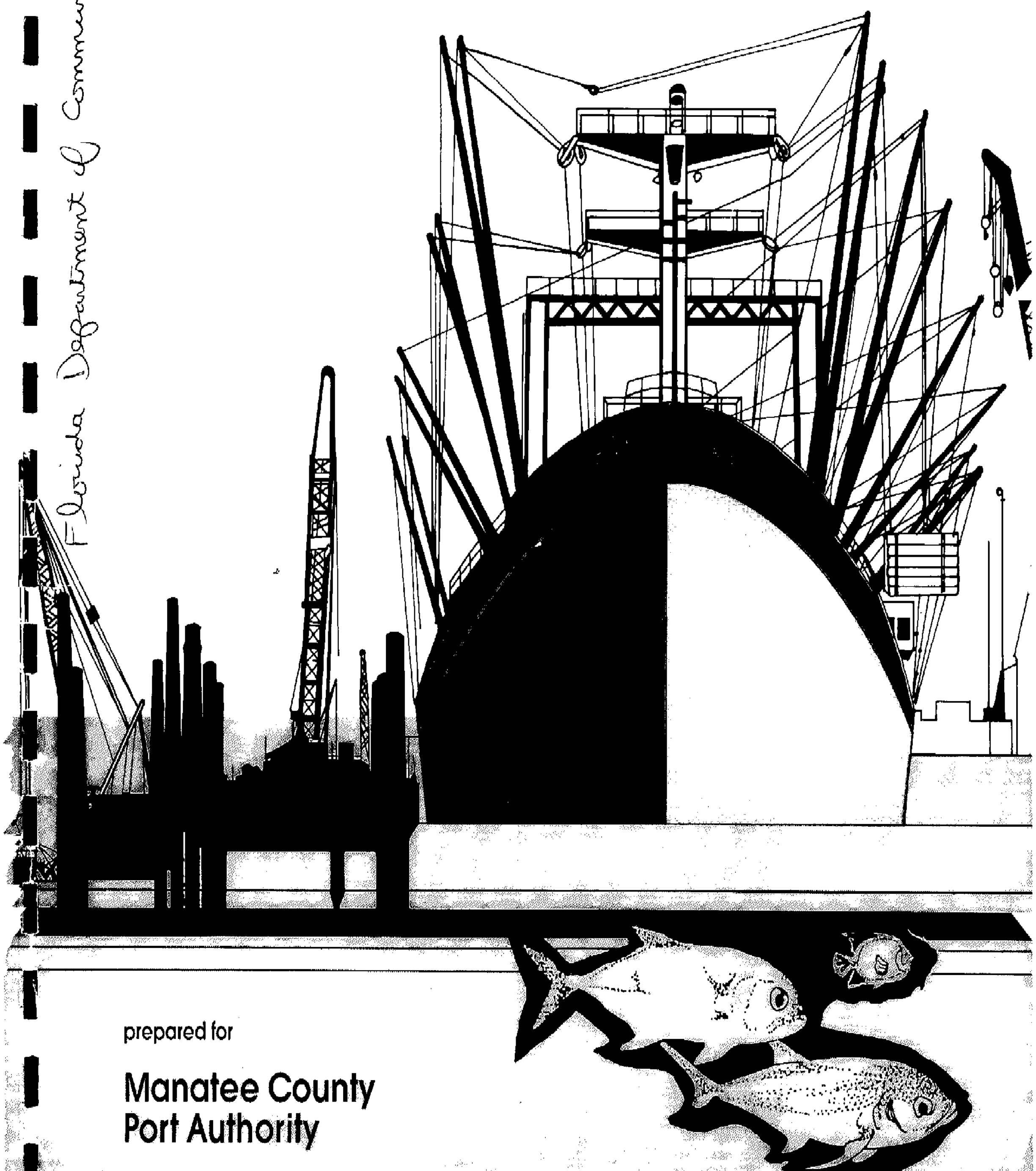
Port Manatee OCS Impact Study

Florida Department of Community Affairs



prepared for

Manatee County Port Authority

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

A Project Funded By The Coastal Energy Impact Program:

United States Department of Commerce
National Oceanic and Atmospheric Administration
Office of Coastal Zone Management

through the

Florida Department of Veteran and Community Affairs
Division of Local Resource Management
Office of Federal Coastal Programs

DEPARTMENT OF COMMUNITY AFFAIRS
DIVISION OF LOCAL RESOURCE MANAGEMENT
OFFICE OF FEDERAL COASTAL PROGRAMS
2571 EXECUTIVE CENTER CIRCLE, EAST
TALLAHASSEE, FLORIDA 32301

HD9567.F6S78 1982

Study of the

OUTER CONTINENTAL SHELF IMPACTS ON PORT MANATEE'S PUBLIC FACILITIES/SERVICES

and

ENVIRONMENTAL/RECREATIONAL RESOURCES

for the

MANATEE COUNTY PORT AUTHORITY
MANATEE COUNTY, FLORIDA

December 1982

Prepared by

GEE & JENSON ENGINEERS, ARCHITECTS, PLANNERS, INC.
2090 Palm Beach Lakes Boulevard
West Palm Beach, FL 33409

1010 Manatee Avenue West
Bradenton, FL 33505

ROGERS, GOLDEN & HALPERN, INC.
1427 Vine Street
Philadelphia, PA 19102

11872-D Sunrise Valley Drive
Reston, VA 22091

Financial assistance for the preparation of this study was provided by the Coastal Zone Management Act of 1972, as amended through Coastal Energy Impact Program Grant No. 81-CE-66-08-47-20-005, administered at the Federal level by the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration and administered at the State level by the Florida Department of Community Affairs, Division of Local Resource Management, Coastal Energy Impact Program.

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

SUMMARY

Should Port Manatee function as a service base for Outer Continental Shelf (OCS) oil and gas exploratory and development activity, up to 75 acres of land, 10,000 square feet of office space and 800 linear feet of berthage would be necessary to adequately support OCS related facility and service requirements.

In order to meet the OCS related requirements, Port Manatee would need to reserve existing, unassigned port owned land for OCS use, make significant structural improvements to an existing berth and extend roadways, drainageways and railways to service OCS development sites within the port. These improvements, along with the presence of OCS related industry at Port Manatee, could result in potential losses of valuable environmental and recreational resources at the port.

Valuable environmental and recreational resources at Port Manatee include the quality of the air and waters surrounding the port, adjacent submerged grass beds and mangrove marshlands including their associated plant and animal populations, three endangered animal species, Cockroach Bay Aquatic Preserve, Bishop Harbor and the offshore spoil island. Potential losses could be incurred by those valuable resources from events, related to the presence of OCS industry at the port, such as fuel spills, mud or cement product spills, untreated stormwater discharges, turbidity increases and site development activities. Potential valuable resource losses could also be incurred from OCS related port activity such as drainageway extension, road construction and berth maintenance dredging.

Measures recommended to minimize potential losses to valuable environmental and recreational resources at Port Manatee include: the use of fuel and product spill containment equipment and devices, the retention/detention of stormwaters prior to their discharge, design modifications to OCS fuel and product berth structures, separation of oils and greases from onsite stormwaters, preservation of natural mangrove

areas, use of approved offsite solid waste disposal areas, internalized location of non-waterfront related industry and excessive noise generating industry and restrictions on crew and supply boat operations. Recommended methods for implementing the above include, formal modifications to Manatee County Port Authority construction policies, formal modifications to the Master Development Plan for Port Manatee and incorporation of specific loss minimizing conditions in the tenant leases.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

LIST OF FIGURES

INTRODUCTION

Port Manatee has historically been used as a service base for Outer Continental Shelf (OCS) energy activities, i.e. offshore exploratory drilling for natural gas and oil resources, by several major energy companies. The port was selected as a service base because of its proximity to exploratory drilling sites, its immediate access to numerous ancillary services found in three moderately sized cities near the port, its deep water access and berthing and its available landside space.

For lease sales occurring within the next few years, the Minerals Management Service (MMS) is proposing to open the entire eastern Gulf of Mexico for nominations from the oil companies. It is anticipated that Port Manatee would be considered as a potential service port for this increased off-shore activity, particularly during the leasing, exploratory, and development phases.

This study estimates the amount of OCS activity which may potentially occur in the eastern Gulf of Mexico within the next five years. It examines whether impacts resulting from OCS energy activities may require new or improved public facilities and services at Port Manatee. The port's transportation systems, landside space, public services and public utilities will be evaluated to determine the nature and degree of needed improvement.

Specifically, this study addresses the impacts on Port Manatee resulting from the OCS activities of well drilling during the exploratory phase and platform installation and rig operation during the development phase. The siting of pipelines and refineries will not be addressed in this study. An energy facility siting study is being performed on a regional basis by the Tampa Bay Regional Planning Council (TBRPC). Once the TBRPC findings are established, an additional grant may be desired to address any related effects on Port Manatee. Because of the lack of previous finds in the eastern Gulf of Mexico, estimates of OCS offshore activity are presented in low, medium, and high finds. These scenarios are carried through the forecasts on projected expansion needed at Port Manatee.

This study also assesses whether Port Manatee would incur potential losses of valuable environmental and recreational resources in accommodating the demands of increased OCS energy activity. Valuable environmental resource losses may include alteration or degradation of existing air quality, surface and groundwater quality, noise levels, and plant/animal (terrestrial/aquatic) populations and habitats. Valuable recreational resource losses may include losses of saltwater fishing, recreational boating, historic/archaeological resources and areas designated by the coastal zone management plan, and state, regional, or local government areas of particular concern or potential use for recreational preservation or restoration purposes.

To assist the Manatee County Port Authority in making intelligent decisions regarding the future management of the port, this study develops programs and strategies intended to minimize impacts while satisfying expansion demands. Methods for implementing these programs and strategies are developed as the final element of this study. The programs, strategies, and their respective implementation methods which are presented in this study are designed to allow Port Manatee to provide the projected public facility and service improvements required to accommodate the demands resulting from the increased OCS energy activity, while minimizing losses of its valuable environmental and recreational resources, and, where possible, preserving and protecting those resources.

CHAPTER 1

ESTIMATED LEVEL OF OCS

Activity and Industry Requirements

The Gulf of Mexico is, by far, the most productive of the Outer Continental Shelf (OCS) oil and gas leasing regions. As of December 31, 1981, oil, condensate and gas produced from the Gulf accounted for 94.3 and 99.8 percent of the national OCS production totals, respectively (Beasley, MMS, 1982). Although all of this production has historically come from extensive areas offshore Texas and Louisiana, the oil industry's interest has, in recent years, expanded to include frontier sections of the eastern Gulf.

The Environmental Impact Statements issued by the Bureau of Land Management (BLM) for OCS Lease Sales 66, 67, and 69, as well as industry opinions expressed in such publications as Offshore, Oil and Gas Journal, and Offshore Construction Report, indicate a portion of the exploration and development activities pursuant to eastern Gult leasing could be supported from Port Manatee, Florida.

Port Manatee has served in the past as a staging site for OCS exploration. This fact undoubtedly adds to its attractiveness as a service/support base for future offshore operations. Port Manatee has expressed the need for planning information in the event that future OCS exploration and development activities place demands on the port facilities. This report is an attempt to estimate the extent of near-term OCS activity, and formulate onshore requirements for such activities.

APPROACH

In the absence of discoveries of commercial (economically producible) quantities of oil and/or gas, it is impossible for anyone to predict exactly the number of jobs, wage levels, tons of material, etc. that would result from offshore development. Oil-producing fields are individual entities; each requires its own specific facilities, personnel, and operations. The approach utilized in this assessment is intended to offer guidelines, not hard and fast figures for estimating the timing, extent, and requirements of offshore development.

There are several terms that will be used often in the body of this report. They need to be explained at this point. The words "block", "lease", "tract", and "field" have discrete definitions and applications. A block is the geographical area as portrayed in the official Mineral Management Service protraction diagrams or leasing maps. A block contains approximately nine square miles (5,000 acres off Louisiana and 5,760 acres elsewhere in the Gulf of Mexico). Each block is assigned a permanent block number. In the course of the lease sale process, the Director of the Minerals Management Service issues an official "call for information." Areas of geologic potential for the occurrence of hydrocarbons identified by the Minerals Management Service are included in the call. The official call for information is approved by the Secretary of the Interior and then published in the Federal Register for the purpose of inviting comments from potential bidders and concerned parties outlining favorable areas for hydrocarbon potential which they may be interested in leasing. The call also invites comments on areas which should receive special concern and analysis because of geologic hazards, multiple-use conflicts, or socioeconomic, biological, or environmental considerations. Following the call for information, blocks are selected for possible sale and are studied as part of a regional or areawide environmental impact statements. At this time, blocks are assigned tract numbers. The federal government, through the Department of the Interior, leases tracts beyond the 3-league limit (the extent of State of Florida jurisdiction over submerged lands in the Gulf of Mexico) on the Outer Continental Shelf. After a lease sale, the tract is usually referred to by the lease number, although in the Gult of Mexico leaseholders may also refer to the parcel by its block number (a designation that is administratively permanent). Leases convey to the owner certain stipulated rights to explore for and produce oil and gas at a specific location. A field refers to the location of the resource itself, trapped within certain geological formations and having particular properties.

In postulating future OCS oil and gas exploration and development activities in the eastern Gulf of Mexico, we will calculate four offshore scenarios (no find, and low, medium, and high finds). In calculating the offshore scenarios, we will first take a look at the leasing and exploration history of the eastern Gulf; a study of the area's OCS history will yield certain trends that may be projected into the future. Secondly, we will look at recent and upcoming OCS lease sales, and the resource estimates that have been developed for the areas leased and to be offered in future OCS lease sales.

Eastern Gulf of Mexico Leasing and Exploration History

In 1973, offshore acreage was leased in the Destin Dome area. Figure 1-1 depicts offshore administrative areas. Destin Dome was the first area off Florida to be leased. Exploratory drilling was conducted, but commercial quantities of oil and/or gas were not found. These early, unsuccessful wells were plugged and abandoned; the leases on which the wells were drilled have since expired.

In spite of the disappointing results of the wildcat exploration at Destin Dome, renewed interest in eastern Gulf tracts has been evidenced, particularly at Lease Sales 41 (February 1976), 65 (October 1978), 66 (October 1981), and 67 (February 1982). After a hiatus from drilling activity following abandonment of the first Destin Dome wells, exploration of Florida tracts leased in 1976 and 1978 resumed in early 1981. None of these wells has yet resulted in a discovery of commercially producible hydrocarbons. Figure 1-2 shows the number of rigs at work during each month from January 1981 to the present. During this time, the number of rigs drilling simultaneously has ranged from one to five. General locations of the rigs are also given. As of April 30, 1982, only one drilling rig was operating in the eastern Gulf. This rig was working on Sohio's Destin Dome block 563 (leased in 1978) off the Florida panhandle. Panama City, Florida, is serving as the onshore support/supply base for the current exploratory activity centered at Destin Dome.

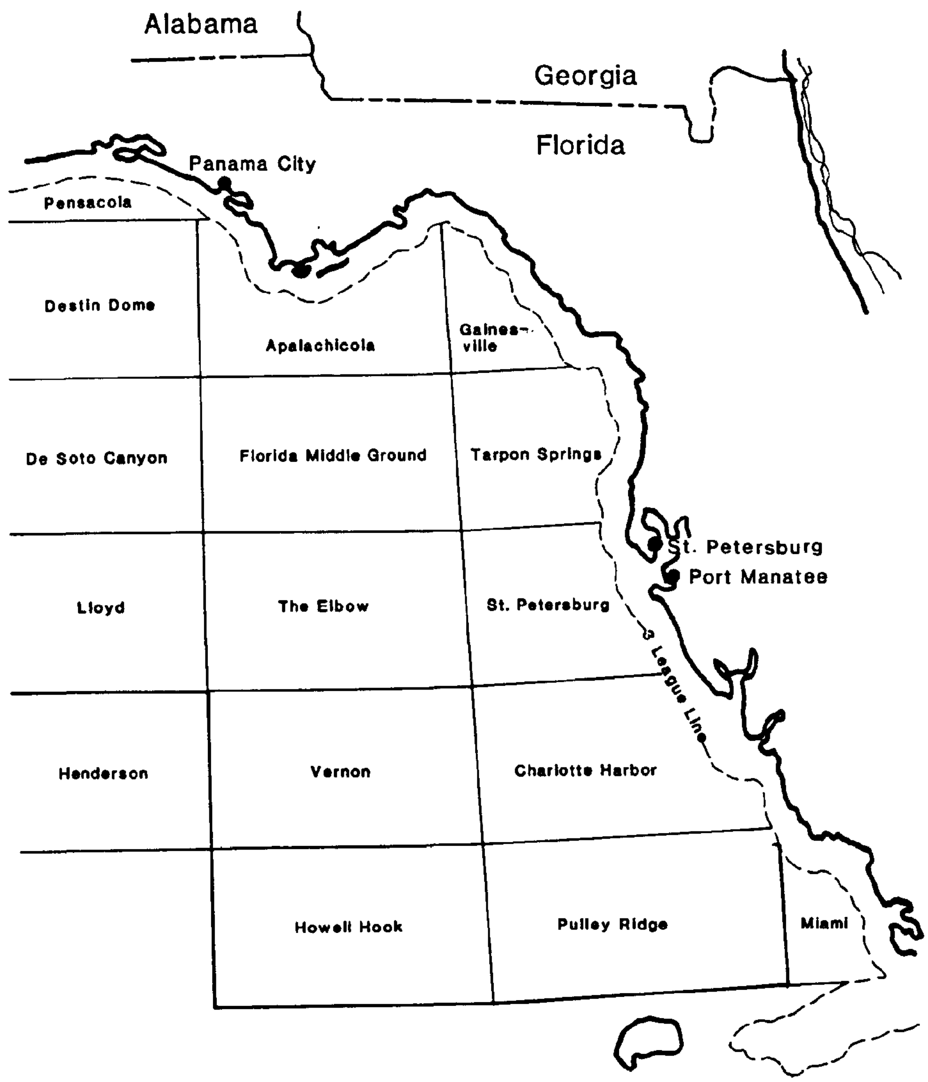
At Sale 66 (October 1981), 91 Florida tracts were offered; 20 were subsequently leased. In February 1982, at Sale 67, 81 Florida tracts were offered, and high bids were accepted by the Bureau of 'Land Management (BLM) for ten of these. Florida offshore tracts leased in both these sales are located in the Charlotte Harbor administrative area. Figure 1-3 shows the Florida blocks leased in OCS Lease Sales 66 and 67; Figure 1-4 shows the locations of these leases.

Evaluation of Recent and Upcoming Lease Sales

Another way to estimate the amount of future OCS activity in the eastern Gulf is to evaluate the upcoming OCS lease sales, the areas to be offered, and the resource estimates made for the sale areas. Figure 1-5 shows the Final Five-Year OCS Oil and Gas Leasing Schedule.

The U.S. Geological Survey (USGS), working with geological and geophysical data, formulates estimates for undiscovered resources. At the same time, industry is carrying out preliminary exploration (without drilling) to determine its interest in an area. The government's estimates are published in the environmental impact statements (EIS's) prepared for each lease sale. As part of the Reagan administration's plan to streamline the OCS leasing process, EIS's in the future will probably be prepared as broader, areawide assessments rather than the more geologically and geographically specific evaluations of the past. Since oil and gas deposits have not yet been discovered in the federal waters of the eastern Gulf of Mexico, it is difficult for government or private industry to make estimates of undiscovered resources. The USGS has published resource estimates for the eastern Gulf of Mexico, and the estimates for the continental shelf (water depths from 0-200 meters) are the basis upon which the offshore scenarios have been developed. Figure 1-6 shows the government estimates for the entire eastern Gulf.

Offshore Administrative Areas



Source:
Gulf of Mexico Summary Report -2, USGS Open File Report 81-620, Plate 1

MONTH/YEAR	NO. RIGS AT WORK	LOCATION OF DRILLING
1/1981	2	Charlotte Harbor
2/1981	3	2 Charlotte Harbor, 1 Vernon
3/1981	4	Elbow, Vernon, 2 Charlotte Harbor
4/1981	5	Elbow, Vernon, 2 Charlotte Harbor, Pensacola
5/1981	3	Elbow, Pensacola, Charlotte Harbor
6/1981	3	Elbow, Pensacola, Charlotte Harbor
7/1981	2	Pensacola, Charlotte Harbor
8/1981	2	Pensacola, Charlotte Harbor
9/1981	1	Pensacola
10/1981	1	Pensacola
11/1981	1	Pensacola
12/1981	1	Destin Dome
1/1982	1	Destin Dome
2/1982	1	Destin Dome
3/1982	1	Destin Dome
4/1982	1	Destin Dome

Rigs at Work, Eastern Gulf of Mexico
Source: "Offshore Rig Data Services"
Offshore Data Services, Inc.,
January 1981, April 1982

Figure 1-2

SALE 66, OCTOBER 1981

CHARLOTTE HARBOR AREA

tract	block	owner	miles from shore
180	577	Shell	95
181	578	Shell	93
182	579	Shell	89
183	580	Shell	87
184	581	Shell	84
188	621	Shell	96
189	622	Shell	94
190	623	Shell	91
193	665	Shell	97
194	666	Shell	94
195	667	Shell	92
196	668	Shell	89
199	709	Shell	98
200	710	Shell	95
201	711	Shell	93
202	712	Shell	89
205	753	Shell	99
206	754	Shell	96
207	755	Shell	94
208	756	Shell	90

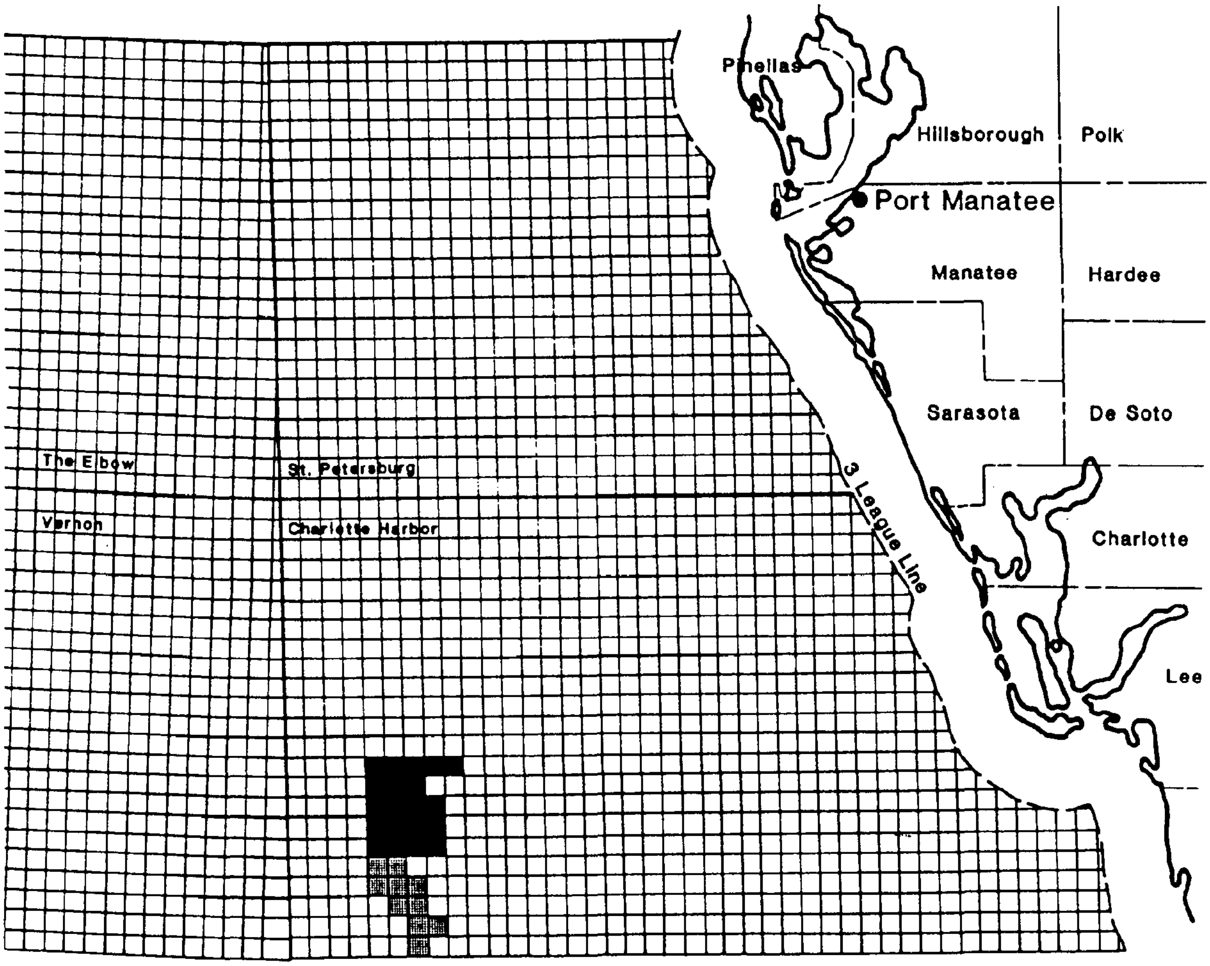
SALE 67, FEBRUARY 1982

CHARLOTTE HARBOR NG-17-4

tract	block	owner	miles from shore
189	797	Shell	62
190	798	Shell	60
196	841	Shell	63
197	842	Shell	61
198	843	Shell	59
204	886	Shell	61
205	887	Shell	59
212	931	Shell	60
213	935	Shell	58
219	975	Shell	61

Florida Blocks Leased in OCS Sales 66 and 67
Source: Ocean Construction Report,
No. 43 - October, 1981
No. 7 - February 1982

Location of Tracts Leased in OCS Sales 66 and 67



Legend

- Tracts Leased in OCS Sales 67
- Tracts Leased in OCS Sales 66

Source: Ocean Construction Report
October 26, 1981
February 15, 1982

Figure 1-4

FINAL 5-YEAR OCS OIL & GAS LEASING SCHEDULE

U.S. Department of the Interior
Minerals Management Service

Proposed Sale Dates

July 1982

1982

- RS-2 .... August
- 71 Diapir Field .... September
- 52 North Atlantic .... October
- 69 Gulf of Mexico .... October
- 57 Norton Basin .... November

1983

- *70 St. George Basin .... February
- 76 Mid Atlantic .... April
- 72 C. Gulf of Mexico .... May
- 78 S. Atlantic .... July
- 74 W. Gulf of Mexico .... August
- 73 C. & N. California .... September
- 79 E. Gulf of Mexico .... November

1984

- 80 S. California .... January
- 82 N. Atlantic .... February
- 83 Navarin Basin .... March
- 81 C. Gulf of Mexico .... April
- 87 Diapir Field .... June
- 84 W. Gulf of Mexico .... July
- 88 Gulf of Alaska/Cook Inlet .... October
- 89 St. George Basin .... December

1985

- 90 S. Atlantic .... January
- 85 Barrow Arch .... February
- 92 N. Aleutian Basin .... April
- 98 C. Gulf of Mexico .... May
- 111 Mid-Atlantic .... June
- 102 W. Gulf of Mexico .... August
- 91 C. & N. California .... September
- 100 Norton Basin .... October
- 94 E. Gulf of Mexico .... November

1986

- 95 S. California .... January
- 96 N. Atlantic .... February
- 107 Navarin Basin .... March
- 104 C. Gulf of Mexico .... April
- 97 Diapir Field .... June
- 105 W. Gulf of Mexico .... July
- 99 Kodiak .... October
- 101 St. George Basin .... December

1987

- 108 S. Atlantic .... January
- 109 Barrow Arch .... February
- 110 C. Gulf of Mexico .... April
- 86 Shumagin .... June

*The Department will consult with the Alaska Land Use Council following issuance of the Proposed Notice of Sale

Jim Watt
Secretary of the Interior

OIL	ASSOCIATED GAS	NON-ASSOCIATED GAS
(billions of barrels)	(trillions of cubic ft)	(trillions of cubic feet)
95% - 0	95% - 0	95% - 0
5% - 3.8	5% - 3.1	5% - 5.9
Mean - 1.2	Mean - 0.9	Mean - 1.5

Estimates for the Outer Continental Shelf (0-200 meters)

Source: U.S. Department of the Interior, Geological Survey. "Estimates of Undiscovered Recoverable Resources of Conventionally Producible Oil and Gas in the United States, A Summary." By G.L. Doulton et al. Open-file Report 81-197, pp. 9 and 10.

