizing the shoaling problem during the Winter months. Funds were provided by Congress to dredge West Beach in FY92, and the work was accomplished in FY93.

Fixed Bypass Plant on West Breakwater

A fixed sand bypass system (Figure 4-4) could be located at the end of the West Breakwater. Jet pumps would be deployed in the channel and on the sand bar to intercept sand as it shoals and pump the material to the beach disposal site. The jet pumps could be a combination of retrievable units and a mobile, portable unit. A pile-supported pumphouse constructed on the leeward side of the breakwater extension would pump supply water to the jet pumps and pump sand slurry to the discharge area. The mobile jet pump assemblies can be moved by boat to other areas. The reach of the jet pumps can be extended by the use of a fluidizer line that would inject water into the sand to create a slurry flow into the crater formed by the jet pump. A portable jet pump supported by pontoons could be moved about by surface craft to collect sand from areas in the channel and mooring area that bypasses the jet pump craters. The maximum reach of the portable jet pump would be about 800 feet. The excavated material would be discharged on the downdrift East Beach in a permanently installed pipeline. A water intake line would be located in the Harbor where sand does not accumulate. The pumps would be powered by electricity and enclosed in a housing.

Evaluation of the costs, technology, capabilities and limitations are not complete enough to consider a fixed sand bypass plant at this time, so this alternative was not considered further. First costs of the bypass plant can range from $4 million to $5 million, and operations and maintenance and replacement costs for the system would be close to, if not somewhat higher, than a floating system at Santa Barbara Harbor. There would be a number of

Figure 4-2. SAND TRAP

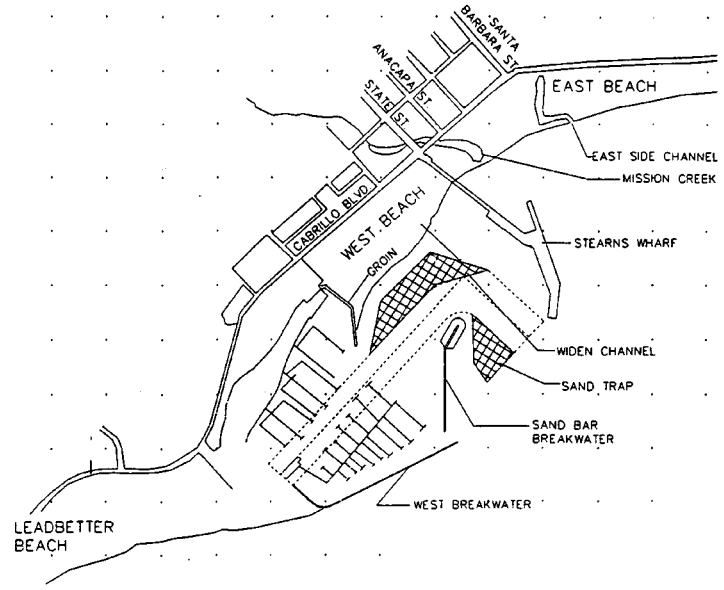


Figure 4-3. WEST BEACH GROIN

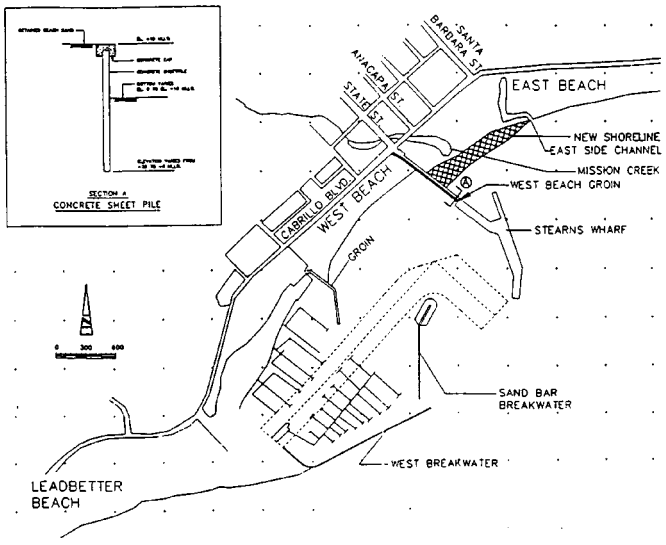
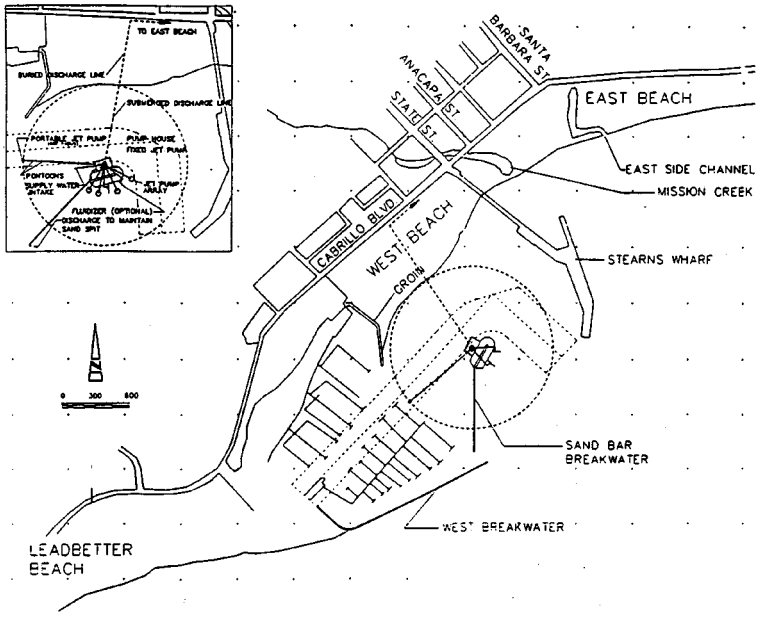


Figure 4-4. SAND BYPASS SYSTEM



concerns with the performance of a fixed bypass system at Santa Barbara Harbor that would need to be addressed in designing the system including the need for taking care of large quantities of material resulting from coastal storm, and the limited environmental window for dredging operations due to environmental and recreation concerns. In view of the cost of a fixed bypass system being similar to a conventional dredge system, and the concerns of its performance during storm conditions, and other uncertainties with this relatively new technology, the City of Santa Barbara indicated that it does not desire a fixed bypass system. Accordingly, the fixed sand bypass system was eliminated from further consideration.

Nonstructural Alternatives

Nonstructural alternatives include the "no-project" and a dedicated dredge. The no-project alternative assumes implementation of the new operating program with continued contracts issued by the Federal Government. This program will not allow the City of Santa Barbara to customize the program to meet their needs, and will continue to subject the Harbor to potential shoaling conditions awaiting contract award and/or budget approval.

The dedicated dredge alternative also assumes implementation of the new operating program and consists of providing funds to the City of Santa Barbara for the purchase of equipment necessary to operate their own dredge program. The equipment includes a dredge, workboat, pipeline, key replacement parts, and shore support equipment.

Alternatives Considered

The only alternatives considered for further analysis are the dedicated dredge and no-project. Other alternatives are either less efficient or not desired by the City of Santa Barbara.

No-Action Alternative

The no-action alternative is the same as the without-project condition and assumes the proposed improvements to the Corps of Engineers dredging plan will be implemented. The frequency of shoaling problems in the navigation channel would be greatly reduced with these measures, although time and expenses by the Federal Government to advertise, monitor, and direct the dredging program would continue. Operations will consist of continuing to advertize three year contracts by employing a contractor to maintain the channel in an earlier-start dredging program during the months of October and February.

Dedicated Dredge

The dedicated dredge alternative consists of providing all of the necessary equipment for the City of Santa Barbara to operate a program on their own. Equipment includes a 1,000 kilowatt, electrically powered, 16-inch discharge hydraulic dredge set up with spare parts and ready to operate,

workboat and skiff, pipelines, shore support equipment such as levee dozer and crane, and electrical support gear such as reel barge and power cable. The dredge would be designed to accommodate normal shoaling of 325,000 cubic yards per year and the capability to pump up to 8,000 cubic yards per day during the six month dredging season for a maximum of approximately 650,000 cubic yards to correspond to the approximate recurrence interval of a 100 year shoaling event. Construction of the dredge would be according to American Bureau of Shipping standards suitable to the wave environment at Santa Barbara Harbor. Under this alternative, the City of Santa Barbara would assume total responsibility for the maintenance of the Federal channels.

Description of Dredge. The dredge would consist of three sections for a combined size of 80 feet long by 30 feet wide. The dredge would be equipped with spuds, the main deck and housing, a lever room complete with controls, a 52-inch diameter pump, a 65-foot-long, 10-foot-wide ladder frame assembly with swing and guide sheaves and the reel and anchor barges to support the dredge. A work boat with twin screws, A-frame winches and communications equipment would also service the dredge. A detailed description is included in Chapter 5 and in Appendix C.

Assessment and Evaluation of Alternative Plans

Economic Evaluation

The dedicated dredge alternative was found to be justified on the basis of net annual benefits exceeding average annual costs. The no-action plan results in continued expenses by the Federal Government for contract administration and condition surveys. The evaluation assumes implementation of the optimized dredging program. Savings from income losses and vessel damage are reduced considerably under this program. The savings in the project are primarily due to savings in operation and maintenance costs.

Current Operating Costs. Existing and future maintenance costs are shown in **Table 4-1**, with a total average annual cost of $1,164,839. These costs reflect average annual shoaling rates and costs based on October 1993 prices. The costs also reflect a 15% contingency over historic rates based on problems that the current contractor has had with the outdated equipment which is expected to increase future bids.

Project Costs. The first cost of the dredge equipment and daily operations are based on October 1993 price levels, and were developed by reviewing actual costs for similar equipment procured for Santa Cruz Harbor, discussions with manufacturers, and coordination with the Corps of Engineers Marine Design Center. A summary of cost estimate of the dredge and components is provided in **Table 4-2**, including a first cost of $4,645,000. Additional first costs for engineering, design and construction support are $800,000. The total project first cost is $5,445,000. Details are presented in Chapter 5 and in Appendix C.

Table 4-1. FEDERAL MAINTENANCE DREDGING COSTS

CONTRACT	FY87	FY88	FY89	FY90	FY91	FY92	AVERAGE	AVE W/ 325K CY	Contingency 15% Wage Increase 13.1%
Mob/Demob	$318,000	$0	$0	$50,000	$0	$0	$61,333	$61,333	$106,000
Set-up	$5,000	$10,000	$10,000	$15,000	$45,000	$30,000	$19,167	$19,167	$22,042
Subtotal	$323,000	$10,000	$10,000	$65,000	$45,000	$30,000	$80,500	$80,500	$128,042
DREDGING									
Cubic yds	223,800	260,000	134,600	202,500	287,781	240,500	224,864	325,000	325,000
Cost/cy	$2.25	$2.00	$2.00	$2.00	$2.00	$2.00	$2.04	$2.04	$2.35
Subtotal	$503,550	$520,000	$269,200	$405,000	$575,562	$481,000	$459,096	$663,000	$762,450
PROJECT MANAGEMENT									
Surveys	$70,000	$70,000	$80,000	$40,000	$55,000	$80,000	$65,833	$65,833	$84,332
Other E&D	$80,000	$80,000	$75,000	$75,000	$50,000	$130,000	$81,667	$81,667	$104,615
S&A	$80,000	$55,000	$80,000	$80,000	$70,000	$35,000	$66,667	$66,667	$85,400
Subtotal	$230,000	$205,000	$235,000	$195,000	$175,000	$245,000	$214,167	$214,167	$274,348
TOTALS	$1,056,550	$735,000	$514,200	$665,000	$795,562	$756,000	$753,763	$957,667	$1,164,839
BUDGETED AMOUNTS		$905,000	$970,000	$918,000	$750,000	$795,000	$867,600		

NOTES:

1. DOES NOT INCLUDE ADDITIONAL SURVEYS FOR EMERGENCY DREDGING EPISODES.

2. 1986 BUDGET AMOUNTS NOT AVAILABLE.

3. THE SECOND TO THE LAST COLUMN SHOWS WHAT THE AVERAGE COST WOULD BE FOR THE STATISTICAL AVERAGE SHOALING AMOUNT OF 325,000 CY. THE PAST SIX YEARS REFLECT A SMALLER AMOUNT OF DREDGE MATERIAL DUE TO THE MILD, DROUGHT CLIMATE CONDITIONS, AND A LESSER AMOUNT OF MATERIAL THAN USUAL HAS BEEN TRANSPORTED INTO THE ENTRANCE CHANNEL. IN ORDER TO BRING THE OPERATING COSTS TO A COMPARABLE BASIS, THE AVERAGE COSTS FOR THE 325,000 CY IS SHOWN.

4. THE LAST COLUMN SHOWS THE STATISTICAL AVERAGE AMOUNT AT THE JULY 1992 PRICE LEVEL. SIGNIFICANT COST INCREASES, 15%, ARE EXPECTED THIS SEASON DUE TO SIGNIFICANT EQUIPMENT FAILURES DURING FY1992 DREDGING SEASON. ALTHOUGH A CONTRACT MODIFICATION WAS NEVER COMPLETED, THE ESTIMATED COST PER CUBIC YARD FOR ADDITIONAL DREDGING WAS OVER $4.00 PER CUBIC YARD. PROJECT MANAGEMENT COST REFLECT THIS OVERALL INCREASE PLUS AN ADDITIONAL WAGE INCREASE OF 13.1 PERCENT. THE MOB/DEMOB COST WAS BEEN ADJUSTED TO REFLECT A MORE REALISTIC ESTIMATE, BASED UPON 1987 COSTS.

Table 4-2. RECOMMENDED PLAN FIRST COST

Account Code & Description		First Cost
20.0.1	Office Equipment/Trailer	$30,000
20.0.2	Shop Equipment	60,000
20.0.4	Radios	10,000
20.0.5.L	16-inch Hydraulic Dredge	2,000,000
20.0.5.L	Spare Parts	100,000
20.0.5.L	Dredge Tender and Skiff	420,000
20.0.5.L	Reel Barge	164,000
20.0.5.L	Power Cable	50,000
20.0.5.L	Shore Power Gear	40,000
20.0.5.L	Pipeline	541,000
20.0.5.L	Shore Support Equipment	296,000
20.0.5.L	Dredge Haulout Air Bags	75,000
20.0.X	Contingencies	859,000
SUBTOTAL DREDGE AND EQUIPMENT		$4,645,000
30	Preconstruction Engineering and Design (PED)	500,000
31	Construction Management (S&A)	300,000
TOTAL RECOMMENDED PLAN FIRST COST		$5,445,000

Annual Costs. The annual cost for this plan, shown in Table 4-3 include costs for interest and amortization of the first cost at 8.25% and 50 year project life, and costs to operate and maintain the dredge. The annual costs also include replacement and major rehabilitation of the equipment. It is expected that the City would continue to operate the dredge similar to current operations at Santa Barbara Harbor. Details of the estimates of operating and maintenance costs for the dredge to maintain the navigation channel, as well as costs for replacement of equipment are included in Chapter 5 and in Appendix C.

Table 4-3. RECOMMENDED PLAN ANNUAL COST
(Oct 93 Price Levels/8.25% Interest Rate/50-Year Life)

	First Cost	
20	Dredge and Equipment	$4,645,000
30	Preconstruction Engineering and Design (PED)	500,000
31	Construction Management (S&A)	300,000
	TOTAL FIRST COST	$5,445,000
	Annual Cost	
	Annualized Interest and Amortization	$457,900
	Operation and Maintenance (50 days @ $11,000/day)	550,000
	Insurance	45,000
	Annual Staff Costs (City of Santa Barbara)	15,000
	Replacement Costs	78,800
	TOTAL ANNUAL COST	$1,147,000

Economic Analysis

The benefits and economic analysis, shown in **Table 4-4**, was based on comparing the cost effectiveness of the Federal Government's continuing maintenance of the channels against the costs of acquiring the dredge and associated equipment and the City of Santa Barbara being responsible for operation, maintenance and replacements to maintain the channel. Costs were analyzed on an annual basis over a 50-year economic life at an 8.25% interest rate. The total annual cost for the Federal Government to maintain the Harbor is estimated to be about $1,165,000, compared to $1,146,700 for the dedicated dredge plan, resulting in net benefits of $18,000 annually, and a Benefit-to-Cost Ratio of 1.02-to-1.

The analysis also examined potential savings to the Federal Government. The present worth cost for the maintenance of the Harbor, assuming a uniform series over the next 50 years, is estimated to be about $13.5 million, which would be 100% Federal. The Federal share of the dedicated dredge plan is estimated to be 80% of the $5,445,000 first cost of the project, or $4,356,000. The City would be responsible for all remaining costs to operate and maintain the dredging equipment including major replacements. Accordingly, the Federal Government would save about $9.1 million over the project life.

Table 4-4. ECONOMIC ANALYSIS OF THE RECOMMENDED PLAN

Summary of Annualized First Costs

		First Cost	Annual Cost
20._._._	Dredge and Equipment	$4,644,400	$390,582
30._._._	PED Activities	500,400	42,082
40._._._	Construction Support	300,000	25,229
	TOTALS	$5,444,800	$457,900

Summary of Total Annual Operating Costs

Annualized First Cost	$457,900
Insurance	45,000
Annual Staff Costs (City of Santa Barbara)	15,000
Annual Operating Costs (50 days @ $11,000/day)	550,000
Replacement Fund	78,800
TOTAL	$1,146,700
Corps of Engineers Operating Costs	$1,165,000
Net Benefits	$18,000
Benefit-to-Cost Ratio	1.02-to-1

The operation of a dredge by the City of Santa Barbara will allow for expedited response to the shoaling problems that could result from extreme storm events. As indicated in Chapter 3, the current maintenance program is expected to minimize the shoaling problem, except for extreme events. The extent of shoaling would vary depending on when the storm occurred in relationship to the last maintenance dredging operation. If the storm occurs immediately following maintenance dredging, the 170,000 cubic yard capacity should accommodate shoaling from most storms, However, if the storm occurs in January, some shoaling of the channel could be expected from extreme storms. Federal response to the storm would require arranging a contract, mobilization or setup by contractor, and surveys to determine pay yardage. This could take several weeks, delaying the initiation of dredging. With a dedicated dredge, the City could begin dredging in a matter of days.

Environmental Evaluation

An Environmental Assessment indicating no significant impacts from the acquisition of a dredge for the City of Santa Barbara is attached. Environmental impacts from operating the dedicated dredge are similar to the existing maintenance dredging program, as described in the 1992 Environmental Assessment prepared for the existing Santa Barbara Harbor Maintenance Dredging Program. The dredge would continue the scheduled material removal during the Winter, and would be powered by electricity to decrease air emissions and noise. The environmental assessment prepared for this project provides more details.

Evaluation of Socio-Economic Effects. The short-term effect of the proposed action results in an initial one-time increase in Federal expenditures resulting from Federal participation in the procurement of the dredge. The long-term effect of the proposed action results in a reduced level of Federal dollar expenditures. The effect of transferring the maintenance responsibility to the City of Santa Barbara increases the City budget. The fact that the City would sign a Cooperative Agreement to perform the maintenance dredging infers the City's financial resources are sufficient to meet the obligations of the agreement. Transfer of the responsibility would increase the flexibility of the City to perform channel maintenance and thus protect the capital investment in Harbor facilities and related commercial development.

Air Quality and Noise Conditions. The proposed dredge equipment is currently designed to be operated under electric power with minimal impacts to these resources. The dredge and support equipment is subject to Federal, State and county air quality regulations and standards. An air quality permit will be required with conditions imposed by the Santa Barbara County Air Pollution Control District. Noise levels during construction or operation of the proposed project are not expected to exceed noise limits as identified in the City of Santa Barbara General Plan. Overall, no significant impacts to noise levels or air quality are expected to occur.

Biological Resources. Impacts on biological resources are anticipated to be the same as those associated with Corps dredging operations. The primary biological impact of dredge operations is the disturbance, transport, or destruction of benthic organisms on and in the material to be dredged. Recolonization of the dredge site would occur over time. Dredging induced turbidity may cause stress on planktonic larvae and filter feeder organisms such as worms and shellfish. Any marine mammals, fish, and shorebirds would probably avoid the immediate area of dredging. No impacts on listed or proposed threatened or endangered species or their habitats are anticipated. Implementation of the project specifies operations of the dedicated dredge between September and March. This program is fully acceptable under current environmental guidelines.

Cultural Resources. The proposed activity is not expected to affect any recorded or known prehistoric or historic cultural resources.

Navigation. The City of Santa Barbara will be required to dredge the entrance channel to the depths authorized by Congress in order to maintain safe navigability of the channel. The dredge will be required to display proper signals and buoys to avoid potential collisions, similar to existing operations.

Recreation. Public access to the nearby recreational facilities will be available during construction. Disruption to the recreational facilities is considered minimal and short term. The discharge pipeline will be buried, and activities involving placement and removal will be coordinated with the contractor and City personnel. Therefore, no significant impacts are anticipated from the proposed project.

Traffic. Little or no change in traffic use of streets adjacent to the Harbor is anticipated.

Water Quality. No change in water quality is anticipated from the proposed project.

Comparison of Alternatives

Screening of Final Alternatives

The final alternatives are limited to the No-Action Plan and the dedicated dredge.

Trade-Off Analysis and Plan Selection

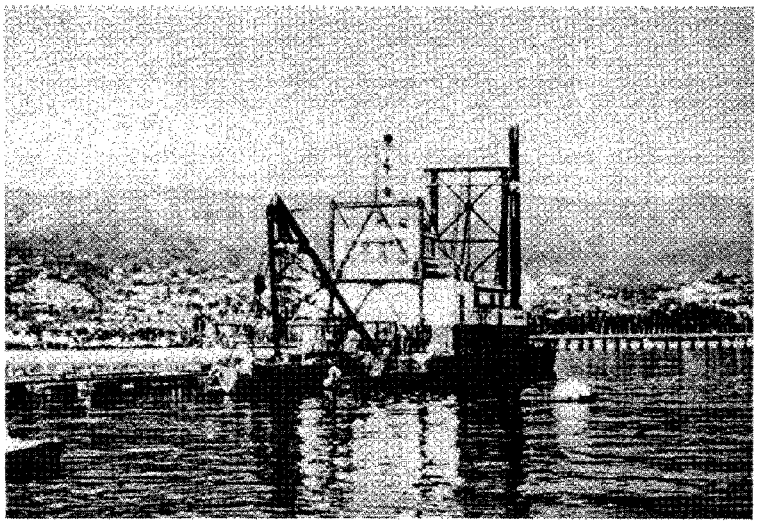
The no-action plan ranks lower than the dedicated dredge alternative because of the higher operation costs associated with the continued Federal involvement in contract administration.

NED Plan Designation and Recommended Plan Selection

The National Economic Development (NED) Plan is that plan that will maximize the net economic benefits. The plan designated as the NED plan will provide the most annualized benefits minus the annualized costs. The dedicated dredge is the NED and recommended plan.

Risks and Uncertainties

The predicted effectiveness of the recommended plan reducing shoal-related damages within the harbor is based primarily on results of analytical studies and the experience gained at Santa Cruz Harbor. The potential for different shoaling rates, either greater or reduced, will affect the operating costs of the equipment. Less shoaling will have less operating time and therefore lower costs. The converse will be true for greater shoaling rates. Costs for the fabrication of the dredge and associated equipment is dependent on labor and material and the assumption of a viable and operating shipyard that can perform the work. Should economic conditions cause dramatic changes in this assumption, cost estimates will vary accordingly.



Chapter 5. Recommended Plan

The Recommended Plan consists of Federal participation in acquiring a dredge system including a dredge and associated equipment and spare parts to allow the City of Santa Barbara to take over the responsibility of maintaining the existing Federal navigation channel. It calls for the City to assume full responsibility for maintaining the Santa Barbara Harbor entrance channels, including operations, funding and maintenance and replacement of the dredge system.

The Recommended Plan includes providing all of the necessary equipment to allow the City to maintain the entrance channels. The dredge plant would be a 1,000-kilowatt, electric-powered, hydraulic dredge, with a full stock of required spare parts. Additional equipment would include a workboat and skiff, pipelines, shore support equipment such as a levee dozer and a crane, and electrical support gear including a reel barge and power cable.

The dredge must be able to handle normal shoaling of at least 325,000 cubic yards per year, with the capability to pump up to 8,000 cubic yards per day throughout the six-month dredging operations -- for a maximum of about 650,000 cubic yards.

Dredge and Plant Description

A complete itemization of the Recommended Plan's dredge system follows.

Hull

Portable 16-inch dredges typically have three pontoons with the outside pontoons measuring around 60 feet in length. Flotation criteria and weight will govern hull size. The length for the outer pontoons was selected to be 80 feet. The length of longer period swells entering the harbor are substantially in excess of 80 feet and sufficient length to be "riding" several swells does not seem practical. While dredges have worked in Santa Barbara Harbor with less, manufacturers agreed that 36 inches of free board in the fully-loaded condition is desirable for hull sizing. Hull plates of 3/8 inch are standard. Double plate thickness on the bottom of the hull would provide extra weight at the lowest center of gravity and also provide strength for pulling the hull ashore in the non-working season. This feature should be considered for inclusion at time of final procurement with the decision based on the impact of the double plate thickness on floatation and full cost. Short choppy waves will result in water on deck during periods when dredging

is possible. Therefore, deck area openings and hatches should be designed accordingly. The hull features include:

1. Self-contained center pontoon section containing dredge pump, main and auxiliary power plant and control house.

2. Side section to provide flotation, A-frame mounting, fuel tanks, spud mountings.

3. Hull to be one way transportable and welded together at site. This provides additional strength and seals interior plating from the saltwater.

4. Criteria

a. Minimum Dimension:

Center section 50' x 10' wide x 7' deep
Side section 80' x 8' wide x 7' deep

b. Floatation Criteria:

3' freeboard minimum with half load fuel and supplies, ladder up and spuds removed
1' freeboard with center pontoon flooded

c. Compartmentation, as appropriate for service

d. Plate Thickness:

3/8" minimum, all pontoons
3/4" on bottom plate, all pontoons

e. Hatches, Portholes and Openings:

Suitable to take green water over entire deck area without damage or flooding

f. Design to American Bureau of Shipping (A.B.S.) "Steel Barges for Offshore Service"

Pump and Machinery

The pump and main power unit are sized for maximum production during the short periods available for operations. Matching main and auxiliary motors simplifies spare part acquisition and maintenance. The electric power is specified due to air quality requirements. The size of the electric power should be approximately 1000 kw to correspond to the 970 HP engine necessary to meet pumping requirements as explained in the Design Appendix.

1. Pump 16" discharge with 18" suction

2. Pump motor - electric, direct drive through gear reduction; motor horsepower approximately 900 HP @ 1200 RPM

3. Auxiliary motor - electric approximately 420 HP

4. Main and auxiliary motors matched for spare part and repair simplicity

Ladder and Special Feature Forward

Ladder and front end design must be suitable for two types of operation. Dredge should be capable of dredging at grade with a cutterhead during mild weather. This will provide the capability to clean up the toe of slope and around the jetty areas. The cutter may also assist in dredging debris filled areas. It is anticipated during rough weather that the "potholing" dredging method will be used. Substitution of plain suction/water jet system for the cutter module will make this possible. The water jet system agitates material in absence of a cutterhead and also provides a cushion to vertical fall of the ladder due to hull pitching. A flat ladder angle reduces chances of transmitting lifting forces on the hull through the trunion. A summary of the ladder features include:

1. Suitable for 35' depth dredging at ladder angle equal or less than 30 degrees. 60' minimum length from trunion.

2. Equipped with cutter drive and cutterhead on detachable flanged forward section.

3. Swing and ladder lift winches mounted on ladder to eliminate openings in center pontoon section.

4. Forward ladder section detachable and suitable for addition of flanged attachment for plain suction/water jet section. Forward ladder section suitable for "potholing" to depth -35' at low water.

5. Feedwater pump suitable for developing 350 psi pressure on 6" line to end of 60' ladder. Approximate 350 HP drive unit powered from auxiliary engine.

6. Separate ladder hoist for forward suction system utilizing constant tension, high line speed winch system. Alternatively, hydraulic arm supported from aft ladder section. Position display in operator's console.

Stern Features

1. Spuds suitable for water depths of 35'. Spud winch equipped for free fall option.

2. Stern swivel with horizontal turning freedom and vertical motion via ball joint. Two (2) additional ball joints at 3' spacing between swivel and ball joint connection with floating line.

Winches

1. Swing winches minimum 22,000 pound line pull.

2. Ladder hoist and spud winches appropriate for load.

Pipelines

Pipeline should be provided in 50-foot sections for ease in handling. Styrofoam collars should be used to keep pipe low in the water as well as simplify storage requirements. Ball joints should be purchased for every pipe section. Use of ball joints could be modified to 10 foot rubber sleeves flanged to pipe ends at every third section if indicated by experience. One anchor barge will be required to keep the pipeline out of the channel. A floating swivel will allow freedom of movement for adding pipeline. Polyethylene pipe should be used on shore due to durability, life and cost. Pipeline features include:

1. Steel 16" I.D., 1/2" wall floating line in 50' sections. Styrofoam collars for floatation and ball joints for connections.

2. One anchor barge approximate diameter 30' x 15' with 3 drum winch.

3. One floating swivel elbow for anchor/shore connection.

4. Shore pipe polyethylene, 110 psi, 15.8" ID, Drisco pipe 8600 or equal.

Workboat

Approximate 40' long by 14' beam, two 200 HP diesel engines. A-frame and winch forward suitable for handling 5000 pound anchor loads. Open deck forward.

Storage Area

The dredge and workboat will be anchored within the harbor near the existing groin. Storage for landside equipment including pipeline, shed, and other equipment will be within the harbor area. The final location will be dependent on City of Santa Barbara Land Use Plans.

Dredge Spare Parts

Parts that will be provided as part of the initial project include any major pieces that would significantly delay operation if damaged, or any non-standard part requiring over 2 to 3 weeks for delivery. A list of parts include Impeller, pump shell, cooling pumps, specialized electric equipment, hoses, and fittings, bearings, cutter blades, gear parts, and other general parts.

Skiff

The skiff is an open steel construction boat with outboard motor.

Reel Barge and Power Cable

The reel barge supports the electrical cable and transformer equipment. The equipment includes hull and fittings, the reel and reel drive, and transformer.

Shore Power Gear

The shore power gear consists of relocating the transformer from Stearns Wharf to the groin within the harbor. This feature includes the switching gear, housing, and conduit for the cable.

Shore Support Equipment

A 20-ton all-terrain crane or a tractor-dozer is also considered part of the dredge plant. In addition, a flat bed truck, boom truck, forklift, and storage shed would be necessary to operate the dredge program.

Provisions for a haulout system for the dredge have also been considered. The haulout system enables the City to remove the dredge from the water during off-season and also to perform maintenance on the underwater portions without an ocean tow to a shipyard. It is anticipated that the dredge could be pulled out of the water and up the existing ramp. Design features would include air bags or rollers to use under the dredge and deadmen on shore. Dredge swing gear with blocks tied to the deadmen would provide the method of pulling ashore.

Miscellaneous

This category includes small tools, welding equipment, supplies, and the dredge haulout gear.

Operation of the Dredge

The purpose of the operating criteria is to assist the City of Santa Barbara in establishing operating methodology for the work. Because of the questions regarding the weather conditions and amount of available time for working, the operation is based more on time than on dredge production for the work. For purposes of the estimate, the following criteria have been established.

1. Total dredging phases per year: 2 (3 if necessary)

2. Total volume per phase: 165,000 cy

3. Total pumping days per phase: 21 days

4. Total non-pumping hours per phase: 4 hours

5. Work days per phase: 4, 5-day weeks

In narrative terms, the dredging operation will be conducted as follows: In October a crew will be hired to prepare the dredge for operations and begin dredging in single 10 hour shifts. On the last day the dredge will be pulled back into the harbor to await the next phase of dredging. For the next phase, it is assumed that four full weeks of crew expense will be necessary. During the next phase of dredging, a partial crew will be held over to demobilize the dredge. Operations consist of a total of 50 days to remove 325,000 cubic yards including mobilization and demobilization.

Maintenance Allowance

The purpose of the maintenance allowance and sinking fund is to reflect future costs in each annual dredging budget. For example, equipment maintenance and repair, overhaul and replacement of hull and machinery will be necessary over time. These costs will be low in early years and high in later years. It is recommended that the maintenance allowance and sinking fund charges be established and funds accumulated in an enterprise fund. After several years the balance of that fund could be evaluated and annual allowances increased or decreased as appropriate. The maintenance allowances were established based on the concept used by the Associated General Contractors Equipment Manual.

Equipment Life Spans

The following equipment life spans have been established.

1. Dredge and reel barge life before replacement of 30 years.

2. Major rehabilitation is required every 15 years.

3. Shore gear must be replaced at 10 year intervals.

4. Pipelines and floats have a 20-year life.

5. The tender/skiff, shed, and crane also have a 20-year life.

6. All other equipment have life spans of 10 years.

Project Costs

First Costs

The estimated first cost of the Recommended Plan includes estimates to acquire all of the necessary equipment to effectively operate a maintenance dredging program. **Table 5-1** presents details of the Recommended Plan's estimated costs. Unit prices for acquisition of the system are based on October 1993 price levels; reflects experience from acquisition of Santa Cruz Dredge system; recent acquisitions by the Corps of Engineers Marine Design Center; and coordination with a number of manufacturers and industry representatives. Details on the basis of the costs for each item and contingencies are presented in Appendix C. All costs were reviewed by the Marine Design Center.

The total first costs include costs for Preconstruction Engineering and Design activities, the preparation of a design report, the preparation of plans and specifications, and preparation and ratification of a Project Coordination Agreement, as indicated in the Project Management Plan. First costs also include cost for Supervision and Administration, Engineering during Construction, Construction Management as reflected in the Project Management Plan. Construction is expected to be initiated in Fiscal Year 1996. The procurement will be accomplished in a three step process and take about two years to complete.

Real Estate

The City of Santa Barbara is expected to locate the dredge and storage areas on City-owned property within the Harbor area. Operation and disposal of dredged material would also be within City boundaries. Accordingly, no additional costs would be incurred for lands, easements and rights of way, and for disposal.

Inflated First Costs

Construction is expected to be initiated in early FY97 and completed in early FY99. The total first cost, inflating the estimated $5,445,000 (October 1993) to the midpoint of construction, is estimated to be $6,400,000.

Table 5-1. FIRST COST OF THE RECOMMENDED PLAN
(October 1993 Price Levels)

Account Code	Description	Quantity	Unit	Unit Price	Amount	Contingency (In Acct # 20.0.Z.-)	Percent	Total
20.-.-.-	Permanent Operating Equipment							
20.0.1.-	Office Equipment/Trailer	1	LS	$30,000	$30,000	$6,000	20%	$36,000
20.0.2.-	Shop Equipment							
	Welding machine	1	EA	$10,000	$10,000	$2,000	20%	$12,000
	Cutting tools	1	LS	$2,000	$2,000	$400	20%	$2,400
	Hand tools	1	LS	$5,000	$5,000	$1,000	20%	$6,000
	Electric tools	1	LS	$1,500	$1,500	$300	20%	$1,800
	Compressor	1	EA	$1,500	$1,500	$300	20%	$1,800
	Rigging Supplies	1	LS	$20,000	$20,000	$4,000	20%	$24,000
	Misc. (lumber, nuts/bolts)	1	LS	$20,000	$20,000	$4,000	20%	$24,000
20.0.4.-	Radios	1	LS	$10,000	$10,000	$2,000	20%	$12,000
20.0.5.-	Maintenance Work Equipment							
20.0.5.L	16 " Hydraulic Suction Dredge w/1000 Kw electric motor ABS design; start up incl.	1	EA	$2,000,000	$2,000,000	$500,000	25%	$2,500,000
20.0.5.L	Spare Parts 5% of dredge cost Incl pumps, valves, fittng, bearings, hoses, specializd	1	EA	$100,000	$100,000	$20,000	20%	$120,000
20.0.5.L	Dredge Tender and Skiff Wrkboat 40'X14',2 dsl A frm Skiff -- steel w/ outboard	1	EA	$420,000	$420,000	$84,000	20%	$504,000
20.0.5.L	Reel barge (20 ft by 40 ft)							
	Hull & Fittings	1	LS	$71,000	$71,000	$14,200	20%	$85,200
	Reel	1	EA	$6,500	$6,500	$1,300	20%	$7,800
	Reel Drive	1	EA	$7,000	$7,000	$1,400	20%	$8,400
	Transformer	1	EA	$33,000	$33,000	$6,600	20%	$39,600
	House & Misc	1	LS	$16,000	$16,000	$3,200	20%	$19,200
	Wiring	1	LS	$9,500	$9,500	$1,900	20%	$11,400
	Disconnect Switch Gear	1	LS	$4,500	$4,500	$900	20%	$5,400
	Secondary Transformer	1	EA	$16,000	$16,000	$3,200	20%	$19,200
20.0.5.L	Power Cable	4,000	LF	$12.50	$50,000	$10,000	20%	$60,000
20.0.5.L	Shore Power Gear Construct switch gear/house and conduit	1	LS	$40,000	$40,000	$10,000	25%	$50,000

Table 5-1 Continued

20.0.5.L Pipeline							
Floating Steel Pipeline	1,200	LF	$30	$36,000	$7,200	20%	$43,200
Unload & Install Pontoons	20	EA	$100	$2,000	$400	20%	$2,400
Ball Joints	21	EA	$3,800	$79,800	$16,000	20%	$95,800
Weld Ball Joints (Incl Supplies)	42	EA	$188	$8,000	$1,600	20%	$9,600
40 Pontoons @ $3,000	40	EA	$3,000	$120,000	$24,000	20%	$144,000
Submerged Steel Pipeline	1,200	LF	$30	$36,000	$7,200	20%	$43,200
Weld sections	60	EA	$100	$6,000	$1,200	20%	$7,200
Subline pontoon w Saddle	1	LS	$10,000	$10,000	$2,000	20%	$12,000
Air Compressor	1	EA	$15,000	$15,000	$3,000	20%	$18,000
Shoreline Plastic Pipeline	6,000	LF	$18	$108,000	$21,600	20%	$129,600
Fuse and flange	150	EA	$100	$15,000	$3,000	20%	$18,000
Couplings	150	EA	$100	$15,000	$3,000	20%	$18,000
Anchor barge 30'X15' w/winc	1	LS	$90,000	$90,000	$18,000	20%	$108,000
20.0.5.L Shore Support Equipment							
Levee Dozer w/blade & winch	1	EA	$60,000	$60,000	$12,000	20%	$72,000
Boomtruck/flatbed	1	EA	$20,000	$20,000	$4,000	20%	$24,000
Trailers (Dozer, etc)	1	EA	$6,000	$6,000	$1,200	20%	$7,200
Forklift	1	EA	$50,000	$50,000	$10,000	20%	$60,000
Storage shed	1	EA	$50,000	$50,000	$10,000	20%	$60,000
10 ton crane	1	EA	$110,000	$110,000	$22,000	20%	$132,000
20.0.5.L Dredge Haul Out- Air bags	1	LS	$75,000	$75,000	$15,000	20%	$90,000
Subtotal, Dredge & Equipment				$3,785,300	$859,100		$4,644,400

Table 5-1 Continued

Account Code	Description	Quantity	Unit	Unit Price	Amount	Contingency (In Acct # 30.-.Z.-)	Percent	Total
30.-.-.-	Preconstruction Engineering & Design							
30.C.-.-	Project Cooperative Agreement	1	LS	$25,000	$25,000	$5,000	20%	$30,000
30.D.-.-	Env'l and Regulatory Support	1	LS	$10,000	$10,000	$2,000	20%	$12,000
30.G.-.-	Design Memorandum	1	LS	$167,000	$167,000	$33,400	20%	$200,400
30.H.-.-	Plans and Specifications	1	LS	$75,000	$75,000	$15,000	20%	$90,000
30.J.-.-	Engineering During Constr	1	LS	$20,000	$20,000	$4,000	20%	$24,000
30.M.-.-	Cost Engineering	1	LS	$10,000	$10,000	$2,000	20%	$12,000
30.P.-.-	Project Management	1	LS	$110,000	$110,000	$22,000	20%	$132,000
	Subtotal, Preconstruction Engineering & Design				$417,000	$83,400		$500,400

Cost Estimate for Construction Management
Costs in October 1993 Dollars 23-Jul-93

Account Code	Description	Quantity	Unit	Unit Price	Amount	Contingency (In Acct # 31.-.Z.-)	Percent	Total
31.-.-.-	Construction Management (S & I)							
31.A.-.-	Constr Mgmt (S & I) Prior to	1	LS	$200,000	$200,000	$40,000	20%	$240,000
31.P.-.-	Project Management	1	LS	$50,000	$50,000	$10,000	20%	$60,000
	Subtotal, Construction Management				$250,000	$50,000		$300,000

TOTAL FIRST COST		$5,444,800
	SAY	$5,445,000

Annual Costs

Annual charges, shown in **Table 5-2**, are the total of interest on investment, at an 8.25% interest rate, with amortization of the investment over a 50-year period, and the annual costs of project maintenance and operation, and major replacements.

Table 5-2. RECOMMENDED PLAN ANNUAL COST
(Oct 93 Price Levels/8.25% Interest Rate/50-Year Life)

	First Cost	
20	**Dredge and Equipment**	$4,645,000
30	**Preconstruction Engineering and Design (PED)**	500,000
31	**Construction Management (S&A)**	300,000
	TOTAL FIRST COST	$5,445,000
	Annual Cost	
	Annualized Interest and Amortization	$457,900
	Operation and Maintenance (50 days @ $11,000/day)	550,000
	Insurance	45,000
	Annual Staff Costs (City of Santa Barbara)	15,000
	Replacement Costs	78,800
	TOTAL ANNUAL COST	$1,147,000

Operations Costs

Operation costs include repair, consumables, supplies, and labor. The daily rates were calculated based on a usage factor for the equipment assuming current industry practice and labor rates. Further information on the basis of operating costs is presented in Appendix C. **Table 5-3** provides a summary of the calculations.

Table 5-3. EQUIPMENT OPERATING COSTS

EQUIPMENT OPERATING COSTS

	DESCRIPTION	REPAIRS	FUEL, OIL,& GREASE	SUPPLIES & EXPENSES	LABOR (UNION RATES)	TOTAL DIRECT COST
1	16" ELECTRIC DREDGE	$1,092	$950	$320	$2,800	$5,162
2	REEL BARGE & PWR. CABLE	$195	$5	$105		$305
3	PIPELINE & ANCHOR BARGE	$400	$5	$55		$460
4	DREDGE TENDER & SKIFF	$164	$350	$270	$1,800	$2,584
5	LEVEE (DOZER/MISC)	$437	$350	$105	$800	$1,692
6	SHORE SUPPORT EQUIPMENT	$143	$50	$55	$325	$573
7	MISC. EQUIPMENT	$52	$10	$105		$167
	TOTAL	$2,483	$1,720	$1,015	$5,725	$10,943

NOTES:
1. Repair costs come directly from estimates by industry representatives.
2. Fuel, oil, & grease costs for the 16" electric dredge were derived assuming a fuel consumption rate of 35 gallons per hour at a cost of $0.95 per gallon plus $6.50 per hour for oil & grease operating at 24 hours per day. It is assumed that energy costs are similar for electrical vs. diesel operation.
3. Fuel, oil, & grease costs for the Skiff & Dozer were derived assuming a fuel consumption rate of 30 gallons per hour at a cost of $0.95 per gallon plus $6.50 per hour for oil & grease operating at 10 hours per day.
4. Supply costs were derived using the Santa Cruz Port fiscal year 1990 cost estimate, under Appendix C. This total ($38,044) was divided by the total operating time (900 hours) to come up with a cost per day ($1,015). Then each line item was broken down by a percentage based on breakdown from industry representatives.
5. Labor costs for 3 shifts were derived based upon adjusting the 1986 Union pay scale up by 14% to October 1991 price levels (for inflation) using Engineering News Record Factors. Labor for the Shore Support Equipment runs 1 shift per day.

Replacement Costs

The equipment will require replacement during the 50-year project life. **Table 5-4** provides a summary of the equipment replacement. In order to establish an annual fund for replacement, all pieces of equipment were examined for their replacement in the future. Costs were brought to October 1993 and then annualized. The dredge, reel barge, power cable and spare parts were assumed to have project lives of 30 years consistent with existing dredge equipment. The pipeline, shed, and crane have project lives of 20 years. Major rehabilitation is accomplished every 15 years. All other equipment is assumed to have a 10-year life. Details are presented in Appendix C.

Economic Analysis

Benefit-to-Cost Ratio. The Recommended Plan is economically justified with a benefit-to-cost ration of 1.02-to-1, and net annual benefits of $18,000, as shown in **Table 5-5**. The benefits are based on comparing the cost effectiveness of the Federal Government continuing maintenance of the channels against the costs of acquiring the dredge and associated equipment and the City of Santa Barbara being responsible for operation, maintenance and replacements to maintain the channel. The Federal Government would realize a total cost savings of about $9.1 million over the life of the project. Additional benefits could be realized by the City being able to reduce response time in mobilizing for dredging after major storms, and other delays or problems related to availability of funding and execution of contracts.

Environmental Effects

The Environmental Assessment on the Recommended Plan, published immediately following this report, indicates that its implementation would not have a significant adverse impact on the existing environment or the quality of the human environment. A Finding Of No Significant Impact is also included.

The implementation of the Recommended Plan, when the dredge system is constructed, delivered and turned over to the City of Santa Barbara, will have the same general impacts as past and current maintenance dredging operations in the Harbor's entrance channels. The City of Santa Barbara will operate the dredge in a manner consistent with past and current maintenance dredging operations. Dredging will take place from November 1 to April, to avoid disturbing the grunion spawning season. Dredging will be restricted to daylight hours, unless night time operation is necessary to avoid the critical seasons of sensitive species.

The project will not jeopardize the continued existence or the habitats of any threatened or endangered species. Dredging will be scheduled so it will not interfere with the grunion spawning season.

Table 5-4. ANNUAL REPLACEMENT COSTS

Costs in October 1993 Price Levels, Including Contingency

Item	Life/Repl	Cost	Present Worth	Annual Cost
Dredge	30	$2,500,000	$231,794	$19,493
Spare Parts	30	$120,000	$11,126	$936
Anchor Barge	30	$108,000	$10,014	$842
Reel Barge	30	$196,200	$18,191	$1,530
Power Cable	30	$60,000	$5,563	$468
Tender/Skiff	20	$504,000	$103,246	$8,683
Tender/Skiff	40	$504,000	$21,150	$1,779
Shed	20	$60,000	$12,291	$1,034
Shed	40	$60,000	$2,518	$212
Crane	20	$132,000	$27,041	$2,274
Crane	40	$132,000	$5,539	$466
Pipeline/Float	20	$295,000	$60,432	$5,082
Pipeline/Float	40	$295,000	$12,380	$1,041
Pipeline/sub	20	$80,000	$16,388	$1,378
Pipeline/sub	40	$80,000	$3,357	$282
Pipeline/Shore	20	$166,000	$34,006	$2,860
Pipeline/Shore	40	$166,000	$6,966	$586
Major Rehab	15	$200,000	$60,899	$5,121
Major Rehab	30	$200,000	$18,544	$1,559
Major Rehab	45	$200,000	$5,646	$475
Shore Gear	10	$50,000	$22,630	$1,903
Shore Gear	20	$50,000	$10,243	$861
Shore Gear	30	$50,000	$4,636	$390
Shore Gear	40	$50,000	$2,098	$176
Shore Gear	50	$50,000	$950	$80
Dozer	10	$72,000	$32,588	$2,741
Dozer	20	$72,000	$14,749	$1,240
Dozer	30	$72,000	$6,676	$561
Dozer	40	$72,000	$3,021	$254
Dozer	50	$72,000	$1,368	$115
Truck	10	$24,000	$10,863	$914
Truck	20	$24,000	$4,916	$413
Truck	30	$24,000	$2,225	$187
Truck	40	$24,000	$1,007	$85
Truck	50	$24,000	$456	$38
Trailors	10	$7,200	$3,259	$274
Trailors	20	$7,200	$1,475	$124
Trailors	30	$7,200	$668	$56
Trailors	40	$7,200	$302	$25
Trailors	50	$7,200	$137	$12

Table 5-4 Continued

Costs in Oct 1992 Price Levels, Including Contingency

Item	Life/Repl	Cost	Present Worth	Annual Cost
Forklift	10	$60,000	$27,156	$2,284
Forklift	20	$60,000	$12,291	$1,034
Forklift	30	$60,000	$5,563	$468
Forklift	40	$60,000	$2,518	$212
Forklift	50	$60,000	$1,140	$96
Welder	10	$12,000	$5,431	$457
Welder	20	$12,000	$2,458	$207
Welder	30	$12,000	$1,113	$94
Welder	40	$12,000	$504	$42
Welder	50	$12,000	$228	$19
Compressor	10	$1,800	$815	$69
Compressor	20	$1,800	$369	$31
Compressor	30	$1,800	$167	$14
Compressor	40	$1,800	$76	$6
Compressor	50	$1,800	$34	$3
Tools/Cutting	10	$2,400	$1,086	$91
Tools/Cutting	20	$2,400	$492	$41
Tools/Cutting	30	$2,400	$223	$19
Tools/Cutting	40	$2,400	$101	$8
Tools/Cutting	50	$2,400	$46	$4
Tools/hand	10	$6,000	$2,716	$228
Tools/hand	20	$6,000	$1,229	$103
Tools/hand	30	$6,000	$556	$47
Tools/hand	40	$6,000	$252	$21
Tools/hand	50	$6,000	$114	$10
Tools/Electric	10	$1,800	$815	$69
Tools/Electric	20	$1,800	$369	$31
Tools/Electric	30	$1,800	$167	$14
Tools/Electric	40	$1,800	$76	$6
Tools/Electric	50	$1,800	$34	$3
Radios	10	$12,000	$5,431	$457
Radios	20	$12,000	$2,458	$207
Radios	30	$12,000	$1,113	$94
Radios	40	$12,000	$504	$42
Radios	50	$12,000	$228	$19
Rigging Supplies	10	$24,000	$10,863	$914
Rigging Supplies	20	$24,000	$4,916	$413
Rigging Supplies	30	$24,000	$2,225	$187
Rigging Supplies	40	$24,000	$1,007	$85
Rigging Supplies	50	$24,000	$456	$38
Misc Equipment	10	$24,000	$10,863	$914
Misc Equipment	20	$24,000	$4,916	$413
Misc Equipment	30	$24,000	$2,225	$187
Misc Equipment	40	$24,000	$1,007	$85
Misc Equipment	50	$24,000	$456	$38
Misc Incidentals	10	$36,000	$16,294	$1,370
Misc Incidentals	20	$36,000	$7,375	$620
Misc Incidentals	30	$36,000	$3,338	$281
Misc Incidentals	40	$36,000	$1,511	$127
Misc Incidentals	50	$36,000	$684	$58
Replacement Fund			$937,361	$78,830

Table 5-5. ECONOMIC ANALYSIS OF THE RECOMMENDED PLAN

Summary of Annualized First Costs

		First Cost		Annual Cost
20._._._	Dredge and Equipment	$4,644,400		$390,582
30._._._	PED Activities		500,400	42,082
40._._._	Construction Support	300,000		25,229
	TOTALS	$5,444,800		$457,900

Summary of Total Annual Operating Costs

Annualized First Cost	$457,900
Insurance	45,000
Annual Staff Costs (City of Santa Barbara)	15,000
Annual Operating Costs (50 days @ $11,000/day)	550,000
Replacement Fund	78,800
TOTAL	$1,146,700
Corps of Engineers Operating Costs	$1,165,000
Net Benefits	$18,000
Benefit-to-Cost Ratio	1.02-to-1

Plan Implementation

Project Purpose

The project would result in reducing costs associated with maintenance of the Santa Barbara Harbor entrance channels. The primary economic benefit of the proposed plan is maintaining the existing navigation channels at Santa Barbara Harbor, which supports a substantial commercial fishing industry as well as other commercial activities, and a significant recreation boating fleet. The Recommended Plan will result in cost savings to the Federal Government for maintenance of the Santa Barbara Harbor navigation channel. These costs are presently 100% Federal and are estimated to be on the average $1,165,000. The present worth cost for maintenance of the harbor for uniform series over the next 50 years, at 8.25%, is estimated to be about $13.5

million. The present worth cost of the proposed Recommended Plan is about $5,445,000, of which the Federal Government will cost share 80%, about $4,356,000.

Division of Plan Responsibilities

The Division of Plan Responsibilities, was established based on considering the requirements and procedures of current Federal Public Laws and policies, and consideration of the requirements and procedures applied in Santa Cruz Dredge Acquisition Project completed in 1987.

The Santa Cruz Dredge Acquisition Project was authorized by Section 101 of the River and Harbor Act of 1958 in accordance with the plans and subject to the conditions recommended by the Chief of Engineers in House Document 85-357. This authorization included the Federal Government provide a sand bypassing plant for Santa Cruz Port District provided that the Port District contribute in cost 35.1% of the first cost of the sand bypassing plant; upon commencement of sand bypassing, the Port District assume operation and maintenance of the sand bypassing plant, make replacements thereto, and maintain the dredged depths in the entrance channel, the inner harbor channel, and the turning basin with the understanding that the United States will reimburse local interests for the actual cost of plant operation, maintenance, and replacement up to a limit of $35,000 annually.

After several failures of experimental sand bypassing systems, the Assistant Secretary of the Army for Civil Works and the Santa Cruz Port District entered into an agreement on 2 April 1986 for the Federal Government to transfer its responsibility for maintenance of channels to the Santa Cruz Port District, subject to certain conditions.

In general, the procedures established to implement the agreement considered of the Santa Cruz Port District being responsible for the design and procurement of the dredge system, subject to funding, review, and audit of expenditures by the Federal Government. The Port District was responsible for acquiring all materials under regulations of the California Government Code and the California Harbors and Navigation Code procedures. A technical committee consisting of members of the Corps of Engineers, the Santa Cruz Port District and dredging industry consultant provided guidance to the Port District in the technical requirements and dredge system acquisition process.

A three-step procurement process was established for the dredge system, which was used for establishing final system requirements, and bid evaluation and selection by the Port District. The acquisition process took about seven months to complete, with the final dredge system dedication held in October 1986.

Cost Apportionment

The cost apportionment proposes a one time Federal contribution of the total costs to purchase the dredging equipment with the local sponsor assuming all future maintenance and operation costs. Section 101(a) of the Water Resources Development Act of 1986 requires non-Federal interests to pay during

the period of construction, the costs associated with general navigation features, including 10% of the cost of construction of the portion of the project which has a depth not in excess of 20 feet. The non-Federal interests are also required to pay an additional 10% of the costs of the general navigation features in cash over a period not to exceed 30 years, at an interest rate determined pursuant to Section 106 of the Act. The non-Federal interests shall also provide the lands, easement, right-of-way, relocations (other than utility relocations), and dredged disposal areas necessary for the project. The value of lands, easements, rights-of-way, relocations and dredged disposal areas provided for the project shall be credited towards the additional 10% payment under this requirement.

In accord with Section 101 (a) of the 1986 Water Resources Development Act, the Federal Government would be responsible for 80% of the $5,445,000 first cost of the Recommended Plan, or $4,356,000. The City of Santa Barbara would be responsible for an initial 10%, and an additional 10%, for a total of 20% of the first cost of the Recommended Plan, estimated to be $1,089,000. The cost apportionment is shown in Table 5-6.

Table 5-6. RECOMMENDED PLAN COST APPORTIONMENT

	Non-Fed Share	Fed Share	Total Project Cost	Non-Fed Project Cost	Federal Project Cost
PROJECT FIRST COST	10% + 10%	80%	$5,445,000	$1,089,000	$4,356,000
MAINTENANCE DREDGING	100%	0%	0	$688,800	0

Section 101(c) of the Act provides that the Federal share of the cost of the operation and maintenance of each shallow draft navigation project for a harbor shall be 100%. However, it is proposed that in this instance the City of Santa Barbara be responsible for operation of the system to maintain the navigation channels, and any maintenance and major replacements necessary for the equipment. These costs are estimated on an average annual basis.

Project Management Plan

A Project Management Plan for implementation of the Santa Barbara Harbor Dredge Acquisition Recommended Plan, lays out activities, responsibilities, schedules and costs generally consistent with procedures used in acquiring the dredge system for Santa Cruz. In general, it calls for establishing a Technical Committee with representatives from the Corps of Engineers and the City of Santa Barbara to establish system requirements, evaluate bidders and proposals, and to monitor acquisition progress and adjustments throughout the design and construction phases. A summary of the major milestones for

completing the design, execution of project coordination agreement, and construction phases of the project are presented in Table 5-7.

At this time it is planned that the Corps of Engineers will take the lead during Planning, Engineering and Design (PED) Phase, to include establishing design requirements, performance specifications, and the Project Cooperation Agreement. The actual procurement of the system will be reviewed during PED, but at this time is expected to be by the City of Santa Barbara.

Federal Responsibilities

The estimated Federal share of the first cost of the project is $4,356,000. In addition to its financial responsibility, the Federal Government would:

A. Be responsible for preparation of design requirements for the dredge system including performance specifications for all features of the system.

B. Provide advice and assistance to the City of Santa Barbara during the procurement, testing, and acceptance of the dredge and appurtenant equipment. The U.S. Army Corps of Engineers will provide technical advice on the plans and specifications for the dredge and appurtenant equipment before bids are solicited and again before any modification of the plans and specifications are issued. By providing this technical advice, the Federal Government does not warrant the suitability of the dredge and appurtenant equipment for the project.

C. Provide 80% of the total first cost of acquiring the Dredge System, presently estimated to be $4,356,000.

D. The Federal Government would surrender all maintenance responsibilities for the entrance channel upon implementation of the dredging program.