Estimates of Undiscovered Recoverable Resources, Eastern Gulf of Mexico

It is important to mention here that government's estimates may differ from industry's. Of course, the oil industry does not make its assessments known until development or production begin. Industry's opinion of the hydrocarbon potential of certain tracts does, however, become evident during lease sale bidding. The lease sale reveals much about the scale and likely pattern of development of a potential resource province. The oil companies, working with essentially the same basic data, will bid for tracts they believe have the greatest chance of proving commercial. Once the bids are in and the leases awarded, the lessees will move as quickly as possible to secure the required permits and begin exploratory drilling on the highest value tracts, hoping for an early return on their substantial front-end investment. A review of bid recap statistics will show the tracts receiving the highest bids. Figure 1-7 shows bid recap statistics for Sales 66 and 67.

Often, the owner of a lease or leases adjacent to the highest-value (highest bid) tract will wait until results of exploration of the highest-value tract become known before deciding to begin exploring his own tracts. This is also the case when the owner of the highest-value tract is also the leaseholder of an adjacent tract or tracts. An early disappointment may influence the decision to cancel exploration plans in the immediate future.

Assumptions for Methodology

In formulating a methodology for estimating future OCS exploration and development activity in the eastern Gulf of Mexico, we have made a number of basic assumptions. These assumptions underlie all of the scenarios. They are:

1. The OCS leasing program will continue through 1987 on the schedule adopted by the Minerals Management Service (Figure 1-5).

2. The lack of available drilling rigs should not become a significant factor in OCS exploration in the eastern Gulf. Industry has

repeatedly signalled its ability to ensure a steady supply of rigs to meet the demand of offshore operators. If a large, commercial find occurs, additional rigs can be ordered on a contract basis. Other rigs can be diverted from smaller, less attractive prospects. Thus, rig availability will not be a deterrent to OCS exploration. It should be noted that drilling rig utilization for 1982 has been approximately 50 percent lower than for 1981. It is anticipated that the record breaking levels of 1981 may not be attained in the foreseeable future.

3. The historical trends of OCS exploratory drilling in the eastern Gulf are indicative of future OCS activity in this area only until a significant discovery is made. During the course of exploratory drilling, operators will make several "teaser" finds which, although noncommercial, will provide the incentive for continued exploration. When a commercial find is made, OCS activity will increase. The "no find" scenario is oriented to the historical trend. The three "find" scenarios are based on a significant discovery in 1983, with a subsequent sharp increase in OCS activity.

4. Exploration in the eastern Gulf during the next few years will be concentrated in relatively shallow-water areas. Although deepwater tracts will be offered in future eastern Gulf lease sales, industry will likely exhaust the exploration potential of the nearer-shore tracts before making the significant investment of time and capital required for deepwater exploration. The "find" scenarios are based on the undiscovered recoverable resource estimates for waters from 0-200 meters, shown in Figure 1-6.

5. Exploratory drilling using mobile rigs will be essentially completed within five years of the lease sale year. However, some exploratory drilling will continue throughout the life of the region, largely as a result of "teaser" finds.

LEASE SALE 66, OCTOBER 1981

CHARLOTTE HARBOR AREA

tract	block	high bidder	bonus bid
180	577	Shell	$154,000
181	578	Shell	163,000
182	579	Shell	205,000
183	580	Shell	188,000
184	581	Shell	188,000
188	621	Shell	154,000
189	622	Shell	188,000
190	623	Shell	205,000
193	665	Shell	154,000
194	666	Shell	154,000
195	667	Shell	188,000
196	668	Shell	188,000
199	709	Shell	188,000
200	710	Shell	154,000
201	711	Shell	163,000
202	712	Shell	205,000
205	753	Shell	205,000
206	754	Shell	154,000
207	755	Shell	154,000
208	756	Shell	163,000

LEASE SALE 67, FEBRUARY 1982

CHARLOTTE HARBOR NG-17-4

tract	block	high bidder	bonus bid
189	797	Shell	$151,000
190	798	Shell	358,000
196	841	Shell	151,000
197	842	Shell	188,000
198	843	Shell	188,000
204	886	Shell	151,000
205	887	Shell	438,000
212	931	Shell	438,000
213	935	Shell	243,000
219	975	Shell	151,000

Bid Recap Statistics for OCS Lease Sales 66 and 67
Source: Ocean Construction Report
No. 43 - October 1981
No. 4 - February 1982

6. Four exploratory wells will be drilled per mobile rig per year.

7. Exploration continues while development and production proceed. The search for oil and gas will stop only when all producible resources are assumed to have been discovered, or when a number of dry holes have been drilled, and optimism is gone.

8. For no finds of gas and oil, 25 percent of tracts leased are drilled (one well drilled for each four tracts). For commercial finds of gas and oil, 50 percent of leased tracts are explored. There are three wells per explored tract, or an average of 1.5 wells per tract.

Pace of Offshore Operations

After offshore leases are awarded for an initial term of five or ten years, the Minerals Management Service (MMS) of the Department of the Interior has the responsibility for regulating and monitoring operations on the leases. Prior to commencement of exploratory drilling, the leaseholder or operator must submit a Plan of Exploration to the regional office of the MMS. Figure 1-8 shows the status of exploration plans the Gulf of Mexico region Minerals Management Service had received as of April 12, 1982.

In addition to the Plan of Exploration, an accompanying environmental report may be required in cases where drilling may affect a state with a federally-approved coastal zone management plan. As of February 28, 1982, these Gulf Coast states had approved coastal plans: Alabama (1979), Florida (1981), Louisiana (1980), and Mississippi (1980). An approved exploration plan does not give the operator permission to drill wells on his lease. However, the fact that an operator has submitted a plan and received MMS approval implies the operator's intent to explore the lease's hydrocarbon potential. Thus, a rough idea of the extent and location of future (near-term) exploratory activity can be gained by examining Figure 1-8.

Eastern Gulf leaseholders have historically submitted their exploration plans within 2-1/2 to 3 years of lease award (Alvarado, MMS, 1982). Once the plan is approved, months or years may elapse before the operator submits an Application for Permit to Drill (APD) to the Minerals Management Service. If approval of the APD is granted, and if a drilling rig is available, exploration activities may begin shortly thereafter. Because of the number of variables in the process from lease award to well spudding (start-up), and because of the low priority that operators have historically accorded their eastern Gulf exploration programs, it is difficult to infer a standard time period between exploration plan approval and well spudding. However, should a commercial discovery be made in the near future, the time span between lease award and exploratory drilling would, of course, be significantly shortened.

INDUSTRY REQUIREMENTS

Exploratory Activity

Exploratory activities are undertaken to locate geological formations that are potential oil or gas reservoirs. These activities, the first step in the process of developing OCS resources, progress through three principal stages:

1. regional surveys to identify promising geological formations;
2. detailed surveys upon which to base the evaluation of specific tracts;
3. exploratory drilling to determine whether oil and gas are actually present.

Both government and industry require good exploratory data for making decisions regarding OCS development. Government requires the data for determining the value of the tracts it proposes for leasing. In addition,

FLORIDA EXPLORATION PLANS

SALE/DATE	AREA	BLOCK NO.	LEASE NO.	LESSEE/OPERATOR	DATE*	FILE CONTROL NO.	RESULTS
32/1973	Destin Dome	353	2466	Shell	3/22/78	G-0019	Wells plugged & abandoned. Lease expired.
41/1976	The Elbow	915	3341	Mobil	8/18/80	N-0549	Well spudded 1/3/81. Plugged & abandoned.
65/1978	Pensacola	973	3886	Mobil	11/20/80	N-0594	Well spudded 4/17/81; drilling 9/1/81. Term contract.
65/1978	Destin Dome	529	3888	Shell	12/18/79	G-0328	Plan approved 11/20/79. Wells drilled, plugged & abandoned.
65/1978	Vernon	654	3903	Mobil	10/28/80	N-0616	Well spudded 1/28/81. Drilling 4/1/81. Contract to 2/18/82.
65/1978	Charlotte Harb.	144	3906	Gulf	8/12/80	N-0521	Well spudded 4/16/81. Plugged & abandoned. Ft. Myers as base.
65/1978	Charlotte Harb.	145	3907	Gulf			Plan approved. No drilling permit
65/1978	Charlotte Harb.	265	3912	Shell	10/6/80	N-0608	Well spudded 1/4/81. Plugged & abandoned.
65/1978	Charlotte Harb.	628	3915	Mobil	10/15/80	N-0613	Well spudded 3/29/81. Plugged & abandoned.
65/1978	Charlotte Harb.	672	3917	Tenneco	2/22/80	G-0292	Well spudded 12/17/80. Plugged & abandoned. Ft. Myers as base.

Status of Florida exploration plans.

FLORIDA EXPLORATION PLANS

SALE/DATE	AREA	BLOCK NO.	LEASE NO.	LESSEE/OPERATOR	DATE*	FILE CONTROL NO.	RESULTS
41/1976	The Elbow	652	3342	Mobil	3/6/81	N-0684	Plan approved 3/27/81. Lease expired.
41/1976	The Elbow	565, 566	3343, 3344	Mobil	3/6/81	N-0685	Plan approved 3/27/81. Lease expired.
65/1978	Pensacola	971	3886	Mobil	1/8/82	N-0866	Plan approved 2/5/82.
65/1978	Pensacola	974	3887	Mobil	1/8/82	N-0865	Plan approved 2/5/82.
65/1978	Destin Dome	563	3890	Sohio	2/19/81	N-0670	Well spudded 11/21/81; drilling as of 12/1/81; contract to 3/84.
65/1978	Vernon	610	3900	Chevron	5/7/81	N-0733	Plan approved 6/12/81. No drilling permit granted yet.
65/1978	Tarpon Springs	277	3904	Mobil	11/23/81	N-0815	Plan conditionally approved.
65/1978	St. Petersburg	753	3905	Gulf	1/4/82	N-0860	Plan approved 2/3/82.
65/1978	Charlotte Harb.	188, 231	3909, 3911	Ocean Production	4/27/81	N-0716	188 drilled, plugged & abandoned. Port Manatee used as service base.
65/1978	Charlotte Harb.	715	3918	Chevron	5/7/81	N-0734	Plan approved 6/12/81. No drilling permit granted yet.
65/1978	Charlotte Harb.	716	3919	Tenneco			Plan submitted, not yet approved.

Status of Florida exploration plans.

continued

Figure 1-8

government agencies need the data in order to assess any environmental risks associated with developing a particular tract, and as a basis for prescribing and enforcing rules to prevent waste and to conserve the natural resources of the OCS, as required by the OCS Lands Act Amendments.

Industry needs the data for determining the value of tracts offered for leasing. Since this is one of the principal determinants of a company's bonus bid, the better the data and its presentation and interpretation, presumably the more competitive a company can be.

Offshore oil exploration is a highly complex marine operation. When exploration begins, operators select one of several types of mobile drilling rigs (barge, drill ship, jack-up, or semisubmersible) appropriate to water depth and ocean bottom conditions. The methods and the equipment used for offshore drilling are almost identical to those used on land. The hole is drilled using a rotary drill: that is, the hole is drilled by a rotating drill bit at the bottom of a "string" of drill pipe. Cuttings from the drill face are removed by a fluid called drilling mud, which is pumped down through the drill string, out through the bit, and circulated back to the surface via the space between the drill string and the bore hole. In addition to removing cuttings, drilling mud acts to prevent blowouts by maintaining formation zones penetrated as the hole is drilled. Such sudden flows of formation liquids or gases are called "blowouts."

Since blowouts are dangerous, expensive, and environmentally damaging, a number of safeguards in addition to drilling mud are used to minimize the likelihood of their occurrence. These include setting casing and installing blowout preventers (BOP's). Casing, which consists of relatively large-diameter steel pipe, is set and cemented to a depth specified by the Minerals Management Service's OCS operating orders. The casing is, in effect, a liner for the bore hole and may be as large as 36 inches in diameter. The surface casing also provides an attachment for the blowout preventer stack, which consists of a series of control valves that are capable of closing the bore hole to shut down the well in case extreme pressures build up. Figures 1-9 and 1-10 illustrate casing and BOP stack.

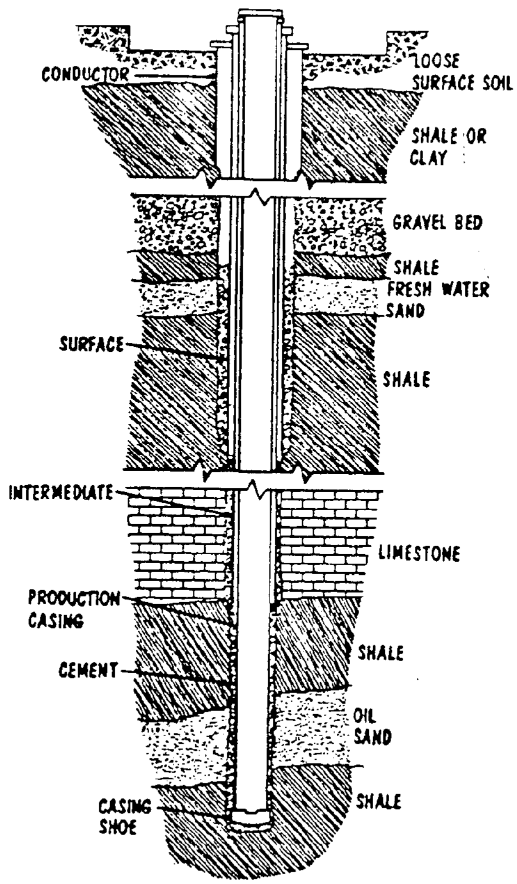
Drilling itself usually is performed by large vessels called "rigs", which may be self-propelled or towed from one tract to another. Each drilling rig employs up to 150 people full time -- about half on board the rig itself. The other half work in support jobs on shore or on supply vessels, which shuttle between the shoreside support bases and the rigs. Figure 1-11 shows representative personnel requirements of exploratory drilling rigs. The personnel requirements listed in Figure 1-11 are averages based upon recent exploratory activities in Louisiana offshore areas. During the exploratory phase, the majority of the workers will not maintain local residences. However, if a high level of exploratory activity is carried on over the years, an increasing number of workers will reside locally.

Service/support bases for drilling rigs include pier space, storage areas, offices, and repair facilities. The demand for services, equipment, and supplies provided by the various ancillary industries will occur as a result of a series of offshore events during the exploration, development, and production of oil and gas. Within the scope of this discussion, we are concerned only with the exploration and development phases, and Chapter 2 will discuss in detail the onshore impacts that can be anticipated during these phases.

Development Phase

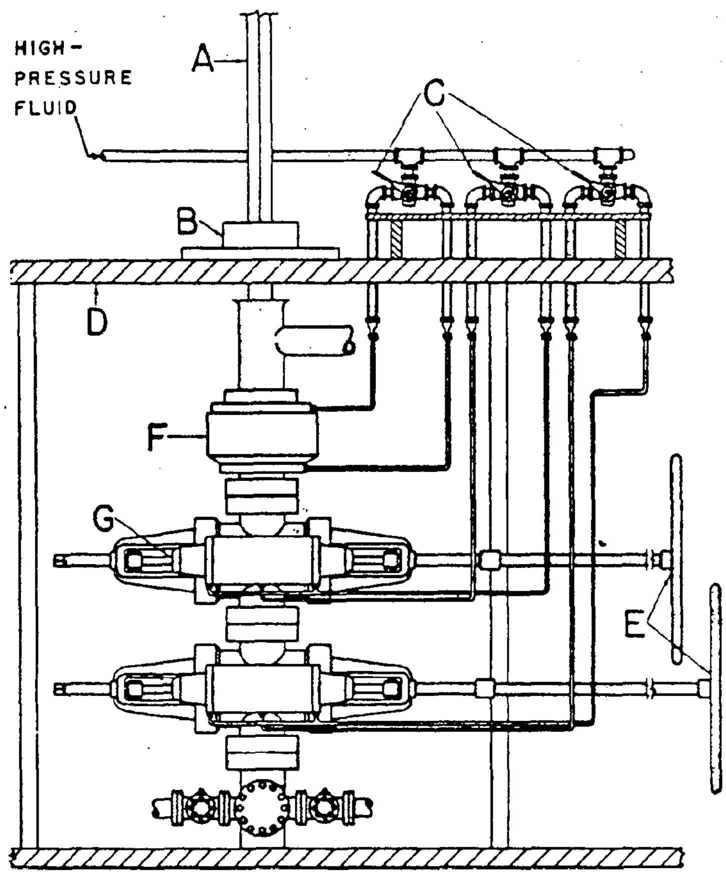
Development drilling proceeds in much the same way as exploratory drilling. After commercial accumulations of oil or gas have been found and fields delineated during the exploratory phase, the operator must formulate and submit a plan for developing the field so that it can be produced. The development plan, submitted to the Minerals Management Area Supervisor, must include:

1. a detailed description of drilling vessels, platforms, and structures, indicating where they are to be located, as well as their major features;



Casing strings and pipe used in an oil well.

Source: Energy Under the Oceans.



A = Kelly; B = Rotary table; C = Hydraulic controls on derrick floor; D = Derrick floor; E = Manually operated controls on side of substructure; F = Top preventer, which contains large rubber element capable of sealing around any tool protruding through casing head; G = Pipe rams, which close off hole, provided drill string is removed.

Blowout preventer stack.

Source: Energy Under the Oceans.

EXPLORATORY DRILLING RIGS

EMPLOYEE TYPE	LOCAL RESIDENTS	NON-LOCAL RESIDENTS
Contract rig crew	30	42
Dockside support	6	
Service support	16	8
Company supervision		4
Transportation		
Air	4	
Marine	16	
TOTALS:	72	54

DEVELOPMENT DRILLING RIGS

EMPLOYEE TYPE	LOCAL RESIDENTS	NON-LOCAL RESIDENTS
Contract rig crew	44	12
Dockside support	6	
Service support	10	
Company supervision	4	
TOTALS:	64	12

Source: Florida Coastal Policy Study

Typical Personnel Requirements of Exploratory & Development Drilling Rigs Based on Source

Figure 1-11

2. the location of each well to be drilled;

3. structural interpretations of the drilling area; and

4. any other information the Area Supervisor may require.

A separate drilling permit must also be submitted; this is identical to the Application for Permit to Drill the operator submits prior to drilling exploratory wells. Because of the comprehensive nature of the development plan, the plan is a good source of information for state and local agencies in anticipating onshore development pressures.

Based on previous experience in the Gulf of Mexico, fewer workers are required on the rig to drill a development well as compared to an exploratory well. Development drilling is usually characterized by fewer uncertainties, so that less effort is required to effectively monitor drilling activity. More workers are required during this phase for on-shore support services than during exploration. Figure 1-11 shows average monthly employment figures during the development phase.

Supplies and Services

Both exploratory and development drilling operations require a range of supplies, equipment, and skilled personnel. Some specific supplies and services needed to support offshore exploratory and development drilling are:

- Drilling muds and mud engineers;
- Cement;
- Drilling tools and equipment;
- Wellhead equipment (including blowout preventers);
- Rental tools;
- Helicopter transport;
- Crew and supply boats; and
- Offshore food and linen services.

The following sections provide general descriptions of the major supplies and services required for offshore exploration and development activities.

1. Drilling Muds and Mud Engineers - The "muds" that are pumped downhole to lubricate drilling equipment and maintain pressures in the geological formation are actually suspensions of premixed chemicals and minerals. Large amounts of the mud mixture are needed for drilling. Because muds must be custom-made to suit unique downhole conditions, the chemical formulation of mud mixtures requires the expertise of professional "mud engineers" who are actually chemists.

2. Cement - Cement companies also provide highly specialized services for offshore drilling operations. The cement company furnishes the required bulk cement and additives, and blends them in the proper proportions before delivery to the drilling rig. Because of the highly specialized nature of well cementing operations, oil companies or drilling contractors rely on established, proven cement companies for these services.

DRILLING MATERIALS REQUIRED PER WELL

Material	Exploration	Development
mud (tons)	642	525
cement (tons)	315	286
steel tubulars (tons)	455	477
diesel fuel (bbl)	3318	3570
fresh water (mil gal)	1.19	.97

(Source: NERBC)

3. Drilling Tools and Equipment - Drilling tools and equipment are required by contractors and oil companies during the drilling process. There are only a handful of major tool and equipment companies, and these companies serve exploratory drilling operations in all of the OCS regions.

4. Wellhead Equipment - Wellhead equipment is used by drilling contractors and oil companies with surface equipment to control oil and gas wells during drilling and production. Technicians are needed to supervise the installation and maintenance of the wellhead equipment.

5. Rental Tools - Rental tools are needed by offshore operators for several functions, including drilling, cutting, tool retrieval, and installing certain types of equipment.

6. Crew and Supply Boats - Another important service provided to offshore drilling contractors and oil and gas operators is the use of crew and supply boats for transporting personnel, supplies, and equipment to and from the drilling rigs. Depending upon the amount of exploration activity, the number of boats will vary. Specifications for representative crew and supply boats are given in Figures 1-12 and 1-13.

7. Helicopter Services - Helicopter companies transport crews, deliver supplies, and provide emergency services to offshore rigs and platforms. The number of people employed by a helicopter service depends on the number of helicopters at the facility. Most helicopters require only one crew member, the pilot. The number of maintenance personnel required varies from one mechanic for two helicopters to two mechanics for one helicopter, depending on the type of aircraft and the level of repair work performed at a given base. Although flights are usually scheduled for daylight hours, pilots and mechanics are on 24-hour call should emergency service be required. Three or four administrative personnel would also be employed at each helicopter base.

8. Boat and Helicopter Requirements -

Distance offshore	less than 150 mi	more than 150 mi
Supply boats	2 per rig	3 per rig
Crew boats	1 per rig	0
Helicopter	1 per 2 rigs	1 per rig

Source: NERBC, November 1976

9. Catering Services - A catering company provides food service and general housekeeping service to offshore operators. Such a company generally operates out of one central onshore facility that may service an entire offshore area. The facility usually consists of an office, and a warehouse, where food and supplies are stored prior to shipment offshore.

Appendix A. lists in detail typical offshore material requirements.

SCENARIOS

No Find Scenario

The "no find" scenario is based on the leasing and exploration history of the eastern Gulf of Mexico, anticipated future leasing, and optimistic attitudes toward the prospectiveness of the region. Historically, no more than five wells have been drilled simultaneously offshore Florida. As stated earlier, it takes about four months to drill one exploratory well. In 1981, there were 12 exploratory wells drilled off Florida. These wells, with possibly one exception, were drilled on acreage acquired in 1978. Working on the premise stated earlier, that exploration of tracts leased in a given sale will be completed five years following the sale, exploration of 1978 leases will probably be completed by the end of 1983. Exploration of leases acquired in 1981 and 1982 will probably begin no earlier than late-1983. While twenty Florida tracts were leased in 1981, only ten were acquired in 1982. The no find scenario will assume that the smaller number of tracts

BLACK GOLD MARINE, INC.
Terminal: Belle Chasse, La.

Name:	M/V CHIMERA
Builder:	Camcraft, Inc.
Year Built:	1975

Dimensions:

Length	100'
Beam	22'
Depth	9' 4"
Max. Draft	5'
Deck Space	44' x 22'
Passengers	59
Cargo	25 Long Tons
Fuel	2,400 gallons
Water	600 gallons
Ballast	7,500 gallons
Wheels	34 x 32 Bronze
	4 Blade

Performance:

Speed	28 MPH
Fuel/hr.	70 gallons
Range	800 miles w/Res.
Air Controls	Yes
Flying Bridge	Yes
Fire Pump	Yes

Black Gold Lounge Area

Machinery:

Main	3 12V71 Turbos
Generator	2 3-71 Diesels
Driving	2 ea. 30 KW Delco
Compressed Air	2 Quincy 150 CFM

Electronics:

Radio	Drake TRM 150 Watt SSB
	RF 11 Channel VHF
	RF-422 Ringer
Radar	Decca 914
Loran	Decca DAL 222
Fathometer	Pacifica 2600

OTHER:

Fully Air Conditioned
6 Bunks
3 Club Areas
1 Lounge Area
Water Cooler
3 Man Crew
Oversized Galley
2 Marine Heads
U.S.C.G. Certificated to Carry aviation fuel
PAS Premium Engine Monitoring Controls

BLACK GOLD MARINE, INC.

4528 ONE SHELL SQUARE / NEW ORLEANS, LOUISIANA 70139 / (504) 522-0793

CREW BOAT SPECIFICATIONS
SOURCE: NERBC

Figure 1-12

ARTHUR LEVY BOAT SERVICE, INC.

A PETROLANE CO.

Specifications for M/V BANDA SEAHORSE

TUG/SUPPLY VESSEL

REGISTRATION

Owner: Southern Offshore Boats, Inc.
Operator: Offshore Crews, Inc., No. in Crew: 7
Official No.: 561338, Port of: Morgan City, Louisiana
Builder: Jacksonville Shipyards, Inc., Year Built: 1974
Built to U.S.C.G. Spec.: yes, Classed: A -1, A.B.S. Load Line: International
Net Tonnage: 201, Gross Tonnage: 295.69

DIMENSIONS

Length: 204', Beam: 40', Depth: 16'6"
Light Draft: 8', Maximum Draft: 14'
Clear Deck Space Length: 109', Width: 35'

PROPULSION

Main Engines No.: 2, Mfg.: Alco, Model: 251 V12
Total H.P. Con.: 5350, Int.: 5885, Max.: 6160
Reduction Gear: Lufkin 5:1, Bollard Pull: 60 Tons
Steering: Hydraulic, Propellers: 108", Shafts: 11-1/2" ss
Vessel Speed: 17 mph, Fuel Consumption: 285 gph, Range: 7150 miles
Stern Controls: yes, Bow Thruster: Schottel Mdl 5225L, 450 hp

CAPACITIES

Fuel Gals.: 113,400 gal, Transfer Rate: 610 gpm @ 150' hd
Ballast Water Bbls.: 3500, Transfer Rate: 610 gpm @ 150' hd
Potable Water Gals.: 20,160 gal, Lube Oil: 6856 gal.
Drill Mud and Cement Tanks No.: 4, Cap. ea.: 920 cu. ft.
Mud and Cement Transfer Rate: 1500 cu.ft./hr.

TOW & MOORING EQ.

Towing & Anchor Handling Winch: HBL Mdl DDW-200 WHL
250,000 lb. line pull
Stern Roller: 5' dia x 8' long, A-Frame: none
Ships Windlass: New England Trawler, 30,000 lb. hydraulic
Ships Anchors: (3) 2000 lb., Chain: 30 shots of 1-1/2"

ACCOMMODATIONS

Certified to Carry: 21 Persons, State Rooms: 9, Berths: 23
Galley: All electric Fully Equipped, Accommodates: 15
Air Cond.: Central, Heating: Central

GENERATORS

No.: 2-Kato, KW: 200 each, Volts: 208-440
Engines Mfg.: Caterpillar, Model: D-343

NAV. & COMM. EQ.

Radios: VHF & SSB, Radars: (2) Decca 196
Fathometer: Decca ELAC LA 241C, Auto Pilot: Decca
Gyro Compass: Decca Sirius, Direction Finder: MK 21

SPECIAL FEATURES

Kort knozzles; Ice Strengthened Hull C; 200 amp welder; 2 capstans @ 10,000# line pull ea., 2 tugger winches @ 10,000# l.p., 2 chain wildcats for 3" chain, 125,000# l.p., 2 storage reels 6' dia. x 4'.

SUPPLY BOAT SPECIFICATIONS

SOURCE: NERBC

Figure 1-13

leased in Sale 67 (1982) indicates industry's diminishing interest in the eastern Gulf area, particularly in the greater Charlotte Harbor administrative area. Other assumptions made for this scenario are:

- 25 percent of tracts leased will be drilled, or one well drilled for each four tracts.

- A drilling rig will move from one lease to another until finished with all the wells contracted for on a given lease.

- Because of the proximity of existing active leases and tracts to be offered in the near future, industry will use the existing temporary service base at Port Manatee for most, if not all, exploration activities.

- Twenty exploration plans will be submitted for leases purchased at Sale 65 (1978). Fifteen wells have already been drilled. Another six will be drilled in 1982, completing drilling on Sale 65 leases.

Using these assumptions, in the period from 1981 to the end of 1988, 60 dry or noncommercial holes will be drilled. Figure 1-14 shows the level of activity and material and personnel requirements characteristic of the no find scenario.