Non-Federal Responsibilities

The non-Federal sponsor, the City of Santa Barbara, will be required to comply with certain requirements for the project which will be further defined in the development and negotiation of the Project Cooperation Agreement. In general these items will cover the following:

A. Acquire, operate, maintain, and rehabilitate or replace a dredge and appurtenant equipment suitable for maintaining the dredged depths in the entrance channel, and the inner harbor channel. Provide 20% of the first cost of the project, estimated to be $1,089,000, and 100% of cost of operation, maintenance and major replacements, estimated to be $688,800 annually. The City of Santa Barbara will assume responsibility for maintaining the dredged depth of the entrance channel and the harbor channel authorized by Congress;

Table 5-7. PROJECT MILESTONES

MILESTONE NUMBER	DESCRIPTION	SCHEDULE
100	**SERIES FOR FEASIBILITY REPORTS**	
170	COMPLETE FEASIBILITY REPORT/DE NOTICE -----	15 SEP 1993
180	WLRC SUBMISSION ----------	15 SEP 1993
300	**SERIES FOR PROJECT AUTHORIZATION**	
330	REPORT OF THE CHIEF OF ENGINEERS ----------	22 FEB 1994
340	ASA(CW) TRANSMITTAL OF REPORT TO CONGRESS -	17 MAY 1994
350	AUTHORIZATION LEGISLATION SIGNED BY PRES. -	30 NOV 1994
200	**SERIES FOR PRECONSTRUCTION ENGR & DESIGN (PED)**	
200	INITIATION OF PED ----------	14 OCT 1993
202	DATE OF TECHNICAL REVIEW CONFERENCE (WITH HQUSACE PARTICIPATION ----------	11 JAN 1994
210	COMPLETION OF PED ----------	14 MAY 1996
400	**SERIES FOR DESIGN MEMORANDA**	
400	DESIGN MEMORANDUM INITIATED ----------	12 JAN 1994
401	DRAFT DM SUBMITTED TO CESPD ----------	5 APR 1995
470	FINAL DM SUBMITTED TO CESPD ----------	27 JUN 1995
480	DM SUBMITTED TO HQUSACE (IF APPLICABLE) ---	25 JUL 1995
490	DM APPROVED ----------	25 JUL 1995
500	**SERIES FOR PLANS AND SPECIFICATIONS (P&S)**	
500	P&S INITIATED ----------	25 JUN 1995
501	SUBMIT DRAFT P&S ----------	6 FEB 1996
580	P&S BCO REVIEW ----------	6 FEB 1996
581	SUBMIT FINAL P&S ----------	14 MAY 1996
590	APPROVAL OF P&S ----------	11 JUN 1996
600	**SERIES FOR PCA'S**	
601	TECHNICAL DOCUMENT FOR PCA EXECUTION SUBMITTED TO CESPD ----------	27 JUN 1995
600	TECHNICAL DOCUMENT FOR PCA EXECUTION SUBMITTED TO HQUSACE ----------	25 JUL 1995
610	TECHNICAL DOCUMENT FOR PCA APPROVED BY HQUSACE ----------	19 SEP 1995
620	PCA SUBMITTED TO CESPD ----------	9 JAN 1996
630	PCA SUBMITTED TO HQUSACE ----------	20 FEB 1996
640	PCA SUBMITTED TO OASA(CW) ----------	2 APR 1996
650	PCA APPROVED BY OASA(CW) ----------	28 MAY 1996
690	PCA EXECUTED ----------	15 OCT 1996
900	**SERIES FOR CONSTRUCTION TO COMPLETION**	
900	HQUSACE APPROVAL DATE, NEW CONSTRUCTION START ----------	19 SEP 1995
910	INCLUDED IN PRESIDENT'S BUDGET ----------	12 FEB 1996
920	FUNDED IN APPROPRIATIONS ACT ----------	14 OCT 1996
950	CONSTRUCTION CONTRACT ADVERTISED ----------	10 DEC 1996
951	BID OPENING ----------	26 MAY 1997
960	CONSTRUCTION CONTRACT AWARDED ----------	21 JUL 1997
961	NOTICE TO PROCEED ----------	22 AUG 1997
980	EQUIPMENT DELIVERED ----------	15 SEP 1998
981	INITIATE SYSTEM TEST ----------	15 SEP 1998
982	COMPLETE SYSTEM TEST ----------	7 DEC 1998
990	PROJECT CONSTRUCTION PHYSICALLY COMPLETE ---	7 DEC 1998
992	PROJECT FISCALLY COMPLETE ----------	18 JAN 1998
999	FINAL ACCEPTANCE AND TRANSFER OF THE PROJECT TO LOCAL PARTNER ----------	18 JAN 1998

B. Comply with requirements, procedures, and standards related to environmental protection and quality control that may be prescribed pursuant to responsibilities of the laws and policies of the Federal Government;

C. Hold and save the United States free from damages due to the construction and maintenance of the project, except for damages due to the negligence of the United States;

D. Comply with safety, labor, and contracting requirements as established by Federal and State laws and policies; and,

E. The dredge shall not be used outside the boundaries of the City without the written consent of the Assistant Secretary of the Army for Civil Works.

Sponsorship Agreement

Prior to the start of construction, the non-federal sponsor will be required to enter into an agreement with the Federal government and satisfy state laws and all applicable regulations. The items included in the Agreement in general have been outlined in the previous paragraphs.

Financial Analysis

Financial information on the non-Federal sponsor's ability to fund their share of the plan is required to establish implementation of the project as required by Principles and Guidelines. The information includes a preliminary financing plan outlining the costs, schedule of expenditures, and a statement of financial capability by the non-Federal sponsor including sources of funds, authorities to use the identical sources and their capability to obtain the funds. **The City of Santa Barbara is being requested to provide a preliminary financial plan.**

Local Cooperation

The Mayor of the City of Santa Barbara, in a letter dated August 3, 1993 indicated its support for the Recommended Plan, and the City's willingness and intent to execute the Local Cooperation Agreement including providing the non-Federal required assurances. The City of Santa Barbara states its financial capability to provide costs with funds from City revenues. A copy of the letter is included in Appendix A.

Procedures for Approval and Authorization

Future actions necessary for Washington level review of the Recommended Plan and final report, project authorization, and project implementation are summarized as follows:

A. The report will be reviewed by the Corps of Engineers, South Pacific Division Commander, who will then issue a public notice announcing completion of the final report.

B. The report will then be submitted for concurrent Washington level review by the Washington Level Review Center (WLRC), Headquarters, U.S. Army Corps of Engineers (HQUSACE), and Assistant Secretary of the Army (Civil Works) (ASA (CW)).

C. The 90-day State and agency review and coordination of the Environmental Assessment by WLRC will be ongoing concurrently during the Washington level review.

D. Concurrent Washington level review with WLRC, HQUSACE and ASA(CW) will conclude with a WLRC staff assessment, the 90-day State and agency review, review input by HQUSACE and Office of the assistant Secretary of the Army (Civil Works) also ASA(CW), Washington level final assessment, a field visit and meeting, and the documentation of report review prepared by WLRC.

E. The Washington level decision-making process will follow the decision-making sequence of HQUSACE and ASA(CW), once the documentation of report review has been completed. There will be a briefing if necessary for the Designated Senior Representatives of Decision-Makers to resolve any outstanding issues., Prior to transmittal of the report to the Congress and signing of the Record of Decision by ASA(CW), the sponsor, the State, the interested Federal agencies, and other parties will be advised of any modifications made to the recommendations and will be afforded an opportunity to comment further.

F. The report will then be transmitted to Congress for project authorization with the Chief of Engineers report, ASA(CW) report, State and agency comments, and Office of Management and Budget comments.

G. Funds could be provided, when appropriated in the budget, for Planning, Engineering and Design (PED), upon issuance of the Division Commander's public notice announcing the completion of the final report and pending project funding authorization.

H. Subsequent to appropriation of procurement funds by Congress, formal assurances of local cooperation in the form of a Project Cooperation Agreement would be required from the Non-Federal Sponsor.

I. Payment would be initiated with Federal funds, once the appropriation of funds by Congress and the project cooperation agreement were finalized.

Chapter 6. Summary of Public Involvement and Coordination

Public Involvement

A public meeting on the Santa Barbara Harbor Feasibility Report and its findings was held on May 17, 1993, in the Council Chambers of the Santa Barbara City Hall. The meeting was attended by 12 people who voiced no opposition to the Report and Findings, and the two participants who spoke up at the meeting supported the Recommended Plan.

The Feasibility Report and the Recommended Plan were presented before the Santa Barbara Harbor Commission on June 17, 1993. The Recommended Plan was approved by the Commission.

The Report and the Recommended Plan were presented before the Santa Barbara City Council on July 20, 1993. The Recommended Plan was approved by the Council.

The City of Santa Barbara indicated its intent to proceed with the implementation of the Recommended Plan, and to fulfill all of the required non-Federal responsibilities, by letter dated August 3, 1993. This letter is reproduced in Appendix A, which includes copies of all correspondence pertinent to the development and the implementation of the Recommended Plan.

Coordination

During the preparation of this document, coordination was accomplished with the following agencies:

Federal Agencies

(1) U.S. Coast Guard
(2) U.S. Environmental Protection Agency
(3) U.S. Fish and Wildlife Service
(4) U.S. National Marine Fisheries Service

State Agencies

(1) California Coastal Commission
(2) Department of Fish and Game
(3) California Regional Water Quality Control Board
(4) Office of Historic Preservation

(5) California Wildlife Conservation Board
(6) California Department of Boating and Waterways

Local Agencies

(1) City of Santa Barbara
(2) Central Coast Air Quality Management District
(3) Santa Cruz Harbor District

In the overall public interest, the District Engineer has reviewed and evaluated the information contained in the environmental assessment, the foregoing report, and the views of other agencies, organizations and individuals on economic, environmental, and other impacts of the plans for improvement at Santa Barbara Harbor. The District Engineer has recognized that the City of Santa Barbara is very desirous of providing a year-round, open navigation channel with the most efficient operational program for their needs. He has personally inspected the project area, and believes that these concerns have been satisfied by the Recommended Plan.

The possible consequences of providing funds for the purchase of dredging equipment at Santa Barbara were studied and evaluated for environmental impacts, social and economic effects; engineering feasibility; compliance with executive orders and legal statutes; appropriateness for meeting the stated objectives of the investigation and ability to implement.

The action proposed is based on a thorough evaluation of all viable alternatives. The project is in consonance with national policy, existing statutes, and administrative directives. The Environmental Assessment meets or exceeds the requirements of the National Environmental Policy Act.

Chapter 7. Recommendation

I recommend that the existing project at Santa Barbara Harbor, authorized by the 1962 River and Harbor Act, be modified to provide a dredge system for the City of Santa Barbara in accordance with the plan selected herein, with such further modifications thereto as in the discretion of the Chief of Engineers may be advisable.

I recommend that the Federal share of the total project cost, presently estimated to be $5,445,000, be allocated in accordance with Chapter 5 of this report. Therefore, I recommend that the estimated Federal share be 80%, or $4,356,000, for funding the purchase of equipment to be used for the purposes of maintaining the Santa Barbara Harbor entrance channel, currently a 100% Federal responsibility. The Non-Federal Sponsor of the project, the City of Santa Barbara, would then be responsible for 20% of the first cost, estimated at $1,089,000, and 100% of the cost for maintaining the entrance channel, and operation, maintenance and replacement of the dredge plant and associated equipment. The City would assume total responsibility for the continued maintenance of the Harbor, relieving the Federal Government from all further responsibilities. This recommendation is made with the provision that prior to implementation, the City of Santa Barbara, in accordance with the general requirements of law for this type of project, agrees to comply with the following requirements:

A. Provide 20% of the first cost of the project, estimated to be $1,089,000. Operate, maintain, and rehabilitate or replace a dredge and appurtenant equipment suitable for maintaining the dredged depths in the entrance channel, and the inner harbor channel and provide 100% of the cost of operation, maintenance and major replacements associated with the dredge system, and the maintenance of the Santa Barbara Harbor entrance channel, estimated to be $688,800 annually. The City of Santa Barbara will assume responsibility for maintaining the dredged depth of the entrance channel and the harbor channel authorized by Congress;

B. Comply with requirements, procedures, and standards related to environmental protection and quality control that may be prescribed pursuant to responsibilities of the laws and policies of the Federal Government;

C. Hold and save the United States free from damages due to the construction and maintenance of the project, except for damages due to the negligence of the United States;

D. Comply with safety, labor, and contracting requirements as established by Federal and State laws and policies; and,

E. The dredge shall not be used outside the boundaries of the City of Santa Barbara, without the written consent of the Assistant Secretary of the Army for Civil Works.

The recommendations contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program, nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendation may be modified before it is transmitted to Congress for authorization and implementation funding. However, prior to transmittal to Congress, the City of Santa Barbara, the State of California, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

R.L. VanAntwerp
Colonel, Corps of Engineers
District Engineer

[First Endorsement]

CESPD-PD-P (August 1993) (1105)
SUBJECT: Feasibility Report for Navigation Improvements, Santa Barbara Harbor, Santa Barbara County, California

DA, South Pacific Division, Corps of Engineers, 630 Sansome St., Room 720, San Francisco, CA 94111-2206 17 September 1993

FOR CDR USACE (CEWRC-WLR), Kingman Building, Fort Belvoir, VA 22060

I concur in the conclusions and recommendations of the District Commander.

Milton Hunter

MILTON HUNTER
Brigadier General, U.S. Army
Commanding

FINAL

ENVIRONMENTAL ASSESSMENT

FOR

SANTA BARBARA HARBOR MAINTENANCE DREDGING TRANSFER OF RESPONSIBILITY

SANTA BARBARA COUNTY, CALIFORNIA

JULY 1993

U.S. ARMY CORPS OF ENGINEERS

LOS ANGELES DISTRICT

FINDING OF NO SIGNIFICANT IMPACT
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SANTA BARBARA HARBOR MAINTENANCE DREDGING
TRANSFER OF RESPONSIBILITY
Santa Barbara County, California

I have reviewed the attached Final Environmental Assessment (EA) prepared for the transfer of responsibility for the Santa Barbara Harbor Maintenance Dredging. This transfer would involve the purchase of a dredge by the Corps of Engineers, to be owned, maintained and operated by the City of Santa Barbara.

The resources potentially affected by this project are discussed in Environmental Effects section of the EA and include biological resources, noise, water quality, recreation, and aesthetics. These impacts have been addressed in the EA and recommended mitigation is included in that document. Implementation of the mitigation measures would reduce the project impacts to a level of insignificance.

Consideration of all the significant factors and all pertinent environmental legislation, in addition to comments and coordination with concerned agencies as discussed in the EA, indicates that the proposed action would not significantly affect the quality of the human environment nor would there be significant adverse environmental effects. Therefore, an Environmental Impact Statement would not be required, pursuant to 33 CFR 230.11.

8/11/93
Date

R. L. VanAntwerp
Colonel, Corps of Engineers
District Engineer

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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared by the Department of the Army, U.S. Army Corps of Engineers (Corps), Los Angeles District, in accordance with the Council on Environmental Quality (CEQ) regulations of November 29, 1978.

This EA is a concise public document which assesses impacts of a proposed project for which a federal agency is responsible. The EA (1) briefly provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI); (2) aids in an agency's compliance with the National Environmental Policy Act of 1969 (NEPA) when no EIS is required; and (3) facilitates the preparation of an EIS when one is necessary.

This EA covers only the proposed Federal project involving the acquisition of a dredge for ownership and operation by the City of Santa Barbara, and the City assuming total responsibility for maintenance of the Federal navigation channel. Since the dredge acquisition is a one-time occurrence, this document should, with regular reviews and minor modification, stand for the life of the project.

2.0 PROPOSED ACTION

The proposed action is the acquisition of a dredge for the City of Santa Barbara Waterfront Department (City), which will operate the dredge to maintain the Santa Barbara Harbor Federal navigation channels consistent with past and current maintenance dredging operations. Dredging of Santa Barbara Harbor would serve the following purposes: (1) maintain the entrance and navigation channels which are subject to continual filling by sand accretion; (2) assure the continued safe navigation for maritime traffic within the harbor; (3) minimize the risk of hazardous shoaling conditions developing within the entrance and navigation channels by maintaining a sand trap in the channels and; (4) provide beach nourishment material for downcoast beaches severely eroded by the littoral processes and by the harbor disruption of the longshore transport of sand.

2.1 BACKGROUND

The maintenance dredging of Santa Barbara Harbor is authorized by the River and Harbor Act approved March 2, 1945. A modification to the Act (PL 91-611, Sec 114) on December 31, 1970 provides that the dredging and maintenance of Santa Barbara Harbor will be the responsibility of the United States.

In 1927-28, local interests constructed an 1,800-foot long detached breakwater to provide a protected harbor at Santa Barbara. In 1930, the westerly end of the breakwater was extended to shore at Point Castillo to control the shoaling at the west end of the harbor. By 1934, shoaling on the west side of the breakwater had created Leadbetter Beach, and littoral material was bypassing the breakwater, creating a shoal at the east end of the breakwater. The problems then resulting from the

breakwater were twofold: the accumulation of sediment at the harbor entrance became a navigation hazard, and as a result of interruption in littoral transport, the beaches to the east, normally nourished by littoral sediment, were severely eroded (Corps of Engineers, 1986).

As a result, a maintenance dredging program was initiated by the Federal government in 1935 for placing accumulated material within the harbor on the starved downcoast beaches to prevent further erosion. Approximately 202,000 cubic yards (cy) of material was dredged by hopper dredge that same year. An agreement was made between the City and County of Santa Barbara and the Federal government to dredge the harbor at two-year intervals and deposit the dredged material along the beaches east of the harbor. The dredging was under the direction of the Corps.

In 1955, the City requested that they be permitted to take over the task of harbor dredging. The City wanted to shape the sand bar to provide temporary protection from southeasterly waves. Surplus sand and future accretion in the harbor area would then be pumped to the downcoast beaches. The City of Santa Barbara purchased a hydraulic dredge in 1956; the Federal government paid the City for part of the maintenance dredging.

In 1963, after construction of a system of floating docks, severe southeast storm waves breached the sand bar causing damage to the recently completed marina facilities.

In December 1970, Congress modified the Federal responsibility for maintenance of the harbor; responsibility for navigation channel maintenance belonged solely to the Federal government. The City continued to maintain the harbor, but was reimbursed 100 percent by the Federal government until September 1972 when the maintenance dredging contract was awarded to a private contractor. Annual contracts for maintenance dredging of the entrance channel were awarded through 1975. In 1976, the Corps began to award three-year dredging contracts.

The Corps' responsibility is limited to the navigation channel. On occasion the City has contracted with the Corps' dredge contractor for dredging outside the Federal channel. In 1980, the City contracted for dredging the area between West Beach and the entrance channel. Approximately 290,000 cy was dredged between the harbor groin and Stearn's Wharf. Prior to 1980, it was estimated by the City that West Beach was last dredged in the late 1960s (Corps, 1986).

Since that time, the Corps has prepared Environmental Assessments to cover 3-year inclusive dredging contracts. The average annual amount of dredged material since 1980 consisted of approximately 350,000 cy. Dredged material was disposed at East Beach or onto the sand spit. In August 1985, the City extended the breakwater an additional 240 feet. The harbor entrance and navigation channels have continued to develop shoal areas which severely restrict and endanger navigation (Corps, 1986). The City by letter dated May 16, 1986 requested the Corps to determine the Federal interest in a plan to provide the City of

Santa Barbara with a dredge, and transfer to them complete responsibility for the maintenance of the Harbor.

2.2 LOCATION

Santa Barbara Harbor (Figure 1) is located on the southern California coast approximately 90 miles northwest of Los Angeles and 320 miles southeast of San Francisco. The closest harbors to Santa Barbara are Ventura Harbor, located 30 miles to the east, and Port San Luis, located 107 miles to the northwest. The project site is bounded on the north by the West Basin of the Santa Barbara Harbor; on the east by East Beach; on the south by Leadbetter Beach; and on the west by the west breakwater.

2.3 PROJECT DESCRIPTION

A. Dredge Acquisition

The proposed Federal project is the acquisition of a dredge for operation and ownership by the City of Santa Barbara, and the City's assumption of total responsibility for the maintenance dredging of the Santa Barbara Harbor navigation channels and for the maintenance and replacement of the dredge. The dredge would comply with all applicable Federal and State laws and regulations, particularly air and water quality requirements. As a result, the Federal project would cause no adverse environmental impacts and mitigation would not be required.

B. Dredge Operation

The City of Santa Barbara would operate the dredge consistent with past and current maintenance dredging operations as described in this document (see Figure 2). The existing dredging project involves removing sediment deposited from the longshore transport of material into the harbor channels and the north flank of the navigation channel (West Beach) at Santa Barbara Harbor. Dredging activities would occur from October until April 30, with discharge directly onto East Beach, in order to avoid most of the peak of grunion spawning season (April - June), yet allow continued research into possible dredging impacts to grunion. From April 1 until April 30, only surf-zone discharge would occur. Dredging operations would be limited to daylight hours unless double or triple-shift dredging is required to complete the project prior to critical seasons of sensitive species.

The existing dredging program includes: (1) harbor channel dredging to project depths and widths; (2) maintenance of a sand trap within the entrance and navigation channels; (3) discharge of dredged material onto East Beach; (4) an environmental monitoring program through FY 1996; and (5) surf-zone discharge only during the months of March and April. The City would continue the program as follows:

(1) Harbor Channel Dredging to Project Dimensions. Dredging of the entrance and navigation channels at Santa Barbara Harbor would annually remove a maximum of 450,000 cubic yards of sediment, which is deposited annually from the littoral

processes. The seaward half of the entrance channel would be dredged to existing project dimensions of -20 feet MLLW at a width of 400 feet, and the harbor half of the navigation channel would be dredged to -15 feet MLLW at a width of 300 feet.

(2) Sand Trap. The existing sand trap would be dredged within the harbor channels located at the bend of the entrance and navigation channels. The navigation channel at the channel bend would be dredged to a depth of -28 feet MLLW at the existing project width of 300 feet. The entrance channel at the channel bend would be dredged to a depth of -35 feet MLLW at the existing project width of 400 feet. Approximately 150,000 cubic yards of material would be dredged from the project area on an annual basis to maintain the existing sand trap dimensions.

(3) Dredged Material Discharge on East Beach. The dredged material would be discharged by a pipeline between approximately 2300 feet and 6300 feet downcoast of the harbor on East Beach. A pipeline would be placed along the supratidal portions of West Beach, run under Stearn's Wharf, and along East Beach where the dredged material would be discharged. The dredged material would be discharged above +6 feet MLLW from October 1 to March 1. From March 1 to April 30, for the duration of the environmental monitoring program, the dredged material would be discharged into the intertidal zone using the single point discharge method as described below in item (e). The disposal area would be limited to a 500 ft area within the designated disposal site.

(4) Environmental Monitoring Program. The existing maintenance project includes provisions for an Environmental Monitoring Program, to assess potential effects on the spawning success of grunion. The City of Santa Barbara would take the lead in continuing this program through FY96, in coordination with the Corps of Engineers, Fish and Wildlife Service, Fish and Game, and the California Coastal Commission. Appendix B of this report contains a proposed monitoring program, which includes disposal of dredged material in March and April of each year, and data collection throughout grunion season. The City, in coordination with permitting and regulatory agencies, shall use the results of this study to determine whether future dredging operations would have a significant impact on grunion reproductive success. If necessary, the City shall include measures to avoid or minimize impacts, to the extent possible. A contingency plan was presented by the Corps in the 1992 Santa Barbara Harbor Dredging Project EA, that included provisions for dredging activities during grunion season (see Appendix C).

In addition, data is being and would continue to be collected on the western snowy plover's (Charadrius alexandrinus nivosus) location, population, and nesting activity during daytime and nighttime hours and relevant characteristics of the environment. Care would continue to be observed in taking census of and avoiding impacts to this newly listed threatened species.

(5) Surf-Zone Disposal. From April 1 through April 30, during the Environmental Monitoring Program, discharge of dredged material would occur only in the surf-zone, in order to minimize

impacts to spawning grunion. The following steps would be adhered to during surf-zone discharge:

a. Pipeline Alignment. The City shall realign the disposal pipe so that surf-zone disposal, rather than beach disposal, shall be implemented within a 500-foot-wide zone of operation. The 500-foot zone of operations shall therefore be located within the same general confines of beach disposal, i.e., between 2300 feet and 6300 feet downcoast of Stearn's Wharf. The exact location of the zone shall be decided by the City, in coordination with permitting and regulatory agencies. The zone of operation shall be fixed and flagged prior to the first day of post-April 1 dredging; no impacts from heavy equipment (i.e., paths of transit), pipes, or dredged material shall extend beyond this zone. Only one zone of operations per dredging episode would be allowed. A dredging episode is defined as reasonably continuous period of dredging with a beginning and final hydrographic survey performed by the City. The disposal pipe and its alternate or backup outfall shall be situated within the zone of disposal operations below +6 feet Mean Lower Low Water (or below Mean Higher High Water) and both shall be positioned perpendicular to the ocean so that the dredged material shall immediately run down the face of the beach and not create ponds of water and "quicksand" in the intertidal zone. Figure 3 should serve as a guideline for pipe positioning and configuration within the zone of disposal operations. When mounding of dredged materials occurs in front of the discharge point of the disposal pipe, extensions shall be added onto the pipes so as to bring the outfall closer to the ocean. Should excessive mounding occur and lateral movement of the pipes be required, such movement of pipes would not result in pipes, heavy equipment (for moving pipes), or dredged material occurring outside of the fixed 500-foot-wide zone of disposal operations. Grading to move sand mounds would be allowed within the zone of disposal operations. Slotted or perforated pipes shall be used when additional pipe must be added to extend the pipeline closer to the ocean in order to discourage erosion of sand mounds supporting the disposal pipeline. Location of the slotted pipes within the pipeline would be decided in the field and location selection based upon meeting the goal of ensuring the integrity of the supporting mound of sand.

b. Discharge Volume. No more than 150,000 cubic yards of material shall be disposed of in the surf-zone between April 1 and April 30, each fiscal year. No more than 600,000 cubic yards of material shall be disposed annually.

c. Work Hours. Double workshift dredging and disposal operations shall be performed so as to minimize the temporal impacts. Triple workshift, or 24 hours/day, dredging shall be permitted. (The contractor would be required to obtain the necessary permits by local noise ordinances, see Environmental Commitments).

3.0 ALTERNATIVES

The Santa Barbara Harbor feasibility study was conducted by the U.S. Army Corps of Engineers to identify potential alternatives for future dredging operations within the harbor. The objective of this study was to identify dredging alternatives so that the current shoaling of the harbor entrance may be reduced.

Several structural alternatives were studied, including an offshore sand trap, a West Beach groin, and a sand bypass system. None of these alternatives satisfied both economic and environmental criteria for Federal projects. Nonstructural alternatives included the "no project" and the dredge acquisition alternatives. Descriptions of these two alternatives, as well as a summary review of potential environmental constraints associated with these alternatives, are provided below.

A. Dredge Acquisition. This alternative consists of providing all of the necessary equipment for the City of Santa Barbara to operate a maintenance program on their own. Equipment includes a 1,000 kilowatt, electrically powered, 16-inch discharge hydraulic dredge set up with spare parts and ready to operate, workboat and skiff, pipelines, shore support equipment such as levee dozer and crane, and electrical support gear such as reel barge and power cable. The dredge would be permanently located within Santa Barbara Harbor and dedicated to maintenance dredging of that area. It would be designed to accommodate normal shoaling of 325,000 cubic yards per year and the capability to pump up to 8,000 cubic yards per day during the six month dredging season for a maximum of approximately 650,000 cubic yards to correspond to the approximate recurrence interval of a 100 year shoaling event. Construction of the dredge would be according to American Bureau of Shipping standards suitable to the wave environment at Santa Barbara Harbor. Under this alternative, the City of Santa Barbara would assume total responsibility for the maintenance of the Federal channels.

B. No-Action Alternative. The No-Action alternative assumes a continuation of the status quo, wherein the existing entrance channel and structures will be improved to meet the most efficient dredging program of an earlier dredge cycle and a 100,000 cubic yard sand trap near the entrance channel. The current Federal channel maintenance dredging contract will be continued as a three-year, two-phase program which is fully funded by the Federal government. Mobilization phases occur in November or December and in January or February. A contingency plan exists that allows the Corps of Engineers to dredge after March 1 if late spring storms move substantial sediment into the harbor. The grunion spawning season is an environmental constraint that normally does not permit dredge disposal from March 15 to September 15. The Environmental Monitoring Program, however, includes provisions for dredge disposal during grunion season to study the effects on spawning success. The primary disposal site is on East Beach, about 3,000 feet east of Stearn's Wharf.

Dredging contractor daily reports for the 1983 and 1986 three-year contracts indicate that dredging occurred from 10 to 24 hours per day over a five-day work week. Down time during the periods was caused by mechanical problems. Weather and sea state did not appear to be significant problems but can result in dredge shutdown for periods of several days (Corps, 1990).

Federal funding for the Santa Barbara Harbor dredging contract is typically provided in October (at the beginning of the fiscal year) with contract award and notice-to-proceed in November or December.

With the No-Action alternative, costs to the Federal Government for the maintenance program will continue to be high, and the City of Santa Barbara will be unable to customize the dredge program to meet their needs.

4.0. AFFECTED ENVIRONMENT

4.1 GENERAL MARINE ENVIRONMENT

A. Santa Barbara Harbor. Santa Barbara Harbor is on the coast of southern California, 90 miles northwest of Los Angeles and 320 miles southeast of San Francisco. The harbor is in the center of a broad indentation in the coastline extending from Point Conception to Port Hueneme (Figure 1). Although local physiographic features do not provide enough natural protection for a harbor in the region, the orientation of the coastline together with the screening effect of the Channel Islands of San Miguel, Santa Rosa, and Santa Cruz reduce the size and force of ocean waves reaching the Santa Barbara shore from most directions. The harbor comprises the sheltered area within the lee of a rubblestone breakwater projecting seaward from Point Castillo on the south side and bounded by Stearn's Wharf on the northeast.

B. East Beach. The proposed discharge site at East Beach is northeast of the harbor and immediately beyond the mouth of Mission Creek. The characteristic habitat type subject to impact by dredged material discharge is semi-protected sandy beach. The creek discharges runoff from the city of Santa Barbara and surrounding hillsides. During storm conditions, this freshwater input is substantial and significantly alters water quality conditions, especially turbidity.

C. Description of Dredged Material. Dredged material is derived principally from littoral drift, including sediment from coastal streams and bluff erosion. This material typically shoals in the harbor at an average rate of 890 cubic yards per day (Corps of Engineers, 1991). A faster rate of shoaling may close the navigation and entrance channels within a few weeks, as was observed during January and February 1986.

Core samples of the north flank of the navigation channel (West Beach), and areas within the channel including the sand trap area were taken in September 1991. The geotechnical and chemical reports on sediment testing are included in Appendix A.

The sediment sampled averaged approximately 7% retained on the No. 200 screen. This indicates that the material is composed predominately of particle sizes larger than silt or clay. The material to be dredged from the normal maintenance areas within the channels is composed entirely of recent sediment deposited from the littoral drift; therefore, particles sizes are expected to be composed predominantly of sands. The biological and chemical oxygen demand (BOD and COD respectively) of these materials has not been recently measured but is expected to be low since the percentage of fines is less than 10%.

Since the composite average of 1991 sediment that was dredged was less than 10% fines and no characteristics of the cores indicated sediment contamination, Tier II testing (U. S. EPA, 1991) was not performed. Based on the analyses, the proposed material to be dredged was determined to be beach compatible sand and would be discharged on East Beach. New sediment entering the channel and sand trap is expected to be less than 10% fines, and thus will not be tested for contamination.

Sediment samples were taken within the navigation channel and seaward of East Beach in August 1993 and January 1993, respectively, for the purpose of chemical analysis. Testing results for those samples are given in Appendix A of this report. Results of the chemical analysis show that for the navigation channel, tested compounds were either not detected or were below screening levels suggested by PSDDA (1989), minimum clean-up criteria as listed by WDOE (1991), and lower effects range of NOS/OMA 52 (1990). For testing results at East Beach, sample TR#4 (-18' to -30' MLLW), TRPH levels were high, possibly due to the heavy utilization of the area for small boats anchorage.

4.2 BIOLOGICAL RESOURCES IN THE HARBOR

A. Marine Vegetation. The project dredge area does not support attached marine algae but may support a meioflora (small phytoplankton within or on the sandy substrate) that is indicative of soft-bottom habitats in an early successional stage because of the frequency of dredging occurring within the entrance and navigation channels. Common algal species which are expected to be associated with the pilings at Stearn's Wharf or substrates of the breakwater include Ulva sp., Enteromorpha sp., Egregia laevigata, and various red algal species.

B. Invertebrates. The organisms most likely present at the dredging site consist of mobile, invasive species such as polychaete worms, molluscs, echinoderms and crustaceans. Sandy-bottom succession dynamics are poorly known. The most recent surveys of biota of Santa Barbara Harbor, performed in 1972, indicated relatively low diversity and low densities of organisms within the harbor.

The pilings of Stearn's Wharf and rocks of the breakwater at the margins of the harbor provide habitat for more diverse communities including poriferans, cnidarians, bryozoans, annelids, molluscs, echinoderms, and tunicates.

C. Fishes. Fish expected in the dredging area include those typical of sheltered sandy and rocky areas. Among the fish that are expected to occur in Santa Barbara Harbor are (Love, 1991):

Scientific Name	Common Name
Atherinops affinis	top smelt
Amphistichus argenteus	barred surfperch
Seriphus politus	queenfish
Roncador stearnsi	spotfin croaker
Hyperprosopon argenteum	walleye surfperch
Engraulis mordax	northern anchovy
Cymatogaster aggregata	shiner surfperch
Leuresthes tenuis	California grunion

A fish species of particular concern is the California grunion (Leuresthes tenuis). Grunion utilize West Beach of Santa Barbara Harbor (observed up to approximately 300 feet on both sides of Stearn's Wharf) for spawning from March through mid-September, with a peak in activity expected between April and June. Spawning activity initiates with the grunion depositing their eggs beneath the sand on the high intertidal portions of the beach during high tides. The eggs are subsequently incubated in the sand, and hatched during the ascending series of high tide conditions before the following full or new moon.

D. Birds. The Santa Barbara harbor serves as both a feeding and resting area for shorebirds and waterfowl. The breakwater is used for daytime roosting by cormorants, gulls, and pelicans. The sandy habitat surrounding the breakwater is used for roosting and as feeding grounds at low tide by willet, godwit, sanderlings and other species. The open-water areas associated with the breakwater are used as habitat for waterfowl such as grebe and coots. A species list of birds observed during the 1992 Santa Barbara site monitoring program are included in Appendix D.

E. Mammals. Several species of marine mammals have been observed in the general vicinity of the harbor. They include:

California sea lion	Zalophus californiaus
harbor seal	Phoca vitulina
northern elephant seal	Mirounga angustirostris
common dolphin	Delphinus delphis
southern sea otter	Enhydra lutris nereis
California gray whale	Eschrichtius robustus

4.3 BIOLOGICAL RESOURCES AT THE DISCHARGE SITE

A. Terrestrial and Marine Vegetation. The proposed disposal site, approximately 2300 feet east of Stearn's Wharf, is a protected sandy beach. There is no coastal strand vegetation on the beach due to heavy human use. The terrestrial vegetation consists of non-native ornamental plants and grass located in a city-maintained green belt above the normal wave reach, between the beach and Cabrillo Boulevard.

No attached marine algae are expected to occur in the intertidal or offshore zone near the disposal site as little-to-no hard substrate exists for attachments. The closest kelp forest is located off Santa Barbara Point approximately one mile west of the harbor. Pieces of algae, including entire detached kelp (Macrocystis pyrifera) can be expected to wash upon the beach especially after winter storms. These plants float in from other areas with suitable habitat. No seagrasses occur in nearshore habitats within the vicinity of discharge. The Diatom or other microalgae can be expected in both the intertidal and offshore sandy benthos.

Debris deposited on the beach by high tide consists primarily of woody material and dried kelp. This material provides camouflage, a roosting zone, and habitat for insects which are a food source for the western snowy plover.

B. Invertebrates. Organisms typical of sandy beaches and protected coastal waters are expected. The sedimentary habitats within the intertidal and nearshore zones are expected to support clams (Macoma sp., Tellina modesta, and Donax gouldii), polychaete worms, crabs (Loxorhynchus grandis and Cancer sp.), and echinoderms. Sand crabs (Emerita analoga), isopods (Tylos punctatus) and other crustaceans, bean clams (Donax gouldii) and other molluscs, and polychaete worms are expected to occur (Gotshall and Laurent, 1980).

C. Fishes. California grunion (Leuresthes tenuis), a member of the silversides family (Atherinidae), utilize the beaches of Santa Barbara Harbor area for nocturnal beach spawning from March through mid-September, with a peak in activity occurring between April and June. Spawning activity initiates with the grunion depositing their eggs in the sand on the high intertidal portions of the beach during spring tides. The eggs are subsequently incubated in the sand, and hatched during the ascending series of high tide conditions before the following full or new moon, approximately 11-13 days later (Love, 1991).

Late winter storms, those occurring in late February or March, typically result in winter beach conditions with a winter berm. Such a beach face is generally considered to preclude grunion spawning success as little-to-no horizontal relief exists between 3.2 and 5.2 feet Mean Sea Level where grunion typically spawn; however, grunion were observed spawning on beaches with berms (2-3 feet high) during the Corps' 1992 site monitoring. Further, winter storms or early spring rains cause increased turbidity levels which may postpone initiation of spawning. Although turbidity has been considered a deterrent to spawning, data collected by the Corps' 1992 site monitoring program at Santa Barbara may suggest otherwise. Spawning grunion were observed on East and West Beaches during and after rain storms when turbidity levels were exceptionally high (Mar 20-22, 1992). In addition, spawning runs ceased prematurely during an anticipated run cycle (Apr 4-7, 1992) during which surf and water temperatures increased sharply. Moreover, evidence collected by the Cabrillo Beach Museum representatives indicates that egg viability and hatching rates are low for spring spawning runs. Whether this is a characteristic of the local population of

grunion or whether it is characteristic of the entire species remains to be demonstrated. It is clear that more study is necessary to begin to understand the environmental constraints on grunion spawning.

No other types of fish are expected to occur at the disposal site since it is non-aquatic. Some fishes which would be expected in the surfzone and shallow, sandy habitat near the discharge site include surfperches or embiotocids; croakers and other sciaenids; jacksmelt and other atherinids, clupeids such as sardines and occasional sharks (Love, 1991; CA Fish and Game, 1987).

D. Birds. Avifauna observed at East Beach by the 1992 site monitoring team included seabirds, waterfowl, gulls, western snowy plover and other shorebirds. A detailed species list is included in Appendix D.

E. Mammals. Small mammals are relatively scarce with the exception of several adaptable rodents such as rats and mice. Opossum and raccoon are expected to be present in the area. The low number of animals is the result of intense human activity in the area and limited space available for colonization. No marine mammals are expected to occur at the discharge site.

4.4 THREATENED AND ENDANGERED SPECIES

There are four State and Federally-listed Threatened or Endangered species, which are known, or likely, to occur in the nearshore waters or offshore waters of the project area. They are the brown pelican (Pelecanus occidentalis), southern sea otter (Enhydra lutris nereis), and California gray whale (Escherichtius robustus). The western snowy plover (Charadrius alexandrinus nivosus) was listed by the Department of Interior, U. S. Fish and Wildlife Service as a threatened species on 3 March 1993.

1. California Brown Pelican. The endangered brown pelican is a year-round resident of most of the southern California coastline. It is most abundant on the mainland coast from August to November. Breeding occurs on several California offshore islands during June to October. The brown pelican primarily forages on surface-feeding fish in the nearshore waters. The species is often very tolerant of human activity and readily utilizes various shoreline structures such as piers, breakwaters, groins, and buoys for roosting. The brown pelican is relatively common in the nearshore waters of the project area, particularly when schools of suitable fish prey species are present. Although frequently foraging in waters farther than one mile from the coast, it commonly roosts on the buoys, rock groins, and jetties in the nearshore waters of the project area. Activities of the brown pelican in these waters are generally restricted to feeding, overflying, or temporary roosting.

2. Western Snowy Plover. On March 3, 1993 the U.S. Department of Interior, under advise of the Fish and Wildlife Service, listed the Pacific coast population of

this species as Threatened under the Endangered Species Act (ESA). During the Corps' ongoing monitoring research study for grunion and plovers at Santa Barbara Harbor, the western snowy plover has been observed in the harbor area only on East Beach in 1992 and 1993. Other observers have reported seeing them on the sand spit associated with the breakwater. This plover's range extends along the Pacific Coast from southern Canada, through the western United States, and into northern Baja Peninsula. It forages primarily on the dry sand of upper levels of open beaches and in the debris left by high tide. Preferred nesting habitat is in low dunes above outer beaches; on East Beach such dunes do exist, however they are currently overgrown with ornamental iceplant and are directly adjacent to a very busy recreational trail. Nesting season begins Mid-March. Only non-breeding populations of snowy plovers have been observed in the harbor area by the 1992 and 1993 Corps monitoring teams, and other researchers (Page, et al., 1991).

On March 18, 1993, pursuant to the ESA, Corps of Engineers Operations Branch staff initiated Informal Consultation with the Service (Ventura office, per Naiomi Mitchell) for associated impacts from the Corps' present dredging work (FY 1993) that may affect this species. The Service expressed concern that census taking by Corps' monitoring teams, and movement of the disposal pipeline, might disturbed plovers. A system to count plovers without disturbing them is now being worked out by the Corps and the Service in the informal consultation process. The City shall use the methods adopted by the Corps, or shall consult with the Service to develop other methods. Observations by Corps monitoring teams indicate that the pipeline has a net positive effect on the plovers since it shelters them from the elements and human encroachment. In nearly two years of monitoring by the Corps, only one flock of plover has been seen at East Beach (none have been observed on the sand spit), which inevitably roosts in unison directly adjacent to the pipeline and usually within 100 meters of the discharge outfall. No signs of nesting activity have been observed to date.

3. **Southern Sea Otter.** The southern sea otters are classified as "threatened" under the Federal Endangered Species Act, "depleted" under the Marine Mammal Protection Act, and as a "fully protected mammal" under California state law. The southern sea otter has been observed in the Santa Barbara Harbor area; however, they usually do not occur south of Pt. Arguello and do not frequent the harbor. Otters forage in shallow coastal waters on shellfish and echinoderms (Reidman, 1990).

4. **California Gray Whale.** On January 7, 1993, the National Marine Fisheries Service determined that the eastern North Pacific stock of the gray whale should be removed from the List of Endangered and Threatened Species under the Endangered Species Act. The U.S. Fish and Wildlife Service (USFWS) has the authority and responsibility to actually remove the stock from the List. At this time, the USFWS has

not delisted the eastern North Pacific stock of the gray whale. This species is also Federally protected under the Marine Mammals Protection Act. The gray whale spends its summers in the Bering and Chukchi Seas and calves in the lagoons of Baja, California and mainland Mexico. The California gray whale is occasionally observed outside of Santa Barbara Harbor during its seasonal migrations which are primarily coastal, especially in the spring, with most whales remaining inside the 100-fathom curve. The whales travel south between the last week in November and the first week in January, and they travel north between the second week of January and the first week of May. Juveniles sometimes do not complete this 11,000 mile migration but linger about the shores of California (Leatherwood and Reeves, 1983; Corps of Engineers, 1986).

4.5 WATER QUALITY

Currents in the project area are predominantly downcoast, i.e. towards Mexico, between Point Conception and the Santa Barbara County line. The current patterns and water circulation are good. Ongoing receiving water monitoring of the Santa Barbara outfall, approximately 5 miles west of the site, is the only known continuous water quality data for the region.

State Mussel Watch data indicate that no significant concentrations of heavy-metal or bacteria were detected in specimens from the harbor in early 1990, the latest available data (Corps of Engineers, 1991). Moreover, studies of water quality at the project site performed by the California Regional Water Quality Control Board (CRWQCB, July 1990) identified that coliform levels in the harbor were below action levels as identified by the Board.

No contaminants are known or expected to be present in the water. There are no known sources of pollutants other than potential leakages from offshore oil drilling and associated onshore pipelines or boats using the harbor. No major oil spills have occurred recently.

4.6 AIR AND NOISE QUALITY

Air quality is determined primarily by meteorological conditions, the type and amount of pollutants emitted, and their subsequent dispersion into the atmosphere. The air quality in the Santa Barbara area varies seasonally and occasionally pollutants exceed federal and state levels. The major source of air pollution in the project area are automobile emissions, and recreational facilities and related vehicles (boats, campers, etc.).

Noise quality is evaluated by two separate entities, in accordance with state and federal requirements. These entities are the local Noise Ordinance and local Noise Elements. The Noise Ordinance basically states no dredging shall be permitted between 8 o'clock p.m. and 7 o'clock a.m. if the noise level created is 5 dBA over ambient noise levels of residential areas (i.e., first lot behind Cabrillo Blvd.). The Noise Elements

state that no dredging shall at any time exceed 60 Ldm of nearby residential areas or 70 Ldm of surrounding commercial areas (harbor, ocean-front hotels, and restaurants)(Ldm = average measure of noise over a period of time). If construction work is needed at night (for double or triple shift dredging), the City shall contact the Chief of Building and Zoning, City of Santa Barbara for permission.

4.7 LAND USE AND RECREATION

Santa Barbara Harbor and East Beach are important recreational resources for the regional and local area. The Harbor complex includes Stearn's Wharf, administration facilities, resort hotels, parking areas, a commercial fishing center, sportfishing centers, boat-repair yard, numerous restaurants, and marine hardware stores. The harbor's open water area provides channels, turning basins, and mooring areas. Small and mid-size recreation power and sail boats operate within the harbor alongside larger commercial fishing boats.

Fishing, boating, jet skiing, hiking, bicycle riding, walking, sun-bathing, swimming, photography, and bird-watching are important recreational activities in the harbor area. Activities observed at or near the disposal site also include jogging, weekend arts and crafts events, and social gatherings.

4.8 AESTHETICS

The aesthetics character of Santa Barbara Harbor and immediate vicinity is primarily comprised of public and commercial water-oriented facilities. The scenic and visual resources of the project area are dominated by the harbor, marina, beach, and nearshore recreational facilities.

4.9 CULTURAL RESOURCES

There are no historic properties within the area of potential effects (APE). Shipwrecks are immediately removed by the Santa Barbara Harbor Patrol and there are no standing structures in the APE. Stearns Wharf, located directly adjacent to the seaward half of the channel dredging area, is not in the APE.

5.0 ENVIRONMENTAL EFFECTS

The following sections discuss the potential environmental impacts from a City-operated dredging program. The City will be responsible for obtaining all necessary permits, and complying with Federal, State, and local laws and regulations before initiating dredging and disposal activities. Impacts, therefore, are expected to be similar to those from Corps operated programs.

5.1 GENERAL MARINE ENVIRONMENT

The impacts of dredging on marine biological resources are discussed at length in LaSalle et al. (1991). That review provides summaries on much of the literature concerning impacts

of the physical and chemical alterations associated with dredging on shellfish, fish, benthic organisms, seabirds, and marine mammals. That report describes in detail specific environmental consequences caused by dredging. These include suspended sediments, sedimentation, dissolved oxygen reduction, and entrainment. That report is hereby incorporated by reference as per 40 CFR 1502.21.

Beach disposal would not cause or contribute to the erosion of existing downcoast beaches and should result in decreasing erosion-associated impacts because material would be returned to the intertidal zone. The disposal site is above Mean Higher High Water level (+6 feet MLLW) and is the most desirable location for the purposes of beach nourishment and minimizing return of sediment into the harbor from the littoral processes. Disturbances resulting from dredge material discharge occurring once or twice per annum and sediment deposition from Mission Creek, whose outlet is situated between Stearn's Wharf and the discharge site, should not significantly degrade the value of intertidal and subtidal beach habitats. There would be no significant cumulative adverse effects on the terrestrial or aquatic ecosystems as a result of the proposed project.

5.2 BIOLOGICAL RESOURCES IN THE HARBOR

A. Marine Vegetation. Benthic flora within the immediate project area would be eliminated by the dredging activities because of site excavation and substrate removal. This impact is expected as a regular part of maintenance of the harbor; therefore, the proposed dredging project would not create any adverse impacts to marine vegetation. Impacts to marine algae and meioflora are localized, minimal, and not significant.

B. Invertebrates. Dredging activities inherently cause a disturbance and redistribution of bottom sediments which may persist for the duration of the operation. Some invertebrates, especially small crustaceans and molluscs of the infauna, may be relocated with the dredged material and deposited on the discharge site. Some would be smothered, some would become food for opportunistic shorebirds, and others would survive at the new location.

Invertebrates, epifauna, and infauna may be exposed to suspended sediment concentrations during dredging and up to 24 hours later. Dredging operations may cause some clogging to gills and suspension feeding apparatuses, resulting in smothering to invertebrates in the immediate vicinity. Impacts are expected to be minor since sediment is composed primarily of fine sands and few silts. The high proportion of sands is due to the frequency of dredging littoral drift sediments. Invertebrates are expected to recover from the disturbance upon completion of the project. The impacts to invertebrates are minimal, temporary, and not significant.

C. Fishes. Dredging of waterways to improve navigation or harbor facilities could affect fish resources in a variety of ways. The dredging process could result in direct loss of foraging habitat, but perhaps even more significant is the

turbidity associated with this activity. Some fish may avoid the immediate project area during dredging operations because of the increased noise and turbidity levels, and oxygen depletion caused by dredged bottom muds. Impacts would be temporary and therefore, insignificant. Greater potential for impacts would exist if there were substantial amounts of fine sediments and organisms in the potential dredging areas; however, testing of samples of material to be dredged indicated grain sizes are predominately fine to medium grain sands (Appendix A). On the beneficial side, dredging could increase water circulation and indirectly benefit fish resources. Also, dredging activities sometimes suspend infauna and epifauna to temporarily enhance fish feeding activities.

Entrainment of fish and shellfish in suction dredges has the potential for being significant depending on time of year or under site-specific conditions. Larson and Moehl (1990) reported an average rate of entrainment of .001 to .38 fish/cu. yd. of material excavated by suction dredges in Gray's Harbor, WA. The most common fish impacted were bottom dwelling fish. LaSalle et al. (1991) reported entrainment rate for shellfish (crabs and shrimp) of .035 - .0502 crabs/cu. yd. and .727 shrimp/cu. yd. in Gray's Harbor, WA.

For suction dredges, it is standard operating procedures for pumps to be activated only when the cutterhead is within a few feet of the bottom. Therefore, there should be an insignificant effect to most fish and shellfish in the project area.

D. Birds. Dredging activities may temporarily degrade water quality and increase ambient noise levels, which could cause disturbances to some birds. Increased levels of activities within the harbor may decrease waterfowl use of the breakwater and other nearby structures for roosting. These effects are not significant because dredging operations would be temporary and localized. Birds and marine mammals are expected to rapidly acclimate to the dredge's monotonous, non-threatening noise (Climo 1987, Gentry 1990) and to return to the project site once construction is completed at the end of the day.

E. Marine Mammals. Since local dredging operations would result in no impacts to sea otters, harbor seals, elephant seals, gray whales, and sea lions, the proposed operation in not expected to create any adverse impacts to marine mammals. Sea lions and seals generally do not haul out on the breakwater and would probably keep clear of the dredging activities; therefore, there would be no significant impacts to these mammals. Santa Barbara Harbor does not constitute essential feeding or breeding habitat for any marine mammal species that may be present in the area. No impacts to gray whales are expected. Impacts to other marine wildlife would be short-term and are not considered significant as wildlife activities would return to normal upon project completion.

5.3 BIOLOGICAL RESOURCES AT THE DISCHARGE SITE

A. Terrestrial and Marine Vegetation. No discharge shall occur in vegetated areas of the beach front. Little native

coastal strand develops on the beach because of trampling associated with high public use. Therefore, no impacts to terrestrial vegetation are expected.

No impacts to marine vegetation are expected as the sandy nearshore area has no suitable habitat. Seagrass and kelp communities are at such distance from the zone of discharge as to be beyond the area of impact (pers. comm., B. Hoffman, 10 April 1992).

B. Invertebrates. The potential biological and physical effects of using dredged material for beach replenishment include coverage and disturbance of fauna by dredged material, and temporary turbidity increase within the shallow subtidal and intertidal beach replenishment areas which can cause clogged gills and breathing apparatuses resulting in death. The turbidity levels are expected to be low because the dredged material would be composed of predominantly sandy material with particle sizes larger than silts or clays; therefore, no significant impacts are expected because of turbidity.

Some invertebrates could thrive best in recently deposited sediment, but may have difficulty adjusting to beaches where sediments are graded several times weekly. The beaches would be graded whenever significant mounding (irregular topography) occurs to return beach profiles to normal, build the beach, decrease erosion impacts, and cover black, organically-rich dredged material to improve the overall aesthetics of the disposal area. Given the temporary and minor nature of disposal, no significant impacts are expected.

C. Fishes. Some fish may avoid the immediate disposal area due to increases in suspended sediments. Other fish species may be attracted to the area to feed on mollusks, crustaceans, and other organisms which may have been caught up in, or exposed by, the dredged material. Recovery within the benthic community is expected to be rapid and complete, and turbidity levels are anticipated to subside upon completion of the beach replenishment operations.

Beach disposal is scheduled from October 1 to April 1. Disposal on the beach at this time should minimize effects to grunion and enhance grunion spawning habitat by decreasing the effects of normal long-term erosion. Potential effects on grunion spawning beaches after April 1, caused by surf-zone disposal, would be minimal and limited to burial of eggs that were in the immediate area of discharge.

Although it is unclear at this time, what effect, if any, dredging operations have on grunion spawning, the monitoring program which was initiated in 1992 is required to be continued through 1996 (Appendix B) (see Environmental Commitments). This program is designed to elucidate possible correlations between grunion spawning and abiotic conditions such as turbidity, wave height, and presence or absence of dredging operations.

D. Birds. With the exception of nesting species, shorebirds utilizing the beach area seem to have adapted to man

as attested to by their feeding activity on all but extremely heavily used beaches. Dredging activities may attract birds to the disposal areas. For example, some invertebrates are caught up and exposed in the dredged material as it is deposited on the beach. Birds such as gulls, sanderlings, and godwits have been observed feeding in the slurry as it is discharged. No significant adverse impacts to birds are expected from this project.

E. Mammals. There are no mammals associated with the discharge site although it is feasible that some marine mammals could be found offshore of the disposal site. If marine mammals did appear in the nearshore habitat or on the beach at the disposal site, dredging and disposal activities would not interfere with their activities (personal communication, I. Lagomarsino, 8 April 1992). No adverse impacts are expected to marine mammals from this project.

5.4 THREATENED AND ENDANGERED SPECIES

1. California Brown Pelican. The endangered brown pelican is often present in Santa Barbara Harbor and beach area, especially between August and November. The proposed project would likely cause only a minor, temporary disruption of feeding habits in the harbor area. Since this species is highly tolerant of human activities in general, and its activities at Santa Barbara Harbor are confined to foraging and daytime roosting, not breeding, dredging operations would not impact this species.

2. Western Snowy Plover. This Federally listed threatened species is present in the project area. Food supply, nest-site availability, and predators are the environmental factors most likely to affect the nest density of the snowy plover, and subsequently its continued existence and recovery (Page et al, 1983). The population of snowy plovers on East Beach appears to be non-breeding; that is, no nesting or egg-laying of snowy plovers has been observed in Santa Barbara. For this reason, nest-site availability is probably not a factor affecting the Santa Barbara population.

There is evidence that dredging operations may enhance food supply for snowy plovers. During on-site monitoring in February, 1992, Corps personnel observed snowy plovers feeding on insects and small crustaceans associated with debris washed up on the beach by high tide. Significant mounds of debris were limited to that portion of East Beach where the discharge pipeline was located. The remainder of the beach was regularly cleared by tractors (City of Santa Barbara). Snowy plovers observed by Corps monitoring personnel were confined to a small section of sand along the discharge pipeline and some were feeding on debris mounded on the seaward side of the pipeline. The pipeline also seems to offer protection from the elements and human encroachment; the single observed plover flock present prefers to roost directly adjacent to the pipeline and about 50 meters from the dredging discharge outfall. During site

monitoring in March, 1992, after removal of the pipeline, the plover population was observed a short distance down the beach in an area where mounds of debris had accumulated from a recent high tide. At night one or two plovers were observed feeding in the surf zone.

Several human factors can affect the quality and quantity of plover habitat (Stenzel et al., 1981), including the vehicular or pedestrian traffic in plover nesting or foraging habitat; destruction of eggs by pedestrian or vehicular traffic; and harassment of adults during egg-laying, incubation, and parental care. Since none of these impacts are expected to be associated with either dredging or disposal operations, it is not expected that the proposed project may adversely affect this species. Moreover, there was no evidence found that Corps dredging operations, including pipeline discharge on the beach, negatively affected snowy plovers at Morro Bay Harbor during an extensive study in 1987 (Hutchinson, et al., 1987). The Corps is requesting written concurrence from the Service that this project as proposed is not likely to adversely affect the plover or its critical habitat.

3. Southern Sea Otter. Sea otters are not expected to be in Santa Barbara Harbor; therefore, this project is expected to have no affect on the southern sea otter (NMFS concurrence by pers. comm. 8 Apr, 1992).

4. California Gray Whale. The gray whale has been observed in the general vicinity of the Santa Barbara Harbor. The whale would not likely be impacted by noise levels from dredging operations as noise levels are not significantly greater than usual types of noises derived from the harbor, i.e. motorboats or other vessels. They may pass by the areas outside of the immediate dredging area. Should a whale accidentally wander into the harbor, the proposed activities would be stopped so as to not impact the individual whale, and the appropriate resource agencies would be notified (FWS and NMFS). Therefore, this project would not affect the endangered gray whale (NMFS concurrence by pers. comm. 8 Apr, 1992).

5.5 WATER QUALITY

Temporary physical and chemical changes in water quality characteristics may result because of resuspension of bottom sediments during dredging activities. Any contaminants present could become ecologically active upon disturbance by these activities. Core samples taken from the proposed dredging areas at Santa Barbara Harbor indicated fines of less than ten percent (see Appendix A); therefore, contaminants are not expected in the dredged material. Because of both the general lack of pollutant sources typical of the larger commercial harbors, and the historical grain size of the littoral drift material, the effects of these activities are expected to be either minimal or absent.

Dredging impacts may include temporary increases in turbidity and suspended solids levels along with the associated

decreases in dissolved oxygen in the immediate vicinity of the dredging and disposal operations. Increased turbidity would result in a decrease in light penetration and cause a general decline in aquatic primary productivity due to temporary reduction of the euphotic zone available to phytoplankton populations. Any appreciable turbidity increase may cause clogging of respiratory and feeding apparatuses of fish and filter feeders. Motile organisms, however, would evacuate and avoid the dredging area and temporarily relocate to an undisturbed area. Due to the small percentage of fines in the dredged material, increases in turbidity would be minimal and restricted to the immediate vicinity of the operation.