Low Find Scenario

The low find scenario assumes that a commercial find will be made in 1983. After a discovery at one well, several delineation wells will be drilled to determine the parameters of the newly found field. Once a commercial field is delineated, it may be as much as 18 months to 2 years before the first platform is installed on the field. At this rate, production will not likely begin until late 1984. At the same time as delineation and development wells are being drilled, a number of new exploratory wells will be spudded, as a result of the encouraging finds.

Until the discovery is made, however, the pace of exploratory activity will be roughly the same as in the no find scenario. In the period 1982-1988, a total of 249 exploratory, delineation, and development wells will be drilled. Operators will be satisfied, at least for a while, that all the known commercial fields in the area offshore central and southwestern Florida have been discovered. Exploratory activity will continue beyond 1988 at about the 1987-88 level.

Development drilling on the discovered fields will continue until the level of maximum attainable yield has been reached. Then, production will go on until the fields are depleted. Figure 1-15 shows the pattern of drilling to be expected under the low find scenario.

Medium Find Scenario

The medium find scenario assumes that fields with similar production characteristics of many of the mature central and western Gulf hydrocarbon fields will be found in the eastern Gulf; this scenario also assumes a discovery in 1983. The medium find scenario is the one postulated by the Bureau of Land Management in environmental impact statements covering the eastern Gulf region. Inferences are made upon government estimates of mean undiscovered recoverable resources. Figure 1-16 depicts the pace of exploratory, delineation, and development well drilling for the medium find scenario. Also shown are the service base support requirements and employment profiles for this scenario.

High Find Scenario

The high find scenario postulates the discovery, beginning in 1983, of a number of giant hydrocarbon-bearing fields, similar in magnitude to some of the fields found off the coasts of Texas and Louisiana. The discovery of such a field or fields in the shallow water areas off Florida seems, at the present time, to be a very remote possibility. The probability of such a discovery is statistically below five percent. The number of exploratory,

ACTIVITIES & REQUIREMENTS	Wells drilled	Rig years	Local employees	Non-local employees	Mud (tons)	Cement (tons)	Steel tubulars (tons)	Diesel fuel (barrels)	Fresh water (million gals.)	Crew boats	Supply boats	Helicopters
YEAR/PHASE												
82 EXPLORATION	6	2	144	108	3,852	1,890	2,730	19,908	7.14	2	4	1
DEVELOPMENT												
TOTAL												
83 EXPLORATION	5	2	144	108	3,210	1,575	2,275	16,590	5.95	2	4	1
DEVELOPMENT												
TOTAL												
84 EXPLORATION	10	3	216	162	6,420	3,150	4,550	33,180	11.9	3	6	2
DEVELOPMENT												
TOTAL												
85 EXPLORATION	13	5	360	250	8,346	4,095	5,915	43,134	15.47	5	10	2
DEVELOPMENT												
TOTAL												
86 EXPLORATION	12	4	288	216	7,704	3,780	5,460	39,816	14.28	4	8	2
DEVELOPMENT												
TOTAL												
87 EXPLORATION	9	3	216	162	5,778	2,835	4,095	29,862	10.71	3	6	2
DEVELOPMENT												
TOTAL												
88 EXPLORATION	5	2	144	108	3,210	1,575	2,275	16,590	5.95	2	4	1
DEVELOPMENT												
TOTAL												

Scale of offshore operations ~~and~~ material and personnel requirements, no find scenario.

Figure 1-14

ACTIVITIES & REQUIREMENTS	Wells drilled	Rig years	Local employees	Non-local employees	Mud (tons)	Cement (tons)	Steel tubulars (tons)	Diesel fuel (barrels)	Fresh water (million gals.)	Crew boats	Supply boats	Helicopters
YEAR/PHASE												
82 EXPLORATION	6	2	216	162	3,852	1,890	2,730	19,908	7.14	2	4	1
DEVELOPMENT												
TOTAL												
83 EXPLORATION	5	2	176	108	3,210	1,575	2,275	16,590	5.95	2	4	1
DEVELOPMENT												
TOTAL												
84 EXPLORATION	18	6	432	324	11,556	5,670	8,190	59,724	21.42	6	12	3
DEVELOPMENT	9	3	192	36	4,725	2,574	4,293	32,130	8.73	3	6	1
TOTAL	27	9	624	360	16,281	8,244	12,483	91,854	30.15	9	18	4
85 EXPLORATION	18	6	432	324	11,556	5,670	8,190	59,724	21.42	6	12	3
DEVELOPMENT	13	5	320	60	6,825	3,718	6,201	46,410	12.61	5	10	2
TOTAL	31	11	752	384	18,381	9,388	14,391	106,134	34.03	11	22	5
86 EXPLORATION	25	9	648	486	16,050	7,875	11,375	82,950	29.75	9	18	4
DEVELOPMENT	15	5	320	60	7,875	4,290	7,155	53,550	14.55	5	10	2
TOTAL	40	14	968	546	23,925	12,165	18,530	136,500	44.30	14	28	6
87 EXPLORATION												
DEVELOPMENT	21	7	448	84	11,025	6,006	10,017	74,970	20.37	7	14	3
TOTAL												
88 EXPLORATION												
DEVELOPMENT	21	7	448	84	11,025	6,006	10,017	74,970	20.37	7	14	3
TOTAL												

Scale of offshore operations and material and personnel requirements, low find scenario.

ACTIVITIES & REQUIREMENTS	Wells drilled	Rig years	Local employees	Non-local employees	Mud (tons)	Cement (tons)	Steel tubulars (tons)	Diesel fuel (barrels)	Fresh water (million gals.)	Crew boats	Supply boats	Helicopters
YEAR/PHASE												
32 EXPLORATION	6	2	144	108	3,852	1,890	2,730	19,908	7.14	2	4	1
DEVELOPMENT												
TOTAL												
83 EXPLORATION	18	6	432	324	11,556	5,670	8,190	59,724	21.42	6	12	3
DEVELOPMENT	15	5	320	60	7,875	4,290	7,155	53,550	14.55	5	10	2
TOTAL	33	11	752	384	19,431	9,960	15,345	113,274	35.97	11	22	5
34 EXPLORATION	32	11	792	594	20,544	10,080	14,560	106,176	38.08	11	22	5
DEVELOPMENT	15	5	320	60	7,875	4,290	7,155	53,550	14.55	5	10	2
TOTAL	47	16	1,112	654	28,419	14,370	21,715	159,726	52.63	16	32	7
85 EXPLORATION	45	15	1,080	810	28,890	14,175	20,475	149,310	53.55	15	30	7
DEVELOPMENT	20	7	448	84	10,500	5,720	9,540	71,400	19.4	7	14	3
TOTAL	65	22	1,528	894	39,390	19,895	30,015	220,710	72.95	22	44	10
86 EXPLORATION	45	15	1,080	810	28,890	14,175	20,475	149,310	53.55	15	30	7
DEVELOPMENT	25	8	512	96	13,125	7,150	11,925	89,250	24.25	8	16	4
TOTAL	70	23	1,592	906	42,015	21,325	32,400	238,560	77.8	23	46	11
87 EXPLORATION	20	7	504	376	12,840	6,300	9,100	66,360	23.8	7	14	3
DEVELOPMENT	35	12	768	144	18,375	10,010	16,695	124,950	33.95	12	24	6
TOTAL	55	19	1,272	520	31,215	16,310	25,795	191,310	57.75	19	38	9
88 EXPLORATION	15	5	360	250	9,630	1,575	6,825	49,770	17.85	5	10	2
DEVELOPMENT	35	12	768	144	18,375	10,010	16,695	124,950	33.95	12	24	6
TOTAL	50	17	1,128	394	28,005	10,585	23,520	174,720	51.8	17	34	8

Scale of offshore operations and material and personnel requirements, medium find scenario.

delineation, and development wells may seem to be unusually high, but in this scenario, it is assumed that the discovery of a giant field off Florida would divert industry's attention away from less promising areas.

Onshore impacts will, under the high find scenario, be much more significant than under the other scenarios. At least two permanent service bases would locate on the Florida Gulf Coast. Supply and crew boat and helicopter traffic would increase dramatically, and existing offshore facilities at Port Manatee would be under great expansion pressure to expand.

Figure 1-17 presents the pace and scale of offshore drilling, and the material and personnel requirements characteristic of the high find scenario.

The corresponding onshore service base support and employment requirements for each phase of offshore development, given all scenarios, will be discussed in Chapter 2.

NOTES ON SCENARIOS

The numbers for the tables at the end of each scenario were derived in the main from the multipliers set forth in the NERBC Factbook, applied to the low, medium, and high find scenarios developed by the Bureau of Land Management for lease sales A66 and 66 for the Gulf of Mexico. The figures from these two sources formed the basis for scenario-building, and have been modified somewhat in light of other sources and actual OCS exploratory experience in the eastern Gult of Mexico.

ACTIVITIES & REQUIREMENTS	Wells drilled	Rig years	Local employees	Non-local employees	Mud (tons)	Cement (tons)	Steel tubulars (tons)	Diesel fuel (barrels)	Fresh water (million gals.)	Crew boats	Supply boats	Helicopters
YEAR/PHASE												
82 EXPLORATION	6	2	216	162	3,852	1,890	2,730	19,908	7.14	2	4	1
DEVELOPMENT												
TOTAL												
83 EXPLORATION	18	6	432	324	11,556	5,670	8,190	59,724	21.42	6	12	3
DEVELOPMENT	15	5	320	60	7,875	4,290	7,155	53,550	14.55	5	10	2
TOTAL	33	11	752	384	19,431	9,960	15,345	113,274	35.97	11	22	5
84 EXPLORATION	80	26	1,872	1,404	51,360	25,200	36,400	265,440	95.2	26	52	13
DEVELOPMENT	25	8	512	96	13,125	7,150	11,925	89,250	24.25	8	16	4
TOTAL	105	34	2,384	1,500	64,485	32,350	48,325	354,690	119.45	34	68	17
85 EXPLORATION	80	26	1,872	1,404	51,360	25,200	36,400	265,440	95.2	26	52	13
DEVELOPMENT	25	8	512	96	13,125	7,150	11,925	89,250	24.25	8	16	4
TOTAL	105	34	2,384	1,500	64,485	32,350	48,325	354,690	119.45	34	68	17
86 EXPLORATION	100	33	2,376	1,782	64,200	31,500	45,500	331,800	119.	33	66	16
DEVELOPMENT	35	12	768	144	18,375	10,010	16,695	124,950	33.95	12	24	6
TOTAL	135	45	3,144	1,926	82,575	41,510	62,195	456,750	152.95	45	90	22
87 EXPLORATION	60	20	1,440	1,080	38,520	18,900	27,300	199,080	71.4	20	40	10
DEVELOPMENT	48	16	1,024	192	25,200	13,728	22,896	171,360	46.56	16	32	8
TOTAL	108	36	2,464	1,272	63,720	32,628	50,196	370,440	117.96	36	72	18
88 EXPLORATION	40	14	1,008	756	25,680	12,600	18,200	132,720	47.6	14	28	7
DEVELOPMENT	48	16	1,024	192	25,200	13,728	22,896	171,360	46.56	16	32	8
TOTAL	88	30	2,032	948	50,880	26,328	41,096	304,080	94.16	30	60	15

Scale of offshore operations and material and personnel requirements, high find scenario.

CHAPTER 2

ANTICIPATED ONSHORE DEMANDS

The nature and extent of onshore development resulting from OCS oil and gas activities in a particular area is closely related to the scale and timing of offshore development. Consequently, where the assumptions made in Chapter 1 were critical in estimating possible offshore activities, this importance is compounded in translating these offshore activities into onshore facility requirements. Perhaps the most critical assumptions throughout these first two chapters relates to the quantities of oil and gas that may be discovered in the eastern Gulf of Mexico resource province and the rate at which exploration and development proceed. Assumptions relating to the timing of exploration, discoveries and subsequent development activities are the key to broader assumptions; they form the basis for estimating what may happen offshore, and thus, onshore.

OCS scenarios, as developed in Chapter 1 and repeated in the last sections of this chapter, are postulated development sequences including lease sale, exploration, development, and some hypotheses regarding production. The scenarios are not predictions of oil and gas activities. They are, rather, hypotheses used for the purpose of determining offshore and onshore impacts of a range of activities if they were to occur as postulated. If the postulated activities do not take place within the time frames indicated in the scenarios, it does not mean that the scenarios are without value. They can be adjusted according to the actual timing of events. In short, while the scenarios are based on analyses of past events in comparable situations, each OCS region is different in many ways from all others. Only the actual discovery of hydrocarbons and the determination of the size of a field or fields will offer accurate information upon which predictions rather than postulations can be made. Thus, the postulations of the scenarios are points for discussion: points from which a study can proceed.

EXPLORATION PHASE

During the exploration phase, onshore activity is generally minimal. Onshore operations during this stage are limited to the port-centered servicing requirements of exploration vessels. Harbor activity revolves around loading ships with drilling equipment, pipe, chemicals, drilling muds, food, supplies, and the like. Transfer of these materials to and from the rigs goes on more or less continuously.

Most of the ancillary industries supporting OCS oil and gas exploration do not establish facilities in a frontier region until after commercially recoverable quantities of oil and/or gas are discovered. However, certain support industries, including mud companies, cement companies, and helicopter companies, will often establish a facility in the area. Others, including drilling tool and equipment companies, fishing and rental tool companies, and catering companies, will often send personnel and equipment from their existing facilities, and perhaps maintain a small office or warehouse in the region.

Other services and supplies are provided by existing businesses during exploration. The oil companies will often arrange for the provision of welding and machine shop services, oil spill control services, and general supplies with these local firms, which may decide to expand at a later time.

DISCOVERY AND DEVELOPMENT PHASE

Once a commercial hydrocarbon discovery is made, the pace of onshore activity increases. The total time frame of the development cycle can be from 15 to 40 years depending upon the type of petroleum found, the extent of the find, and the rate of extraction. However, the peak activity period of construction-development will last for only a few years, during which time petroleum may come to dominate a local or regional economy, and the resulting development may place undue strain on social and natural systems that might last beyond the era of offshore production. The development cycle comes to an end with the depletion of the offshore fields (Lamson and others, "Coastal Communities: Continuity and Change", in New Directions in Ocean Law, Policy and Management, Dalhousie Ocean Studies Programme, Vol. 2, Issue 2, May 1982).

If the field discovered is large, a platform fabrication yard may be sited in a shoreline area accessible to the field. From the fabrication yard, the platforms can be towed or barged to the field. Due to the location of existing platform fabrication yards in Texas, Louisiana and Mississippi, as well as the capital expenditures involved in establishing such an operation, it is unlikely any such facility will be developed in Florida.

At the same time, refineries may be constructed if none already exist, or if those in operation cannot handle production from the discovery. Refineries can be located either at the shoreline or inland, closer to distribution markets, and may be supplied with crude oil by either vessel or pipelines. Gas processing plants may also be built near the coast during this phase.

The Gulf Coast already has an extensive refining network. Thus, it is highly unlikely at this time that (barring a huge hydrocarbon find) any new refineries would be located on the Gulf Coast of Florida. Figure 2-1 shows the current refining capacity of Gulf coastal counties and parishes by state.

Pipeline construction, both onshore and offshore, is also a major activity during the development phase. Pipe fabrication and coating yards are established, and operations for offshore pipe laying are begun. Large supply depots are required for storage of drill pipe, cement, drilling muds, and drilling equipment. There are already a number of such facilities on the Gulf Coast (see Figure 2-2).

Harbors and channels may need to be dredged and wharves constructed or expanded to accommodate the additional marine traffic. Facilities for repair of supply boats and drilling rigs may also be built. Land transportation routes -- highways and railroads -- may need to be improved to provide movement of personnel, equipment, and supplies.

Since the development phase calls for a larger number of workers, local communities are subjected to demands for housing and related facilities and services during this phase. During this phase, the influx of specialized labor into coastal areas may require expanded public services such as schools and hospitals, and new or upgraded utilities -- sewer, water, and electricity. However, once the oil facilities are built and in operation, the number of jobs in the area will diminish, and with them will go the families that, during the construction phase, placed these additional demands upon the community. Planners should be aware of the dangers of overbuilding in response to this temporary influx, and the desirability of creating a diversified economy to provide new jobs when the construction boom has ended.

In the transition phase between the development and production phases, heavy construction declines and operations related to supply and maintenance increase. Other industries, such as petrochemical plants, manufacturers, and commercial/retail establishments, move into the coastal regions. Supply boats, generally about two per platform, continue to use the harbor facilities for transfer of personnel and supplies to platforms. This transfer may be augmented by helicopter traffic from nearby airfields.

Figure 2-3 summarizes activities characteristic of the exploration and development phases. These activities will be further discussed in the scenario development section.

THE SERVICE BASE

Service bases serve as logistical links between offshore operations and onshore support activities during all phases of OCS oil and gas development. During exploration, the service base is a center for crew changes and equipment and supply transfers. The service base may be operated by an

State	Number of Refineries	Crude Oil Capacity (bpcd)
Alabama	3	96,400
Florida	2	41,400
Louisiana	25	2,408,758
Mississippi	1	280,000
Texas	37	4,496,556

bpcd = barrels per calendar day.

Source: Havran, 1982.

Refining Capacity of the Gulf Coast by State

Company	Location
Texas	
Morrison-Knudsen Co., Inc.	Houston
Nippon Kokan K.K.	Houston
Raymond International	Houston
Panama-Williams, Inc.	Houston
NOVA Pressure Services	Houston
Northwest Constructors, Inc.	Houston
H.H. Null, Inc.	Houston
Netherlands Offshore Co.	Houston
Natural Gas Construction Co.	Houston
Mid-Valley, Inc.	Houston
Marathon Paving and Utility Construction	Houston
McDermott Incorporated	Houston
Brown & Root	Port O'Connor
U.S. Steel	Baytown
Louisiana	
McDermott Incorporated	Lafayette
Brown & Root	Morgan City
Brown & Root	Harvey
McDermott Incorporated	Gibson
Williams-McWilliams Co., Inc.	New Orleans
McDermott Incorporated	Venice
Brown & Root	Belle Chasse
Brown & Root	Intracoastal City
McDermott Incorporated	New Iberia

Source: BLM OCS Office, New Orleans, 1980, unpublished documents.

Pipe Coating and Fabrication Facilities

Figure 2-2

EXPLORATION PHASE

Establishment of temporary service base, including:

- o mud companies
- o cement companies
- o helicopter companies
- o drilling tool and equipment companies
- o fishing (tool retrieval) and rental tool companies
- o catering companies

DEVELOPMENT PHASE

Platform fabrication yard established in area
Refinery(ies) may be constructed
Pipe fabrication and coating yards may be sited
Expansion of temporary service base
Possible harbor/channel deepening
Establishment of facilities for repair or supply boats & drilling rigs
Possible improvement of land transportation routes (railways and highways)

Typical Activities, Exploration and Development Phases
Source: RG&H, 1982

Figure 2-3

individual oil company, or by a specialized oil field service company. Before commercial quantities of oil and gas are discovered, the bases will be temporary; given the proximity of leases purchased by Shell Oil Company in OCS Lease Sales 66 and 67, it is reasonable to assume that exploration, and, perhaps later, development activities will be supported from Port Manatee, Florida, an existing temporary service base.

General estimates of land requirements for both temporary and permanent service bases can be made according to the amounts of offshore activity that are expected during the exploration and development phases. These estimates are shown in Figure 2-4 and in the scenario development sections that follow. It is important to emphasize that the numbers shown in these tables are rough generalizations, taken from an analysis of more or less comparable situations. Differences in location, site, operating procedures, and the phases of offshore activity being serviced directly affect the kinds of facilities located at a service base, the workforce required to run the base, the quantities of land needed, and the community infrastructural requirements.

Temporary Service Base

A temporary base includes, at a minimum, berthage for supply and crew boats, dock space for loading and unloading, warehousing and open storage areas, a helipad, and space to house supervisory and communications personnel.

Service base size and amount of vessel activity are functions of the number and kinds of exploration vessels and drilling rigs being serviced. Temporary bases are relatively small operations, and the limited acreage they occupy is usually leased on a short-term basis. Often existing public port facilities are used during the exploration phase. This was the case at Port Manatee during previous Gulf of Mexico exploratory operations.

A temporary service base is set up on a flat, vacant piece of waterfront land bounded on one side by a marginal wharf. Most of the land is used for open storage, primarily for tubular goods and drilling supplies. If any adequate buildings exist on the site, they may be used to house office and communication facilities. If not, one or more house trailers or similar prefabricated structures may be used for this purpose. Buildings and structures occupy a small portion of the land and are usually surrounded by large open areas. Warehouses needed to store supplies are located close to the docks to facilitate loading. Since large amounts of fuel are stored at the base, fuel tanks are also necessary. Some of these tanks are located close to the docks to expedite fuel transfer.

About five acres of land per drilling rig are required at a temporary service base. At Port Manatee, for example, ten acres of land were used to support two drilling rigs operated by two different oil companies.

Permanent Service Base

The permanent service base serves essentially the same function as the temporary base. It differs from the temporary base only in terms of size, intensity of activity, and ownership.

During development drilling, the service base provides the same types of goods and services as those needed during exploratory drilling. However, the fact that as many as 50 wells can be drilled from one platform, combined with the fact that one company's success often spurs increased exploratory activity by other OCS leaseholders, and that offshore operations continue for a long time, causes the size and intensity of support services to increase dramatically over those provided by the temporary service base.

Permanent bases also can be set up by either the oil companies or by service companies. Tenants at the service base may include such firms as cement companies, caterers, oil companies, mud companies, and equipment suppliers. A typical permanent service base may require 50 to 75 acres of

Service Bases: Summary of Requirements and Impacts

LAND

Temporary: 5-10 acres on an all-weather harbor.

The land is used for the following purposes:

- o warehousing: 1/2 acres per rig
- o open storage: 1 acre per rig
- o operations space (office and communications): house trailer
- o helipad: 1 acre per rig
- o parking space for employees

Permanent: 50-75 acres on an all-weather harbor. A typical permanent base might require 50 to 75 acres of waterfront land, depending on the intensity of offshore activity. Most of this land is used for warehouses and open storage. At least 10,000 square feet are needed for a permanent facility to house offices and communications, and one acre for each offshore platform is needed for helicopter landing space. These are approximate figures and they vary with economies of scale. Storage requirements are dependent on the proximity to the material supplier.

WATERFRONT:

Temporary: 200 feet of wharf/15-20 feet water depth

Permanent: 400 feet of wharf/15-20 foot water depth

FRESH WATER:

Temporary: 5,200,000 gal/rig/year during drilling

Permanent: 8,200,000 gal/platform/year during drilling

FUEL:

Temporary: 26,000 bbl/rig/year

Permanent: 54,000 bbl/platform/year during drilling; 19,200 bbl/platform/year during production

LABOR:

Temporary: 45 jobs per rig. About 45 jobs would be created at a temporary base for each rig drilling on the OCS. A base servicing 4 rigs would employ about 150 people. About 3/4 of these jobs could be filled from the local labor force. It is possible that some of this labor might be attracted away from other industries due to the higher wages at a service base.

Figure 2-4

Service Bases: Summary of Requirements and Impacts (Continued)

Four job categories exist at a service base:

- o wharf and warehouse crew (6 per rig)
- o helicopter crew (3 per helicopter)
- o crew boat crew (6 per boat)
- o supply boat crew (10-12 per boat)

Permanent: 50-60 jobs per platform during drilling. For each offshore platform engaged in drilling, from 50-60 service base jobs would be provided, approximately half of which could be filled from the local labor force. However, since a 7-day-on/7-day-off crew rotation is common for a service base operation, there may be no need for the crew to live locally.

Four job categories exist at a permanent base:

- o wharf and warehouse crew (6 per rig)
- o helicopter crew (3 per helicopter)
- o crew boat crew (6 per boat)
- o supply boat crew (20 per boat)

Air emissions: Hydrocarbons from fuel storage tanks and transfer operations; carbon monoxide and nitrogen oxides from machinery and vehicle exhaust.

Wastewater contaminants: Hydrocarbons and heavy metals from bilge and ballast water discharged by boats.

Noise: Up to 85 decibels on a 24-hour basis.

Solid wastes: Up to 6 tons per day during drilling operations, including hazardous, oil-contaminated wastes.

Source: NERBC Factbook, p.1.2

waterfront land, depending on the intensity of offshore activity. Most of this land is used for warehouses and open storage. At least 10,000 square feet are needed for a permanent facility to house offices and communications, and an additional acre for each offshore platform is needed for helicopter landing space. These are approximate figures; storage requirements are dependent on the proximity to the materials suppliers.

Bases Supporting Platform and Pipeline Installation

Onshore service bases are also established to support offshore platform and pipeline installation.

A number of vessels are required to install platforms and pipelines. For pipe laying, this involves a "spread", that is, a team of boats and barges supporting the pipeline lay barge. Tug boats and derrick barges are also required for towing the platform to its offshore site, and piecing together the platform deck with the riser. The companies performing these operations generally establish their own support bases to service the equipment and personnel engaged in these activities. Bases supporting platform or pipeline installation are quite similar to the temporary bases established during the exploratory phase. They require wharfage, warehouse space, and service, repair and maintenance facilities. One such support/supply base can service several pipe laying or platform installation operations simultaneously.

It is economically preferable for the company installing the platform or pipeline to locate at an onshore site as close as possible to the adjacent offshore location. Often, the installer will request space at the onshore service base of the oil company owning the lease. If there is not any available space at the oil company's service base, the contractor will attempt to procure land in an area close to the oil company's service base. In some cases, the platform installer will have space adjacent to the platform fabrication site.

Although bases supporting pipeline and platform installation are generally temporary, the installers may establish more permanent bases if a significant volume of future work in the area is anticipated. The establishment of permanent bases becomes more likely if a number of oil companies have made hydrocarbon finds in the adjacent offshore area.

Approximately five acres of land are required for a base supporting platform installation or pipe laying operations. This acreage allows the installation of about four platforms per year. In the case of platform installation, the land is used mainly for open storage. In the case of pipe laying, warehousing and open storage areas for equipment and maintenance supplies occupy the major portion of the land. Large quantities of pipe are not generally stored at the installation site, however, but are transported directly from the pipe coating yard to the offshore site.

Both the platform and pipeline installation operations require an additional acre for a helipad, and approximately 10,000 square feet of temporary office and communications facility space.

The location of the supply base within the harbor is also important. It is preferable for the offshore servicing functions to be segregated from other harbor functions, such as commercial fishing and recreational boating. This separation of uses helps the offshore operators avoid delays caused by congestion with other vessels and conflicting uses of waterfront facilities.

Service bases, both temporary and permanent, place a number of demands on the community in which they are located. The following describes some of these impacts.

<u>Transportation</u>

1. Water - Deliveries of fuel, mud, cement, and other supplies to the service base may be made by boat if this method proves to be the most economical. However, most of the boats using the base will

be supply, crew, and work boats, which transport workers and materials between the service base and the offshore rigs.

Two or three supply boats and one crew boat are needed to service each drilling rig. Since each boat can service more than one rig, economies of scale apply when one or two rigs are in operation. The number of rigs each boat can serve depends primarily on how far offshore and how close together the rigs are. For example, if three rigs were drilling 200 miles from the base, eight or nine supply boats would probably be needed. If the rigs were 100 miles away, four or five boats might suffice, since each could make twice as many trips per day. Although subject to wide variation, supply boats will generally remain at the drilling location until new supplies are needed (this can be up to 30 days). Smaller crew boats usually make the round trips which necessitate permanent berthing space.

2. Air - Oil companies often rent helicopters from an independent contractor whose heliport is located near the service base. The exception to this rule occurs during exploration, when a heliport may be located away from a service base under two conditions: (1) if the area contains an existing or potential airfield significantly closer to the drilling site than the nearest site suitable for a service base, thus lowering the highly distance-sensitive cost of helicopter operation, or (2) if the area is unsuitable for a service base (it may have no road access or port facilities).

   Depending upon weather conditions in the drilling region, helicopters may either stay at the rigs or return to the contractor's heliport at the end of each day.

   Since helicopters arrive at and depart from the service base, refueling facilities, communications equipment, and adequate landing space must be provided there. Although one helicopter and one acre of land (for a helipad) are needed for each drilling rig, less land per rig is needed when several rigs are operating at the same time, since several helicopters use the helipad at different times. For example, a five-acre helipad might be sufficient to handle helicopter operations for seven or eight rigs.

Access to a major airport is desirable for transferring personnel into and out of the region.

3. Highway and Railroad - Road and/or rail access is essential for a service base, since large quantities of materials must be brought into the base for transfer to the rigs. If offshore rigs drill four 15,000 foot wells per year, the following quantities of materials must be transported through the service base:

   - mud: 2,568 tons/rig/year
   - cement: 1,260 tons/rig/year
   - fresh water: 5,200,000 gallons/rig/year
   - tubular goods: 1,820 tons/rig/year
   - fuel for drilling: 13,272 barrels/rig/year
   - fuel for transportation: 12,000 barrels/rig/year
   - food, tools, and parts are needed at all stages

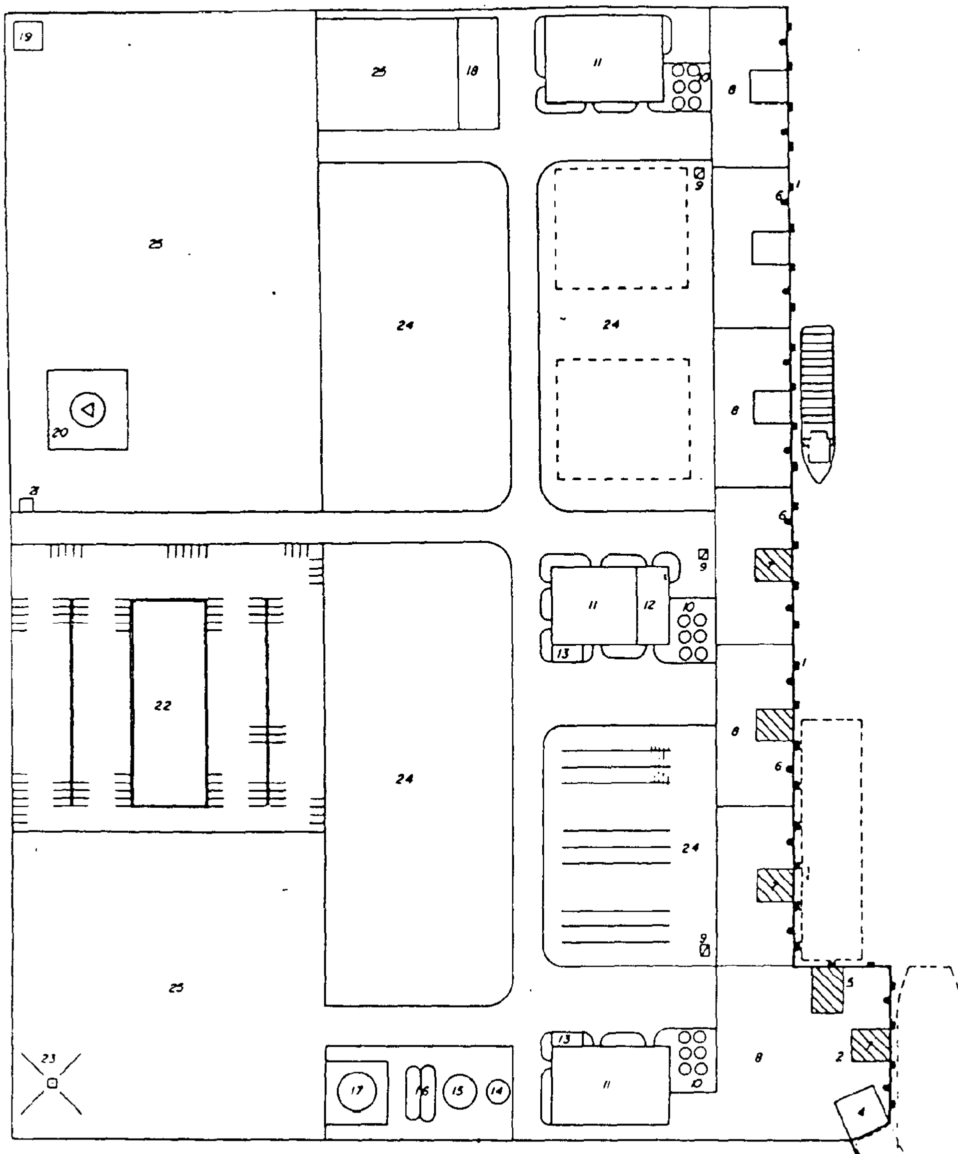
   (Source: NERBC Factbook, p.1.28)

   Figure 2-5 shows a prototypical service base.

DEMANDS ON PORT FACILITIES

Harbor Requirements

Sheltered harbors in the general area of offshore leases or proposed offshore activity are the major factor in locating onshore support/supply



LEGEND:

1 QUAYSIDE FENDERS
2 EXTENDED QUAY-DEEP DRAFT
3 DOLPHIN
4 ROLL ON/ROLL OFF FACILITY
5 AFT HANDLING FACILITY
6 POINTS FOR WATER/FUEL/MUD/CEMENT
7 REINFORCED AREAS FOR HEAVY LIFTING
8 QUAY APRON
9 FLOODLIGHTING TOWERS
10 MUD AND CEMENT SILOS
11 WAREHOUSES
12 BASE OPERATIONS OFFICE-2nd Floor
13 WAREHOUSE OFFICES
14 PORTABLE WATER TANK
15 DRILL WATER TANK
16 GASOLINE AND AVIATION FUEL
17 DIESEL FUEL
18 WORKSHOP
19 EXPLOSIVES STORAGE
20 HELICOPTER PAD
21 GUARD HOUSE
22 OFFICE BUILDING
23 COMMUNICATIONS TOWER
24 OPEN STORAGE
25 RESERVED FOR FUTURE EXPANSION

Alaska Consultants, Inc.

SERVICE BASE PROTOTYPE

base. It should also, if possible, have the dimensions to accommodate the anchoring and berthing of large mobile drilling rigs and pipe laying barges, which may need to anchor temporarily at the port.

The harbor must be deep enough at dockside during all tides to allow crew and supply boats alongside to load or unload the personnel and cargoes necessary for offshore operations. In the Gulf of Mexico, supply boats must be able to operate around the clock throughout the year. During the exploration and development stages, these vessels may also be required to haul anchors for drilling rigs and pipe laying barges.

Berthing space is that harbor capacity that is provided to the offshore oil industry. It is necessary for the operators to be able to load many supply vessels within a relatively short time, thus space must be available to carry out this function. Ideally, all service vessels within the harbor should be able to moor dockside. However, if sufficient berths are not available, the harbor must at least be large enough to enable the supply vessels to moor two or three abreast at dockside, or anchor safely within the harbor.

1. Supply/Crew Boats - Typical specifications for the kinds of crew and supply boats used in the Gulf of Mexico were given in Chapter 1. To briefly recapitulate, these are the dockside requirements for such vessels.

<u>CREW BOAT</u>

Length: 100 linear feet
Beam: 22 feet
Maximum draft: 5 feet
Capacity: 22 passengers; 25 long tons of cargo
Fuel (fully loaded): 2,400 gallons

SUPPLY BOAT

Length: 204 linear feet
Beam: 40 feet
Maximum draft: 14 feet
Capacity: 1,125 gross tons of cargo
Fuel (fully loaded): 113,400 gallons

2. Mobile Drilling Rigs - Jack-up rigs are platforms with legs that can be moved up and down. When the legs are extended, the platform can elevate itself above water and temporarily become a bottom-standing platform. By retracting its legs, the jack-up becomes a floater and, with assistance, can be moved from one location to another. At the present time, jack-ups can drill in water depths of up to 350 feet (Energy Under the Oceans, p. 39). Leases in the Charlotte Harbor administrative area do not exceed 350 feet in depth, so jack-ups are the type of drilling rig most likely to be used in exploring these eastern Gulf of Mexico leases. The jack-up must have assistance from tugs or barges to move from one spot to another, so these "assisting" vessels may from time to time call at the service base.

Drillships are self-propelled ships, generally used in deeper waters, and moored to the seabed or dynamically positioned above the drillsite.

Semisubmersibles are towed or self-propelled vessels located above the drillsite and stabilized in the water by partial flooding of the hollow pontoons and the "legs" of the craft. The vessel is held on location by seabed moorings or dynamic positioning, using motor-driven thrusters (API, The Search for Offshore Oil and Gas).

3. Pipe Laying Barges - There are several different methods employed in offshore pipeline installation. The most common is the lay barge or "stovepipe" technique, whereby sections of pipe are welded together on the lay barge and released into the water as the barge moves along the designated right-of-way.

A second technique uses the reel barge. This method entails welding long sections of pipe on land, winding them onto a large reel on the barge, and then laying the pipe directly from the reel.

Another method is to pull pipe lengths from onshore make-up facilities into the water. Because of the frictional stress on the pipe, the pull method is limited to lengths of 2 to 4 miles. This method would not be used to bring hydrocarbons from the eastern Gulf offshore (Energy Under the Oceans, p. 69).

Landside Space - Facility Requirements

The following sections describe typical service base tenants, and their characteristics and requirements.

1. Drilling Mud Companies - Drilling mud companies supply essential drilling fluids to contractors. Facilities required by a drilling mud company generally include a central office employing sales, clerical, and bookkeeping personnel, in addition to the engineers, chemists, and technicians. Distribution points are also located to store muds and service the rigs. There is often a small office and laboratory adjoining the distribution facility.

Land - A distribution point for a major mud company may occupy from three to ten acres, depending upon the amount of land available. Generally, one or two warehouses are located on a site, requiring from 8,000 to 10,000 square feet of covered storage area. Approximately 2,500 square feet of covered storage per platform serviced is a rule of thumb used by industry (NERBC Factbook, p. 10.18).

The distribution point for a small mud supplier is generally smaller than that established for the large mud company. One or two acres may be utilized, with warehouse storage space of approximately 5,000 square feet. Berths for loading service vessels are generally leased, either at an oil company's service base or from private owners in the area.

Waterfront footage is required by mud companies for loading supplies onto vessels to be transported offshore. As few as one or two berths may suffice.

Labor - The number of people employed at a mud distribution base will vary with the number of wells being drilled and the level of service activity. Four to 15 people may be employed at a base, including warehouse, clerical, managerial, and engineering personnel.

Warehouse personnel generally make up the majority of the work force at a distribution point. They are responsible for the movement of materials and supplies both into and out of the warehouses. Normally, these employees are on 24-hour call.

Clerical and managerial personnel are in charge of coordinating operations, bookkeeping, and other administrative tasks.

Engineering personnel design and oversee the administration of the mud program at the drilling site. Generally, two mud engineers, working a 7-days-on/7-days-off schedule, are required per platform. People hired as engineers are usually college graduates, with specialized training in "mud engineering."

Transportation - Small mud suppliers may use rail or truck service for the delivery of supplies. Trucking is often favored by the small supplier because of its flexibility and speed. Therefore, the small mud supplier may require good highway access rather than proximity to rail lines. Large mud companies generally rely quite heavily on rail delivery service as the most economical means of bringing supplies to a distribution point. If a distribution center does not include a railway siding, trucks are often used to move supplies from the nearest siding to the base.

Cement Companies - Cement companies provide highly specialized services for offshore drilling operations. The cement company furnishes the required cementing materials, bulk cement, and additives, and blends them in the proper proportions before delivery to the drilling rig. Due to the highly specialized nature of well cementing operations, oil companies or drilling contractors rely on established, proven cement companies to provide these services. A shoreside cement company will have a distribution center, basically a materials storage area with one or more warehouses for storage of the additives, and large pneumatic vessels for the storage of bulk cement.

Land - The siting requirements of a cement company are also similar to those of a mud company. Initially, a cement company looks for a site with enough waterfront footage to accommodate one or more workboats and enough land area to erect bulk cement silos and a warehouse for stacked goods.

The size of a cement distribution center varies in proportion to the volume of business handled through the facility and the amount of land available in the chosen area. About one to ten acres may be leased for a site. A cement distribution center requires waterfront access. Generally, there should be dock space for at least three boats (200 linear feet per boat), and minimum dockside depth of 14 feet.

Labor - The number of people on a cement company payroll may vary widely, depending on the number of offshore rigs being serviced at any given time. As few as five or as many as 165 workers may be employed, both offshore and onshore. Some onshore workers are employed in management, clerical, and laboratory positions. Others work as bulk plant operators, warehousemen, and mechanics. Generally, all onshore employees work eight-hour days, although for an emergency or a particular assignment, personnel may be on call, or working around the clock.

Cement companies generally maintain schools where inexperienced employees are trained in cement engineering. These employees then return to their regions of origin to work as cementers. Ultimately, as many as 75 percent of the people employed at a cement distribution base will be from local labor markets (Source: NERBC Factbook, p. 10.26).

Cement engineers operate the company's machinery and supervise cementing operations on the rig. Generally, these crews consist of two or three cementers working 7-days-on/7-days-off. In addition, there may be several persons employed as offshore supervisors and mechanics responsible for overseeing operations and making repairs, respectively, on all rigs carrying cement company equipment.

Transportation - A cement distributor must have access to the waterfront. A minimum of 200 feet of dock space is generally required for loading cement for transport to the drilling rigs. Generally, the company will try to acquire more space, with some companies maintaining as much as 750 feet of dock area, which is more than sufficient for three boats. If docked side by side, as many as six boats can be serviced in this amount of dock space. A minimum of 14 feet of water depth is required dockside (NERBC Factbook, p. 10.25).

Drilling Tools and Equipment Companies - Drilling tools and equipment companies manufacture and sell the tools and equipment required by contractors and oil companies during the drilling process. There are only a handful of major tool and equipment companies, and these companies establish small, branch facilities to serve exploratory drilling operations in a frontier area.

Land - A temporary facility in a frontier area may require 8,000 to 10,000 square feet of covered space for office and storage, depending on the type of product and services, whereas a permanent facility in a frontier area requires approximately 20,000 feet of covered space. On the Gult Coast, however, where the equipment needs of permanent sales and service facilities are served by regional warehouses, storage space requirements are not as great as in frontier areas where there may be only one facility. Therefore, Gult Coast facilities may be located on sites as small as one-eighth or one-quarter of an acre.

Labor - A permanent facility may employ one or two warehouse/office personnel and between six and ten service technicians.

Transportation - Most drilling tool companies do not require their own dockside space, but access to the service base wharves is desirable. Tools may be brought to the service base area from regional distribution points via either rail or highway, depending on the existing infrastructure.

Helicopter Companies - Helicopter companies transport crews, deliver supplies, and provide emergency services to offshore rigs and platforms. Because of the highly specialized nature of offshore helicopter operations, it is unlikely that oil companies would contract with a local operator for helicopter services in a frontier region. It is more likely that the oil companies would prefer to deal with an established offshore helicopter operator with a demonstrated record for safely transporting crews and machinery to and from the offshore rigs. Once contracted, the operator could expand or relocate in order to service the frontier area.

A helicopter company will move into a frontier region only after obtaining a firm service contract with an oil company. This is due to the substantial cost of expansion and the fact that helicopter companies generally work close to full capacity and, therefore, have few available helicopters or employees. However, one contract is generally a sufficient incentive to relocate, based on the assumption that one contract will lead to others. Initial contracts are usually obtained during the exploratory phase.

Land - A heliport consists of a helicopter landing area, a radio and/or control tower, a hangar for repairs, fuel storage tanks, an office/ communications facility with a waiting room, and parking facilities for employees and customers.

The amount of land required by a helicopter facility may range from 5 to 50 acres, depending on several factors. Each landing pad at a base takes about one acre of land; at a large or permanent heliport, a maintenance hangar of 14,000 square feet would be sufficient for the indoor servicing of 10 to 12 aircraft. Other variables are: the number and size of helicopters based at a facility, the weather conditions there, and the extent of the services provided at a facility. The amount of land necessary to ensure a clear flight path free of obstructions such as tall trees or power lines ultimately dictates the amount of land required.

Labor - Employment rolls at a helicopter base depend on the number of helicopters at the facility. Total employment at a single helicopter base may range from 20 to 140 people. This includes pilots, mechanics, and administrative personnel.

Transportation - Because helicopters are often chosen as the method of transporting emergency goods and personnel to offshore rigs and platforms, good highway and airline access is necessary. Highway access is also important for crews that need to get to the helicopter base in order to be transported offshore (NERBC Factbook, p. 10.50).

Catering Services - A catering company provides food and general housekeeping services to offshore rigs. Such a company generally operates out of one central onshore facility that services an entire offshore area. The facility usually consists of an office, from which operations are managed, and a warehouse, where food and supplies are stored prior to shipment to offshore rigs.

Initially a new onshore catering facility may not be set up in a frontier area. Instead, the caterer may contract with a local food supplier to deliver directly to the service base dock. If the number of rigs to be serviced numbers six or more, however, the establishment of a new facility would be likely.

Land - An onshore facility for a caterer is relatively small in relation to many other OCS-related facilities. A caterer may require as little as four acres of land. Waterfront footage is not required.

Labor - Because a catering company attempts to hire most of its offshore employees from the local region, an important siting criterion is the availability of local labor, particularly those skilled in food preparation. The number of persons employed by a catering firm ranges from one to ten per rig, depending on the number of persons serviced and the extent of the services provided offshore. Employees work 14-days-on and 14-days-off or 7-days-on and 7-days-off, depending on the personnel policies of the catering firm.

Full-scale operations could employ significant numbers of people offshore. Of the 500 people employed by one Gulf Coast catering firm, almost 85 percent work on offshore rigs. The remaining 15 percent consists of onshore administrative, supervisory, and clerical staff. Another caterer employs approximately 20 people onshore and 200 people on 35 to 50 offshore rigs and platforms (NERBC Factbook, p. 10.56).

Transportation - The oil company has the responsibility for transporting catering personnel and supplies offshore, either by helicopter or boat. Employees at the onshore catering facility will use existing highways for personal transportation.

Platform Fabrication Yards - Platform fabrication yards are industrial construction facilities where the platforms used to drill for and produce offshore oil and gas are built. There are two general types of platforms -- concrete and steel. The type of platform used is determined by the precise nature of the field being developed -- the mix of oil and gas in the find; wind and wave conditions; ocean bottom conditions; the number of wells to be drilled from the platform, and other conditions. Those used in the Gulf of Mexico are of the steel variety, so requirements for fabrication of this type only will be discussed herein.

Steel platform fabrication yards are large waterfront construction facilities, consisting mainly of cleared land, buildings, shops, and administrative offices, all set back from the waterfront. The steel platforms are constructed close to the waterfront and the marginal wharves.

The layout, requirements, and impacts of the fabrication yard are determined, in large part, by the number and complexity of platforms being constructed. The size of the yard depends on the size and number of platforms constructed annually, as well as the number of platform components fabricated on the site. Deck modules and tubulars (pipe), for example, are often manufactured elsewhere, either by the platform fabrication company or a subcontractor.

A steel platform fabrication company will generally establish a new yard only after a significant hydrocarbon discovery has been made, and development schedules have been set. A number of platform fabrication yards have already been established in the Gulf of Mexico region. Since platforms or platform sections could easily be towed from these existing yards to sites offshore Florida, it is highly unlikely that any new platform fabrication yards would be constructed in Florida. Figure 2-6 lists the locations of Gulf Coast platform fabrication yards.

Repair and Maintenance Yards - Repair and maintenance yards consist of many firms of varying capabilities, which provide services to the operators of vessels and equipment involved in OCS oil and gas development.

The repair and maintenance industry presents what is perhaps one of the easiest ways for indigenous enterprises in a frontier area to capitalize on OCS activity. Repair and maintenance firms need only augment their existing capabilities to meet the repair and maintenance needs of the OCS-related vessels, rigs, fixed offshore platforms, and equipment in order to participate in OCS-related onshore economic growth.

Since many repair and maintenance functions are performed underwater, specialized diving support vessels with workshops onboard are needed to service subsea completion units, pipes, hoses, etc.

Second only to crew payroll, the money spent on repair and maintenance is the largest amount of money spent by the operators of OCS support vessels (Source: NERBC Factbook, p. 2.1).

A repair and maintenance yard principally serving the needs of the petroleum industry is not likely to be newly sited in a frontier area. For the most part, these services already exist in ports where many of the OCS-related facilities requiring repair and maintenance capabilities are already sited.

The extent to which repair and maintenance services are augmented will depend on the amount of exploration, the number of wells that go into production, and the miles of marine pipeline laid. In other words, the repair and maintenance services will expand in direct relation to the amount of offshore activity.

Land - Repair and maintenance yards already exist as part of the indigenous industrial infrastructure of the Gulf Coast area. They generally service local industry at the same time they are handling the repair and maintenance of oil industry vessels and equipment. For this reason, it is unrealistic to discuss specific energy, land and waterfront requirements, as can be done with strictly OCS-related onshore facilities.

Labor - Most repair and maintenance firms need to be open for business 24 hours a day. Depending on the type of work to be done, the repair and maintenance operation should be able to call upon the services of a wide range of skilled people. Certified welders and pipefitters, sandblasters, and painters may all be needed.

Transportation - Accessibility to road, rail, and air transportation for delivery of parts from suppliers is necessary to ensure quick,

Location	Firm
TEXAS	
Beaumont	Bethlehem Steel
Brownsville	Marathon-LeTourneau
Channelview	Vemar
Houston	Brown and Root
Ingleside	Baker Marine
Ingleside	Chicago Bridge & Iron
Orange	American Bridge (U.S. Steel)
Orange	Levingston Shipbuilding
Port Aransas	Brown and Root
Port Arthur	Levingston Shipbuilding
LOUISIANA	
Amelia	Raymond Fabricators
Harvey	Avondale Shipyards, Inc.
Harvey	Brown and Root
Harvey	McDermott Incorporated
Harvey	Williams-McWilliams Co., Inc.
Houma	Benoit Machine
Houma	Delta Fabricators
Houma	Houma Welders
Lafayette	Teledyne Movible Offshore, Inc.
Morgan City	Twin Brothers
Morgan City	Avondale Shipyards, Inc.
Morgan City	Brown and Root
Morgan City	Corbitt Allen, Jr.
Morgan City	McDermott Inc. (Bayou Boeuf)
Morgan City	McDermott Inc. (Bayou Black)
Morgan City	Service Machine Group
New Iberia	Universal Fabricators
New Orleans	Avondale Shipyards, Inc.
New Orleans	Williams-McWilliams Co., Inc.
MISSISSIPPI	
Gulfport	McDermott Inc.
Pascagoula	Ingalls Shipbuilduing
Pascagoula	Chicago Bridge & Iron
Vicksburg	Marathon-LeTourneau

EXISTING PLATFORM FABRICATION FACILITIES

Source: Havran, 1982

efficient service to the offshore operators. Local commercial airports, as well as existing railways and highways may be used for transporting personnel and equipment.

8. Pipe Coating and Storage Yards - Pipe used for offshore oil and gas transmission must be coated for corrosion-proofing and, in some cases, to prevent flotation. There are two types of pipe coating operations: temporary ("railhead") and permanent. The temporary pipe coating firm may move into an area after winning a contract to supply coated pipe has been signed. The firm may coat and furnish pipe for one pipeline contractor for the duration of a season, or until a particular pipeline is completed. All this operation requires is firm, cleared ground, proximity to overland transportation (preferably a railroad), and access to the waterfront. If the company sees the possibility for continuing business, it may make the operation permanent.

   A permanent pipe coating facility will be established when the owner receives a long-term contract or sees the possibility for continuing, large-scale business. Once the yard is established, the owner will expand it as orders resulting from new offshore discoveries are received.

   Land - A permanent pipe coating yard requires between 100 and 150 acres; 30 acres may be sufficient for establishing a temporary operation. Depending on the storage needs and the availability of suitable land, a pipe coating firm may purchase or lease up to 200 acres. Sites already serving the Gulf Coast area range from about 75 to 200 acres.

   Labor - Labor requirements will vary depending on the length of operation, pipe sizes, and individual handling capacity of the yard. Approximately 100-150 workers are employed by one Gulf Coast company that specializes in pipes with diameters of 24 inches or less on its 84-acre site. During slack periods, the number of employees drops to about 85. Another Gulf Coast operation, with two locations, handles pipe ranging from 6 to 56 inches in diameter, and employs 150-200 in season, with 40-45 on the payroll during slack times (Source: NERBC Factbook, p. 9.23).

Transportation - Pipe joints are delivered from the steel mill to the pipe coating yard via barge or rail, depending on the location of the coating yard. Sand, cement, and ore aggregates are normally transported to the coating yard by barge or ship.

9. Wellhead Equipment Companies - Wellhead equipment companies provide drilling contractors and oil companies with surface equipment that controls oil and gas wells during drilling and production. They also employ technicians who supervise the installation and maintenance of wellhead equipment.

   Companies that manufacture and sell wellhead equipment have large, centralized production facilities. They establish a number of sales and service facilities throughout oil-producing regions, and supply these branch facilities from regional warehouses.

   During initial exploratory drilling in a frontier area, a wellhead equipment company with equipment on one of the contracted rigs will establish a small temporary facility at or near the service base supporting offshore exploration. The expansion of a temporary facility to a more permanent facility depends on the level of drilling activity over time. If commercial quantities of hydrocarbons are discovered, the activity associated with development drilling and additional exploratory drilling would very likely be sufficient to justify establishment of a permanent facility.

   Land - For initial operations in a frontier area, a wellhead equipment company would require 400 to 500 square feet of inside space, and additional outside space. A permanent facility in a frontier region may require 1 to 1.5 acres of land; 5,000 to 10,000 square feet of warehouse space; 500 to 1,000 square feet of office space, plus a repair shop and a fabrication shop.

A site with dock facilities is preferable, but if such a site is not available, a location near a dock facility and preferably convenient to the service base of their major customer would be sought.

Labor - For a temporary facility, only one or two full-time employees may be on the payroll. Employment at a permanent facility may range from 10 to 100 people, depending on the level of drilling activity and whether or not the facility has a machine shop on the premises.

Transportation - Companies that manufacture and sell wellhead equipment operate from large, centralized office/warehouse complexes. They will establish small branch offices in the area adjacent to the site of offshore exploration and development. Wellhead equipment is shipped from the regional distribution center to the service base site via truck or rail, whichever exists in the area.

10. Fishing and Rental Tool Companies - Fishing and rental tool companies provide tools for several offshore functions, including drilling, cutting, "fishing" (parts retrieval) and installing certain types of equipment. The tools these companies rent are often too specialized and/or expensive to be permanently provided on the drilling rig. Some fishing and rental tool companies not only provide tools, but also the specialized labor to work with them.

Land - Approximately one acre of land with a small warehouse is usually adequate for temporary fishing and rental tool facilities. Two to four acres of land are required for construction of permanent facilities. Space needed for offices, repair shops, and warehouses ranges between 5,000 and 20,000 square feet.

Labor - Temporary facilities employ from four to ten people, nearly all of whom will have been relocated from existing facilities in oil-producing regions. Permanent facilities generally employ from 10 to 30 people. Personnel working on the offshore rigs usually stay offshore until their job is completed; the job may take from 1 to 21 days (Source: NERBC Factbook, p. 10.39).

Transportation - Road and/or rail transport are required to bring equipment and personnel to the supplier's service base.

SCENARIOS

No Find

The no find scenario, as described in Chapter 1, spans the years 1982 through 1988. For exploration of eastern Gulf of Mexico tracts, the temporary service base at Port Manatee, Florida will be utilized by offshore drilling contractors. Any services not already provided by tenants at the port will be established, and will operate for the duration of exploratory activity. Services that will be required during exploration are the following:

- mud companies
- cement companies
- helicopter service
- drilling tool and equipment companies
- fishing and rental tool companies
- offshore caterers

The primary onshore facilities associated with the exploratory phase are docks, open and sheltered storage space, and office space. It is estimated that no dock personnel in addition to the personnel associated with marine transportation or onshore rig support or in the employ of the ancillary industries listed immediately above, will be required. Thus, there is no double-counting of personnel.

The following charts (Figures 2-7, 2-8 and 2-9) show the level of activity that could be expected at Port Manatee per year, under the no find scenario.

Low Find

The low find scenario assumes that a commercial hydrocarbon find will be made in 1983. The first few years following the discovery will find the offshore operators conducting delineation drilling in order to establish the extent of the fields or reservoirs. Increased capital investments will allow the service base to expand, and a few additional types of services will locate at or around the port. For example, a commercial find will encourage the fabrication and installation of production platforms and, if the operators determine it to be economically feasible, the emplacement of a submarine pipeline to carry hydrocarbons to shore. Activities previously described as characteristic of the construction-development phase will be accelerated. A temporary or "railhead" pipe coating operation may locate in the area in response to a contract to lay an offshore pipeline.

The following charts (Figures 2-10, 2-11 and 2-12) show levels of activity per year for the low find scenario.

Medium Find

It is assumed that oil and gas discoveries will be made during years 1983 through 1988 of the scenario. Exploratory activity conducted under the medium find scenario reflects the tendency of oil companies to increase their exploratory activities following a discovery in the area of commercial quantities of hydrocarbons.