Dredging activities probably contribute only a small percentage of the total turbidity found in the ocean when compared with that created by natural erosion of the beach, storm run-off from terrestrial habitats, and resuspension of solids by waves, currents, and maritime traffic. High levels of turbidity resulting from the dredging operation are usually restricted to the immediate vicinity of the dredging area and tend to dissipate rapidly. For these reasons, the proposed City-operated dredging and disposal program is not expected to cause significant changes in water quality. Furthermore, dredging and disposal activities shall adhere to the requirements and controls set forth by the California Regional Water Quality Control Board.

There have been no major oil spill accidents in the Santa Barbara Channel since the Union Oil blowout in 1969. Minute amounts of oil are presumed to come from natural fissures and natural seeps which have been in the harbor for over a decade. There have been no new accidental contaminated waste incidents in the harbor in over the past fifteen years. Furthermore, the mechanical analysis of the sediment sampled in September 1992 indicated the predominance of sand; therefore, the dredged material is not expected to contain significant levels of contaminants and no significant impacts to water quality are expected.

5.6 AIR AND NOISE QUALITY

An electric-powered dredge would be used for dredging. The proposed dredging activities in Santa Barbara Harbor are subject to Federal, state, and county air quality regulations and standards. Dust and debris from construction activities, such as heavy equipment on the beach, would cause minor adverse impacts on air quality for a short duration. If necessary, the City would be required to obtain and to observe Santa Barbara Air Pollution Control District permits, therefore impacts to air quality are not expected to be significant.

In a February 1, 1993 letter from Santa Barbara County Air Pollution Control District to the Corps, the District reported that if the power dredge emits more that 2.5 lb/hr of non-attainment pollutants or their precursors (NO_x, ROC, PM_{10}, and SO_x), special analysis is required, along with a District permit. Additionally, District rules prohibit the use of Selective Catalytic Reactor equipped diesel engines that employ the use of

anhydrous ammonia to meet engine emission standards. The District goes on to say that "An electric powered dredge, at any location, would not be subject to any existing District Rules or air quality permit requirements because it generates zero emissions."

Ambient noise levels on the beach and within the Harbor are such that the electric-powered dredge would not significantly decrease noise quality. Noise levels at hotels, motels, and restaurants on the inland side of Cabrillo Highway would not exceed existing highway-associated noise. Section 9.16.015 of the Santa Barbara Noise ordinance states that "if the kind of work to be performed emits noises at such a low level as to not cause significant disturbance in the vicinity of the work site,..., if great economic hardship would occur if the work were spread over a longer time, if the work would abate or prevent hazard to life or property, if the proposed night work is in the general public interest, then the Chief of Building and Zoning for the City of Santa Barbara could grant a special permit to make working during evening hours permissible". The proposed project falls under this category for several reasons: (1) the costs would be greater if the dredging activity were spread over a longer period of time; (2) the dredging and disposal operation would abate a life-threatening situation to harbor traffic; (3) the efficiency of the dredge operation would avoid potential public safety hazards due to beach erosion; and (4) beach replenishment would be in the local and public interest. Both air quality and noise levels would return to ambient conditions upon project completion; therefore impacts would be temporary and not significant.

5.7 LAND USE AND RECREATION

The City would use surface disposal pipeline over the sandy beach. Surface lain pipeline would allow for simplicity, cost efficiency, and safety, and readily allow for pipe maintenance. The use of a buried disposal pipeline could create a potential hazard to beach users if the pipeline were partially uncovered because of drifting sand of winter beach erosion. Disposal pipes that are partially covered by loose sand, as opposed to being completely buried, could be inconspicuous to beach users. In this respect, buried disposal pipeline could create a "sinkhole" effect through which beach users could trip or fall over the pipeline and injure themselves. Also, a buried pipeline could damage beach grading equipment.

Modifications to the existing bottom topography should be expected as a result of future dredging projects. Local, but minor, changes to the bathymetry would result because of relocation of marine sediments. In addition, topographic changes to the existing land forms would occur from the disposal of dredged materials on East Beach above Mean Higher High Water, which would nourish beaches, and from the slow effects of erosion. The beach is eroded annually. Beach disposal/replenishment should, therefore, produce a positive effect through probable increases in beach recreational usage following the completion of the project. The beaches would be graded to cover black organically-rich dredged material, to build

the beach and to improve overall aesthetics on the beach. Potential impacts of the proposed activities affecting the existing land use would be localized to the immediate project vicinity and are considered minor in nature.

The environmental impacts and disturbances to recreation related activities are expected to be minimal. The utilization of heavy equipment would detract from recreational use (i.e. walking, jogging, sunbathing, etc.) of East Beach. Since beach disposal would occur before April 1 of each year, which is prior to the peak recreation use, the impacts to the beach area would be temporary, localized, and not significant. The dredge equipment and floating pipes could obstruct recreational and commercial vessels. The navigational impacts would be minimized by properly marking the pipes and buoys so that boaters can safely avoid the immediate dredging area. The City will coordinate with the 11th Coast Guard District in Long Beach before initiating dredging activities; therefore, impacts to recreational and commercial vessels would be insignificant.

5.8 AESTHETICS

Localized turbidity associated with dredging and temporary blackening of sand caused by disposal of (chemically reduced) organic material onto the beach detracts from the aesthetics of the nearshore oceanic and beach areas. Heavy equipment used in placement and removal of pipes and beach grading may degrade aesthetics locally. The aesthetic qualities of the project area would not be significantly impaired as a result of the proposed project because the beach disposal and surf-zone disposal are prior to the peak period of human utilization. Impacts would be temporary, localized, and not significant.

5.9 CULTURAL RESOURCES

In the absence of historic properties within the APE, dredging projects in the existing channels will have no known effect on National Register listed or eligible properties.

6.0 COORDINATION

The proposal to transfer harbor maintenance responsibilities to the City was coordinated with the following agencies: Fish and Wildlife Service (FWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), California Coastal Commission (CCC), and the California Regional Water Quality Control Board (CRWQCB). The principal agencies with which the current Corps dredging project has been coordinated include: FWS, NMFS, Environmental Protection Agency, State Historic Preservation Office, U.S. Coast Guard, CCC, CDFG, California State Resources Agency (State Parks and Recreation), CRWQCB (Central Coast Region), Air Pollution Control District (APCD), Santa Barbara Waterfront Department and the Santa Barbara Harbor District.

The primary concern of these agencies was that impacts to grunion spawning be minimized. Prior coordination for the 1986

EA led to the development of the East Beach disposal alternative and the single-point discharge into the surf-zone for contingency dredging. Another concern of the agencies contacted was the cause of contingency dredging in previous years. Table 1 addresses these questions by summarizing duration of dredging and cause of extension of schedule or early cessation.

During annual reviews of the 1986 and 1992 EA's by the Corps and resource agencies, a monitoring program was designed to provide answers to questions regarding effects of beach disposal on grunion spawning. A description of this monitoring program is included in Appendix B, and suggestions for the City's continued monitoring are described below under Environmental Commitments.

7.0 ENVIRONMENTAL COMMITMENTS

The City will be responsible for obtaining all necessary licenses and permits to operate the dredge, and to dispose material. Permitting agencies include, but are not limited to, the Santa Barbara County APCD, CRWQCB, CCC, and the Corps of Engineers. Operations shall be consistent with all applicable Federal, State, and local laws and regulations. Amendments to the existing dredging and disposal program shall be coordinated in accordance with the National Environmental Policy Act and the California Environmental Quality Act.

The following specific commitments were designed to minimize environmental impacts, to comply with environmental law and to comply with public agency recommendations during coordination and preparation of the draft Environmental Assessment.

7.1 CONSTRAINTS ON DREDGING AND DISPOSAL

1. Project features shall not interfere with tidal circulation and/or fresh water inflows into and through the mouth of Mission Creek, between Stearn's Wharf and East Beach discharge site.

2. Geotechnical investigations on material from the dredging areas shall be completed before these areas may be dredged. If the results of the analysis indicate compatibility with the grain size of East Beach (disposal site), dredged material shall be discharged there as described above.

3. The City shall train harbor maintenance personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, and familiarization with pollution standards.

4. Conditions of the Regional Water Quality Control Board's Waste Discharge Requirements shall be met. A copy of this permit shall be posted in a public location near the disposal site. Included are the following: the City shall notify the Board and appropriate agencies prior to commencing dredging activities in March; and, no more than 250,000 cy of dredge shall be disposed in the surf between March 1 and April 30, and no more than 600,000 cy shall be disposed of annually.

5. Whenever feasible, dredging techniques will be selected to minimize water quality impacts. The City shall not pollute the waters of the harbor, beaches, or the ocean with fuels, oils or other materials which would have an adverse effect on aquatic life or its habitat or degrade water quality for any protected beneficial use. It is the responsibility of the City to investigate and comply with all applicable Federal, State, County and Municipal regulations concerning pollution of the Harbor, beaches or the ocean. All work shall be performed in such a manner that objectional conditions will not be created in the project or adjacent areas. If any waste material is dumped in unauthorized areas, the City shall remove the material and restore the area to the condition of the adjacent undisturbed area.

6. Dredging operations and the disposal of dredged materials shall not cause any of the following conditions in the receiving waters:

a. The formation of sludge banks or deposits of waste that would adversely affect the composition of the bottom fauna and flora, interfere with fish propagation or deleteriously affect their habitat, or adversely change the physical or chemical nature of the bottom.

b. Turbidity or discolorization that would cause substantial visible contrast with the natural appearance of the water outside the immediate area of operation.

c. Visible material including oil and grease, either floating on, or suspended in, the water or deposited on beaches, shores, or structures outside the immediate area of operation.

d. Objectionable odors emanating from water surface.

e. Depression of dissolved oxygen concentrations below 5.0 mg/l at any time outside the immediate area of operation.

f. Toxic substances in concentrations that would be deleterious to human, animal, or plant life.

7. Water Quality Monitoring. Grab samples shall be obtained from within 3 feet of the water surface at the specified intervals at the following locations:

a. 100 feet from each point of dredging operations.

b. 200 feet from each point of dredging operations.

c. 200 feet from each point where runoff from land disposal of these materials enter waters.

8. Sampling shall commence 2 weeks before the start of operations affecting the waters and shall continue at least one week after completion of all such operations. Sampling during operations shall be while dredging and/or disposal is occurring, during outgoing tide, downcurrent and at least 30 minutes after

the start of such work. During dredging/disposal operations, sampling and analysis of samples shall be conducted in accordance with the following:

Parameter	Units	Frequency
Dissolved Oxygen (a)	mg/l	Weekly (b)
Turbidity (c)	feet	Weekly (b)
pH	--	Weekly

(a) By the iodometric method, azide modification.

(b) Additional samples shall be taken every 24 hours each time the dissolved oxygen falls below 5.0 mg/l, or the pH is outside of the range 6.5 to 8.5.

(c) Determined by means of 20-cm Secchi disk at time of sampling. Color photographs shall be taken at each time of sample to record the extent of visible effects of operations.

9. Between May and September, there shall be no discharge of dredged material, without prior authorization from permitting agencies.

10. Noise levels of the dredge operation shall not exceed the limits established by the City of Santa Barbara noise element portions of the General Plan (i.e. 60 Ldm for residential areas, 70 Ldm for commercial areas; Ldm=average measure of noise over a period of time).

11. If double-shift or triple-shift dredging is required to insure project completion by April 30, the dredge operator shall obtain a special permit from the City of Santa Barbara which would make working during evening hours permissible.

12. Conditions of Santa Barbara Air Pollution Control District's laws, regulations, and permits shall be met.

13. Operators of dredge equipment shall not harass any marine mammal or waterfowl in the project area. The City shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to and damage of fish and wildlife. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire period of activities.

14. Dredge operator shall move the dredge equipment for U.S. Coast Guard and Harbor Patrol law enforcement and rescue vessels.

15. The City shall mark the dredge pipe area (i.e., a sign on the buoy using an arrow to indicate which side of the buoy the boats are to pass so that small boat traffic does not pass over

the dredge pipe. This condition stems from U.S. Coast guard and Harbor Patrol concerns about impacts from boaters who are unacquainted with FTC dredge operation markers. Warning signs shall also be placed around the beach discharge area.

16. The City shall notify the Commander, OAN (Operations and Aids to Navigation), 11th Coast Guard District, 400 Ocean Gate, Long Beach, CA 90822, (213) 590-2222 at least 2 weeks before the start of activity or 30 days before if buoys are to be placed. This notification shall include the following:

a. The size and type of equipment that would be performing the work.

b. Name and radio call sign for working boats.

c. Contact name and telephone number.

d. The schedule for completing the project.

Furthermore, the USCG Aids to Navigation Branch shall be notified of any hazards to navigation.

17. To minimize impacts to grunion, the following constraints shall be placed on dredging during the months of March and April:

a. Surf-zone disposal of dredged material using single-point discharge method.

b. Disposal of dredged material confined to a 500 ft swath of operations within the 4000 ft designated disposal zone.

c. Telephone coordination with resource agencies (U.S. Fish and Wildlife Service, California Coastal Commission, California Fish and Game, and National Marine Fisheries Service) to offer the opportunity of an on-site meeting to determine the disposal site.

18. To minimize impacts to western snowy plovers, the following constraints shall be placed on beach and surf-zone discharge:

a. Minimal positional changes of the beach surface pipeline.

b. No disturbance during plover census taking and monitoring.

19. Construction equipment shall utilize existing beach access routes to the proposed construction site.

20. All existing utilities shall be left in place and the City shall conduct operations in such a manner that the utilities will be protected from damage at all times, or arrangements shall be made by the City for their relocation, at the City's own expense. The City shall be responsible for any damage to

utilities known to exist and shall reimburse the owners for such damage caused by their operations.

21. The City shall clean up all areas used for construction including storage areas, harbor, pipeline corridor, and the disposal area. The City shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas.

7.2 ENVIRONMENTAL MONITORING

The City shall continue the Environmental Monitoring Program initiated by the Corps, through 1996. The program shall be implemented March through May of each year on the dates of expected grunion runs as published by the California Fish and Game Department. Habitats covered by the monitoring shall include the breakwater and sand spit (during daylight only), West Beach, and East Beach to the Sheraton Hotel. Data shall be collected on presence and extent of grunion spawning, species density and abundance of shorebirds with special attention to snowy plover abundance and distribution, and relevant abiotic conditions such as beach profiles, turbidity, water temperature, wave height, etc.

A description of the monitoring program for 1993 appears in Appendix B. When finalized, the FY 1994-1996 Maintenance Dredging EA would contain updated methods and responsibilities of this program. This document is expected to be available to the public by the end of July 1993. The City shall refer to that document as the final authority for the environmental monitoring program, and the dredging contingency plan (see also Section 7.3, Surf-Zone Disposal). Changes to either program shall be coordinated with the Corps of Engineers and other appropriate resource and permitting agencies. The City shall also continue to coordinate its research with these agencies. Results of the study will be used to determine whether future dredging operations would have a significant impact on grunion reproductive success. If necessary, the City shall include measures to avoid or minimize impacts, to the extent possible.

7.3 SURF-ZONE DISPOSAL

During the month of April, discharge of dredged material shall occur only in the surf-zone as described in the paragraph below and in II.C.2.e. (Surf [Intertidal] Zone Disposal). See Appendix C for additional responsibilities concerning documentation and coordination.

1. The City shall realign the disposal pipe so that surf-zone disposal, rather than beach disposal shall be implemented within a 500-foot-wide zone of operation on East Beach. Both outfall pipes shall be perpendicular to the shore and located below Mean Higher High Water.

2. The zone of operation shall be fixed and flagged prior to the first day of post-March 1, 1993 dredging; no impacts from heavy equipment (i.e., paths of transit), pipes, or

dredged material shall extend beyond this zone. Only one zone of operations per dredging episode shall be allowed.

3. When mounding of dredged materials occurs in front of the discharge point of the disposal pipe, extensions shall be added onto the pipes so as to bring the outfall closer to the ocean. Should excessive mounding occur and lateral movement of the pipes be required, such movement of pipes would not result in pipes, heavy equipment (for moving pipes), or dredged material occurring outside of the fixed 500-foot-wide zone of disposal operations.

4. Slotted or perforated pipes shall be used when additional pipe must be added to extend the pipeline closer to the ocean in order to discourage erosion of sand mounds supporting the disposal pipeline.

5. No more than 150,000 cubic yards of material shall be disposed in the surf zone between April 1 and April 30, 1993. (No more than 600,000 cubic yards of material shall be disposed annually).

6. Double workshift dredging and disposal operations shall be performed so as to minimize the temporal impacts. Triple workshift, or 24 hours/day, dredging shall be permitted. (The dredge operator shall be required to obtain the necessary permits by local noise ordinances--see Environmental Effects, Air and Noise Quality).

7.4 CULTURAL RESOURCES

The City shall demonstrate compliance with the National Historic Preservation Act, before initiating dredge and disposal activities. If any archeological remains are uncovered by project activities, the City shall suspend operations at the site of discovery, and notify the Corps of Engineers and the State Historic Preservation Officer (SHPO). The City shall record and document the find, and determine its eligibility for the National Register of Historic Places. Results shall be provided to the Corps and SHPO.

8.0 COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

8.1 CLEAN WATER ACT

SECTION 404(b)(1) GUIDELINES: The proposed project, with the above environmental commitments and special conditions, complies with the guidelines promulgated by the Administrator, Environmental Protection Agency, under authority of Section 404(b)(1) of the Clean Water Act (33 USC 1344) (Appendix E). The City shall obtain a 404 permit for any action within the jurisdiction of the Corps of Engineers.

SECTION 401: The proposed project complies with the requirements of the California Regional Water Quality Control Board and would thus be eligible for a Water Quality Certification, pursuant to 33 USC 1341. The work would also

comply with the Waste Discharge Requirements set forth in Regional Board's Order No. 86-149. The City shall continue to obtain 401 Certification, and comply with the Waste Discharge Requirements.

8.2 COASTAL ZONE MANAGEMENT ACT OF 1972

The proposed project activities have been reviewed by the Corps and determined to be consistent with the California Coastal Act to the maximum extent practicable as required by the Coastal Zone Management Act of 1972. The purchase of a dredge, and the transfer of maintenance responsibility to the City, does not require consistency review. The City shall obtain permits from the California Coastal Commission before initiating dredge and disposal activities.

8.3 ENDANGERED SPECIES ACT OF 1972, SECTION 7(c)

As discussed above, and following informal consultation with the U. S. Fish and Wildlife Service, the Corps has determined that the transfer of maintenance dredging operations to the City would not have an effect upon the continued existence of any species proposed or listed as threatened or endangered by the FWS, and therefore formal consultation pursuant to Section 7 (c) of this act is not required. The City shall continue to coordinate with the resource agencies to assess potential effects from future activities.

8.4 NATIONAL HISTORIC PRESERVATION ACT

A letter dated April 1, 1993 was sent to the State Historic Preservation Officer stating that the Corps of Engineers FY 1994-1996 dredging project would not involve properties that are listed in or are eligible for the National Register of Historic Places. The SHPO concurred with the Corps' determination in a letter dated May 3, 1993. City archaeologists/historians will consult with SHPO as needed for future dredging operations.

8.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

This project is the least environmentally damaging viable alternative and will not have significant adverse effects on the environment within the meaning of CEQA. The City shall ensure all future activities are in compliance with CEQA, and obtain all necessary licenses and permits. The project is therefore consistent with the provisions of CEQA.

8.6 FISH AND WILDLIFE COORDINATION ACT

The U.S. Fish and Wildlife Service (USFWS) has reviewed this project under the authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e; the Act of March 10, 1934; Ch. 55; 48 Stat. 401) as amended and other authorities mandating Department of the Interior concern for environmental values. The USFWS had no concerns with the draft feasibility report.

8.7 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY:

Increased safety of harbor operations would result with implementation of the proposed project alternatives. Although watercraft would be exposed to operation activities, this exposure is considered less significant than current unsafe conditions of the harbor. Short-term construction-related impacts are local and the potential loss of habitats can be mitigated as discussed in Section VI. No significant long-term adverse environmental impacts would result from proposed project alternatives.

8.8 OTHER APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

The proposed project has been reviewed and determined to be in compliance with the following applicable laws and regulations:

1. National Environmental Policy Act
2. Clean Air Act
3. Marine Protection, Research and Sanctuaries Act

9.0 CONCLUSION

The transfer of maintenance dredging operations to the City of Santa Barbara Harbor has been designed and scheduled to avoid, minimize, and mitigate the probable effects on the environment. Dredging operations would be completed before 30 April of each year, to avoid impacts on threatened or endangered wildlife, and to avoid peak recreational use of the area.

This Environmental Assessment, and formal coordination with the appropriate public agencies, indicates that the proposed activity would not have a significant impact upon the existing environment or the quality of the human environment. As a result, preparation of an Environmental Impact Statement (EIS) is not required.

10.0 CONSULTATION AND COORDINATION

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11.0 LIST OF PREPARERS AND CONTRIBUTORS

U.S. Army Corps of Engineers personnel directed the preparation of this EA and provided technical information regarding the operations, needs, resources, and facilities of Santa Barbara Harbor. Mark Durham, Lori Buckley, Hayley Lovan, Jane Grandon and Jared Miller of the Corps assisted with the preparation of this EA.

This report was compiled by Dames & Moore of Santa Ana, California. Dames & Moore has no financial interest in the approval or disapproval of the proposed project. Staff who participated in preparing this document are as follows:

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FIGURE 1

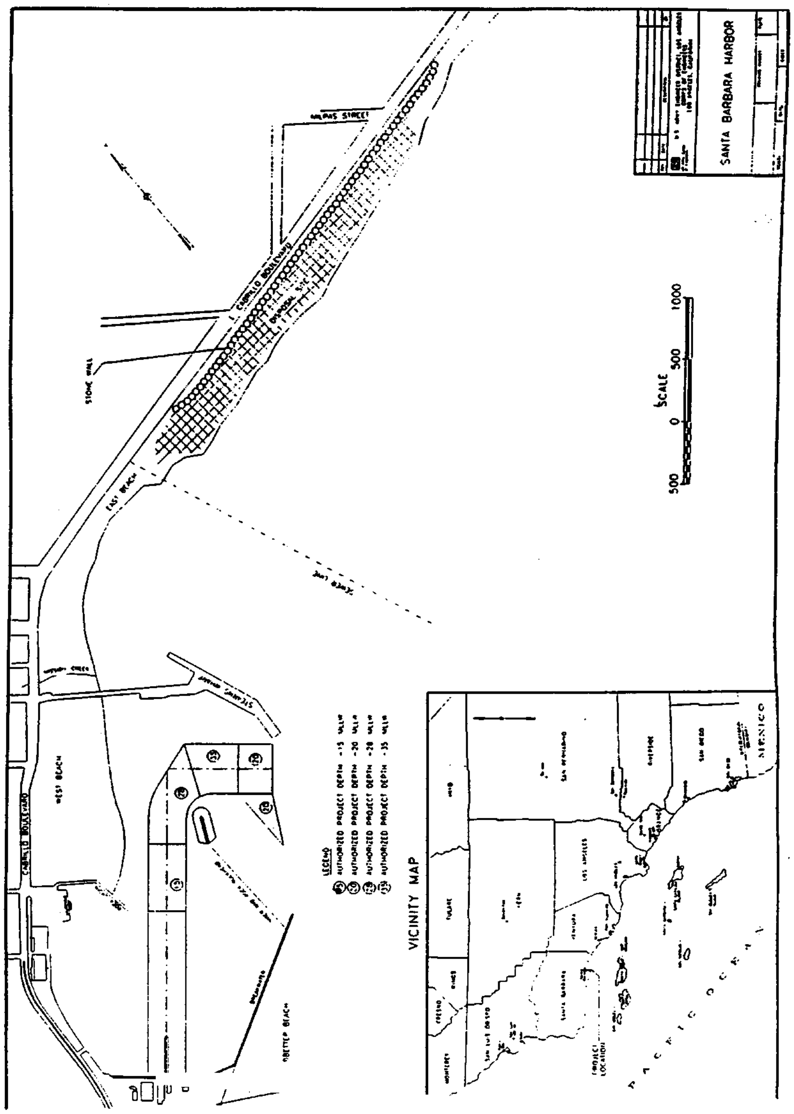
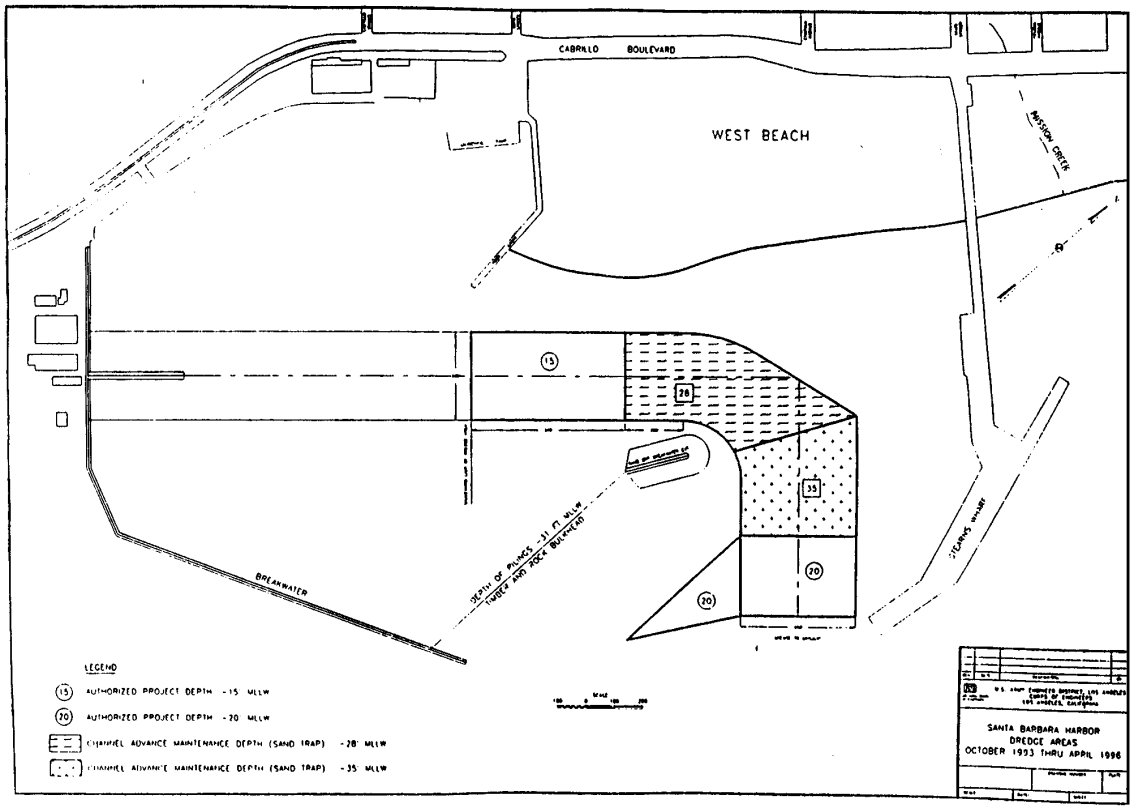

CABRILLO BOULEVARD
WEST BEACH
EAST BEACH
STONE WALL
LEGEND
AUTHORIZED PROJECT DEPTH -15 MLLW
AUTHORIZED PROJECT DEPTH -20 MLLW
AUTHORIZED PROJECT DEPTH -28 MLLW
AUTHORIZED PROJECT DEPTH -35 MLLW
VICINITY MAP
SCALE
500 0 500 1000
PACIFIC OCEAN
MEXICO
SANTA BARBARA HARBOR

FIGURE 2


CABRILLO BOULEVARD
WEST BEACH
MISSION CREEK
15
20
35
20
BREAKWATER
DEPTH OF PILINGS -31 FT. MLLW
STEARNS WHARF
LEGEND
15 AUTHORIZED PROJECT DEPTH -15' MLLW
20 AUTHORIZED PROJECT DEPTH -20' MLLW
CHANNEL ADVANCE MAINTENANCE DEPTH (SAND TRAP) -28' MLLW
CHANNEL ADVANCE MAINTENANCE DEPTH (SAND TRAP) -35' MLLW
SANTA BARBARA HARBOR
DREDGE AREAS
OCTOBER 1993 THRU APRIL 1996

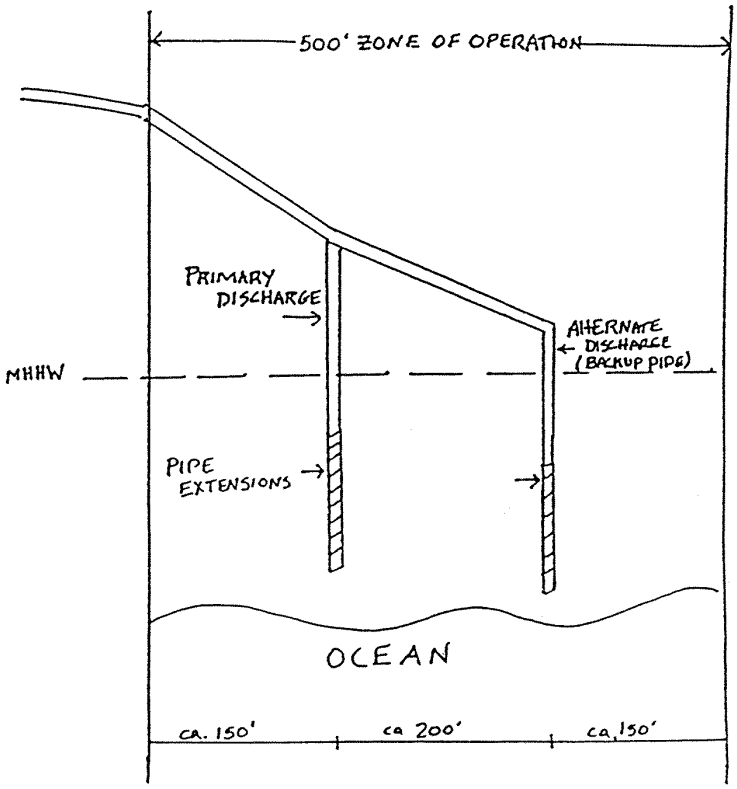


FIGURE 3

Surf-zone disposal

TABLE 1

HISTORY OF SANTA BARBARA HARBOR MAINTENANCE DREDGING

DREDGING CYCLE	CUBIC YARDS	DREDGING DATES	DREDGING AFTER MARCH 1ST	REASON
Fall 86 to Spring 87	223480	13 Jan 87-13 May 87	yes	late winter storms
Fall 87 to Spring 88	260000	01 Dec 87-25 Feb 88	no	n/a
Fall 88 to Spring 89	134600	12 Dec 88-14 Apr 89	yes	late winter storms
Fall 89 to Spring 90	202456	01 Dec 89-28 Feb 90	no	n/a
Fall 90 to Spring 91	287781	19 Nov 90-29 Apr 91	yes	late winter storms
Fall 91 to Spring 92	241500	17 Nov 91-24 Feb 92	no	n/a
Fall 92 to Spring 93	600000	30 Nov 92-12 Apr 93	yes	grunion research & severe winter storms

APPENDIX A

GEOTECHNICAL & CHEMICAL ANALYSIS REPORTS

Santa Barbara Harbor Dredging Material Fines Content & Chemical Analysis (Including East Beach)

21 April 1992

MEMORANDUM FOR CESPL-CO-ON

SUBJECT: Santa Barbara Harbor Dredging Material Fines Content

1. Listed below is the information requested concerning the estimated amount of fines in the proposed dredging material based on samples taken in November 1991.