As oil and gas are discovered, production platforms will be fabricated and installed. In the case of the eastern Gulf of Mexico, it is unlikely that a platform fabrication yard would be sited in Florida, in view of the economies involved. Establishment of a new fabrication yard could be more costly than continuing to order platforms from the number of fabrication yards already in existence on the Gulf Coast, and have the platforms towed to leases off Florida. Establishment of a platform fabrication yard requires a huge capital investment, including amassing a large enough parcel of waterfront property.

The only real difference in onshore activity between the low find and medium find scenario will be in the level of activity and permanence of operations. Onshore suppliers may be more willing than under the low find scenario to make capital investments in their companies, and may establish more permanent offices at the port site. The size, distribution, and number of finds may indicate that production will continue into the future, and the security of the service base tenants is more secure.

While a medium find may be enough to prompt consideration of siting refineries in Florida, this is also a complex question of corporate economics. A large refining capacity is already present in the Gulf Coast. Crude produced offshore Florida could, with relative ease, be shipped to existing Gulf Coast refineries, backing out the same quantities of foreign crude now being imported. A proposal for a new refinery in Manatee County was defeated in a referendum by the voters of the county, primarily as a result of fear of possible environmental degradation (Florida Coastal Policy Study, 1975, p. 71). If such attitudes against construction of new refineries in Florida can be expected in the future, refiners may be hesitant to buck such opposition and, thus, may site refineries in other areas of the Gulf Coast. The decision to build refineries in Florida will ultimately depend not only on the amount of crude oil discovered off the Florida coast, but also on what is decided at the federal level regarding national energy policies, the attitudes of State and local governments, and the policies of the individual oil companies (Florida Coastal Policy Study, p. 71).

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER/HELIPAD SPACE	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING AND RENTAL TOOL COMPANIES	PIPE COATING AND STORAGE YARDS	WHARF SPACE (LINEAR FEET)
1982	2 ac	1 ac	1/8 ac	No space needed at service base during exploration phase.	No space needed at service base during exploration phase.	400 sf	1 ac	No space needed at service base prior to hydrocarbon find.	200'
1983	2 ac	1 ac	1/8 ac			400 sf	1 ac		200'
1984	4 ac	2 ac	1/4 ac			400 sf	1 ac		200'
1985	4 ac	2 ac	1/4 ac			600 sf	1 ac		400'
1986	4 ac	2 ac	1/4 ac			600 sf	1 ac		400'
1987	4 ac	2 ac	1/4 ac			400 sf	1 ac		200'
1988	2 ac	1 ac	1/4 ac			400 sf	1 ac		200'

Service base land requirements, no find scenario
Source: Collins - RG&H, 1982

ac = acres
sf = square feet

Figure 2-7

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS	REPAIR AND MAINTENANCE FACILITIES
1982	4-15	10	1-2	8	None at service base during this phase.	20	4-10	None at service base during this phase.	Strictly OCS-related impacts cannot be computed; see text.
1983	4-15	10	1-2	8		20	4-10		
1984	4-15	15	1-2	8		30	4-10		
1985	4-15	25	1-2	10		50	4-10		
1986	4-15	20	1-2	10		40	4-10		
1987	4-15	15	1-2	8		30	4-10		
1988	4-15	10	1-2	8		20	4-10		

Service base labor requirements, no find scenario
Source: Collins - RG&H, 1982
(Units Refer to Individuals Employed)

2-37 Figure 2-8

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	REPAIR AND MAINTENANCE COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING TOOL & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS
1982	Rd, Wh	Rd, Wh	RR, Rd	Rd, FW	Hc, Rd	RR, Rd, Wh	RR, Rd	RR, Rd	
1983									
1984	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	NO REQUIREMENT AT SERVICE BASE
1985									
1986									
1987									
1988									

RR = railroad
Rd = road
Hc = Helicopter
FW = fixed wing aircraft
Wh = wharf site or access needed

Service base transporation demands, low find scenario
Source: Collins - RG&H, 1982

Figure 2-9

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER/HELIPAD SPACE	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING AND RENTAL TOOL COMPANIES	PIPE COATING AND STORAGE YARDS	WHARF SPACE (LINEAR FEET)
1982	2 ac	1 ac	20,000 sf	6 ac	4 ac	1,000 sf	2 ac	No requirement at service base at this time. See text.	200'
1983	2 ac	1 ac	20,000 sf	6 ac	4 ac	1,000 sf	2 ac		200'
1984	6 ac	3 ac	20,000 sf	10 ac	4 ac	1,000 sf	3 ac		400'
1985	6 ac	3 ac	20,000 sf	10 ac	4 ac	1,000 sf	3 ac		400'
1986	6 ac	10 ac	20,000 sf	15 ac	4 ac	1,000 sf	4 ac		400'
1987	6 ac	10 ac	20,000 sf	15 ac	4 ac	1,000 sf	4 ac		400'
1988	6 ac	10 ac	20,000 sf	15 ac	4 ac	1,000 sf	4 ac		400'

ac = acres
sf = square feet

Service base land requirements, low find scenario
Source: Collins - RG&H, 1982

Figure 2-10

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS	REPAIR AND MAINTENANCE FACILITIES
1982	4-10	10	4-10	8	10	10-20	4-10	No requirement at this stage. See text.	Strictly OCS-related impacts cannot be calculated. See text.
1983	4-10	10	4-10	8	10	10-20	4-10		
1984	4-10	30	4-10	12	30	10-20	4-10		
1985	4-10	30	4-10	12	30	10-20	4-10		
1986	4-10	40	4-10	12	45	10-20	4-10		
1987	4-10	35	4-10	12	35	10-20	4-10		
1988	4-10	35	4-10	12	35	10-20	4-10		

Service base labor requirements, low find scenario
Source: Collins - RG&H, 1982
(Units Refer to Individuals Employed)

Figure 2-11

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	REPAIR AND MAINTENANCE COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING TOOL & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS
1982	Rd, Wh	Rd, Wh	RR, Rd	Rd, FW	Hc, Rd	RR, Rd, Wh	RR, Rd	RR, Rd	N.A.
1983									
1984	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	NO REQUIREMENT AT SERVICE BASE
1985									
1986									
1987									
1988									

RR = railroad
Rd = road
Hc = Helicopter
FW = fixed wing aircraft
WH = wharf site or access needed

Service base transporation demands, low find scenario
Source: Collins - RG&H, 1982

Figure 2-12

The following charts (Figures 2-13, 2-14 and 2-15) show levels of activity per year for the medium find scenario.

High Find

The high find scenario postulates a number of commercially producible hydrocarbon finds; some of which may be of the same magnitude as some of the "giant" fields of the central and western Gulf of Mexico.

This scenario makes the assumption that commercial quantities of hydrocarbons will be discovered every year for the next five years and beyond. The exploratory activities under this scenario reflect the proven trend of oil companies to assiduously explore leases following a highly attractive discovery.

As in the other find scenarios, platform fabrication and installation follow close on the heels of the discovery. In the Gulf of Mexico, this is made possible by the fact that a number of platform fabrication yards are already in existence along the Gulf Coast, and the generally good weather conditions allow offshore operations to proceed throughout the year. Development wells are drilled once the production platforms are installed, and will continue until the operators are reasonably sure that all accessible fields have been discovered and produced.

Offshore events postulated in the high find scenario may justify construction of a platform fabrication yard in coastal Florida, along with one or more pipeline fabrication/coating operations. If the quantity of hydrocarbons produced is large, the construction of refineries in Florida may also prove feasible. Again, the constraints discussed previously regarding siting refineries in Florida must be considered. The amount of hydrocarbons produced is but one factor involved in the decision to site a large refinery.

Should a refinery be sited in Florida, the oil and/or gas produced from eastern Gulf leases would likely be transported to shore points near the refinery via submarine and onshore pipelines. The selection of pipeline routes is a complex matter, and state and local jurisdictions and powers come into play. The optimal landfall site (the place where the pipeline comes ashore) is at the location the shortest distance from the producing platform. Likewise, the optimal right-of-way for the onshore pipeline represents the straightest path from the landfall location to the refinery. Problems of land ownership, and coastal zone management policies of the state are but two of the "real world" factors that can influence pipeline siting in coastal areas.

The following charts (Figures 2-16, 2-17 and 2-18) show onshore impacts that could reasonably be expected given the high find scenario.

ACTIVITIES	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER/HELIPAD SPACE	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING AND RENTAL TOOL COMPANIES	PIPE COATING AND STORAGE YARDS	WHARF SPACE (LINEAR FEET)
YEAR 1982	2 ac	1 ac	20,000 sf	2 ac	4-6 ac	1,000 sf	4-6 ac		200'
1983	6 ac	3 ac	20,000 sf	6 ac	4-6 ac	1,000 sf	4-6 ac		400'
1984	6 ac	3 ac	20,000 sf	10 ac	4-6 ac	1,000 sf	4-6 ac		400'
1985	6 ac	10 ac	20,000 sf	15 ac	4-6 ac	1,000 sf	4-6 ac	5-10 ac	400'
1986	6 ac	10 ac	20,000 sf	15 ac	4-6 ac	1,000 sf	4-6 ac	5-10 ac	600'
1987	6 ac	10 ac	20,000 sf	15 ac	4-6 ac	1,000 sf	4-6 ac	5-10 ac	600'
1988	6 ac	10 ac	20,000 sf	15 ac	4-6 ac	1,000 sf	4-6 ac	5-10 ac	600'

ac = acres
sf = square feet

Service base land requirements, medium find scenario
Source: Collins - RG&H, 1982

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER/HELIPAD SPACE	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING AND RENTAL TOOL COMPANIES	PIPE COATING AND STORAGE YARDS	REPAIR AND MAINTENANCE FACILITIES
1982	10-15	10	4-12	8	10	10-20	4-10	50-150	Strictly OCS related impacts cannot be calculated. See text.
1983	10-15	20	4-12	12	25	10-20	4-10	50-150	
1984	10-15	45	4-12	16	45	10-20	4-10	50-150	
1985	10-15	45	4-12	16	45	10-20	4-10	50-150	
1986	10-15	55	4-12	20	55	10-20	4-10	50-150	
1987	10-15	45	4-12	16	45	10-20	4-10	50-150	
1988	10-15	45	4-12	16	50	10-20	4-10	50-150	

Service base labor requirements, medium find scenario
Source: Collins - RG&H, 1982

(Units Refer to Individuals Employed)

Figure 2-14

Figure 2-15

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	REPAIR AND MAINTENANCE COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING TOOL & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS
1982	Rd, Wh	Rd, Wh	RR, Rd	Rd, FW	Hc, Rd	RR, Rd, Wh	RR, Rd	RR, Rd	RR, Wh
1983									
1984	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR
1985									
1986									
1987									
1988									

RR = railroad
Rd = road
Hc = helicopter
FW = fixed wing aircraft
Wh = wharf space/access needed

Service base transportation requirements, medium find scenario
Source: Collins - RG&H, 1982

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER/HELIPAD SPACE	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING AND RENTAL TOOL COMPANIES	PIPE COATING AND STORAGE YARDS	WHARF SPACE (LINEAR FEET)
1982	6 ac	1 ac	20,000 sf	2 ac	4 ac	1,000 sf	4-6 ac	100-150 ac	400'
1983	6 ac	3 ac	20,000 sf	10 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'
1984	6 ac	10 ac	20,000 sf	50 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'
1985	6 ac	10 ac	20,000 sf	50 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'
1986	6 ac	10 ac	20,000 sf	50 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'
1987	6 ac	10 ac	20,000 sf	50 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'
1988	6 ac	10 ac	20,000 sf	50 ac	6 ac	1,000 sf	4-6 ac	100-150 ac	800'

ac = acres
sf = square feet

Service base land requirements, high find scenario
Source: Collins - RG&H, 1982

Figure 2-16

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS	REPAIR AND MAINTENANCE FACILITIES
1982	15-25	10	4-12	8	10	20-50	4-10	150-200	Strictly OCS-related impacts cannot be calculated. See text.
1983	15-25	55	4-12	16	55	20-50	4-10	150-200	
1984	15-25	60	4-12	20	60	20-50	4-10	150-200	
1985	15-25	60	4-12	20	60	20-50	4-10	150-200	
1986	15-25	70	4-12	28	70	20-50	4-10	150-200	
1987	15-25	60	4-12	20	60	20-50	4-10	150-200	
1988	15-25	55	4-12	20	55	20-50	4-10	150-200	

Service base labor requirements, high find scenario
Source: Collins - RG&H, 1982
(Units Refer to Individuals Employed)

Figure 2-17

ACTIVITIES / YEAR	DRILLING MUD COMPANIES	CEMENT COMPANIES	DRILLING TOOL & EQUIPMENT COMPANIES	HELICOPTER COMPANIES	CATERING COMPANIES	REPAIR AND MAINTENANCE COMPANIES	WELLHEAD EQUIPMENT COMPANIES	FISHING TOOL & RENTAL TOOL COMPANIES	PIPE COATING & STORAGE YARDS
1982	Rd, Wh	Rd, Wh	RR, Rd	Rd, FW	Hc, Rd	RR, Rd, Wh	RR, Rd	RR, Rd	RR, Wh
1983									
1984	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR	SAME AS BASE YEAR
1985									
1986									
1987									
1988									

RR = railroad
Rd = road
Hc = helicopter
FW = fixed wing aircraft
Wh = wharf space/access needed

Figure 2-18

Service base transportation requirements, high find scenario
Source: Collins - RG&H, 1982

CHAPTER 3

INVENTORY OF EXISTING PUBLIC FACILITIES AND SERVICES AT PORT MANATEE

Port Manatee is located in the northwest corner of Manatee County, Florida and on the southeast shore of Tampa Bay (see Location Map Figure 3-1 and Aerial Photo Figure 3-2).

Port Manatee consists of approximately 675 acres of port operational lands, including: an access channel connecting Port Manatee to the Federal Tampa Bay Channel, a ship turning basin, seven improved Berths (5 - 11), open and warehouse storage areas and land leased for agricultural farming.

Cargo presently handled at the port includes:

- Liquid Bulk Cargo (petroleum products) - crude oil, bunker C, diesel fuel, jet fuel, gasoline, industrial blends of fuel.
- Dry Bulk Cargo - cement, fertilizer/phosphate products, citrus pellets, feed, coal.
- General Cargo - lumber and plywood, steel, industrial equipment, scrap metal, citrus concentrates, waste paper, explosives, oil drilling supplies, building materials.

TRANSPORTATION ACCESS

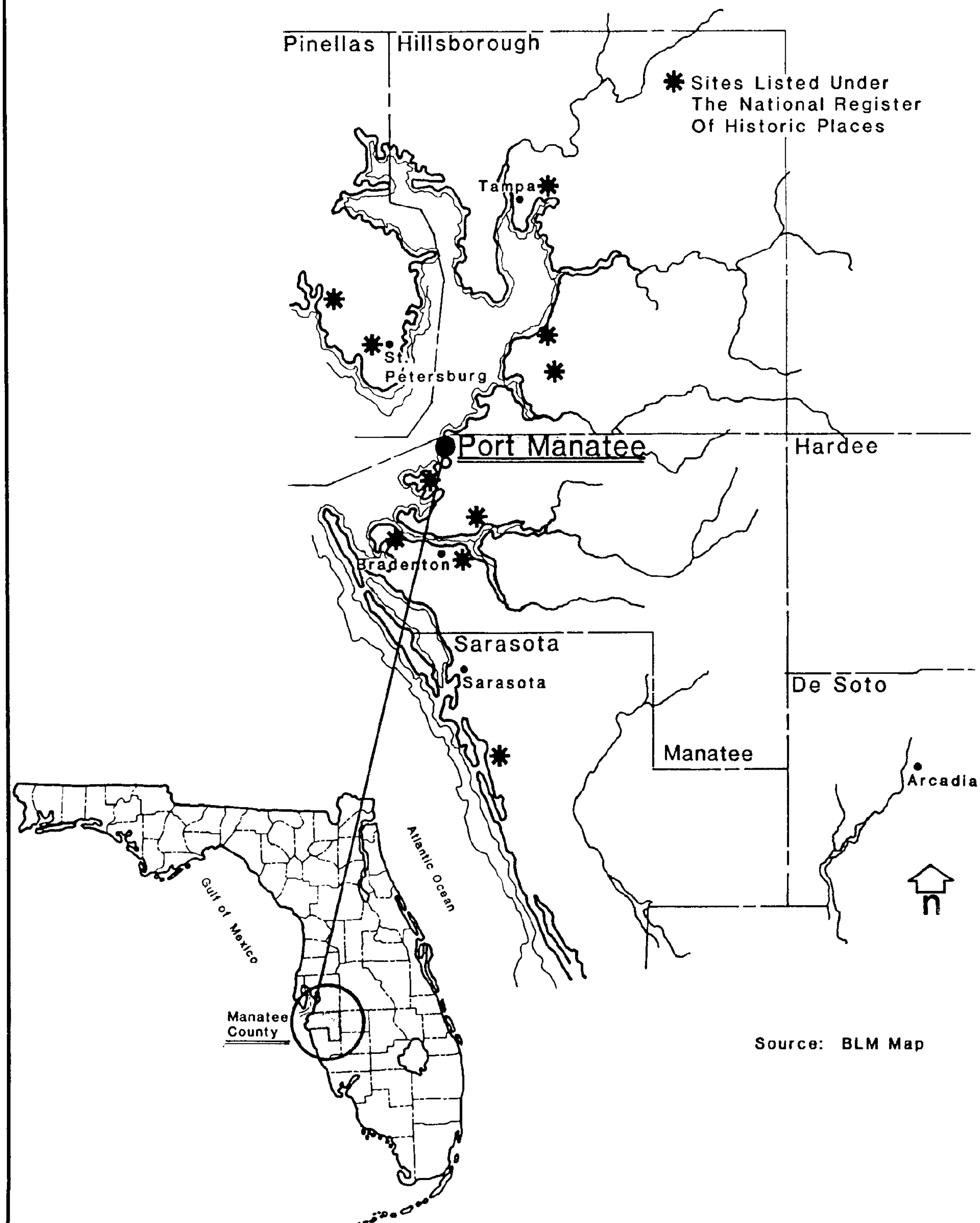
Water

Port Manatee is located approximately 12 nautical miles from the Tampa Bay entrance and is the first port of call along the Federal Tampa Bay Channel. After entering Tampa Bay between Egmont Key and Mullett Key, ships headed for Port Manatee proceed east approximately 5.5 nautical miles to the Sunshine Skyway Bridge. At the bridge the Tampa Channel heads northeast for approximately 3.5 miles to the Port Manatee access channel. The two channels intersect at right angles and have flared corners for turning (see Figure 3-3, Water Access to Port Manatee).

A 3-mile long access channel connects Port Manatee to the Federal Tampa Bay Channel. The access channel is 400 feet wide by 40-42 feet deep at low tide. The dimensions of the access channel and turning basin are based on a design vessel 600 feet long with a beam of 80 feet, which reflects present and future ship traffic. The access channel flares at its intersection with the Tampa Bay Channel and also at the entrance to the turning basin to provide sufficient area to maneuver a design vessel. At present, the Federal Tampa Harbor Channel depth limits vessel drafts to 33 feet, 6 inches. The USACOE is currently deepening the Federal Harbor Channel to -43' MLW. Completion of this project is anticipated by 1985, at which time Port Manatee will be able to utilize its access channel and basins to their design capacity. Port Manatee owns and maintains side channel markers and buoys which mark the limits of the access channel. Two upland range lights exist to aid pilots with channel alignment at night.

Tampa Harbor pilots, specially trained for navigating the Tampa Channel and the access channels into and out of the various ports in Tampa Bay, meet the larger ships just off Egmont Key, relieve the Captain and steer to the desired port. At the ports, tugs aid in the final docking procedure. Two tugs, owned by the Manatee Tug and Barge Company, are available for service at Port Manatee for an hourly fee. The harbor pilots are again contacted prior to departure. They provide their own transportation to and from the ships. The schedule of entrances and departures at the Tampa Bay entrance and at the ports is controlled by the Tampa Harbor pilots.

Location Map – Port Manatee



Source: BLM Map

Figure 3-1

N

Scale: 1"=400

PORT MANATEE

Figure 3-2

Air

Helicopter

One helicopter pad exists at Port Manatee and is located adjacent to Berths 10 and 11 on the southeastern side of the basin (see Figure 3-4, Port Manatee Helipad). However, helicopters have been observed to land at most all of the open areas at the port.

Fixed-Wing

Port Manatee is located within 40 minutes of Tampa International Airport and within 30 minutes of St. Petersburg International Airport and Sarasota-Bradenton Airport. Large air cargo or international/national flights are handled by any of these airports. Manatee Airport, a privately owned airport, is open to the public and is located on U.S. Highway 41, approximately one mile east of the port entrance. Manatee Airport consists of a 3,300 foot grass airstrip capable of servicing small planes (2-10 passengers) and is used for transferring personnel into and out of the area (see Figure 3-5, Major Roads and Airports Surrounding Port Manatee).

Land

Highway and Internal Roadway System

Highway access to Port Manatee is from U.S. Highway 41, west on Piney Point Road 0.58 miles, south on Reeder Road 0.13 miles, then west on the Port Manatee access road 0.55 miles to the port.

U.S. Highway 41 is a four lane, asphalt road and is owned by Manatee County. Manatee County maintains Piney Point Road except for the 2,500 foot stretch on port property, which is maintained by Port Manatee. Reeder Road is a two-lane, asphalt road and is owned and maintained by Manatee County. The two-lane, asphalt access road to Port Manatee, and other roads around the port facilities, are owned and maintained by Port Manatee (see Figure 3-5, Major Roads and Airports Surrounding Port Manatee).

Within the port land, paved roads consist of the westerly extension of the access road along the northern side of the basin, a north-south road along the eastern side of the basin and miscellaneous roads servicing the wharf areas. Unpaved roads connect additional areas, especially on the south side of the basin (see Figure 3-6, Internal Roadways and Rail Transportation).

Rail System

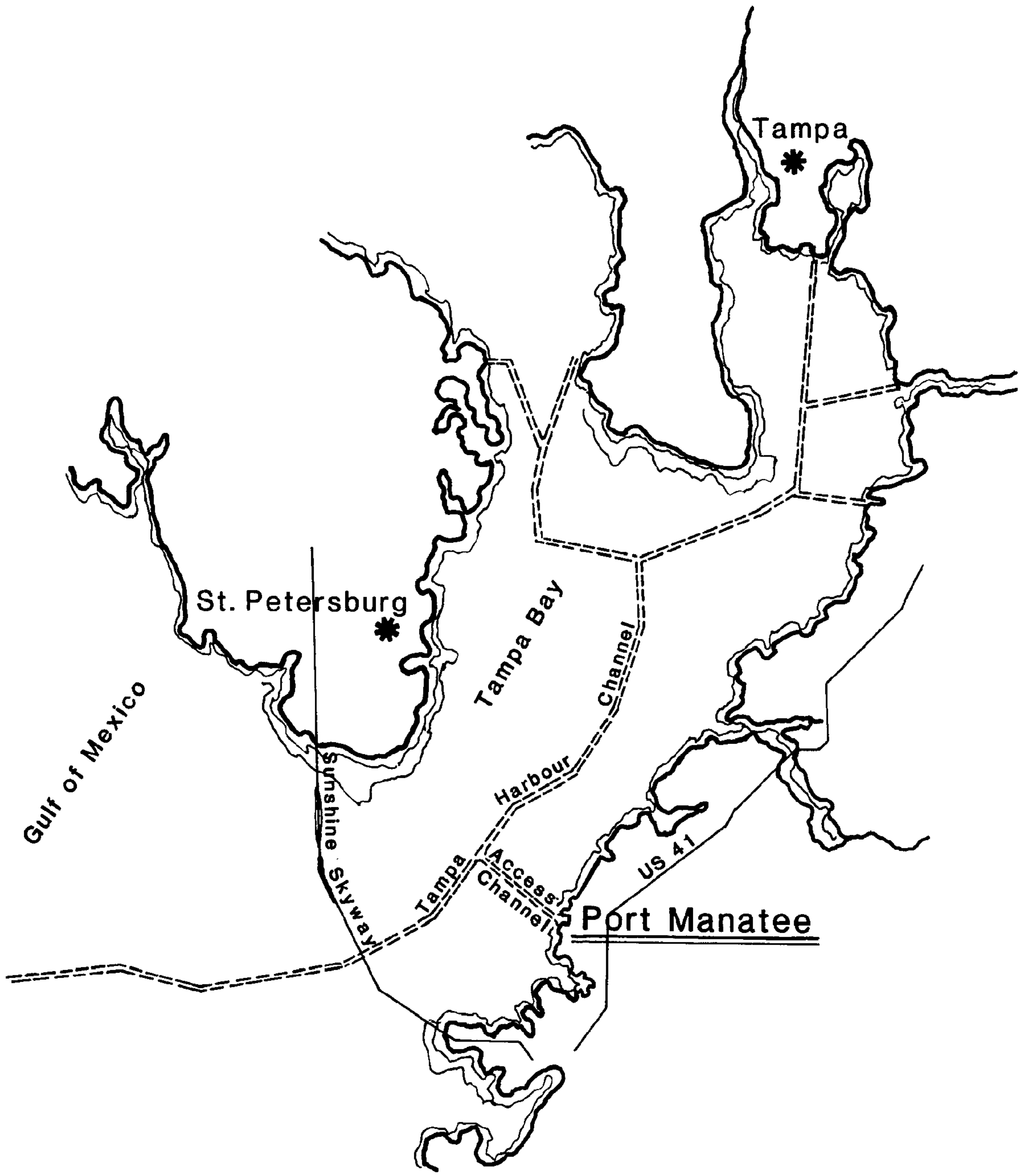
Port Manatee operates its own terminal railroad, the MCPA Railroad, which is licensed under the Interstate Commerce Commission. The port publishes a switching tariff as a Class III railroad. Railroad classes are designated by the Federal Safety Board. Class III indicates the railroad was designed to safely attain speeds of 40 to 50 miles per hour. The switching tariff is a tax to allow the connection with the interstate railroad, Seaboard Coastline Railroad. Port Manatee's railroad system consists of two switch engines, 26 switches, and approximately six miles of track.

The MCPA Railroad joins with the Seaboard Coastline (SCL) Railroad near the port entrance and parallels SCL while servicing the Dickey Clay Pipe Company and the Manatee Metals Company. From the connection with SCL, the MCPA Railroad runs west along the port access road to the port facilities. Berths 5 through 9 have access to rail service and Berths 6 and 7 utilize the railroad extensively (see Figure 3-6, Internal Roadways and Rail Transportation).

BERTHING FACILITIES

The port basin is an open-ended rectangular shape, approximately 1,500 feet long by 800 feet wide, bounded on all three sides by Berths 6 through 10. This allows efficient use of waterfront space, as the entire basin

Water Access to Port Manatee



Not to Scale

Source:

Department of the Army Jacksonville District
Corps of Engineers, Jacksonville, Florida

Figure 3-3

Port Manatee Helipad

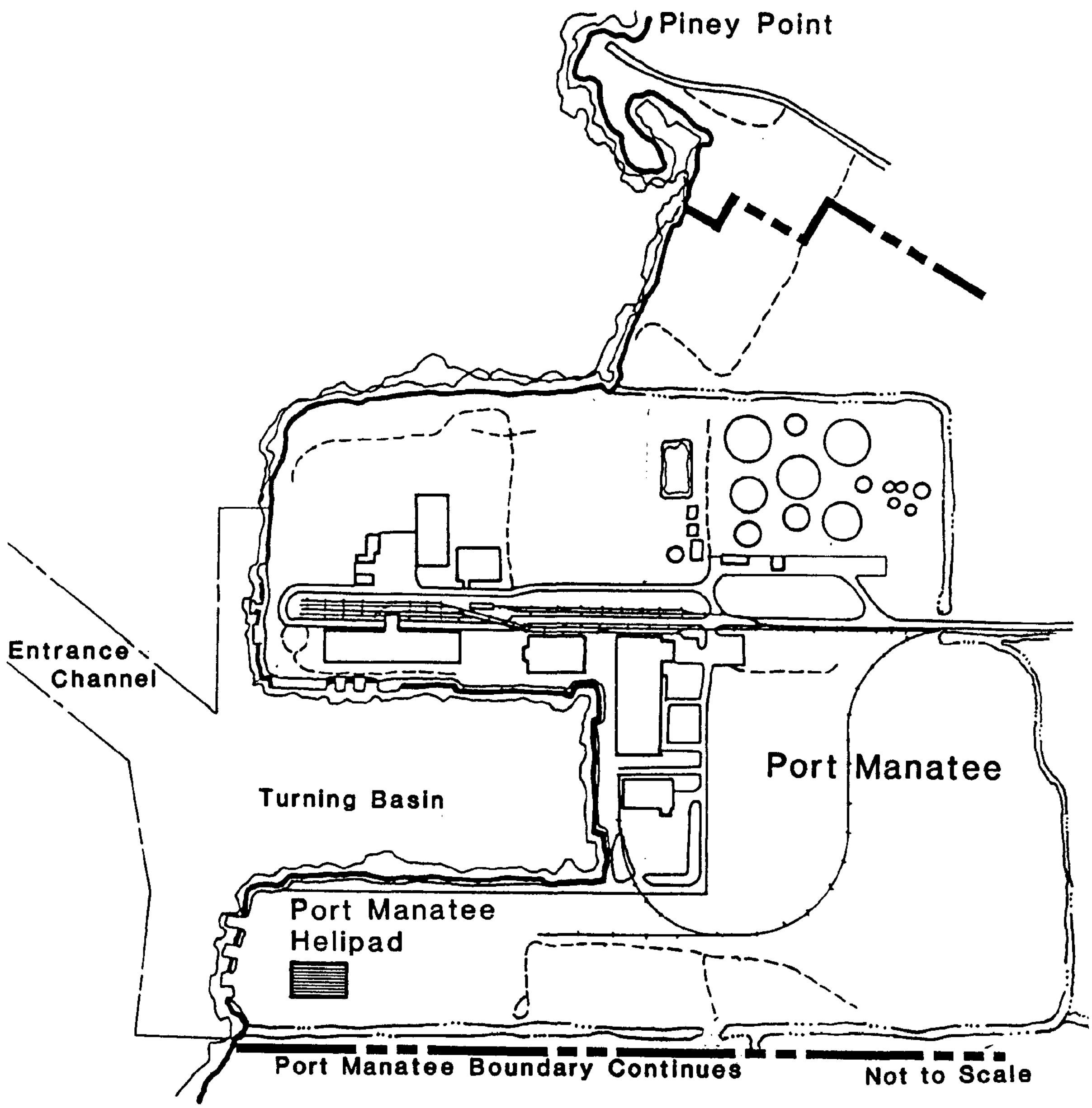


Figure 3-4

Major Roads & Airports Surrounding Port Manatee

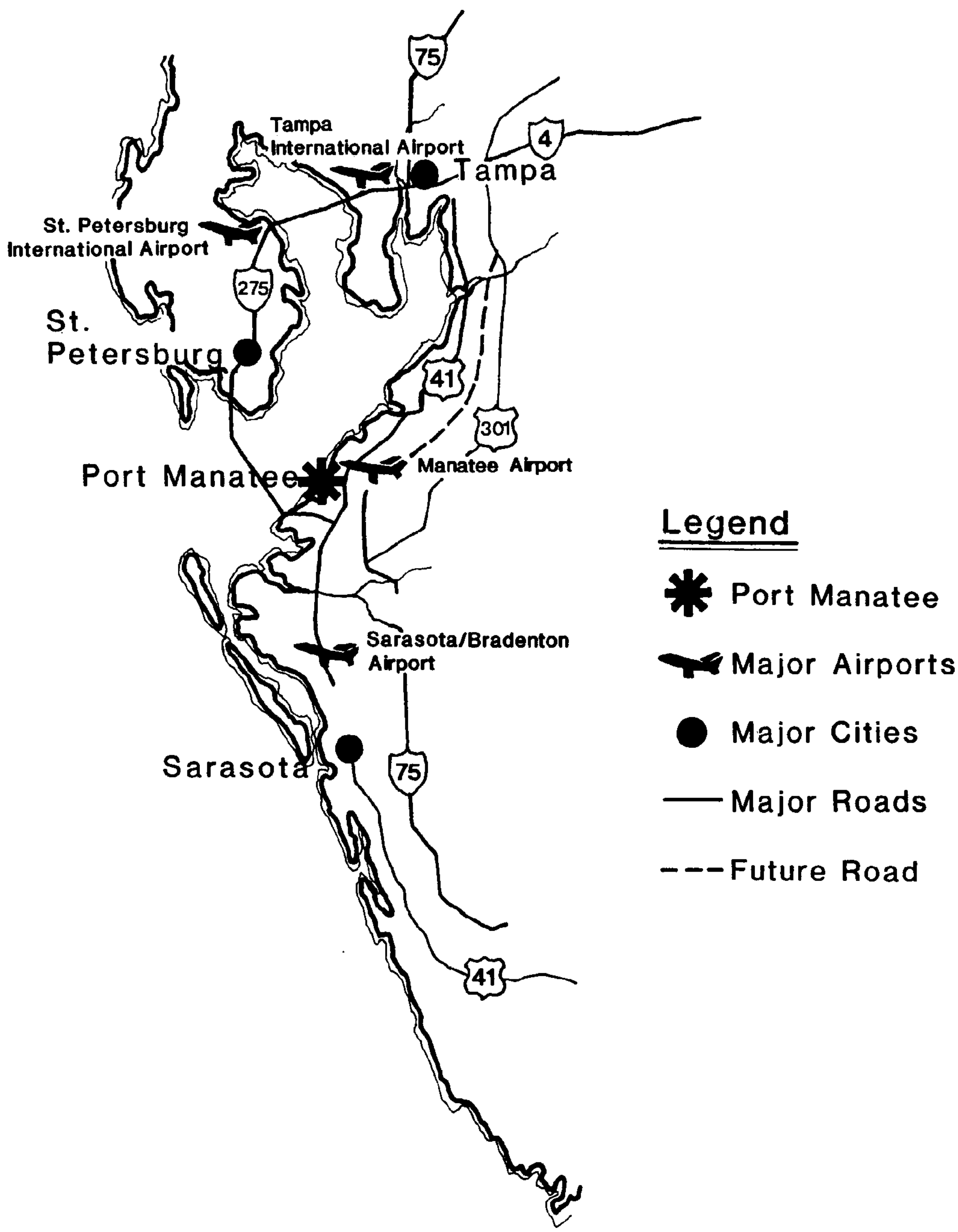
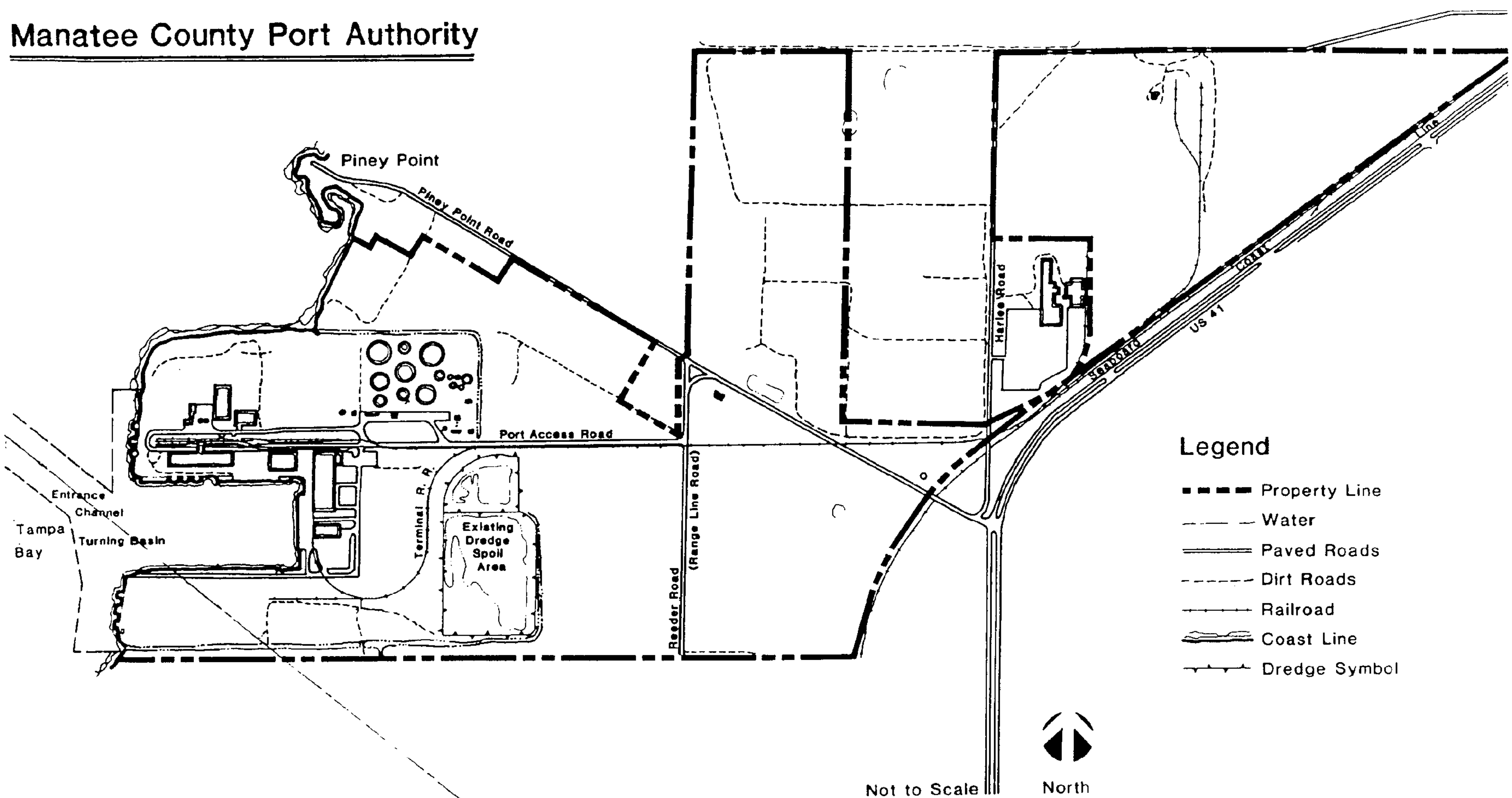


Figure 3-5

Manatee County Port Authority



Internal Roadways & Rail Transportation

Figure 3-6

perimeter is lined with berths. The open, rectangular shape coupled with direct access from the access channel, provides safe and efficient maneuvering to and from the berths (see Figure 3-7, Berthing Facilities).

Berth 5

Berth 5, originally constructed as a barge berth, is approximately 650 feet in length. Berthing structures consist of two steel sheet pile cells with concrete caps placed 250 feet apart, and a wood and concrete berthing platform located between them. Berth 5 is used for ship repair and barge storage. Since its construction in 1972, the steel sheet pile cells have experienced deterioration from corrosion to the point that the berth has significant operational limitations.

Berth 6

Berth 6 is approximately 750 feet in total length and consists of three "T" head concrete platforms (bulk oil loading (BOL) docks) constructed during the early 1970's and a newly completed wharf section. The new wharf, located 30 feet west of the westernmost platform, is approximately 240 feet in length and is designed to receive rails for a gantry type bulk loader. The new wharf section also includes an oil service point for off-loading and bunkering.

Berth 7

Berth 7 is approximately 500 feet long and consists of continuous steel sheet pile (SSP) cells. Berth 7 is used for oil, dry bulk and general cargo handling. Manatee Terminals operates a fixed gantry bulk loader on the berth which handles products such as phosphate and cement.

Berth 8

Berth 8 is approximately 500 feet long and consists of the same type structure as Berth 7 (SSP cells). The berth is used for petroleum and general cargo products, and is within close proximity to two large warehouses and the port administration building.

Berths 9 and 10

Berths 9 and 10 consist of continuous SSP cells with a concrete cap. The combined length of these berths is approximately 1,200 feet. These berths are mainly used for phosphate and general cargo handling. Becker Phosphate Company employs extensive use of Berth 9; Berth 10 is used by Florida Power & Light for off-loading and bunkering.

Berth 11

Berth 11 is approximately 550 feet in length and consists of three breasting platforms spaced 90 feet apart. The berth provides facilities for liquid bulk and general cargo vessels.

Existing Pipeline Facilities

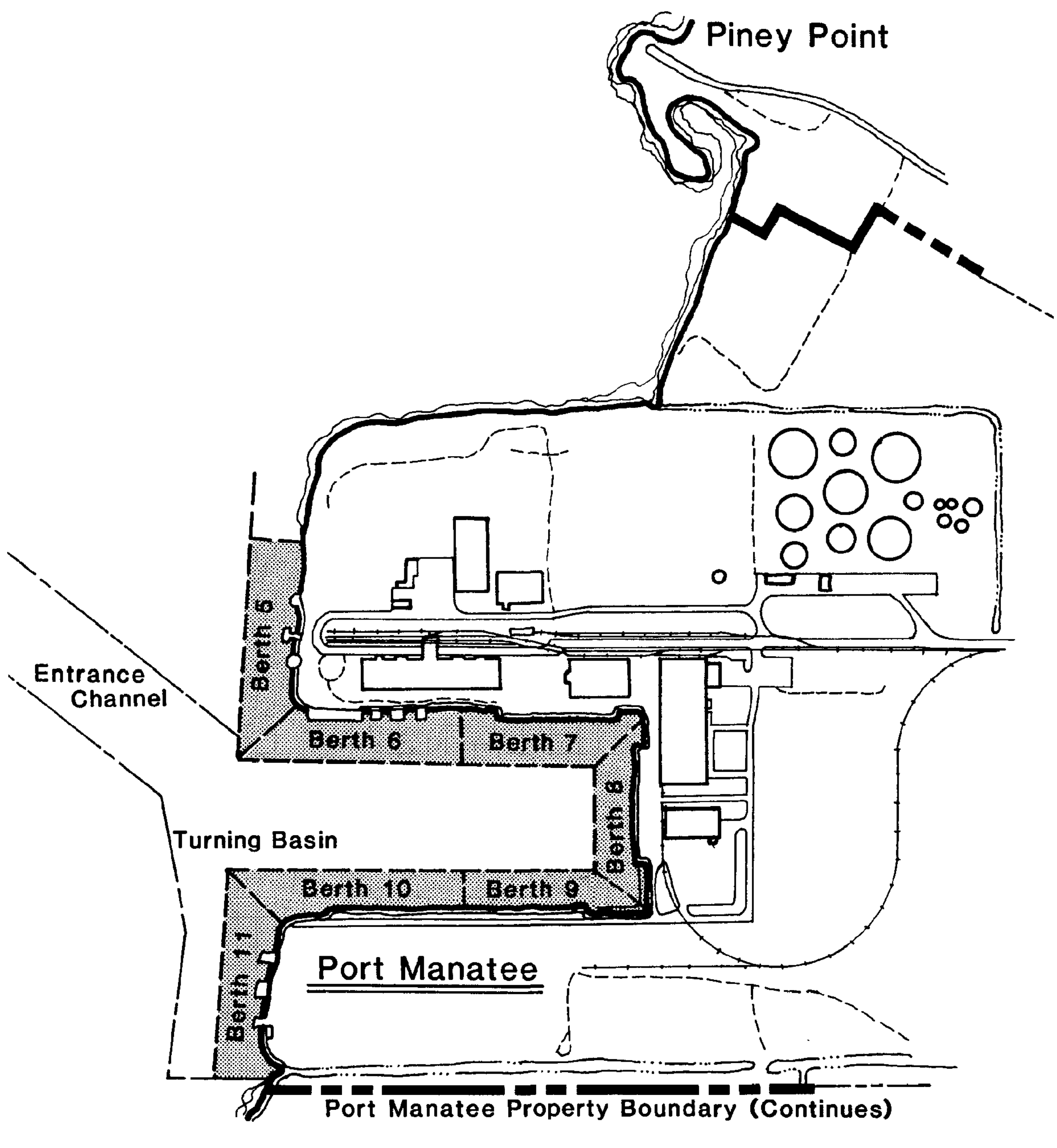
The existing pipeline facilities at each berth are listed below. These lines have on and off-loading capability.

Berth 5 - None

Berth 6 - Bunker C
Black Oil

Berth 7 - 8" Leaded Gasoline
10" Diesel
2-8" Bunkers (16" drops to 2-8")
10" Unleaded Gasoline
16" Asphalt

Port Manatee Berthing Facilities



Berth 8 - N to S

16" Asphalt
5 Stubs
2-12" Bunkers
10" Diesel
10" Bunker

Berth 9 - E to W

2-30" Bunker Lines
4-8" Diesels
6" Heavy Marine Diesel (dirty diesel)
8" Spare will tie to gas lines

Berth 10 - 4-8" Diesel

6" Heavy Marine Diesel
8" Spare
2-12" tied to 30" FPL

Berth 11 - None, 30" Diesel and Bunker lines planned.

UTILITIES

Water

Potable water supplied to Port Manatee is owned, maintained and operated by the Manatee County Utilities Department. Treated potable water is supplied by a water main running north along U.S. 41 from the Manatee Reservoir, which is located approximately 25 miles upstream of the Manatee River. The potable water is treated at the Manatee Reservoir before piping to the port. The water main is capable of supplying 4,700 gal/min of potable water (see Figure 3-8, Water Supply for Port Manatee) to Port Manatee.

Sewerage

Sewer facilities are located at Port Manatee and are owned, maintained and operated by the Manatee County Utilities Department. The wastewater treatment plant at the port has a permitted design flow of 40,000 gallons per day. The 1982 average flow was 5,000 gallons per day. Sewage treatment is by extended aeration. The effluent is chlorinated and discharged into an on-site evaporation-percolation pond. The sludge is disintegrated by chemicals and the treated water is piped underground to Tampa Bay (see Figure 3-9, Port Manatee Sewage Treatment Facilities and Primary Storm Drainage Systems).

Electricity

Electrical power and distribution facilities are provided by the Florida Power & Light (FPL) Company. Electric power service is provided individually to each tenant. Generally, there are no limitations to the amount of service that may be supplied.

Any sewer, water and electric power facilities/equipment located at the wharf structures and port-owned buildings are owned and maintained by the port.

MISCELLANEOUS SERVICES

Stormwater Drainage

Stormwater drainage within the main port facility is provided by a combination of ditches, swales, and underground pipe systems. South of Piney Point Road (including the main port facility) drainage flow is generally westward into the main north or south border ditches, then into Tampa Bay. North of Piney Point Road drainage flow is generally northward to the Piney Point Creek Watershed (see Figure 3-9, Port Manatee Sewage Treatment Facilities and Primary Storm Drainage System).

Water Supply for Port Manatee

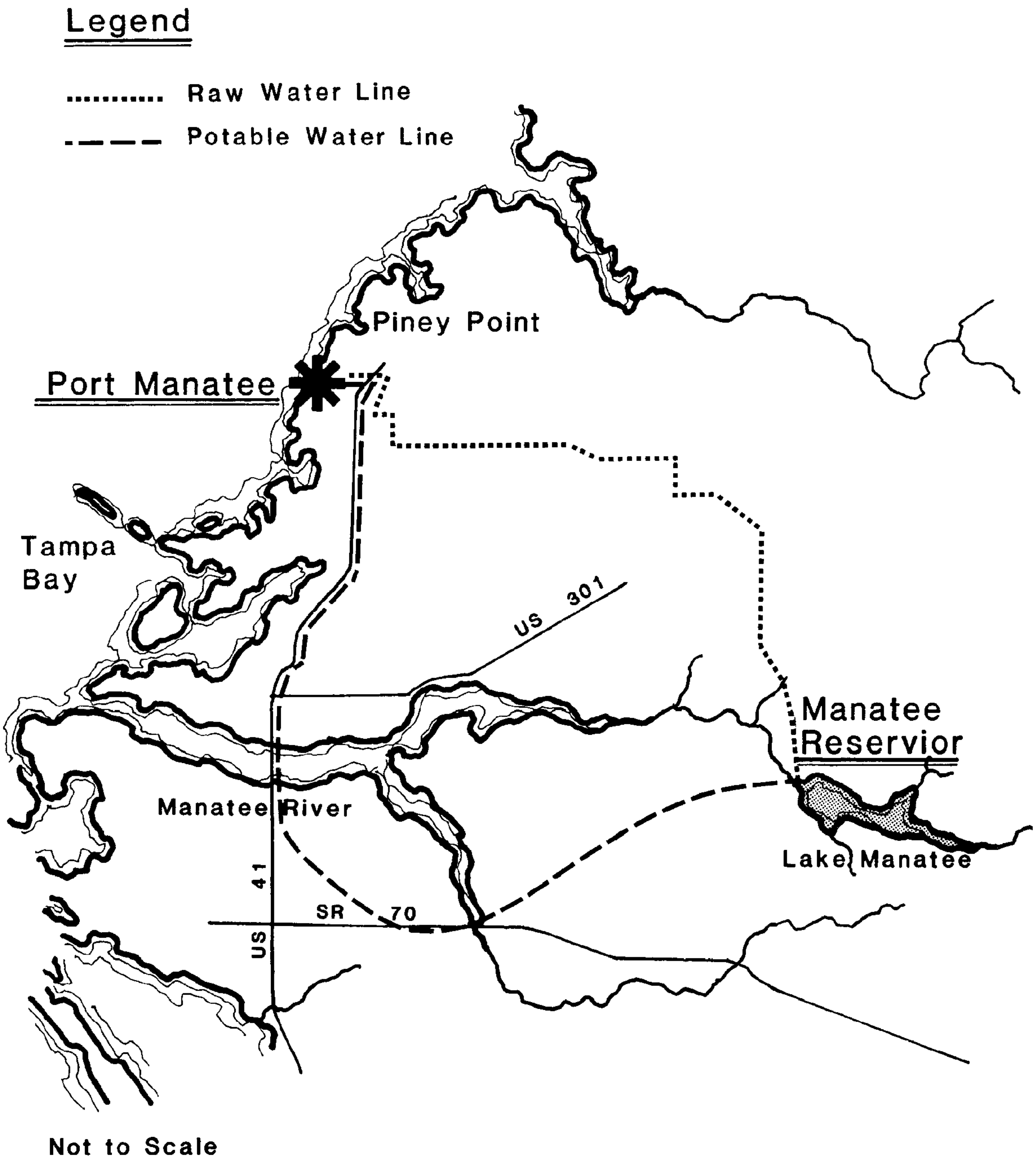


Figure 3-8

Port Manatee Sewage Treatment Facilities & Primary Storm Drainage System

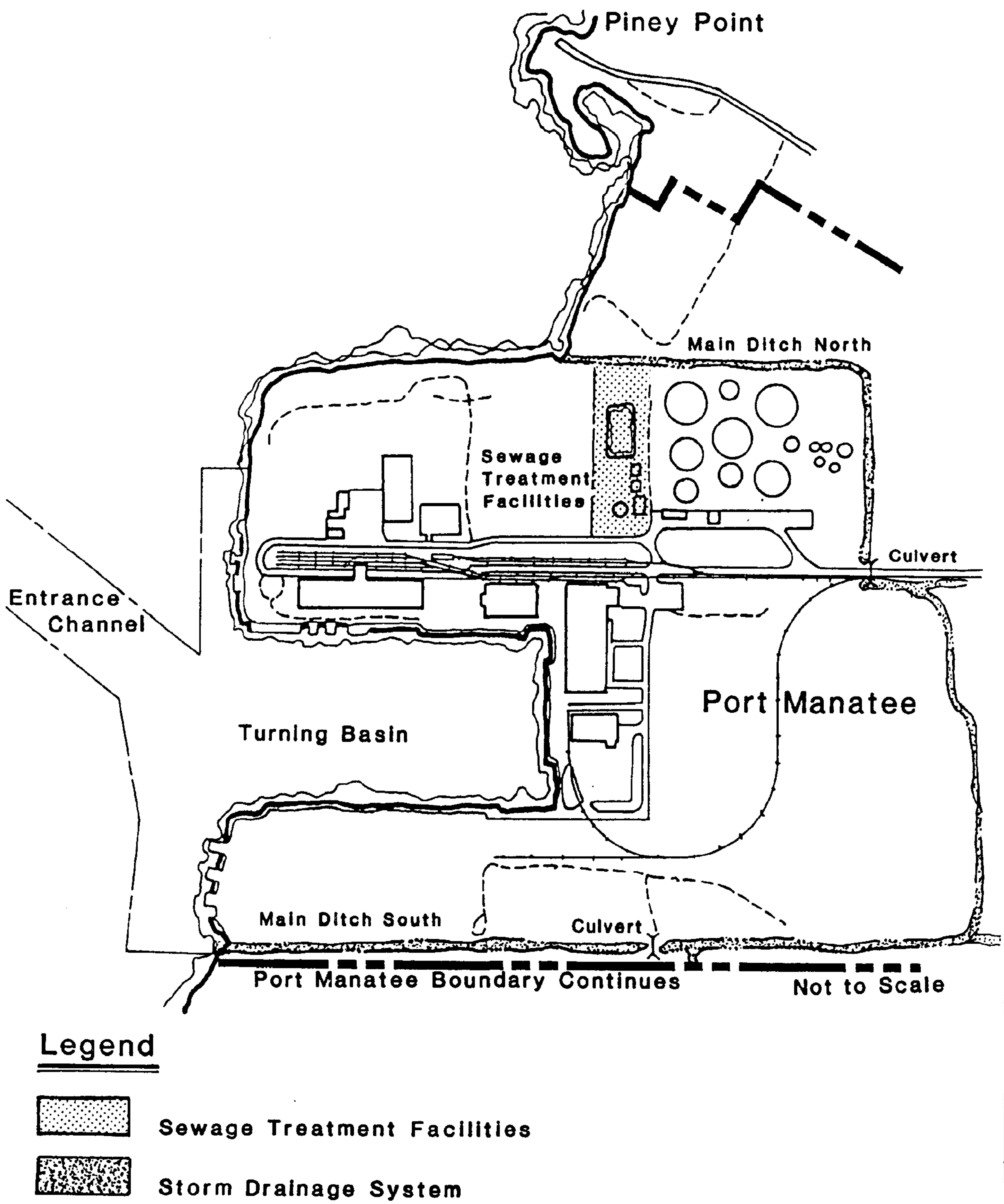


Figure 3-9

Solid Waste Disposal

Solid waste disposal is provided by a commercial collection company. Dumpsters are distributed throughout the port. The collected waste is disposed off port property in approved disposal facilities in accordance with the collection company's standard procedures.

Fire Control

Untreated raw water is piped directly from the Manatee Reservoir to an elevated storage tank located between Port Manatee and the AMAX Phosphate Complex (see Figure 3-8, Water Supply at Port Manatee). The storage tank capacity is sufficient to provide water for fire protection at Port Manatee. Port Manatee has a contract with the City of Palmetto Fire Department which provides fire fighting services. The Fire Department can be at the scene in 10 to 12 minutes from notification. Fire hydrants are distributed throughout the port to provide protection to all sections. Belcher Oil has some foam fire fighting equipment. Tugboats at the port have the capability of pumping saltwater for fire fighting.

Oil Spill Cleanup

The Port Manatee Environmental Protection Committee has a contract with A & A Coastal Pollution Cleanup Services, Inc. to contain oil spills at the port, whether they occur on water or land.

There is a trailer located on port property which houses equipment and materials. Included in the equipment is an oil boom capable of extending across the entire basin. This boom is strategically stationed at the western corner of Berth 10 where it can be immediately deployed to contain a spill within the basin. A copy of the contract, including a list of equipment and materials, is presented in Appendix B.

Security

A guard house is located at the port facility entrance with a guard on duty during hours when most tenants are not present, 3:30 p.m. to 8:00 a.m. The guard makes rounds through the port facilities every four hours. The guard is employed by the Manatee County Port Authority.

General Port Maintenance

The port has a maintenance crew of 12 persons, including one supervisor. The crew maintains the navigation buoys, channel markers, wharfs and buildings. The crew also maintains the drainage system, grounds and roads.

Lease Agreements

The typical lease addresses the following items:

Term - The terms of leases vary depending on the nature of the business of the diversified tenants. Existing terms at the port range from a month-to-month basis to fifteen years.

Rent - Rent is paid on a monthly basis and the amount is figured in different ways, again, depending on the business. Methods of payment are determined by the Port Authority and include; payment of a percentage of the appraised property value, a price per acre of leased land, an amount per ton of cargo shipped, or a set amount per month.

Purpose - The proposed use of the leased land is described in the lease and the tenant agrees to conduct business according to these guidelines. Any demolition or new construction must be authorized by the Port Authority.