Maximum fines content (>90%) =	97%	at	VCH-11a,	area 5
	96%	at	VCH-5,	area 3
	94%	at	VCH-7,	area 3
	93%	at	VCH-4,	area 2
Minimum fines content =	0%	at	VCH-16,	area 2
			VCH-6A,	area 3
			VCH-7,	area 3
			VCH-10,	area 5
			VCH-12,	area 5
Average fines content =	7%			
Portion of material with fines content greater than or equal to 10% =	11%			

Fines are considered to be material that passes through a No. 200 standard sieve, which corresponds to an approximate soil diameter of less than 0.003 inches (0.074 mm).

2. Also included is the spreadsheet used to develop the numbers given above. This spreadsheet contains all the relevant data from the borings located within the proposed dredging area organized by each sub-area. In addition, the average fines content and portion of material with fines content greater than or equal to 10% is given for each sub-area.

3. If you have any questions, please contact Chris Sands at X-6867 or Greg Dombrosky at X-7126.

Gregory A. Dombrosky
Soil Design Section

Encl

SANTA BARBARA HARBOR DREDGING

A	DREDGE DEPTH (2)	HOLE (3)	LAYER TYPE (4)	TOP OF LAYER, FT (5)	BOTTOM OF LAYER, FT (6)	DEPTH OF LAYER, FT (7)	% FINES (8)	DEPTH x % FINES (9)	DEPTH W/ %FINES > = 10% (10)	COMMENTS (11)
	-20	VCH-2	SP	-16.9	-19.9	3.0	1	3.0	0.0	
			SP	-19.9	-22.9	0.1	1	0.1	0.0	
			SP	-22.9	-26.9	0.0	1	0.0	0.0	
		VCH-14	SP	-13.4	-16.4	3.0	1	3.0	0.0	
			SP	-16.4	-19.4	3.0	1	3.0	0.0	
			SP-SM	-19.4	-21.4	0.6	6	3.6	0.0	
		VCH-15	SP-SM	-15.5	-18.5	3.0	12	36.0	3.0	
			SP	-18.5	-21.5	1.5	2	3.0	0.0	
			SP	-21.5	-24.5	0.0	1	0.0	0.0	
		SUB-TOTAL				14.2		51.7	3.0	
			AVE. % FINES =		3.6 %					
			% FINES > = 10% =		21.1 %					
	-35	VCH-1	SP-SM	-18.0	-21.0	3.0	10	30.0	3.0	MIN. HOLE ELEV. = -25.0'
			SP	-21.0	-25.0	4.0	1	4.0	0.0	
		VCH-4	SP	-19.8	-22.8	3.0	1	3.0	0.0	MIN. HOLE ELEV. = -29.8'
			SP	-22.8	-25.8	3.0	2	6.0	0.0	
			SP	-25.8	-28.8	3.0	2	6.0	0.0	
			ML	-28.8	-29.8	1.0	93	93.0	1.0	
		VCH-16	SP	-17.0	-20.0	3.0	0	0.0	0.0	MIN. HOLE ELEV. = -25.5'
			SP	-20.0	-23.0	3.0	1	3.0	0.0	
			SP	-23.0	-25.5	2.5	1	2.5	0.0	
		SUB-TOTAL				25.5		147.5	4.0	
			AVE. % FINES =		5.8 %					
			% FINES > = 10% =		15.7 %					

SANTA BARBARA HARBOR DREDGING

BA	DREDGE DEPTH (2)	HOLE (3)	LAYER TYPE (4)	TOP OF LAYER, FT (5)	BOTTOM OF LAYER, FT (6)	DEPTH OF LAYER, FT (7)	% FINES (8)	DEPTH x % FINES (9)	DEPTH W/ %FINES > = 10% (10)	COMMENTS (11)
)										
	-28	VCH-3	SP	-16.3	-19.3	3.0	1	3.0	0.0	MIN. HOLE ELEV. = -25.8'
			SP	-19.3	-22.3	3.0	2	6.0	0.0	
			SP	-22.3	-25.3	3.0	1	3.0	0.0	
			ML	-25.3	-25.8	0.5	84	42.0	0.5	
		VCH-5	SP	-12.5	-15.5	3.0	1	3.0	0.0	MIN. HOLE ELEV. = -20.5'
			SP	-15.5	-18.5	3.0	2	6.0	0.0	
			ML	-18.5	-19.5	1.0	82	82.0	1.0	
			ML	-19.5	-20.5	1.0	96	96.0	1.0	
		VCH-6	SP	-14.0	-17.0	3.0	3	9.0	0.0	MIN. HOLE ELEV. = -19.0'
			SP	-17.0	-19.0	2.0	1	2.0	0.0	
		VCH-6A	SP	-14.0	-17.0	3.0	2	6.0	0.0	MIN. HOLE ELEV. = -25.0'
			SP	-17.0	-20.0	3.0	2	6.0	0.0	
			SP	-20.0	-23.0	3.0	0	0.0	0.0	
			SP	-23.0	-25.0	2.0	0	0.0	0.0	
		VCH-7	SP	-20.4	-23.4	3.0	0	0.0	0.0	
			ML	-23.4	-26.4	3.0	94	282.0	3.0	
			SP	-26.4	-29.4	1.6	3	4.8	0.0	
			SM	-29.4	-31.9	0.0	37	0.0	0.0	
		VCH-8	SP	-18.0	-21.0	3.0	1	3.0	0.0	
			SP	-21.0	-24.0	3.0	3	9.0	0.0	
			SP	-24.0	-28.0	4.0	1	4.0	0.0	
		SUB-TOTAL				51.1		566.8	5.5	

AVE. % FINES = 11.1 %

% FINES > = 10% = 10.8 %

SANTA BARBARA HARBOR DREDGING

EA 1)	DREDGE DEPTH (2)	HOLE (3)	LAYER TYPE (4)	TOP OF LAYER, FT (5)	BOTTOM OF LAYER, FT (6)	DEPTH OF LAYER, FT (7)	% FINES (8)	DEPTH x % FINES (9)	DEPTH W/ %FINES > = 10% (10)	COMMENTS (11)
4	-15	NO SAMPLING WAS DONE IN AREA 4								
5	-15	VCH-9	SM	-13.3	-16.3	1.7	25	42.5	1.7	
			SM	-16.3	-19.3	0.0	16	0.0	0.0	
			SP-SM	-19.3	-22.3	0.0	7	0.0	0.0	
			SP	-22.3	-24.3	0.0	4	0.0	0.0	
		HSA-2	SP-SM	4.5	1.5	3.0	5	15.0	0.0	MIN. HOLE ELEV. = -13.5'
			SP-SM	1.5	-1.5	3.0	7	21.0	0.0	
			SP	-1.5	-4.5	3.0	4	12.0	0.0	
			SP-SM	-4.5	-7.5	3.0	6	18.0	0.0	
			SP-SM	-7.5	-10.5	3.0	5	15.0	0.0	
			SP	-10.5	-13.5	3.0	4	12.0	0.0	
		SUB-TOTAL				19.7		135.5	1.7	
			AVE % FINES =		6.9 %					
			% FINES > = 10% =		8.6 %					

SANTA BARBARA HARBOR DREDGING

EA)	DREDGE DEPTH (2)	HOLE (3)	LAYER TYPE (4)	TOP OF LAYER, FT (5)	BOTTOM OF LAYER, FT (6)	DEPTH OF LAYER, FT (7)	% FINES (8)	DEPTH x % FINES (9)	DEPTH W/ %FINES > = 10% (10)	COMMENTS (11)
)	-20	VCH-10	SP	-2.1	-5.1	3.0	0	0.0	0.0	MIN. HOLE ELEV. = -13.1'
			SP	-5.1	-8.1	3.0	2	6.0	0.0	
			SW	-8.1	-11.1	3.0	2	6.0	0.0	
			SW	-11.1	-13.1	2.0	2	4.0	0.0	
		VCH-11	SP	-14.0	-15.5	1.5	5	7.5	0.0	
			SW	-15.5	-18.0	2.5	2	5.0	0.0	
			SP	-18.0	-22.0	2.0	2	4.0	0.0	
		VCH-11A	SP	-14.0	-17.0	3.0	2	6.0	0.0	
			SP	-17.0	-19.0	2.0	1	2.0	0.0	
			ML	-19.0	-20.0	1.0	97	97.0	1.0	
		VCH-12	SP	-3.5	-6.5	3.0	0	0.0	0.0	MIN. HOLE ELEV. = -13.0'
			SP	-6.5	-9.5	3.0	1	3.0	0.0	
			SP-SM	-9.5	-13.0	3.5	5	17.5	0.0	
		HSA-4	SP-SM	4.3	1.3	3.0	6	18.0	0.0	
			SW-SM	1.3	-1.7	3.0	6	18.0	0.0	
			SP	-1.7	-4.7	3.0	2	6.0	0.0	
			SW-SM	-4.7	-7.7	3.0	6	18.0	0.0	
			SP-SM	-7.7	-10.7	3.0	10	30.0	3.0	
			SP	-10.7	-13.7	3.0	3	9.0	0.0	
		SUB-TOTAL				50.5		257.0	4.0	
			AVE. % FINES =		5.1 %					
			% FINES > = 10% =		7.9 %					

SANTA BARBARA HARBOR DREDGING

AREA (1)	DREDGE DEPTH (2)	HOLE (3)	LAYER TYPE (4)	TOP OF LAYER, FT (5)	BOTTOM OF LAYER, FT (6)	DEPTH OF LAYER, FT (7)	% FINES (8)	DEPTH x % FINES (9)	DEPTH W/ %FINES >= 10% (10)	COMMENTS (11)
	TOTALS					161		1158.5	18.2	
			AVE. % FINES =		7.2 %					
			% FINES >= 10% =		11.3 %					

NOTES:

1. % FINES >= 10% is the percentage of sampled material having a fines content greater than 10%.
2. Fines are considered to be material that passes through a No. 200 standard sieve, which corresponds to an approximate soil particle diameter of less than 0.003 in. (0.074 mm).
3. Computations are based solely on materials sampled. Holes which did not reach proposed dredge depth have their deepest elevations noted.
4. Formulas: AVE. % FINES = Σ(DEPTH x % FINES) / Σ(DEPTH)
   % FINES >= 10% = Σ(DEPTH WITH %FINES >= 10%) / Σ(DEPTH)
5. Borings taken in November 1991.

CESPL-CO-ON 05 April 1993

MEMORANDUM FOR Chief, Natural Resources Management Section

SUBJECT: Santa Barbara Harbor Navigation Channels and Beach Disposal Site Chemical Analysis Results.

1. References:

a. Memorandum from CESPD-ED-GL to CESPL-ED-GL (Greg Dombrosky) Subject: Santa Barbara Harbor Analytical Results, Ser. 1110-1-8100b, dated 28 Aug 92.

b. Memorandum from CESPD-ED-GL to CESPL-ED-GL (Greg Dombrosky) Subject: Santa Barbara Harbor Dredging Test Results, Ser. 1110-1-8100b, dated Mar 93.

2. Referenced memorandums reported the chemical test results from the sediment samples taken from the Federal navigation channels (dredging site) and from East Beach (beach disposal site) at Santa Barbara Harbor.

3. Beach grab samples were taken along a single transect (see enclosure 1) on 28 Jan 93. Sampling occurred between +12 ft MLLW and -30 ft MLLW at elevation intervals of 6 feet. For chemical testing, beach grab samples were composited into two samples from +12 ft MLLW to -12 ft MLLW (TR#4, +12' to -12' MLLW) and from -18 ft MLLW to -30 ft MLLW (TR#4, -18' to -30' MLLW).

4. Five (5) samples (RW92-1 to RW92-4, RW92-6C) were taken from the Federal navigation channels (dredging site) at Santa Barbara Harbor (see enclosure 2) on 11/12 Aug 92 utilizing the rotary wash drilling method. Penetration depth ranged from -30 ft MLLW to -33 ft MLLW.

5. Results of the sediment chemistry analysis are listed in enclosure (3). For the navigation channels, tested compounds were either not detected (within the detection limits set forth for the analysis) or were below screening levels suggested by PSDDA (1989), minimum clean-up criteria as listed by WDOE (1991), and lower effects range (ER-L) as listed by NOS/OMA 52 (1990).

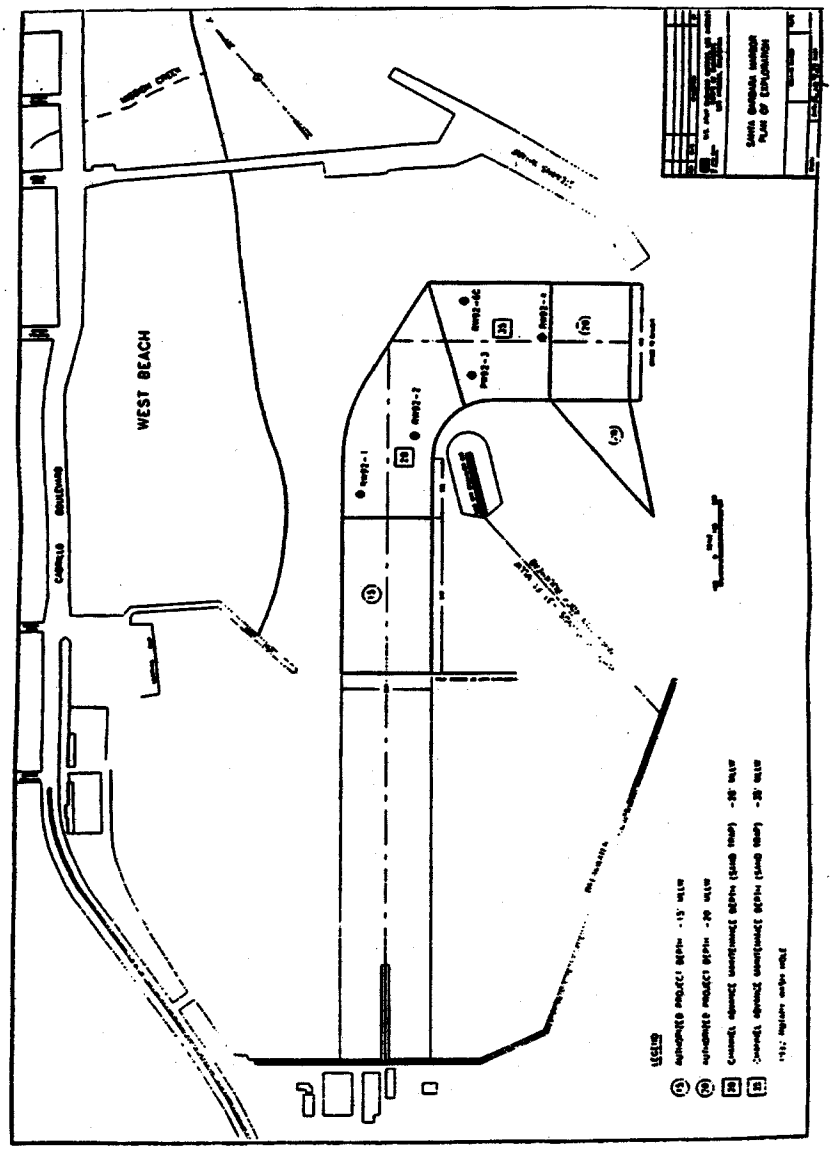
6. For beach sample TR#4 (-18' to -30' MLLW), TRPH of 289 mg/kg well exceeded the detection limit of 25 mg/kg. The high level of TRPH may be a result that the sampled area is heavily utilized as small boat anchorage site.

7. Disposal of the dredged material from the Federal navigation channels at Santa Barbara Harbor should not significantly impact the chemical composition of the receiving site (East Beach) since all sediment chemistry concentrations of the dredged material were below suggested screening/effects levels, and in some instances below the concentrations at the beach disposal site. Any future dredging of the Federal navigation channels will remove. only recently deposited coarse grain sediments (greater than 90%) and should therefore not present any adverse chemical impacts to the receiving site.

8. Results of the chemical analysis of the dredged area were not reported in the FY93 Santa Barbara Harbor Maintenance Dredging Project Final Environmental Assessment (FEA) since the sampling and analysis did not occur until after the finalization of the FEA.

9. If you have any questions regarding this matter please contact Mr. Tony Risko, Navigation Section at (213) 894-5644.

MOHAMMED N. CHANG
Chief, Navigation
Section


WEST BEACH
CABRILLO BOULEVARD

SANTA BARBARA HARBOR
NAVIGATION CHANNELS SEDIMENT CHEMISTRY ANALYSIS
11/12 August 1992

Parameter	EPA Method	Reporting Limits	Sample RW92-1 (-30' MLLW) Results	Sample RW92-2 (-31' MLLW) Results
METALS:		MG/KG	MG/KG	MG/KG
Arsenic (As)	(2)	0.30	1.60	4.10
Cadmium (Cd)	(1)	0.20	ND	ND
Chromium (Cr)	(1)	0.50	7.50	2.40
Copper (Cu)	(1)	0.60	7.50	1.90
Lead (Pb)	(1)	2.00	ND	10.00
Mercury (Hg)	(3)	0.05	ND	ND
Nickel (Ni)	(1)	1.00	8.00	2.50
Selenium (Se)	2)	0.30	0.30	0.40
Silver (Ag)	(1)	1.00	ND	ND
Zinc (Zn)	(1)	2.00	12.00	6.10
PESTICIDES:(4)		UG/KG	UG/KG	UG/KG
Aldrin	8080	12.5	ND	ND
BHC-A	8080	12.5	ND	ND
BHC-B	8080	12.5	ND	ND
BHC-D	8080	12.5	ND	ND
Chlordane	8080	25.0	ND	ND
DDD	8080	12.5	ND	ND
DDE	8080	12.5	ND	ND
DDT	8080	12.5	ND	ND
Dieldrin	8080	12.5	ND	ND
Endrin	8080	12.5	ND	ND
Endrin Aldehyde	8080	12.5	ND	ND
Endosulfan I	8080	12.5	ND	ND
Endosulfan II	8080	12.5	ND	ND
Endo Sulfate	8080	12.5	ND	ND
Heptachlor	8080	12.5	ND	ND
Heptachlor epoxide	8080	12.5	ND	ND
Lindane	8080	12.5	ND	ND
Methoxychlor	8080	12.5	ND	ND
Toxaphene	8080	125.0	ND	ND
		UG/KG	UG/KG	UG/KG
PCBs (4)	8080	50.0	ND	ND
		MG/KG	MG/KG	MG/KG
TRPH	418.1/9071	25.0	ND	ND

(1) Inductively Coupled Argon Plasma Emission Spectroscopy.
(2) Atomic Absorption Spectrophotometry.
(3) Cold-Vapor Atomic Absorption Spectrophotometry (Reported in mg/kg, wet).
(4) Increased detection limit due to matrix interferences.

SANTA BARBARA HARBOR
NAVIGATION CHANNELS SEDIMENT CHEMISTRY ANALYSIS
11/12 August 1992

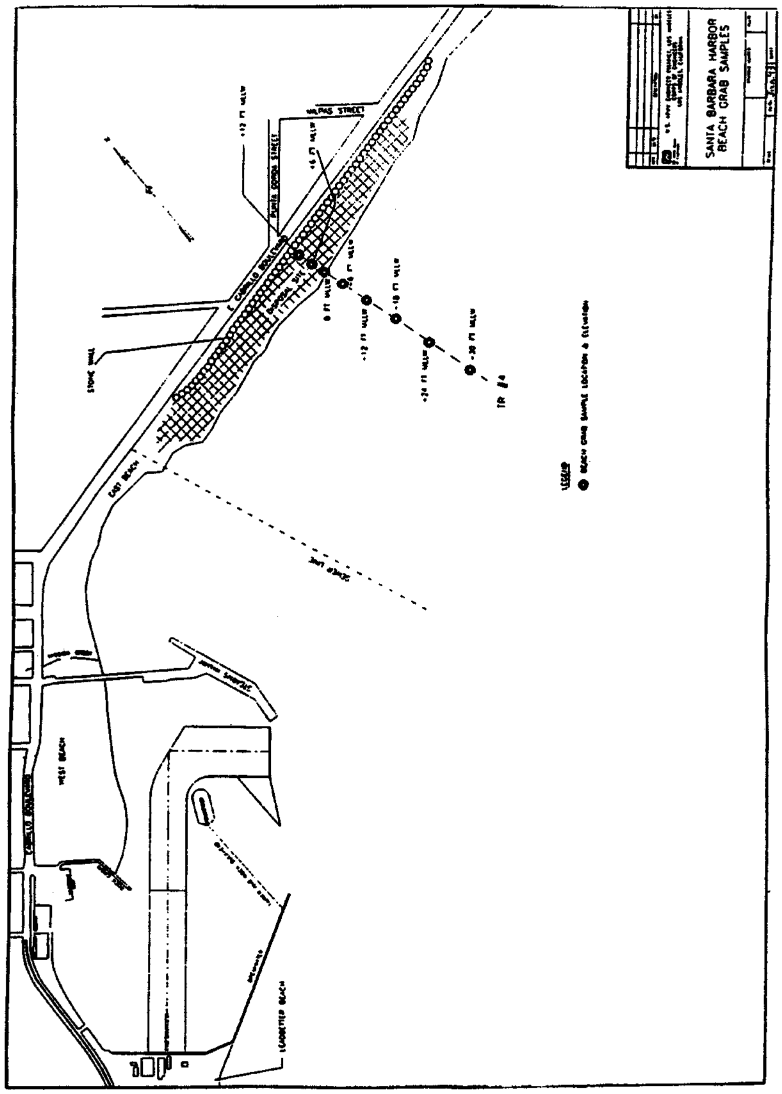
Parameter	EPA Method	Reporting Limits	Sample RW92-3 (-30' MLLW) Results	Sample RW92-4 (-30' MLLW) Results
METALS:		MG/KG	MG/KG	MG/KG
Arsenic (As)	(2)	0.30	1.60	3.20
Cadmium (Cd)	(1)	0.20	ND	ND
Chromium (Cr)	(1)	0.50	5.10	12.00
Copper (Cu)	(1)	0.60	17.00	8.60
Lead (Pb)	(1)	2.00	ND	3.00
Mercury (Hg)	(3)	0.05	ND	ND
Nickel (Ni)	(1)	1.00	4.00	13.00
Selenium (Se)	(2)	0.30	ND	ND
Silver (Ag)	(1)	1.00	ND	ND
Zinc (Zn)	(1)	2.00	8.00	28.00
PESTICIDES:(4)		UG/KG	UG/KG	UG/KG
Aldrin	8080	12.5	ND	ND
BHC-A	8080	12.5	ND	ND
BHC-B	8080	12.5	ND	ND
BHC-D	8080	12.5	ND	ND
Chlordane	8080	25.0	ND	ND
DDD	8080	12.5	ND	ND
DDE	8080	12.5	ND	ND
DDT	8080	12.5	ND	ND
Dieldrin	8080	12.5	ND	ND
Endrin	8080	12.5	ND	ND
Endrin Aldehyde	8080	12.5	ND	ND
Endosulfan I	8080	12.5	ND	ND
Endosulfan II	8080	12.5	ND	ND
Endo Sulfate	8080	12.5	ND	ND
Heptachlor	8080	12.5	ND	ND
Heptachlor epoxide	8080	12.5	ND	ND
Lindane	8080	12.5	ND	ND
Methoxychlor	8080	12.5	ND	ND
Toxaphene	8080	125.0	ND	ND
		UG/KG	UG/KG	UG/KG
PCBs (4)	8080	50.0	ND	ND
		MG/KG	MG/KG	MG/KG
TRPH	418.1/9071	25.0	ND	ND

(1) Inductively Coupled Argon Plasma Emission Spectroscopy.
(2) Atomic Absorption Spectrophotometry.
(3) Cold-Vapor Atomic Absorption Spectrophotometry (Reported in mg/kg, wet).
(4) Increased detection limit due to matrix interferences.

SANTA BARBARA HARBOR
NAVIGATION CHANNELS SEDIMENT CHEMISTRY ANALYSIS
11/12 August 1992

Parameter	EPA Method	Reporting Limits	Sample RW92-6C (-33' MLLW) Results
METALS:		MG/KG	MG/KG
Arsenic (As)	(2)	0.30	5.30
Cadmium (Cd)	(1)	0.20	ND
Chromium (Cr)	(1)	0.50	2.70
Copper (Cu)	(1)	0.60	3.20
Lead (Pb)	(1)	2.00	ND
Mercury (Hg)	(3)	0.05	ND
Nickel (Ni)	(1)	1.00	3.00
Selenium (Se)	(2)	0.30	ND
Silver (Ag)	(1)	1.00	ND
Zinc (Zn)	(1)	2.00	13.00
PESTICIDES:(4)		UG/KG	UG/KG
Aldrin	8080	12.5	ND
BHC-A	8080	12.5	ND
BHC-B	8080	12.5	ND
BHC-D	8080	12.5	ND
Chlordane	8080	25.0	ND
DDD	8080	12.5	ND
DDE	8080	12.5	ND
DDT	8080	12.5	ND
Dieldrin	8080	12.5	ND
Endrin	8080	12.5	ND
Endrin Aldehyde	8080	12.5	ND
Endosulfan I	8080	12.5	ND
Endosulfan II	8080	12.5	ND
Endo Sulfate	8080	12.5	ND
Heptachlor	8080	12.5	ND
Heptachlor epoxide	8080	12.5	ND
Lindane -	8080	12.5	ND
Methoxychlor	8080	12.5	ND
Toxaphene	8080	125.0	ND
		UG/KG	UG/KG
PCBs (4)	8080	50.0	ND
		MG/KG	MG/KG
TRPH	418.1/9071	25.0	ND

(1) Inductively Coupled Argon Plasma Emission Spectroscopy.
(2) Atomic Absorption Spectrophotometry.
(3) Cold-Vapor Atomic Absorption Spectrophotometry (Reported in mg/kg, wet).
(4) Increased detection limit due to matrix interferences.