Guaranteed Wharfage - Each tenant is guaranteed a certain footage of wharf and can use it to their fullest capability. However, tenants are responsible to provide the Port Authority with an advanced schedule of ship arrivals and departures so that other non-tenants may use the berths when vacant.

Access - The tenant has the right to continuously ingress and egress through Port Manatee to the leased property and guaranteed wharf. Full use of roads and railroads is included. The Port Authority shall have free access to the leased land, during reasonable hours, for examination and inspection to insure compliance with the terms in the lease.

Maintenance - All equipment and machinery at the berthing area and leased land should be in good repair and kept in an orderly, safe and healthy condition at all times.

Taxes and License Fees - All taxes and license fees for property, buildings, facilities, services or other improvements located on the leased property are to be paid by the tenant.

Utilities - Water, sewer and electrical services are available and all payments, including deposits and hook-ups are to be made by the tenant.

Insurance - Tenants are required to have a public liability policy to insure against any claims made by any persons injured in connection with construction, operation and maintenance of improvements, land and buildings. Usually, the policy will be required to name the Port Authority as well as the tenant as the persons insured. Otherwise, the Port Authority will be held harmless from all liability connected with activities on the leased land.

Subletting and Termination - Subletting of the leased property is only allowed if both parties formerly agree and produce legal documentation. Any termination of the lease, whether forced or intended, without the written agreement of the Port Authority will make the tenant liable under all applicable laws pertaining.

LANDSIDE SPACE

Existing Land Use

The following existing land uses are present at Port Manatee (see Figure 3-10, Existing Land Use):

- National Portland Cement operates a cement grinding mill on port property north of Berth 6. Processed Portland-grade cement is trucked from the port to industry in west central Florida.

- Manatee Terminals, Inc. operates dry bulk loading and storage facilities adjacent to Berths 6 and 7. Dry bulk loading at Berth 7 is performed primarily by a fixed gantry. Storage facilities consist of four silos, two for cement storage and two for citrus pellet storage, and approximately 80,000 square feet of warehouse storage area. The warehouses are used for phosphate, citrus products and cement storage.

- The Belcher Oil Company operates a petroleum storage tank farm in an area just northeast of the port basin. The farm presently has a capacity of 1,400,000 barrels. Belcher has purchased additional land adjacent to this property to provide increased storage capacity. Belcher utilizes Berths 6-10 for on and off loading of petroleum products.

- The Manatee Energy Company operates a 28,000 barrel-per-day crude oil processing plant northeast of the basin near Belcher Oil. The plant processes jet fuel, diesel and residual oil products for the west central Florida area. The property also has a 300,000 barrel capacity for storage.

Existing Land Use

Manatee County Port Authority

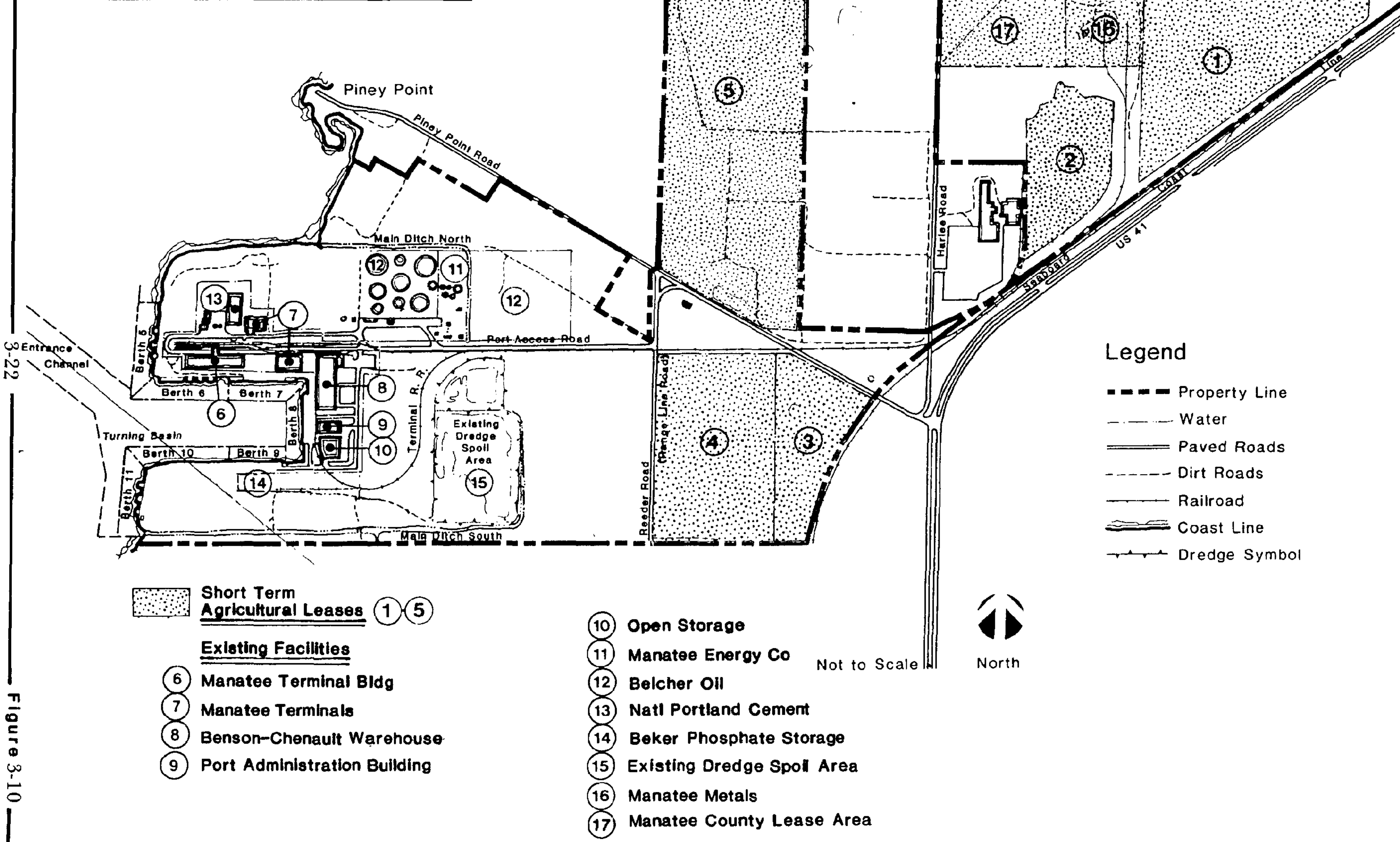


Figure 3-10

- Benson-Chenault owns a 110,000 square foot warehouse adjacent to Berth 8. This warehouse is currently unused.

- Port Manatee owns a transit shed located adjacent to Berth 8. The transit shed has a storage area of 30,000 square feet.

- The Becker Phosphate Company operates a facility adjacent to Berth 9 for receipt, open storage and shipment of wet phosphate rock.

- Florida Power & Light utilizes Berth 10 for on and off-loading of petroleum products. Berths 10 and 11 are also used for general cargo handling.

- The Port Authority has a permitted spoil disposal area located approximately 1300 feet from the basin.

- Manatee Metals operates a scrap metal processing plant in the northeast section of port property.

- Approximately 82 acres of land along the northeastern property line has been leased on a long term basis to Manatee County for use as a correctional complex.

Projected and/or Master Planned Land Use

The following land uses are projected or Master Planned at Port Manatee (see Figure 3-11, Master Planned and Unassigned Land Use).

- The area along the south property line, adjacent to Berths 9, 10 and 11, is designated in the Master Plan as bulk storage area for phosphate. The area between the Berth 8 warehouses and the spoil disposal area is designated in the Master Plan as open storage for general cargo. Both of these areas are adjacent to present waterside development and are designated as such to meet future storage needs.

- The area east of the existing spoil area to Reeder Road is permitted to be used for spoil disposal in 1983. The area from Reeder Road east to the SCL railroad is also permitted for spoil disposal. Both of these areas, currently leased for agricultural use, are shown as dry bulk storage areas for rock, coal and cement in the Master Plan and may be used as such if other areas or methods are used for spoil disposal.

- The area of port property north of Piney Point Road is currently leased for agricultural use. This area is designated by the Master Plan as dry bulk storage for phosphate rock, coal and cement.

- The northeastern corner of port property, east of Manatee Metals, is designated by the Master Plan for liquid bulk storage of petroleum products. This is the farthest point of port property from the basin and pipelines would probably run underground from the basin to the storage tanks.

A copy of the Port Manatee - Master Development Plan contained in the port's master planning document entitled, Master Development Plan Update, is included in Appendix C.

Unassigned Land

Approximately 163 acres of land at Port Manatee has either no long term existing use commitments or is not reserved for a specific future use (see Figure 3-11 Master Planned and Unassigned Land Use). This unassigned land is distributed as follows:

Master Planned & Unassigned Land Use

Manatee County Port Authority

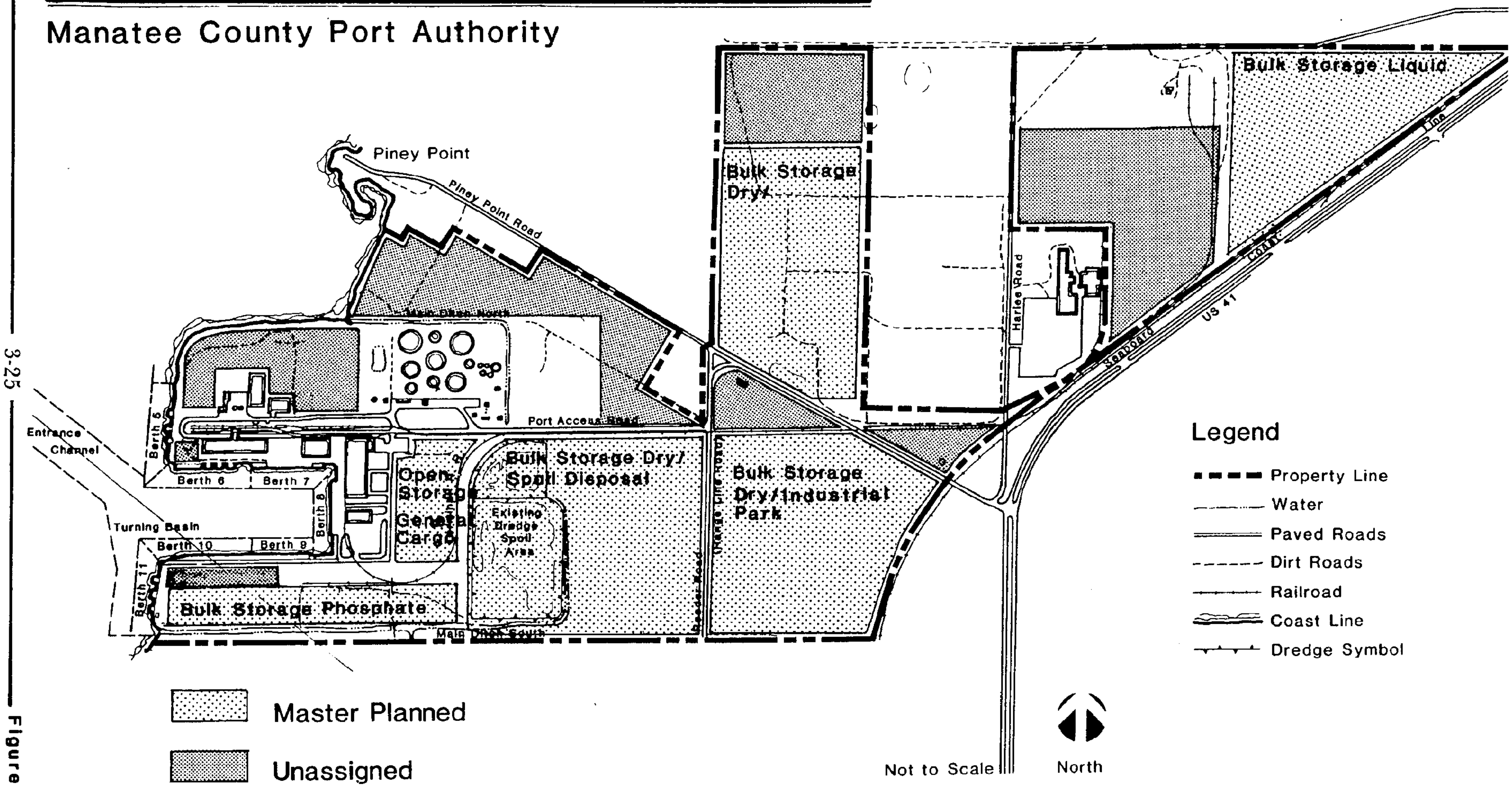


Figure 3-11

- Approximately 23 acres of open land north of Manatee Terminals and National Portland Cement are unused and available. This land has approximately 2400 feet of waterfront to the north and west. However, only approximately 330 feet of this waterfront (Berth 5) has been developed/dredged.

- Approximately 6 acres of land adjacent to Berths 10 and 11 is presently unassigned.

- A one acre area on the corner of Berths 5 and 6 is presently unused and available.

- Approximately 52 acres of open land between Belcher Oil Company and Piney Point Road is available, with approximately 1200 feet of waterfront. There is no ship access to this waterfront as this area is undeveloped and has not been dredged.

- Approximately 13 acres of open land exists at the intersection of Piney Point Road and the east-west railroad track. This area consists of two triangular regions. The western region is currently used for agricultural growing and the eastern region is unused and has the elevated water tower for fire protection at its center.

- Approximately 24 acres of unassigned agricultural land exists at the western end of the northernmost property line. Approximately 50 acres of unassigned land exists east of this area between the Dickey Clay Pipe Company and Manatee Metals. Approximately one-third of this area is agricultural in nature with the northern part still unused.

CHAPTER 4

FORECAST OF EXPANSION NEEDED TO MEET OCS INDUSTRY DEMANDS

The demands on Port Manatee from forecasted OCS activity may affect the future of physical development in the port area. By considering OCS activity in the four scenarios (no find, low, medium and high finds), the potential demands on the port have been estimated. In the previous chapter, an inventory of existing facilities and services was presented which is used in this chapter to determine the degree to which demands can be met. By comparing forecasted demands to existing facilities, the additional services which the port must provide are determined. The needs generated by each of the scenarios are considered through the exploratory and development stages to provide the port with a range of possibilities for the following years.

TEMPORARY SERVICE BASE

Port Manatee has been used as a temporary service base. Four OCS service base companies most recently leasing land at the port include the following: Tenneco Oil Company, IMCO Services, Dresser Industries, Inc. and N.L. Baroid/N.L. Industries, Inc. IMCO is the only company presently leasing land at the port.

In the event of increased OCS exploration and possible oil/gas development activities, it is likely that these activities would involve Port Manatee. From a review of Chapter 3, it appears that the demands placed on the port in terms of land transportation, labor, services, and utilities can be satisfied in a temporary service base situation. A comparison of these temporary demands and the existing facilities and services supports this condition. The minimum demands on the port as a temporary service base include berthage for supply and crew boats, dock space for loading and unloading, warehousing and open storage areas, a helipad, and space to house supervisory and communication personnel. These demands appear to be met with existing conditions.

Berthage

Port Manatee has 2,700 lineal feet (Berths 5, 6, 10 and 11) of available berthage for fulltime use with OCS activities (Figure 3-8). The amount of berthage which is required during the exploration phase is dependent upon the number of supply and crew boats needed to serve each rig. A typical supply boat is about 200 feet in length with a draft of 14 feet loaded. A crew boat is shorter in length, about 100 feet with a maximum draft of 5 feet. In an exploratory phase rarely would the boats being used require dock space simultaneously. The most boats which could be expected at one time are probably two crew boats and four supply boats. With even half of the boats at the port, only 500 lineal feet of berthage would be needed satisfying this demand. Within the port basin, the depth is maintained to 40 feet M.L.W. which is more than adequate for these boats' required drafts.

Landside Space

There are approximately 30 acres of available waterside land at the port (Figure 3-10). Chapter 2 indicates that land is needed along the waterfront for the loading/unloading and storage of goods. During the exploratory phase about five acres of land are needed per rig for these purposes. Other land requirements would be warehousing operations or office space and parking. One acre per helipad (for each rig) would result in additional space: two acres maximum during this phase. A total of 5-10 acres of land is needed which the 30 acres of available waterside port land can accommodate.

The initial establishment of mud, cement, helicopter, drilling tool and equipment, fishing and rental tool, and catering companies are likely during the exploratory phase. The land requirements listed above will cover space needed by these companies.

Transportation

Transportation requirements as discussed in Chapter 2 for a temporary service base include water, air, road and railroad usage. Water depths, widths and berthage have been discussed previously and appear satisfactory. The existing helipad would suffice for two helicopters which are the maximum needed during the exploratory phase. The existing roads and railroad are of adequate size and location to serve the needs of the companies for trucking and shipping goods (Figures 3-5).

Support Services

The labor, which is required during the exploratory phase, affects the port through the services required to support it. These services include the catering companies, and transportation in the form of helicopters and new boats. As a temporary service base with the existing facilities and transportation, labor needs can be accommodated. The labor source (local or transported) and its housing and public service needs (schools, hospitals, utilities) would not directly affect or make demands on the port.

Summary

Based on the above comparisons, it appears that Port Manatee would satisfy the demands placed upon it as a temporary service base during the exploratory phase. However, consideration must be given to the fact that the projected demands on port facilities and services are based on educated but hypothetical forecasts of offshore activity levels. Should the levels of offshore activity experienced in the future differ significantly from those forecasted, the fulfillment of the demands on the port, may not be satisfied.

PERMANENT SERVICE BASE

A permanent service base will be established once a commercial find of oil and gas is made. Offshore activity then progresses into the development phase. Because of its location, it is reasonable to assume that Port Manatee would be considered as a permanent service base. By comparing the demands which the development phase will place on the port's facilities and services to that presently existing, the adequacies and deficiencies of the port can be estimated. Measures to solve these deficiencies can be determined and programmed. Activities likely to occur at the port during the development phase include establishment of pipe fabrication and coating yards, facilities for repair of boats and rigs and possible transportation improvements. There are a number of platform fabrication yards already established in the Gulf of Mexico area within towable distance including four on the Mississippi coast (Figure 2-6). Because of this proximity, it is unlikely that a new yard would be constructed in Florida. While the construction of a refinery(ies) in the Tampa Bay region may occur if a large amount of "commercially developable" oil and gas is found, its location within the region is a very complex issue. A study of refinery siting and oil and gas pipeline landfalls in the area is being conducted by the Tampa Bay Regional Planning Council and for that reason will not be addressed in this study.

Landside Space

For a permanent service base more land will be required than for a temporary service base. In general, about 50-75 acres on an all-weather harbor, depending on the intensity of development, is needed to support the development phase. Most land will be used for warehouses and open storage with at least 10,000 sq. ft. for office space. The 30 acres of available open land immediately adjacent to the port waterfront may not be sufficient. However, when including the additional 52 acres north of Belcher Oil Company which is available land with access to the water, there is enough to satisfy waterfront land demands (Figure 4-1). Three hundred (300) acres of

Waterfront Related Land

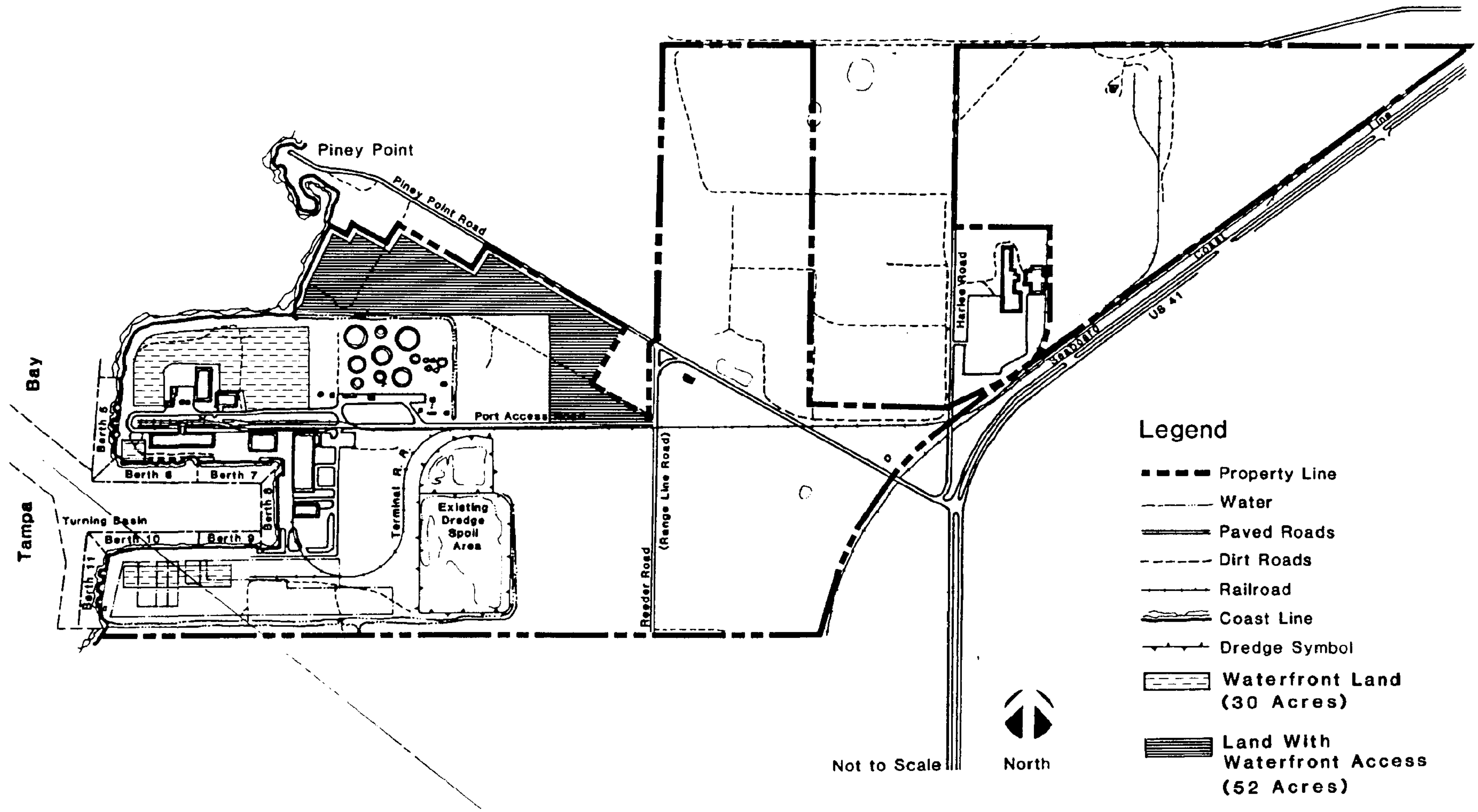


Figure 4-1

land to the north of the port, presently agricultural, have been partially reserved on the Master Plan for future bulk and tank storage as well as spoil disposal (Figure 3-10). Adjacent to Berth 8 is an additional 30,000 sq. ft. of warehouse storage in a transit shed, which is also available for use as office space. A privately owned warehouse just north of the transit shed is presently unused and contains 110,000 sq. ft. of space. If additional land is needed for open storage such as for pipe coating and storage yards, land is available for purchase to the south of the port (Figure 4-2).

Berthage

From postulations in Chapter 2, the minimum amount of wharf space needed for a permanent service base is 400 lineal feet with a maximum high find demand of 800 lineal feet. The port has 2,700 lineal feet of wharf available for OCS use in its basin. If a high find situation were to occur with as many as 135 boats required for supplies and crew, additional oil and product spill containment equipment would need to be developed for loading and unloading areas. In a high find situation, there would probably be enough berth space available at Port Manatee. Although the port may not receive the total impact of these boats in a high find situation due to the possibility of other service bases, it is reasonable to assume that the 2,700 lineal feet of wharf would provide adequate berthage. Berth 5, in particular, is likely to experience the bulk of the water oriented OCS activity. As discussed later in this chapter, Berth 5 will need to be upgraded to support the level of anticipated OCS activity should a find be discovered. The required improvements to Berth 5 include: replacement of existing structure, extension of the functional length of berthage to a minimum of 500 feet and the addition of the full compliment of utilities, including fuel connections.

The ultimate draft required by vessels involved in the development phase could be reasonably satisfied by the 40 feet depth of the Port Manatee access channel and basin. The Federal Tampa Harbor Channel is presently limited to 33.5 feet but will be deepened by 1985 to 43 feet. The port basin itself can handle a vessel 600 feet long with an 80 feet beam. Boats associated with the development phase will not exceed these dimensions. Channel widths of 400 feet are also sufficient for associated vessels.

Transportation

Air transportation for a permanent service base involves helicopter service as well as planes. One helipad is presently existing at the port. With a high find situation as many as 22 helicopters could be needed during the course of one year. According to offshore activity forecasts, the acreage demand for helicopter pad space could range up to 50 acres. By utilizing the southern most 15 acres of the 52 acre open space south of Piney Point Road for an initial heliport, requirements up to the highest find situation can be fulfilled. At the time of an extremely large "find", the additional helicopters could be handled at Manatee Airport, one mile to the east. Both locations, within the port and at the airport have excellent road access which is essential in heliport requirements (Figure 4-3).

With three airports within 30-40 minutes of the port, large air cargo shipments or national/international flights could be directed through them. Manatee Airport which can accommodate small planes (2-10 seaters) is one mile east of the port. It is sufficient to handle the transferring of personnel into and out of the region. No additional services in air strip or airport facilities would be required.

Road access to Port Manatee appears sufficient to handle an increase in vehicular traffic to the port. Within the port itself, some of the unpaved roads presently existing may need a hardtop surface if their use has a significant increase. New roads may be needed to provide access to newly developed storage areas, helipads or warehouses. This will be determined as use areas are designated and developed. Road improvement or additional maintenance with increased trucking may occur. This should be monitored by the port and treated appropriately. Employee parking has been incorporated in landside space requirements.