SANTA BARBARA HARBOR
BEACH GRAB SAMPLES
LEGEND
BEACH GRAB SAMPLE LOCATION & ELEVATION
MILPAS STREET
PUNTA GORDA STREET
STONE WALL
EAST BEACH
WEST BEACH
SEWER LINE
LEADBETTER BEACH

SANTA BARBARA HARBOR
DISPOSAL SITE SEDIMENT CHEMISTRY ANALYSIS
(EAST BEACH AND NEARSHORE)
28 January 1993

Parameter	EPA Method	Reporting Limits	Sample #TR4 +12 to -12 MLLW Results	Sample #TR4 -18 to -30 MLLW Results
METALS:		MG/KG	MG/KG	MG/KG
Arsenic (As)	7060	0.7	5.85	ND
Cadmium (Cd)	6010	1.0	ND	ND
Chromium (Cr)	6010	10.0	15.30	27.12
Copper (Cu)	6010	1.0	2.62	7.82
Lead (Pb)	7421	0.5	1.62	4.61
Mercury (Hg)	7471	10.0	ND	ND
Nickel (Ni)	6010	5.0	7.93	15.24
Selenium (Se)	7740	0.5	ND	ND
Silver (Ag)	6010	1.0	ND	ND
Zinc (Zn)	6010	5.0	12.59	36.21
PESTICIDES:		UG/KG	UG/KG	UG/KG
Aldrin	8080	1.2	ND	ND
BHC-A	8080	0.3	ND	ND
BHC-B	8080	0.3	ND	ND
BHC-D	8080	0.3	ND	ND
DDD	8080	3.0	ND	ND
DDE	8080	3.0	ND	ND
DDT	8080	3.0	ND	ND
Dieldrin	8080	3.0	ND	ND
Endrin	8080	3.0	ND	ND
Endrin Aldehyde	8080	3.0	ND	ND
Endosulfan I	8080	3.0	ND	ND
Endosulfan II	8080	3.0	ND	ND
Endo Sulfate	8080	3.0	ND	ND
Heptachlor	8080	3.0	ND	ND
Heptachlor epoxide	8080	3.0	ND	ND
Lindane	8080	1.2	ND	ND
Methoxychlor	8080	5.0	ND	ND
Toxaphene	8080	60.0	ND	ND
POLYCHORLINATED BIPHENYLS:		UG/KG	UG/KG	UG/KG
Arochlor 1016	8080	100.0	ND	ND
Arochlor 1221	8080	500.0	ND	ND
Arochlor 1232	8080	200.0	ND	ND
Arochlor 1242	8080	100.0	ND	ND
Arochlor 1248	8080	100.0	ND	ND
Arochlor 1254	8080	50.0	ND	ND
Arochlor 1260	8080	50.0	ND	ND
		MG/KG	MG/KG	MG/KG
TRPH	418.1	25.0	ND	289.00

APPENDIX B

SANTA BARBARA ENVIRONMENTAL MONITORING PROGRAM

Methods for Snowy Plover Survey

Methods for Grunion Survey

1993 MONITORING PROGRAM
COE SANTA BARBARA HARBOR DREDGING PROJECT

The purpose of the Monitoring Program at Santa Barbara is to determine what effect, if any, beach disposal of dredged material has on grunion spawning success and the local population of snowy plover.

Other than the loss of a limited number of egg masses which are in the direct path of dredged material deposition, little is known of the effect of dredging on the California grunion. Presence of a significant number of viable egg masses on the disposal site during dredging events will be evidence to support the hypothesis that disposal of beach compatible dredged material has no effect on the success of succeeding grunion spawning events.

From February through May, on a morning following the last expected grunion run of each 3-4 day cycle, 5-10 intertidal trench transects perpendicular to the water line at each of four sites will be surveyed. The time of data collection will vary to insure that transects are surveyed at consistent tidal heights. Two of the sites will be in the dredged material disposal area and two will be beyond the disposal area. For each transect, data will be recorded regarding beach profile, sediment characteristics, temperature of sand at depth of egg masses, and location and size of grunion egg masses. Sediment will be searched for grunion eggs by turning the sand with a hoe to approximately 15 cm deep and 10 cm wide along each transect. Samples of grunion eggs will be removed from each site with trowels and placed in specimen jars. Samples of sediment will be taken at each site with punch trowels and placed in sample bags. Initial description of sediment will be made on site including color, odor, etc.

The sample bags and specimen jars will be transported for further analysis in the laboratory. Number of eggs per egg mass will be determined for a representative sample of egg masses from each collection date. Developmental stages of eggs will be assessed during incubation period. Viability of egg masses will be determined by percentage of eggs hatching with agitation after 12 days of incubation. Sediment will be tested in the laboratory for grain size, pH and other pertinent characteristics.

Previous years' monitoring programs have been limited to nocturnal monitoring of the beaches adjacent to Santa Barbara Harbor for the presence of grunion runs on dates of expected grunion runs as predicted by the California Department of Fish and Game (see description of 1992 methods). During previous years if grunion were observed on East or West Beaches, dredging operations would cease until after the spawning season. Although this procedure prevented direct burial of egg masses, it did not

result in data that served to improve our understanding of the possible indirect effects of dredging, the long-term effects of dredged material disposal, or the reproductive biology of the grunion. Although the nocturnal monitoring procedure will be repeated in 1993, its results will be studied in conjunction with the results of daylight surveys of the beach for egg masses. With both sets of data, it can be determined if the presence of grunion on the beach is an indicator of spawning effort.

The 1992 monitoring program resulted in conclusive evidence that the snowy plover was not nesting on East or West Beach. A population of the species was located on East Beach but no evidence of nesting was observed. The snowy plovers in this flock ranged from 28-32 individuals and were observed on every visit to East Beach in February and March of 1992. The current year's monitoring program will continue to survey the beach for snowy plover. The number of individuals, the extent of breeding plumage, and evidence of nesting will be recorded. Observations will be accomplished with the realization that this species was Federally listed as Threatened in March 1993. COE survey teams will <u>not</u> impact this species during survey periods; i.e., census taking and observations will be done from a safe distance so as to not force the bird to move from its roosting sites.

These data will provide valuable information regarding the reproductive biology of the California grunion and will reinforce the data collected last year on the snowy plover. Moreover, the results will help COE personnel assess the effectiveness of nocturnal observation for grunion, the effect of disposal of dredged material on beach characteristics, the duration of that effect after dredging ceases, the effect of beach characteristics of grunion spawning, and the effect of dredging on grunion spawning.

METHODS FOR SNOWY PLOVER SURVEY

March - April 1992

Site monitoring for the snowy plover consisted of a walking survey conducted once a day between dawn and dusk. Low-tide conditions were advantageous for counting snowy plovers as the birds were more easily seen when feeding along the debris left by the high tide. However, even at low tide when some birds were feeding, others were settled into depressions in the dry sand above the debris line.

Observers walked along the entire extent of exposed sand at the end of the breakwater, then proceeded to West Beach. Observers walked near the debris line between the water and the high-tide mark where the flatter portions of the beach taper down to the water. This enabled observation of the surfline, the debris at the high tide mark, and the drier beach above high tide level. Observers walked along West Beach, under Stearn's Wharf, and down East Beach to the Sheraton Hotel, and then returned on a path, parallel to the first but 3-5 meters further from the water and above the high-tide mark.

The number of birds in a group was recorded with the sector and time of observation. A map was carefully marked as to the location of the observed birds. Photographs of the plovers were made for identification confirmation and for a record of color. A video tape of their position and behavior was made for reference. Whenever possible, voice description of observed behavior, location and other pertinent information was recorded on the video tape. Other bird species observed during the survey were noted.

For surveys in April, the sandy areas of East Beach were scanned slowly for setting birds which would be in depressions and extremely cryptic. Locations were noted with references such as debris. Once noted, setting birds were approached slowly, pausing frequently to observe the bird.

When time permitted a single dusk observation of the snowy plover population was made to document the nocturnal setting site. Birds were not able to found after dark; therefore, observation began at dusk when there was enough light to locate the group. Sufficient distance was maintained between birds and observers to avoid influencing their choice of setting or foraging areas. Observers then sat on the beach and watched the plovers with binoculars until well after dark. If the birds flew away, the time and cause (if known) was noted and the observers tried to follow the flock until it again landed and reestablished a roosting area.

SUMMARY OF RESULTS

Snowy plovers were observed adjacent to the debris line at East Beach. Primary activities of the snowy plover included foraging and setting. During the observation period there was no indication the snowy plovers were attempting to nest or breed on East Beach. Human activity on the beaches at Santa Barbara frequently interrupted the plover's activities. Flocks numbered from 13 to 21 birds congregating and setting adjacent to the debris line. The snowy plovers were observed to be present at East Beach during the month of March and the first two weeks of April. Observations indicated the absence of the plover at Santa Barbara during the last two weeks of April. A full report of the Santa Barbara Snowy Plover Monitoring Program will be generated following the 1993 monitoring season.

METHODS FOR GRUNION SURVEY

March - April 1992

Beach surveys were conducted during the hours of expected spawning runs in March and April, 1992 at East and West Beaches in Santa Barbara, California. Surveys were conducted by a team of at least two observers, and consisted of walking the length of East Beach. Climatic conditions and physical characteristics of the water and the beach were recorded including wave height, turbidity, water temperature, air temperature, precipitation, beach slope, and berm height. If grunion were observed, each person tossed a circular quadrat on the wet sand where the grunion were spawning and recorded the number of fish within the boundaries of the quadrat. The quadrat was repeatedly tossed and fish counted as the team walked down the beach until the end of the expected time of grunion run. A map was marked with the exact location and extent of the observed grunion run. On nights that there were few grunion on the beach, counts were made of the total number of grunion observed. Use of flashlights was kept to a minimum to avoid disturbance of the fish.

SUMMARY OF RESULTS

Grunion were observed on the beach on 7 of the 15 nights of observations, and the largest spawning run occurred on 20 April 1992. Runs occurred on beach slopes ranging from a 10:1 slope to a 6:1 slope and beach conditions ranging from a smooth face to berms measuring up to 1 meter high. Runs were observed in the vicinity of Stearns Wharf (an area of greater light intensity) on every night of the 7 observed runs. Other areas included the beaches between Mission Creek and Milipas Street, with runs occurring on 5 nights of the 7 observed runs. Turbidity levels within the intertidal and nearshore zones were low during 6 of the 7 observed runs. One run occurred through an area of elevated turbidity levels caused by a high discharge rate from Mission Creek as a result of a rain storm. A full report of the Santa Barbara Grunion Monitoring Program will generated following the 1993 monitoring season.

APPENDIX C

CONTINGENCY PLAN FOR DREDGING AND DISPOSAL

DURING GRUNION SEASON

May 21, 1993

Office of the Chief
Operations Branch

Mr. Jim Raives
California Coastal Commission
45 Fremont, Suite 2000
San Francisco, California 94105

Dear Mr. Raives:

This letter constitutes supplemental information for the Corps of Engineers (COE) Consistency Determination (CD) of April 12, 1993 for the proposed three-year maintenance dredging of the navigation channel at Santa Barbara Harbor, 1994-1996. On May 17 you requested that this information be forwarded to the Commission in order for processing procedures to continue.

You specifically asked what the COE would do if it were determined during the next year or two from the on-going grunion research that beach disposal of dredged material negatively impacts this fish during the month of April. Mr. Mark Durham of the Operations Branch suggested reintroducing the contingency plan that was part of the FY 1993 Santa Barbara Harbor proposal. However, this plan would be activated only with conclusive evidence of negative impacts. You agreed that this would be acceptable. This plan would be incorporated into the final Environmental Assessment (EA) report for the upcoming dredging cycles (1994-96), as follows:

CONTINGENCY PLAN: The contingency plan shall only be implemented between April 1 and April 30, when the COE and resource agencies have determined that beach disposal of dredged material has a negative impact on grunion (Leuresthes tenuis), as determined by the COE's on-going research. Additionally, the COE (and its contractor) would demonstrate that they have made every effort to comply with the conditions and environmental commitments as outlined in the EA between October 1 and through April 1, and when the COE can demonstrate that storm events caused significant infilling of the harbor between February 15 and April 15. Environmental commitments pertaining to the contingency plan include the following (section II.F.1-4 of "Proposed Action" of the EA):

1. The Corps of Engineers (COE) would orally contact the resource agencies with staff subject matter expertise (U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, and the Central Coast Region of the California Regional Water Quality Control Board) prior to initiation of post-April 1 disposal.

Agencies would be requested to attend an on-site meeting, prior to onset of dredging, to assist determining the optimum location for the zone of disposal operations. Optimal location, selected by the Corps' Project Manager, would be based on several criteria including, but not limited to: (1) area of least impact to critical species; (2) areas of recent similar impact; (3) areas requiring beach nourishment; and (4) feasibility of contractor to conduct disposal operations in the area.

2. A letter shall be sent to these agencies by the Corps documenting the conditions leading to the necessity of disposal between April 1 and April 30, i.e., identifying what actions the COE took to insure that dredging would be completed by April 1, and identifying what natural circumstances occurred that resulted in significant shoaling or infilling of the harbor (dates, type, location, and physical manifestation of the event shall be detailed). This letter shall further document the oral communications among all agencies and describe the location of the zone of disposal operations.

3. The Corps' contractor shall realign the disposal pipe so that surf-zone disposal, rather than beach disposal shall be implemented within a 500-foot-wide zone of operation on East Beach. Both outfall pipes shall be perpendicular to the shore and located below Mean Higher High Water.

4. The zone of operation shall be fixed and flagged prior to the first day of post-April 1 dredging; no impacts from heavy equipment (i.e., paths of transit), pipes, or dredged material shall extend beyond this zone. Only one zone of operations per dredging episode shall be allowed.

5. When mounding of dredged materials occurs in front of the discharge point of the disposal pipe, extensions shall be added onto the pipes so as to bring the outfall closer to the ocean. Should excessive mounding occur and lateral movement of the pipes be required, such movement of pipes would not result in pipes, heavy equipment (for moving pipes), or dredged material occurring outside of the fixed 500-foot-wide zone of disposal operations.

6. Slotted or perforated pipes shall be used when additional pipe must be added to extend the pipeline closer to the ocean in order to discourage erosion of sand mounds supporting the disposal pipeline.

7. No more than 150,000 cubic yards of material shall be disposed in the surf zone between April 1 and April 30. (No more than 600,000 cubic yards of material shall be disposed annually).

8. Double workshift dredging and disposal operations shall be performed so as to minimize the temporal impacts. Triple workshift, or 24 hours/day, dredging shall be permitted. (The contractor would be required to obtain the necessary permits by local noise ordinances--see Environmental Effects, Air and Noise Quality).

I trust that with this additional information, the California Coastal Commission can continue processing the COE's Consistency Determination for maintenance dredging in Santa Barbara Harbor. If you need more assistance or information, please call Mr. Mark Durham at (213) 894-6423.

Sincerely,

Carl F. Enson, P.E.
Chief, Construction-
Operations Division

Copies Furnished:
U. S. Fish & Wildlife Service, Ventura
National Marine Fisheries Service, Long Beach
CA Department of Fish & Game, Long Beach
City of Santa Barbara, Waterfront Office
CA Regional Water Quality Control Board, SLO
CA Coastal Commission
CESPL-PD

APPENDIX D

AVIFAUNA OF EAST BEACH AND SANTA BARBARA HARBOR

Operations Branch Site Monitoring Program
March-April 1992 and 1993

Scientific Name	Common Name
Aechmophorus occidentalis	western grebe
Pelecanus occidentalis	brown pelican
Phalacrocorax auritus	double-crested comorant
Ardea herodias	great blue heron
Egretta thula	snowy egret
Mergus serrator	red-breasted merganser
Fulica americana	American coot
Rynchops nigra	black skimmer
Charadrius alexandrinus	snowy plover
Charadrius vociferus	killdeer
Pluvialis squatarola	black-bellied plover
Numenius phaeopus	whimbrel
Cataptrophorus semipalmatus	willet
Calidris minutilla	least sandpiper
Limosa fedoa	marbled godwit
Crocethia alba	sanderling
Larus occidentalis	western gull
Larus argentatus	herring gull
Larus californicus	California gull
Larus delawarensis	ring-billed gull
Larus philadelphia	Bonaparte's gull
Larus heermanni	Heermann's gull
Sterna maxima	royal tern
Sterna forsteri	Forster's tern
Uria aalge	common murre
Sayornis nigricans	black phoebe
Corvus brachyrhynchos	common crow
Dendroica coronata	yellow-rumped warbler
Passer domesticus	house sparrow

APPENDIX E

CLEAN WATER ACT 404(b)(1) ANALYSIS:

EVALUATION OF EFFECTS OF THE DISCHARGE OF DREDGE AND FILL MATERIAL INTO THE WATERS OF THE UNITED STATES

Santa Barbara Harbor Maintenance Dredging
Santa Barbara County, California
April 1993

I. INTRODUCTION. The following evaluation is provided in accordance with Section 404 (b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into the waters of the U. S. As such, it is not meant to stand alone and relies heavily upon information provided in the environmental document to which it is attached. Use of the "Documentation" category is for expansion of discussions only when necessary or for references and citations.

II. PROJECT DESCRIPTION. (Referenced in the DEA and described briefly as follows:)

A. Location: The project location is described on page 2 of the attached environmental document.

Brief Summary: The project site is Santa Barbara Harbor and East Beach, Santa Barbara County, California.

B. General Description: The project is generally described on pages 3-7 of the attached environmental document.

Brief Summary: In order to maintain channel configurations and assure safe navigation within the harbor channels, the proposed maintenance dredging project involves the removal of no more than 600,000 cubic yards of littoral drift material deposited in the entrance and navigational channels of Santa Barbara Harbor.

C. Authority and Purpose: The project authority and purpose is documented on page 1 of the environmental document.

Brief Summary: Maintenance dredging of Santa Barbara Harbor is authorized by the River and Harbor Act approved March 2, 1945. A modification to the Act (P.L. 91-611, Sec. 114) on December 31, 1970 provides that the dredging and maintenance of the Santa Barbara Harbor will be the responsibility of the United States.

The purposes of the proposed project are to
(1) maintain the entrance and navigation channels

(2) assure the continued safe navigation within the harbor
(3) minimize the risk of hazardous shoaling with entrance and navigation channels by creating a sand trap in the channels and by removing material from the north flank of the navigation channel (West Beach)
(4) avoid intrusion of dredging operations into the critical seasons of vulnerable species
(5) provide beach nourishment material for severely eroded downcoast beaches.

D. General Description of Dredged or Fill Material: A description of the dredged or fill material is on page 2 of the attached environmental document.

Brief Summary: The composite average of samples of sediment to be dredged was sand with less than 10% fines (retained on the No. 200 screen) and no characteristics of the cores sampled indicated contamination.

E. Description of the Proposed Discharge Site: The proposed discharge sites are described on pages 4-5 of the attached environmental document.

Brief Summary: Dredged material will be discharged approximately 2300 to 6300 feet downcoast of the harbor onto East Beach which is semi-protected sandy beach.

F. Description of Disposal Method: The disposal method is described on page 4-5 of the attached environmental document.

Brief Summary: An electric or diesel dredge would be used to remove material from the channels. A pipeline would be placed along the supratidal portions of West Beach, run under Stearn's Wharf, and along East Beach where the dredged material would be discharged.

III. FACTUAL DETERMINATIONS.

A. Disposal Site Physical Substrate Determinations:

1. Substrate Elevation and Slope:

Impact: ____N/A __X__INSIGNIF. ____SIGNIF. __18__PAGE #

2. Sediment Type:

Impact: ____N/A __X__INSIGNIF. ____SIGNIF. __2__PAGE #

3. Dredged/Fill Material Movement:

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __23__PAGE #

There should be little movement of erosion of dredged material since disposal will be above MHHW between September 15 and March 1. The deposited material will be graded whenever significant mounding occurs to return beach profiles to normal. However, surf-zone disposal below MHHW, will use normal littoral processes to move sediment around and nourish downcoast beaches. This disposal method will be used between March 1 and April 30.

4. Physical Effects on Benthos (burial, changes in sediment type, composition, etc.):

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __19__PAGE #

5. Actions taken to Minimize Impacts

Needed?: _____YES __X__NO

If Needed, Taken:

__X__N/A _____YES _____NO

B. Effect on Water Circulation, Fluctuation, and Salinity Determinations:

1. Effect on Water. The following potential impacts were considered:

a. Salinity	__X__N/A	_____INSIGNIF.	_____SIGNIF.
b. Water Chemistry (pH, etc.)	_____N/A	__X__INSIGNIF.	_____SIGNIF.
c. Clarity	_____N/A	__X__INSIGNIF.	_____SIGNIF.
d. Color	_____N/A	__X__INSIGNIF.	_____SIGNIF.
e. Odor	_____N/A	__X__INSIGNIF.	_____SIGNIF.
f. Taste	__X__N/A	_____INSIGNIF.	_____SIGNIF.
g. Dissolved gas levels	_____N/A	__X__INSIGNIF.	_____SIGNIF.
h. Nutrients	_____N/A	__X__INSIGNIF.	_____SIGNIF.
i. Eutrophication	___N/A	__X__INSIGNIF.	_____SIGNIF.
j. Others	__X__N/A	_____INSIGNIF.	_____SIGNIF.

The proposed maintenance dredging will not adversely affect the salinity or quality of the receiving waters. Odors from dredged material are common and dissipate rapidly. Odor sources range from decaying organic materials to small isolated pockets of harbor pollutants. Dredged material is often black or brown in color which results from organic material. This color usually bleaches out by the sun within one day. See Water Quality on page 23 for more information.

2. Effect on Current Patterns and Circulation. The potential of discharge or fill on the following conditions were evaluated:

a. Current Pattern and Flow
_____N/A__X__INSIGNIF.____SIGNIF.

b. Velocity
__X__N/A_____INSIGNIF.____SIGNIF.

c. Stratification
__X__N/A_____INSIGNIF.____SIGNIF.

d. Hydrology Regime
__X__N/A_____INSIGNIF.____SIGNIF.

3. Effect on Normal Water Level Fluctuations. The potential of discharge of fill on the following were evaluated:

a. Tide _____N/A __X__INSIGNIF. _____SIGNIF.

b. River Stage __X__N/A _____INSIGNIF. _____SIGNIF.

4. Action Taken to Minimize Effects:

Selected methods minimize impacts.

C. <u>Suspended Particulate/Turbidity Determinations at the Disposal Site:</u>

1. Expected Change in Suspended Particulate and Turbidity levels in Vicinity of Disposal Site:

Impact: _____N/A __X__INSIGNIF. _____SIGNIF. __23__PAGE #

2. Effects (degree and duration) on Chemical and Physical Properties of the Water Column:

a. Light Penetration
_____N/A __X__INSIGNIF._____SIGNIF. __23__PAGE #

b. Dissolved Oxygen
_____N/A __x__INSIGNIF._____SIGNIF. __23__PAGE #

c. Toxic Metals & Organic
__X__N/A _____INSIGNIF._____SIGNIF.

d. Pathogen
__X__N/A _____INSIGNIF._____SIGNIF.

e. Esthetics
_____N/A __X__INSIGNIF._____SIGNIF. __23__PAGE #

3. Effects of Turbidity on Biota: The following effects of turbidity on biota were evaluated:

a. Primary Productivity
_____N/A __X__INSIGNIF._____SIGNIF. __23__PAGE #

b. Suspension/Filter Feeders
_____N/A __X__INSIGNIF._____SIGNIF. __20__PAGE #

c. Sight feeders
_____N/A __X__INSIGNIF._____SIGNIF. __20__PAGE #

D. Contaminant Determination:

The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

1. Physical characteristics

2. Results from previous testing of the material or similar material in the vicinity of the project

An evaluation of the appropriate information above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to be constraints. The material meets the testing exclusion criteria.

YES__X__NO_____

Impact: _____N/A__X__INSIGNIF._____SIGNIF.

E. Effect on Aquatic Ecosystem and Organism Determinations: The Following ecosystem effects were evaluated:

1. On Plankton
   _____N/A__X__INSIGNIF._____SIGNIF.__19__PAGE#

2. On Benthos
   _____N/A__X__INSIGNIF._____SIGNIF.__20__PAGE#

3. On Nekton
   _____N/A__X__INSIGNIF._____SIGNIF.__20__PAGE#

4. Food Web
   _____N/A__X__INSIGNIF._____SIGNIF.__18__PAGE#

5. Sensitive Habitats:

   a. Sanctuaries, refuges
      __X__N/A_____INSIGNIF._____SIGNIF.

   b. Wetlands
      __X__N/A_____INSIGNIF._____SIGNIF.

   c. Mudflats
      __X__N/A_____INSIGNIF._____SIGNIF.

   d. Eelgrass beds
      __X__N/A_____INSIGNIF._____SIGNIF.

   e. Riffle and Pool Complexes
      __X__N/A_____INSIGNIF._____SIGNIF.

6. Threatened & Endangered Species
   _____N/A__X__INSIGNIF._____SIGNIF.__21__PAGE#

7. Other Wildlife (grunion)
_____N/A__X__INSIGNIF._____SIGNIF._21_PAGE#

F. Proposed Disposal Site Determinations: Is the mixing zone for each disposal site confined to the smallest practicable zone?

__X__YES _____NO

G. Determination of Cumulative Effects of Disposal or Fill on the Aquatic Ecosystem:

Impacts: _____N/A__X__INSIGNIF._____SIGNIF.

No significant cumulative adverse effects on the aquatic ecosystem are expected.

H. Determination of Indirect Effects of Disposal or Fill on the Aquatic Ecosystem:

Impacts: _____N/A__X__INSIGNIF._____SIGNIF.

IV. FINDING OF COMPLIANCE.

A review of the proposed project indicates that:

a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.

__X__YES _____NO

b. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary.

__X__YES _____NO

c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.

__X__YES ____NO

d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

__X__YES ____NO

On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material (specify which) is (select one):

__X__ (1) Specified as complying with the requirements of these guidelines; or,

_____ (2) Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem;or,

_____ (3) Specified as failing to comply with the requirements of these guidelines.

Prepared by: Mark Durham
Name

Ecologist
Position

Date: March 29, 1993

APPENDIX F

CORRESPONDENCE AND RESPONSE TO COMMENTS

U.S. FISH AND WILDLIFE SERVICE (USFWS)

The USFWS had no concerns with the draft feasibility report.

OFFICE OF HISTORIC PRESERVATION

Comment: The State Historic Preservation Officer (SHPO) recommended consultation with the Archaeological Information Center at the University of California at Santa Barbara, and the California State Lands Commission, to identify potential cultural resources in the project area.

Response: These agencies, and SHPO, have been consulted regarding the current Corps of Engineers (Corps) dredging program. The SHPO concurred with the Corps' determination that the Corps' dredging project will have no effect on National Register listed or eligible properties. Dredging of Santa Barbara Harbor, by the Corps, has been approved through April 30, 1996. When the City of Santa Barbara assumes responsibility for harbor maintenance, the City will coordinate with appropriate agencies prior to construction, to ascertain potential effects to cultural resources.

SANTA BARBARA COUNTY AIR POLLUTION CONTROL DISTRICT (APCD)

In a letter to the Corps dated February 1, 1993, the APCD provided an explanation as to why an electric-powered dredge, rather than a diesel-powered dredge, would potentially be required for maintenance dredging of Santa Barbara Harbor. The APCD also outlined general permitting requirements for diesel-powered dredges at other locations in Santa Barbara County.

MICHAEL HUFFINGTON, HOUSE OF REPRESENTATIVES

Representative Huffington expressed strong support for the proposed plan.

CALIFORNIA DEPARTMENT OF FISH AND GAME (CDFG)

The CDFG has no objection to implementation of the recommended plan.

CALIFORNIA STATE LANDS COMMISSION (SLC)

Comment: Dredging operations proposed to be conducted in the harbor will require SLC authorization.

Response: As stated in the draft EA (Section 7.0), the City of Santa Barbara shall obtain all necessary licenses and permits to operate the dredge, and to dispose material. Operations shall

be consistent with all applicable Federal, State, and local laws and regulations.

NATIONAL MARINE FISHERIES SERVICE (NMFS)

Comment: The Draft EA erroneously states that, "The gray whale has recently been delisted by the NMFS."

Response: The document has been revised to reflect the following information:

> On January 7, 1993, the National Marine Fisheries Service determined that the eastern North Pacific stock of the gray whale should be removed from the List of Endangered and Threatened Species under the Endangered Species Act. The U.S. Fish and Wildlife Service (USFWS) has the authority and responsibility to actually remove the stock from the List. At this time, the USFWS has not delisted the eastern North Pacific stock of the gray whale. This species is also Federally protected under the Marine Mammals Protection Act.

Comment: The NMFS further recommends that the proposal to complete a grunion monitoring program for FY 1994-1996 be supplemented with the inclusion of beach profiles during March - May to determine the rate of beach buildup and its effect on grunion hatching success. Should funding be unavailable for this monitoring program, the NMFS recommends that the contingency plan in effect for prior Santa Barbara Harbor dredging and disposal projects be implemented.

Response: The environmental monitoring program, included in Appendix B of this EA, is being updated to reflect recent amendments to the program. When finalized, the FY 1994-1996 Maintenance Dredging EA would contain the current methods and responsibilities of the environmental monitoring program. This document is expected to be available to the public by the end of July 1993. In the amended program, beach profiles shall be conducted from March through August, as long as grunion monitoring is required.

The dredging contingency plan has also been amended (see Appendix C). The plan shall only be implemented between April 1 and April 30 when the City, the Corps, and resource agencies have determined, from the on-going grunion research, that beach disposal of dredged material has a negative impact on grunion. Additionally, the City would demonstrate that they have made every effort to comply with the conditions and environmental commitments as outlined in the current EA, and that storm events caused significant infilling of the harbor between February 15 and April 15. The City would orally contact the appropriate permitting and resource agencies prior to initiation of post April 1 disposal. Agencies would be requested to attend an on-site meeting, prior to the onset of dredging. The City would also notify these agencies in writing, documenting conditions leading to the necessity of disposal between April 1 and April 30.

These changes have been fully coordinated with resource agencies during the review process for the Final FY 1994-1996 Maintenance Dredging EA. The City shall refer to that document as the final authority for the environmental monitoring program, and the dredging contingency plan. Additional changes to either program shall be coordinated with the Corps of Engineers and other appropriate agencies.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ECOLOGICAL SERVICES
Ventura Field Office
2140 Eastman Avenue, Suite 100
Ventura, California 93003

May 26, 1993

Jarod Miller
Coastal Resources Branch, Los Angeles District
U.S. Army Corps of Engineers
Post Office Box 2711
Los Angeles, California 90053-2325

Subject: Santa Barbara Harbor Feasibility Study

Dear Mr. Miller:

The U.S. Fish and Wildlife Service (Service) has completed review of the draft feasibility report on Santa Barbara Harbor dated May 7, 1991, and received in this office May 10, 1993. The report includes a proposed recommended plan for improving a hazardous shoaling condition in the harbor entrance and the acquisition of a dredge for ownership and operation by the city of Santa Barbara.

The following comments have been prepared under the authority of, and in accordance with, the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e; the Act of March 10, 1934; Ch. 55; 48 Stat. 401) as amended and other authorities mandating Department of the Interior concern for environmental values. It is our understanding that maintenance operations by the city of Santa Barbara will be consistent with current Corps of Engineers practices and comply with all applicable Federal and State laws, regulations, and permit requirements. Therefore, the Service has no concerns with the draft feasibility report.

Please contact Naomi Mitchell of my staff at (805) 644-1766 if you have any further questions.

Sincerely,

For Craig Faanes
Field Supervisor

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 2711
LOS ANGELES, CALIFORNIA 90053-2325

April 1, 1993

REPLY TO
ATTENTION OF
Office of the Chief
Environmental Resources Branch

Mr. Steade Craigo, AIA
Deputy State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Craigo:

The Los Angeles District Corps of Engineers (COE), is proposing to extend the approved maintenance dredging schedule for Santa Barbara Harbor. The current schedule is approved through September, 1993. The COE proposes to continue uninterrupted dredging from October 1, 1993 to April 30, 1996. The extended dredging program will not include the West Beach area that is part of the current channel deepening effort. The current project was approved by your office in a letter dated July 25, 1992 (enclosure). The latest coordination was conducted in consultation with Mr. Hans Kreutzberg of your office, and your project number is COE 920725Z.

Central to this request is the knowledge, as previously presented in the July letter, that there are no National Register listed or eligible properties in the Channel. Additionally, because the Harbor Patrol removes shipwrecks immediately there is no possibility for submerged historic properties. The beach disposal area for the dredged sediments will continue at the East Beach site. Therefore, the COE has determined that the proposed extended maintenance dredging program will not involve National Register listed or eligible properties.

We request that you review the enclosed information. If you agree with this request, we would appreciate your concurrence that continued maintenance dredging through April 30, 1996 will not involve National Register listed or eligible properties. If you have any questions concerning this project or the determination, please contact Mr. Richard Perry, Project Archeologist, at (213) 894-6087.

Sincerely,

Carl F. Enson, P.E.
Chief, Construction-
Operations Division

Enclosure

STATE OF CALIFORNIA — THE RESOURCES AGENCY PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

4 June 1993

Reply to: CoE 930510B

Col. R. L. VanAntwerp, District Engineer
U.S. Army Corps of Engineers
ATTENTION: Robert Joe
P.O. Box 2711
LOS ANGELES CA 90053-2325

SUBJECT: DRAFT FEASIBILITY REPORT ON MAINTAINING THE SANTA BARBARA CHANNEL

Dear Col. VanAntwerp:

Thank you for sending me a copy of the Draft Feasibility report for dredging the Santa Barbara Channel.

The Archaeological Information Center at the University of California, Santa Barbara is the best source for current information about archaeological properties in your project's Area of Potential Effect, or APE. The Information Center will search their records and maps, review the most current version of the National Register of Historic Places and other lists of historic properties, give you a listing of the sites within or near the project area, provide you with recommendations for additional work if needed, and furnish you with a directory of professionally qualified consulting archaeologists if one is needed. You can reach the Information Center by calling (805) 893-2474.

In addition, the California State Lands Commission maintains a computerized inventory of all shipwrecks, sunken vessels, and stranded hulks in California waters. While the inventory is not comprehensive, it is currently the best source of accurate information on beached and submerged historic maritime resources in California waters. Because your undertaking has a potential to affect submerged cultural resources, we recommend you consult the State Lands Commission's submerged cultural resources inventory by calling Goodyear "Kirk" Walker at (916) 322-0530.

Please include a copy of the Information Center's and the State Lands Commission's written response and a map which shows the project area as well as the Area of Potential Effect (36 CFR 800.2). When replying to us, always use the reference number in the upper right corner of this letter.

If you have any questions, please telephone Nicholas Del Cioppo of my staff at (916) 653-9696.

Sincerely,

Stéade R. Craigo, AIA, Deputy
State Historic Preservation Officer

STATE OF CALIFORNIA — THE RESOURCES AGENCY

PETE WILSON, Governor

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO 94296-0001
(916) 653-6624
FAX: (916) 653-9824

May 3, 1993

Mr. Carl F. Enson, P.E.
Chief, Construction - Operations
Division
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles CA 90053-2325

Reply To: COE930405[illegible]Y

Re: Santa Barbara Harbor Maintenance Dredging Through 4/30/96

Dear Mr. Enson:

This will acknowledge receipt of your letter in which you request my concurrence that extending the undertaking noted above through 4/30/96 will not involve historic properties.

I herewith concur in the Corp's determination again with the proviso contained in my July 25, 1992 letter concerning unforeseen discoveries or unanticipated effects.

Your continuing consideration of historic properties in the planning process for this undertaking is appreciated. Please direct any questions or further information to the attention of Hans Kreutzberg.

Sincerely,

for Stanle R. Craig, AIA, Deputy
State Historic Preservation Officer

Santa Barbara County
Air Pollution Control District

February 1, 1993

U.S. Army Corps of Engineers
Los Angeles District
Coastal Engineering Division
Post Office Box 2711
Los Angeles, California 90053-2325

Attention: Jane Fulton Grandon

Re: Santa Barbara Harbor Dredge

Dear Ms. Grandon:

On January 14, 1993, the District received your letter regarding the permit requirements for a diesel powered dredge. You requested a justification as to why an electric powered dredge may be required rather than a comparable diesel powered dredge for routine maintenance dredging of Santa Barbara Harbor.

Based on estimated oxides of nitrogen (NO_x) emissions generated by a hypothetical "controlled" diesel powered dredge specified in your letter (see ATTACHMENT No. 1), it is apparent that this diesel powered dredge would trigger a Best Available Control Technology (BACT) analysis. A BACT analysis is required by our District's Rule 205.C for any diesel (or other type) powered dredge which emits more than 2.5 lb/hr of non-attainment pollutants or their precursors (i.e., NO_x, Reactive organic compounds (ROCs), oxides of sulfur (SO_x), and particulate matter (PM_{10})). If a BACT analysis is triggered, this analysis requires that the emissions from the dredge are controlled according to the following criteria:

> ***"The most effective emission control device, emission limit, or technique which has been achieved in practice for the type of equipment comprising such stationary source."***

In the above, the phrase "equipment comprising such stationary source" refers to (implies) a dredge (either electric, diesel, gasoline, or other powered type).

In accordance with the above BACT criteria, the District finds that electric powered dredges constitute BACT for Santa Barbara Harbor routine maintenance dredging, or any other dredging location where electric power is available, because electric dredges have been used previously. Therefore, an electric powered (or equivalent zero emission) dredge must be utilized to perform routine maintenance dredging of Santa Barbara Harbor unless a diesel (or other) powered dredge emits less than 2.5 lb/hr of all non-attainment pollutants and their precursors (NO_x, ROC, PM_{10}, and SO_x), in which case a BACT analysis is not required.

Your letter also requested information on the requirements for permitting diesel powered dredges. We are transmitting this information only for the purpose of defining what might be required to

permit a diesel powered dredge at other locations in Santa Barbara County (but not necessarily the Santa Barbara Harbor). The specific information you requested, and our responses are as follows:

1. **"....outline the requirements to be met by diesel engines and a diesel engine with catalytic convertor prior to obtaining a permit".**

   Answer: All new diesel powered dredges will require District permits and be subject to Rule 205.C - New Source Review, as well as Rule 333 - Control of Emissions from Reciprocating Internal Combustion Engines (ICEs). Rule 333 prohibits the use of anhydrous ammonia to meet engine emission standards, which may limit the application of Selective Catalytic Reactor (SCR) equipped diesel engines; SCR systems can reduce NO_x emissions from diesel engines. Per Rule 205.C, if NO_x or other non-attainment and precursor emissions exceed 2.5 lb/hr, BACT is triggered. Any pollutant emitted above 5.0 lb/hr will trigger an Air Quality Impact Analysis (AQIA). Emissions above 10.0 lb/hr will trigger pre-construction local ambient air quality monitoring, as well as require that emission offsets (emission reductions) are secured elsewhere in the county.

2. **"...a "ballpark" figure of costs associated with obtaining an air quality permit for this equipment."**

   Answer: This is a difficult number to estimate, since it is dependent on what is triggered by the quantity of emissions generated by the proposed dredge. The District would most likely process this permit on a cost reimbursement basis. This method of permit processing only recovers our costs associated with processing, issuing and enforcing the permit. Based on the hypothetical diesel dredge shown in ATTACHMENT No. 1, a permit for this dredge is estimated to cost approximately $10,000 for District staff effort. Costs would likely be considerably higher if an AQIA and pre-construction monitoring are required.

3. **"...the electric motor (powered dredge) requires no air quality permit....please (verify)."**

   Answer: An electric powered dredge, at any location, would not be subject to any existing District Rules or air quality permit requirements because it generates zero emissions.

4. **"Estimate Emission Offset Costs"**

   Answer: Again, these are difficult to estimate, since the securing of offsets is the responsibility of the permit applicant and not the District. The process of obtaining offsets may involve third parties not related to your project. Your costs may include:

   a. Obtaining District permits for third parties for the emission controls in their equipment. Permits are required to ensure that emission reductions are real and enforceable; and.

   b. Purchasing the emission control device, and/or leasing back the emission reductions provided by the new device.

Recent experience indicates that completing the above tasks can cost up to $25,000/ton for NO_x emission offsets, and lesser $/ton costs for offsetting reactive organic compound (ROC) emissions. The District does not "charge" the applicant these costs.

Note, emission offsets must be secured and in place before the project is permitted to operate. In the case of your hypothetical "controlled" dredge emissions (ATTACHMENT No. 1), emission offsets would not be triggered.

We trust that the above answers will help complete your feasibility study. We appreciate your interest in understanding our District requirements. Many of our requirements may seem onerous, however, these requirements exist because Santa Barbara County does not meet Federal and California ambient air quality standards for ozone and several other pollutants. It is only through implementation of new controls on existing equipment, and application of BACT on new equipment that will eventually bring the county into attainment with existing ambient air quality standards.

If you should have any questions on this letter's contents, feel free to call me at (805) 961-8886.

Sincerely,

Steve Sterner
Air Quality Engineer

[ACOEDRDG.wp5]

ATTACHMENT No. 1

Estimated Diesel Engine Powered Dredge Emissions

Emission Factor[1] (g/BHP-hr)	Uncontrolled Emissions[2] (lb/hr)	BACT Req'rd?(5)	BACT Control Efficiency[3] (% Reduct.)	Net Emissions Rate[4] (lb/hr)	BACT Req'rd?(6)
NO_x: 14.0	42.9	yes	90	4.29	yes
ROC: 1.12	3.43	yes	80	0.69	no
SO_x: 0.931	2.85	yes	93	0.20	no
PM_{10}: 1.00	3.06	yes	80	0.61	no

Notes:

(1) Per EPA AP-42, Section 3.3 - Diesel Engine Emission factors, October 1992.

(2) Based on 1390 total dredge diesel engine BHP. Formula for lb/hr = g/BHP-hr * (lb/454g) * 1390 BHP.

(3) BACT reductions estimated based on achieved in practice results document in SCAQMD BACT Guidance, EPA's BACT Clearinghouse database, and Santa Barbara County Air Pollution Control District experience.

(4) Net lb/hr = uncontrolled lb/hr *

(100 - BACT efficiency)/100%~

(5) Is a BACT review triggered based on uncontrolled emissions (yes/no)?

(6) Is a BACT review still triggered based on BACT controlled emissions? (yes/no).

MICHAEL [illegible]
CALIFORNIA

113 CANNON HOUSE BUILDING
WASHINGTON, DC 20515
202-225-3601

FINANCE AND URBAN AFFAIRS
COMMITTEE ON
SMALL BUSINESS

Congress of the United States
House of Representatives
Washington, DC 20515–0522

May 17, 1993

Colonel R.L. Van Antwerp, USA
District Engineer
Los Angeles District
U.S. Army Corps of Engineers
Los Angeles, CA 90053-2325

Dear Colonel Van Antwerp:

I appreciate the opportunity to comment on the recommendations included in the Army Corps of Engineers Draft Feasibility Report for solving Santa Barbara Harbor's shoaling problem. I would also like to express my strong support for the City of Santa Barbara's objective to proceed with the Army Corps of Engineer's plan to acquire a dredge system for Santa Barbara Harbor. Providing Santa Barbara Harbor with its own means of maintenance dredging will allow the City to be unilaterally responsive to the continual shoaling problem at the Harbor entrance caused by seasonal storms.

Under the current dredging schedule as performed by the federal government, needed dredging can be delayed by federal authorization and appropriations processes. Delays often result from the Congressional funding cycle which is not, as you well know, compatible with the storm seasons on the Pacific Coast. The resulting inability of the City to respond with adequate speed has on several occasions closed the harbor, impeding both commercial uses and federal emergency response times. Through possession of its own dredge, the City will gain the flexibility needed to correct expeditiously the shoaling problem as it occurs.

Given the critical importance of a navigable and safe Harbor to the region's economy, a permanent solution is unquestionably necessary. In addition to sustaining a productive commercial fishing industry -the sixth largest in California - Santa Barbara also provides substantial opportunities for recreational boating with over 850 slips available for City residents and visitors. Losing the economic infusion generated by this maritime presence would be damaging to the City's finances and the area's economy.

For safety reasons as well, it is important that the Harbor possess sufficient means for flexible and immediate dredging. Santa Barbara Harbor provides the Coast Guard with a base of operations to cover the entire area between Santa Barbara and Morro Bay - a stretch of coastline over 100 miles in length. Santa Barbara Harbor is also home to fire fighting and other support vessels for the extensive system of off-shore oil drilling platforms. Additionally, the Harbor is valuable for scientific research reasons, providing a base of operations for vessels operated by the National Oceanic and Atmospheric Administration and Santa Barbara Community College.

Finally, for national economic reasons the Army Corps' recommendation makes good sense. Currently, the annual cost to the federal government for dredging the Harbor is roughly $867,000. The Army Corps of Engineers estimates transferring responsibility for the scheduled maintenance dredging to the City will save the federal government $50 million over the life of this dredge.

Again, I would like to thank the Army Corps of Engineers for providing the opportunity for public comment on the Draft Feasibility Report for Santa Barbara Navigation Improvements. The recommendation for the Corps to acquire for Santa Barbara Harbor a dredge system is a sound approach to a long standing problem. I strongly support the City in its desire to pursue this plan.

Sincerely,

Michael

Michael Huffington
Member of Congress

STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
P.O. BOX 944209
SACRAMENTO, CA 94244-2090

(916) 653-4875

June 4, 1993

Mr. Jared Miller
Santa Barbara Harbor Feasibility Study
Coastal Resources Branch
Los Angeles District
U.S. Army Corps of Engineers
Post Office Box 2711
Los Angeles, California 90053-2325

Dear Mr. Miller:

Department of Fish and Game personnel have reviewed the draft Feasibility Report for the Santa Barbara Harbor. The feasibility report identifies measures which would significantly reduce the historic shoaling problem and provides an analysis of the Federal interest in a City of Santa Barbara plan to take over the responsibility for maintaining the Federal Channel through acquisition of a dredge and associated equipment for operation by the City. The U.S. Army Corps of Engineers has incorporated identified mitigation measures (earlier dredging and advanced maintenance areas) into the current maintenance program for Santa Barbara Harbor.

The Department has reviewed and provided comments regarding the Corp's currently proposed three-year maintenance dredging program, and we have recommended implementation of a proposed grunion monitoring program and inclusion of the existing grunion contingency plan if implementation of the proposed monitoring plan does not occur.

The Department has no objection to implementation of the recommended plan for Federal participation in acquiring a dredge system to allow the City of Santa Barbara to take over the responsibility of maintaining the existing Federal navigation channel. This plan also includes a grunion monitoring program and contingency plan, both of which are acceptable to the Department.

Should you have any questions please contact Mr. Richard Nitsos, Environmental Services Division, Department of Fish and Game, 330 Golden Shore, Suite 50, Long Beach, California 90802, telephone (310) 590-5174.

Sincerely,

John L. Turner, Chief
Environmental Services Division

cc: Mr. Richard Nitsos
Department of Fish and Game
Long Beach, California

STATE OF CALIFORNIA

PETE WILSON, *Governor*

STATE LANDS COMMISSION

LEO T. McCARTHY, *Lieutenant Governor*
GRAY DAVIS, *Controller*
THOMAS W. HAYES, *Director of Finance*

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, CA 95814

CHARLES WARREN
Executive Officer

June 15, 1993

File Ref.: SD 93-05-14.1
PRC 6620
W 24868

Jared Miller
Santa Barbara Harbor Feasibility Study
Coastal Resources Branch
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles CA 90053-2325

Dear Mr. Miller:

SUBJECT: Draft Feasibility Report/Environmental Assessment (EA), Santa Barbara Harbor, Santa Barbara County

Staff of the State Lands Commission (SLC) has reviewed the subject document. Based on this review, we offer the following comments.

Santa Barbara Harbor is located within lands which have been legislatively granted to the City of Santa Barbara pursuant to Chapter 78, Statutes of 1925, and as amended, with minerals reserved to the State. As such, any dredging operations proposed to be conducted in the harbor will require SLC authorization.

A review of our files indicates an existing dredging permit (PRC 6620.9) to the City of Santa Barbara to conduct harbor maintenance dredging. SLC staff should be advised of any future dredging proposed.

Thank you for the opportunity to comment. If you have any questions, please contact Linda Martinez at (916) 322-6375.

Sincerely,

Mary Griggs

MARY GRIGGS
Environmental Review Section
Division of Environmental
Planning and Management

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

June 3, 1993 F/SWO21:RSH

Colonel R.L. VanAntwerp
District Engineer
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053-2325

Dear Colonel VanAntwerp:

Please accept the following comments relative to the Draft Environmental Assessment for the Santa Barbara Harbor maintenance dredging project.

I recommend that the proposal to complete a grunion monitoring program for FY 1994, 1995, and 1996 be supplemented with the inclusion of beach profiles during March through May to determine the rate of beach buildup and its effect on grunion hatching success. Should funding be unavailable for this monitoring program, I recommend that the contingency plan in effect for prior Santa Barbara Harbor dredging and disposal projects be implemented.

Should you have any questions, please contact Mr. Robert Hoffman at (310) 980-4043.

Sincerely,

for Gary Matlock, Ph.D.
Acting Regional Director

cc:
USFWS, Ventura
CDFG, Long Beach (Richard Nitsos)
EPA, San Francisco

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213
TEL (310) 980-4000; FAX (310) 980-4018

June 3, 1993 F/SWO21:RSH

Colonel R.L. VanAntwerp
District Engineer
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053-2325

Dear Colonel VanAntwerp:

Please accept the following comments relative to the Santa Barbara Harbor Draft Feasibility Report and Draft Environmental Assessment.

The proposed project involves continued maintenance dredging and disposal activities at Santa Barbara Harbor. The work would be completed by the City of Santa Barbara instead of the Corps. Since the maintenance work remains the same, and only the responsible party will change, our recent comments on the Draft Environmental Assessment for the maintenance project are enclosed for your information.

One correction should be included in the final Environmental Assessment for the Feasibility Report. On page 12 it is stated that "The gray whale has recently been delisted by the National Marine Fisheries Service..." This is not correct. Rather, on January 7, 1993, the National Marine Fisheries Service determined that the eastern North Pacific stock of the gray whale should be removed from the List of Endangered and Threatened Species under the Endangered Species Act. The U.S. Fish and Wildlife Service (USFWS) has the authority and responsibility to actually remove the stock from the List. At this time, the USFWS has not delisted the eastern North Pacific stock of the gray whale.

Should you have any questions, please contact Mr. Robert Hoffman at (310) 980-4043.

Sincerely,

for D.J. Darm

Gary Matlock, Ph.D.
Acting Regional Director

CITY OF SANTA BARBARA

SHEILA LODGE
MAYOR

CITY HALL
DE LA GUERRA PLAZA
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990
TELEPHONE (805) 564-5325
FAX NUMBER (805) 564-5336

August 3, 1993

Colonel R. L. VanAntwerp
Corps of Engineers
Department of the Army
P.O. Box 2711
Los Angeles, California 90053-2325

Dear Colonel VanAntwerp:

This letter should serve as a formal indication of interest and intent by the City of Santa Barbara in proceeding with the recommended project indicated in the Santa Barbara Harbor Draft Feasibility Report, dated May, 1993.

The City is willing and able to provide all non-Federal requirements to acquire and operate and maintain the dredge system including cost-sharing requirements as indicated in the draft report. Funds for our share of acquiring the dredge, if necessary, and for operation and maintenance would come from City revenues.

However, we must emphasize that we still disagree with the requirement for the City to cost share in the First Cost of acquiring the dredge system. We believe that the cost-sharing for this specific project should recognize that the Federal Government is now responsible for one hundred percent (100%) of the cost for maintaining the Harbor Channel, and that with the recommended plan, the City will be responsible for operation and maintenance of the dredge system, resulting in substantial savings to the Federal Government.

We thank you for your continued interest and support for this worthwhile project.

Sincerely,

Sheila Lodge
Mayor

DEPARTMENT OF THE ARMY
MARINE DESIGN CENTER, CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3391

MAR 0 3 1993

REPLY TO ATTENTION OF

FACSIMILE TRANSMISSION
Number of Pages: 6

CEMDC/2304-0006

MEMORANDUM FOR Cdr, USAED, Los Angeles, ATTN: CESPL-ED-DC (GRANDON)

SUBJECT: SANTA BARBARA "DEDICATED DREDGE" ENGINEERING ESTIMATE

REFERENCES:
1. FAX FROM CESPL-ED-DC (GRANDON), dated 12 January 1993.
2. SANTA BARBARA HARBOR SHOALING STUDY - DRAFT FEASIBILITY REPORT - MAY 1991, APPENDIX D - DESIGN AND COST APPENDIX

1. Pursuant to your request contained in reference 1., MDC has reviewed the cost estimate.

2. Enclosed please find a report assessing costs, cost related factors, findings and recommendations related to the alternatives under consideration, which are:

- a conventional diesel driven dredge
- an electric driven dredge
- a diesel driven dredge with a "clean air" system.

3. A diesel dredge without the "clean air" system to treat the exhaust gases, has an initial cost 10% to 15% less than the electric equivalent.

4. Treatment of diesel exhaust with a catalytic type system, should be approached with caution; the enclosed report addresses technical aspects that must be resolved for a specific application, and a preliminary assessment of the costs, indicates that they may vary from $100,000.00 to $1,000,000.00, depending on the point of contact for the cost information.

REPLY REQUESTED: [ ] YES [X] NO
AUTHOR: ARTHUR F. DASILVA
SENT BY:

MDC FAX: (215) 656-6868
FAX TO: (213) 894-5312
CONFIRM: (213) 894-6192

5. If you have any questions, please contact Tom Tiefenthaler at (215) 656-6850.

ROBERT J. HOPMAN, P.E.
Acting Director, Marine Design Center

Enclosure:
1. Cost, Factors, Findings and Recommendations

Enclosure #1 -

U S ARMY CORPS OF ENGINEERS
MARINE DESIGN CENTER

February 19, 1993

SUBJECT: COSTS, COST RELATED FACTORS, FINDINGS AND RECOMMENDATIONS, FOR THE FOLLOWING ALTERNATIVES UNDER CONSIDERATION:
- ELECTRIC DRIVEN DREDGE
- DIESEL DRIVEN DREDGE
- DIESEL DRIVEN DREDGE WITH "CLEAN AIR" SYSTEM

REFERENCE: SANTA BARBARA "DEDICATED DREDGE" ENGINEERING ESTIMATE

1. MDC's assessment of costs for the electric driven dredge and associated floating plant, was the object of a previous study and correspondence with CESPL-ED-DC (GRANDON); please see CEMDC/2304-0004 dated July 2, 1992, and CEMDC/2304-0005 dated July 17, 1992.

2. Considering the first two alternatives, electric driven dredge vs. diesel driven dredge without "clean air" system, MDC findings are that the initial cost of a diesel driven dredge will be 10% to 15% less expensive than the electric equivalent.

3. The electric driven dredge, in addition to being more expensive as stated, will require additional components to constitute a complete operable system, namely:
   - Reel Barge
   - Power Cable
   - Shore Power Station

4. The costs associated with these additional components were assessed in the same correspondence indicated in 1. above.

5. The electric driven dredge, by comparison to the diesel driven dredge, will normally provide significantly more hours of operation between maintenance, and more hours of operation between failure and overhauls.

6. The electric driven dredge, by comparison to the diesel driven dredge, will be less flexible and less mobile, because it will always need to integrate and deploy, the other components of the system.

7. These advantages and disadvantages listed for the electric dredge in 5. and 6. however, ought to have little impact in this case, because of the mission profile described for this dredge.

8. Due to the total number of hours of operation per year, the advantage enunciated in 5. becomes less important, and due to the absence of a requirement for mobility or deployment elsewhere, (the dredge is dedicated to Santa Barbara), the disadvantage indicated in 6. is a lesser concern.

9. With respect to the need to be "environmentally correct", the electric driven dredge presents no concern in this area; the simple diesel dredge alternative, however, appears to be unacceptable to the City of Santa Barbara.

10. It is understood that the diesel driven dredge, to operate in the Santa Barbara area, needs to be fitted with a system that provides Best Available Control Technology (BACT), to minimize the noxious effects of the exhaust gases produced by the diesel engines.

11. MDC findings in this area, are that the system recommended as state of the art for treatment of marine diesel exhaust gases, is currently designated Selective Catalytic Reduction System (SCR). SCR replaces the diesel engine mufflers with a system that uses ammonia to reduce the oxides of nitrogen from the exhaust emissions.

12. Various types of SCR systems appear to have been tested since 1984, with only a very few having completed the tests successfully. From those that were eventually successful, information from only one manufacturer, KLEENAIRE, was found to be on file at MDC.

13. Attempts to establish contact with this company have not been successful; the corporation appears to have dissolved. Their field engineer at the time, Mr. Reine Corbeil, has taken up their business, and may eventually be available to provide his services in this area of expertise.

14. MDC established contact with Mr. Reine Corbeil, of Corbeil Services Inc. who had no reservations or concerns with the effectiveness of the system that he could provide; Mr. Corbeil was confident that the total acquisition cost of his system, including field supervision for installation, calibration and testing for one SCR system to treat two diesels (dredge pump and generator), would amount to approximately $100,000.00.

15. On this subject (SCR systems for marine diesel applications), MDC has contacted as well a diesel engine manufacturer, Caterpillar, and a Dredge Operator who owns a diesel driven dredge equipped with a SCR system.

16. Concerns with the application of a SCR system to a marine diesel were discussed at length with the two sources indicated above; a basic list of factors to consider are:
    - system effectiveness
    - cost and life of the system
    - life of some system components

17. System effectiveness is primarily dependent on two factors:
    - back pressure to the engines
    - "sensitiveness" of the SCR system to the temperature of the exhaust gases.

18. The back pressure to the engines will increase with the SCR total accumulated hours of operation, and should be monitored.

19. The temperature of the exhaust gases flowing through the system is important, because the SCR system is ineffective up to 500 degrees F, is 70% to 80% effective between 550 to 750 degrees F, and is 90% effective from 750 to 850 degrees F, dropping rapidly to becoming ineffective again at about 930 degrees F.

20. Basically, the SCR system does not work in the initial 20 minutes to one hour of operation.

21. The Caterpillar representative contacted, voiced the opinion that each engine ought to be fitted with a single dedicated system, that is, two systems for two engines, to treat the emissions more effectively, at a minimum cost of around $300,000.00.

22. Mr. Reine Corbeil was presented with the above recommendation, and stated that one SCR system properly sized would suffice; his SCR system would be semi-automatic, and inject the ammonia as a function of the Amps from the genset, and as a function of the throttle linkage of the pump motor.

23. The Dredge Owner contacted, indicated that his dredge has three diesel engines, and all three exhausts combine through one single KLEENAIRE SCR system; it appears that the system had been installed, calibrated and tested by Mr. Reine Corbeil.

24. MDC was told that the total final cost for the system mentioned above, including field supervision for installation, calibration and testing was in the order of $1,000,000.00. The time spent to bring that SCR system to a good level of effectiveness, was in the order of months, "very time consuming".

25. There are lessons learned by the people directly involved in previous installations of this type, however, in view of the technical factors explained herewith, a clear assessment of the costs, reliability and effectiveness of a SCR system for marine diesel applications, moreover for the specific Santa Barbara project application, appears to be a difficult task in itself.

26. In conclusion, for the mission profile described for the dedicated Santa Barbara dredge, that is:

- to be operated in the Santa Barbara area by the City of Santa Barbara
- to shoal 325,000 cubic yards per year
- to pump 8,000 cubic yards per day in a 6 month dredging season
- to pump a maximum of 650,000 cubic yards per year

MDC would support the recommendation that the electric driven dredge is the preferred of the two acceptable alternatives described in this report.

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