Land Available For Purchase

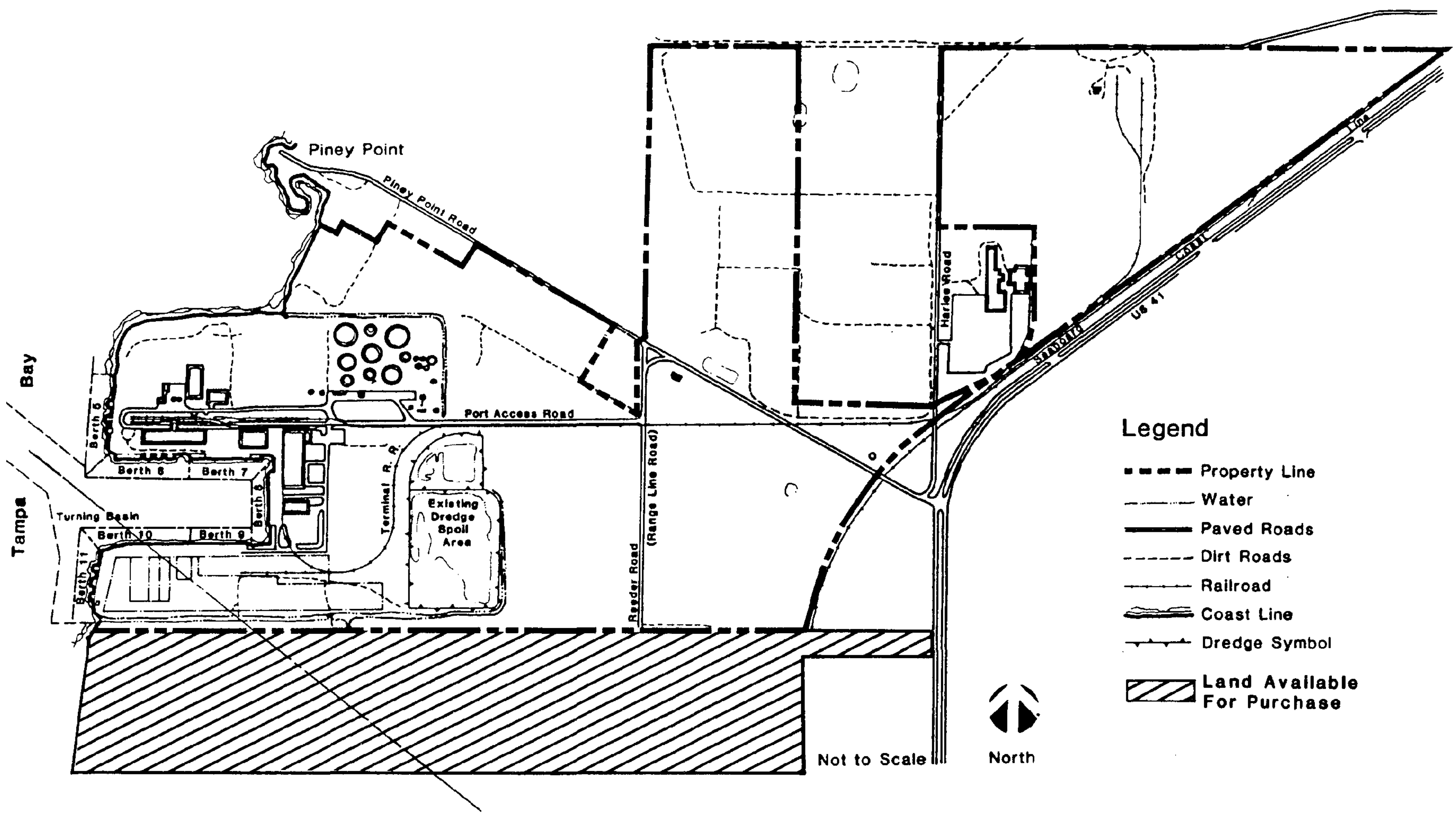


Figure 4-2

Proposed (15 Acres) Helipad Space

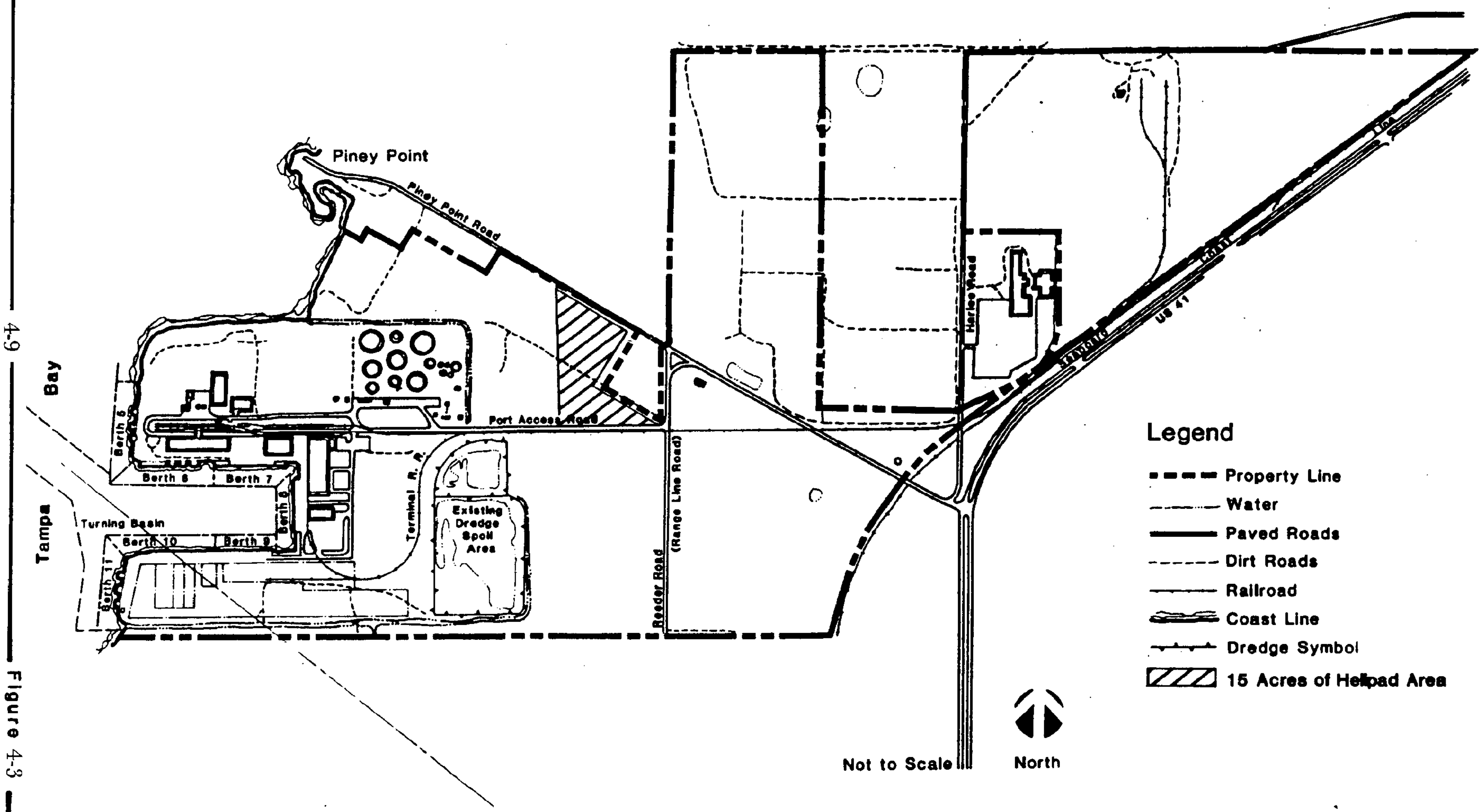


Figure 4-3

The terminal railroad which is owned by the port, presently accesses Berths 5 through 9. If direct access is needed to additional berths, a new spur will be required. As new storage areas are developed, direct loading and unloading of cars may be required. If this becomes necessary, new tracks will need to be installed to satisfy this demand. This will depend on the layout and location of new storage and warehouse facilities.

Support Services

The labor force generated by a permanent service base will affect the port in the same ways as with a temporary one. These will be demands on catering companies, crew, boats and air transport. Because the demands of these items have been discussed, the labor force will not be considered as a separate demand requiring new or improved facilities at the port.

In considering Port Manatee as a permanent service base, assumptions must be made. In the highest offshore activity situation, there will probably be more than one permanent service base. This assumption allows for a reduction of overall demands on a single port. Improvements or new facilities will also depend to some degree on the actual location of uses/buildings on the site. This directly applies to roads and railroad additions/improvements.

SCENARIOS

The companies which move into the area once the exploration and development phases begin, place demands on the port in four areas: landside space, transportation, public utilities and port services. By postulating the effect that different degrees of activity have on these demands, a range of possible scenarios has been developed. Scenarios are outlines for hypothetical situations. In these scenarios, a seven-year cumulative story of what could happen in the event of various finds has been given. These scenarios provide points for discussion on improving or constructing new facilities and services at the port in the event demands cannot be satisfied.

In the following scenarios, each service company is considered in the context of the demands it places on land, transportation, utilities and services. In the case of land, both waterfront and non-waterfront space are reviewed. Waterfront land includes berthage, warehouses, and open storage. If there is adequate land for the demands of that company, the table will indicate a sufficiency or "X". If part of the demands are not met, then the table will indicate they are insufficient or "O". In some cases the company or the facility service may not apply. These situations are marked by "NA" (non-applicable). In the instance of an insufficient service or facility appearing on the table, an explanation of the degree of inadequacy as well as remedial measures are discussed. Some facilities may need improvement one year (O); be satisfactory to fulfill additional needs of the second year (X); but need improvement again by the third year (O).

Transportation demands are considered for water, air and land. Water transportation involves sufficient widths and depths of the port basin, access channel and Tampa Bay Channel. Adequate helipad space and airport services are the determining factors for air travel. Land transportation has two aspects: roads and railroads. Sufficient size, quality and location of port roads must meet trucking and access demands. Railroads are concerned with location in relation to loading and storage areas. If transportation demands cannot be met, an insufficient "O" is used on the table and an explanation is given.

Utilities include water, fire, wastewater, electricity, solid waste, and telephone service from local, public or private companies. The fulfillment of demands placed on these companies is considered sufficient if the agency confirms available capacity.

The port provides services to the companies that presently exist on the site. These include stormwater drainage, railroads, highways, security guard and maintenance crew. These services must meet the demands of increased activity to be considered sufficient.

The following tables address the above issues in no, low, medium and high find scenarios. The text explains non-applications and inadequacies.

NO FIND SCENARIO

Landside Space (Figure 4-4 and Figure 4-5)

In a no find scenario, catering companies will probably not move into the area due to insignificant need. Pipe coatıng and storage yards are not used in the exploratory phase, i.e., the only phase occurring in the no find scenario. Platform fabrication yards will not be considered in the scenarios. This is because as previously stated in the text, when needed, platforms will be towed from yards in Mississippi.

Transportation (Figure 4-6)

The transportation demands placed on the port facilities appear to be satisfied in a no find situation. Because the port will not be used to any further extent than as a temporary service base in a no find situation, no additional or improved roads, railroads or helipads will be needed.

Utilities (Figure 4-7)

Because there will be no significant change in utility demands during the no find situation, it appears the existing facilities will meet temporary service base needs.

Services (Figure 4-8)

The existing port services which provide security, maintenance, oil spill clean-up and drainage for the port appear to satisfy demands in a no find scenario.

LOW FIND SCENARIO

Landside Space (Figure 4-9 and 4-10)

The landspace required for the low find scenario appears sufficient for all companies. There is no requirement during a low find scenario for pipe coating and storage yards. Because of the location of land to be used, improvements to Berth 5 may be needed in 1984. Berth 5 is the most accessible berth to the land acreage most likely to be used to support the OCS activity.

Transportation (Figure 4-11)

Although some improvement may be needed to existing roads, very little if any additional roads will need construction. During a low find scenario, up to six helicopters may be employed in 1986. Therefore, new helipads will need to be built as needed in the first, third and fifth years.

Utilities (Figure 4-12)

Utility companies appear to have sufficient capacity to handle the low find scenario needs.

Services (Figure 4-13)

In a low find situation, it appears that the port's services are sufficient to satisfy demands.

MEDIUM FIND SCENARIO

Landside Space (Figure 4-14 and 4-15)

There appears to be sufficient land for the service base requirements in a low find situation. In the fourth year, however, improvements to Berth 5

NO FIND - SERVICE BASE LAND REQUIREMENTS

LAND USE Year	DRILLING MUD CO.	CEMENT CO.	DRILLING TOOL & EQUIP. CO.	HELICOPTER CO.	CATERING CO.	REPAIR & MAINT. CO.	WELLHEAD EQUIP. CO.	FISHING TOOL & RENTAL TOOL CO.	PIPECOATING & STORAGE YARDS	WHARF SPACE
1 - (1982)	X	X	X	X	NA	X	X	X	NA	X
2 - (1983)	X	X	X	X	NA	X	X	X	NA	X
3 - (1984)	X	X	X	X	NA	X	X	X	NA	X
4 - (1985)	X	X	X	X	NA	X	X	X	NA	X
5 - (1986)	X	X	X	X	NA	X	X	X	NA	X
6 - (1987)	X	X	X	X	NA	X	X	X	NA	X
7 - (1988)	X	X	X	X	NA	X	X	X	NA	X

X Sufficient
0 Insufficient
NA Non Applicable

Figure 4-4

No Find Scenario – Space Requirements

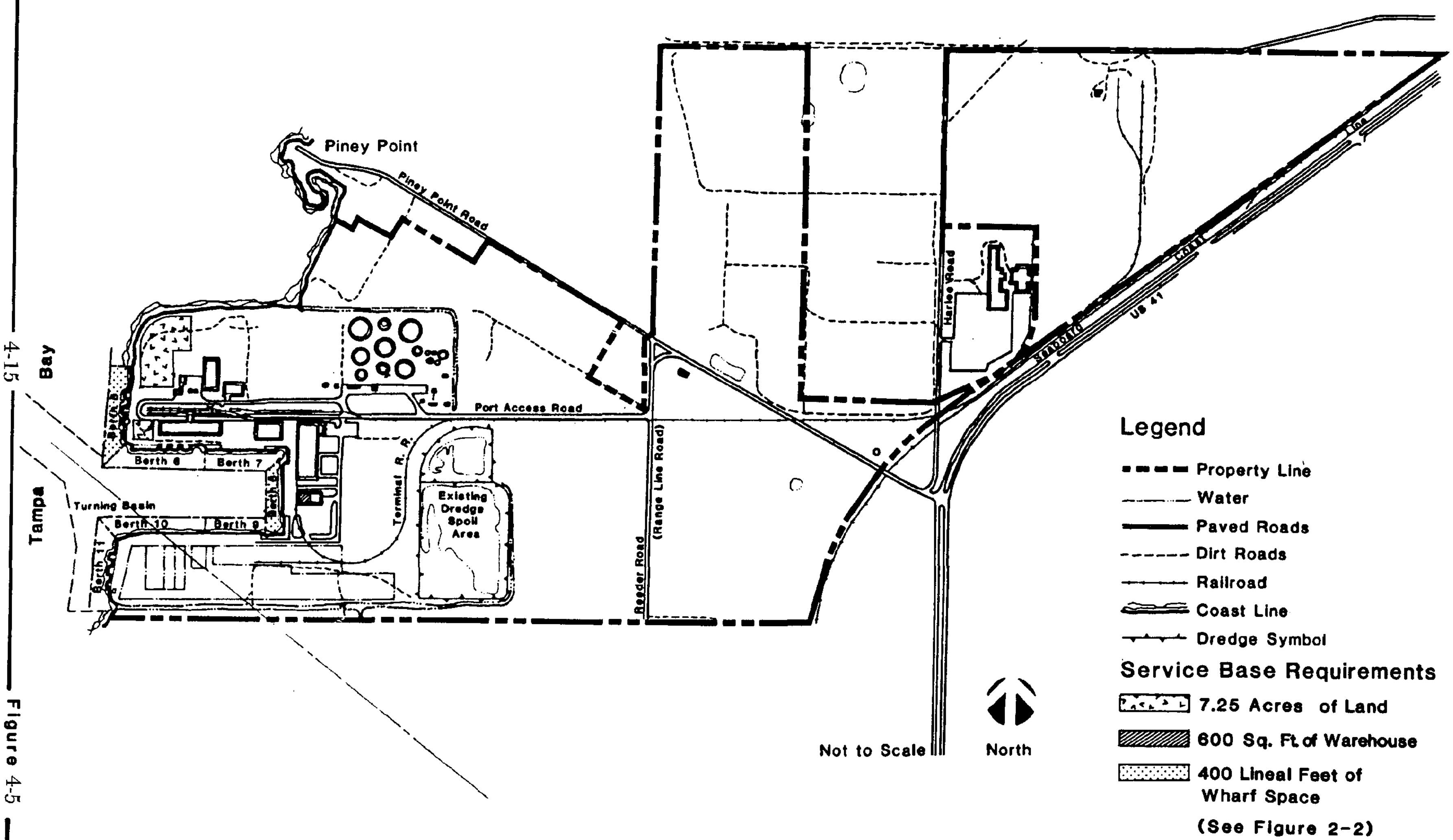


Figure 4-5

NO FIND - SERVICE BASE TRANSPORTATION REQUIREMENTS

TRANSPORTATION Year	Paved Roads	Railroads	Harbor Basin	Channel	Helipads	Airports
1 - (1982)	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
0 Insufficient
NA Non Applicable

Figure 4-6

NO FIND - SERVICE BASE UTILITY REQUIREMENTS

UTILITY Year	Water	Sewer	Telephone	Electricity	Solid Waste	Fire
1 - (1982)	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-7

NO FIND - SERVICE BASE PORT SERVICES

PORT SERVICE Year	Guard	Maintenance Crew	Oil Spill Clean-Up	Stormwater Drainage System
1 - (1982)	X	X	X	X
2 - (1983)	X	X	X	X
3 - (1984)	X	X	X	X
4 - (1985)	X	X	X	X
5 - (1986)	X	X	X	X
6 - (1987)	X	X	X	X
7 - (1988)	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-8

LOW FIND - SERVICE BASE LAND REQUIREMENTS

LAND USE Year	DRILLING MUD CO.	CEMENT CO.	DRILLING TOOL & EQUIP. CO.	HELICOPTER CO.	CATERING CO.	REPAIR & MAINT. CO.	WELLHEAD EQUIP. CO.	FISHING TOOL & RENTAL TOOL CO.	PIPECOATING & STORAGE YARDS	WHARF SPACE
1 - (1982)	X	X	X	X	X	X	X	X	NA	X
2 - (1983)	X	X	X	X	X	X	X	X	NA	X
3 - (1984)	X	X	X	X	X	X	X	X	NA	0
4 - (1985)	X	X	X	X	X	X	X	X	NA	X
5 - (1986)	X	X	X	X	X	X	X	X	NA	X
6 - (1987)	X	X	X	X	X	X	X	X	NA	X
7 - (1988)	X	X	X	X	X	X	X	X	NA	X

X Sufficient
0 Insufficient
NA Non Applicable

Low Find Scenario – Space Requirements

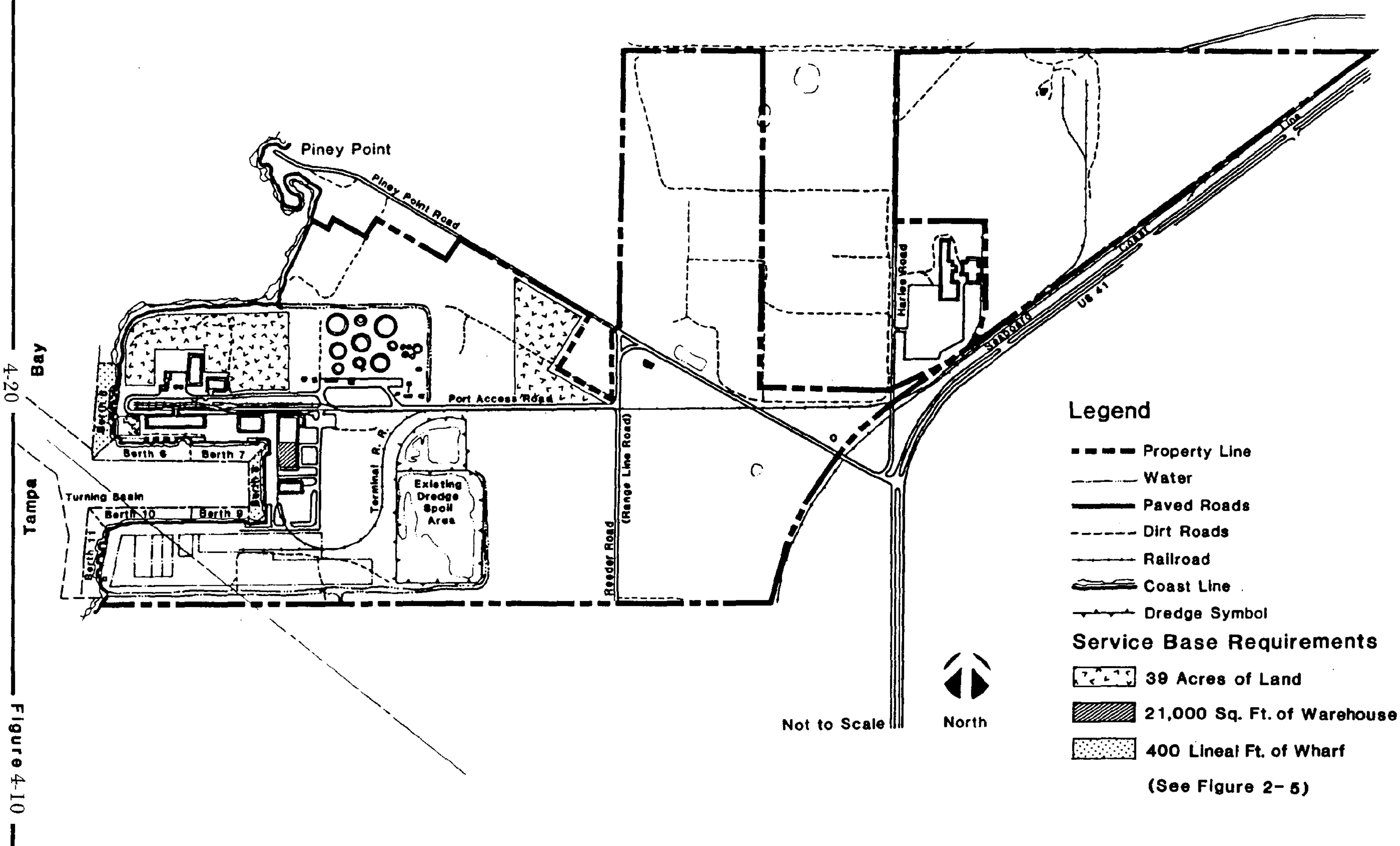


Figure 4-10

LOW FIND - SERVICE BASE TRANSPORTATION REQUIREMENTS

TRANSPORTATION Year	Paved Roads	Railroads	Harbor Basin	Channel	Helipads	Airports
1 - (1982)	X	X	X	X	O	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	O	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	O	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-11

LOW FIND - SERVICE BASE UTILITY REQUIREMENTS

UTILITY Year	Water	Sewer	Telephone	Electricity	Solid Waste	Fire
1 - (1982)	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-12

LOW FIND - SERVICE BASE PORT SERVICES

PORT SERVICE

Year	Guard	Maintenance Crew	Oil Spill Clean-Up	Stormwater Drainage System
1 - (1982)	X	X	X	X
2 - (1983)	X	X	X	X
3 - (1984)	X	X	X	X
4 - (1985)	X	X	X	X
5 - (1986)	X	X	X	X
6 - (1987)	X	X	X	X
7 - (1988)	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-13

may be required to handle increased OCS activity of loading and unloading during the development phase.

Transportation (Figure 4-16)

In a medium find situation, it appears that improvements will be required to meet increased transportation demands. As mentioned previously, Berth 5 will need its basin deepened and the dock area upgraded. As the northern acres of land at the port become utilized for bulk/open storage or heliport needs, paved roads will be required for adequate access. These improvements will probably be required in the fourth year. Depending on the location within the port of storage areas, additional railroad spurs may be required to provide sufficient service. By the second year, five helicopters are forecasted to be operating out of this service base, which will require additional helipads. The maximum helicopter traffic is projected to occur in the fifth year with 11 helicopters. Construction of sufficient pads will be required to handle this increased transportation demand on a yearly basis from the first through sixth years.

Utilities (Figure 4-17)

Utility companies have indicated that they will have sufficient capacity to service a medium find situation.

Services (Figure 4-18)

In a medium find security services will probably need reinforcement with the increase in developed areas in the second and fourth years. This will also apply to the stormwater drainage system which will need redesigning to handle increased runoff due to more impervious areas.

Because of the growth in buildings, paving and other developed areas, an increase in the maintenance crew appears necessary in the second and fourth years. As boat traffic increases within the port, the oil spill clean up company should be kept informed. By the fifth year when the most activity will be taking place, assurances from the company of their ability to handle this increase should be acquired, as improvement in equipment is likely.

HIGH FIND SCENARIO

Landside Space (Figure 4-19 and 4-20)

In a high find situation, there appears to be sufficient land to satisfy demands placed on the port. By the second year, however, due to an increase in boat traffic, it seems probable that improvements to Berth 5 will be required.

Transportation (Figure 4-21)

In a high find situation, definite improvements in transportation at the port would probably be required. Paved roads providing access to all open and bulk storage areas would be required as well as paved access to warehouses and helipads constructed in the first through third years. Railroad spurs may be required in the first and second years if additional tracts are needed for delivery or pick-up at new storage or berth areas. This will be determined as companies locate in specific sites within the property. By the second year, a total of five helicopters will be required to service the exploration and development phases. This number increases to a maximum of 22 in the fifth year requiring that during the first five years, adequate helipads be constructed to provide for their needs. Airports and channel dimensions appear to satisfy the demands placed on them in a high find situation. Berth 5 will need improvement by the second year to upgrade its dock area.

Utilities (Figure 4-22)

From communication with local utility companies, it appears they can provide sufficient capacity to the port as a service base during the

MEDIUM FIND - SERVICE BASE LAND REQUIREMENTS

LAND USE Year	DRILLING MUD CO.	CEMENT CO.	DRILLING TOOL & EQUIP. CO.	HELICOPTER CO.	CATERING CO.	REPAIR & MAINT. CO.	WELLHEAD EQUIP. CO.	FISHING TOOL & RENTAL TOOL CO.	PIPECOATING & STORAGE YARDS	WHARF SPACE
1 - (1982)	X	X	X	X	X	X	X	X	NA	X
2 - (1983)	X	X	X	X	X	X	X	X	NA	X
3 - (1984)	X	X	X	X	X	X	X	X	NA	X
4 - (1985)	X	X	X	X	X	X	X	X	X	0
5 - (1986)	X	X	X	X	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X	X	X	X	X

X Sufficient
0 Insufficient
NA Non Applicable

Medium Find Scenario - Space Requirements

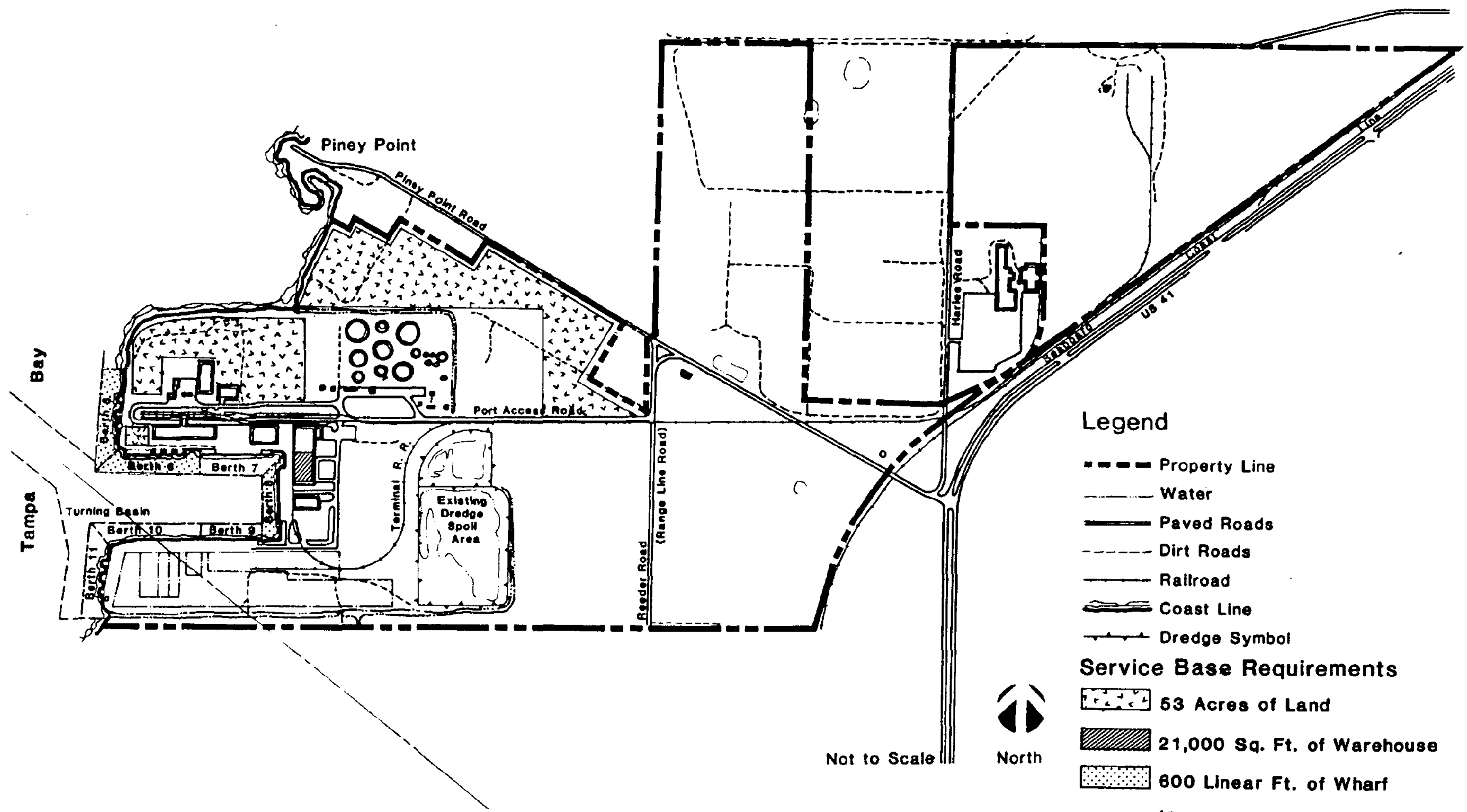


Figure 4-15

MEDIUM FIND - SERVICE BASE TRANSPORTATION REQUIREMENTS

TRANSPORTATION Year	Paved Roads	Railroads	Harbor Basin	Channel	Helipads	Airports
1 - (1982)	X	X	X	X	O	X
2 - (1983)	X	X	X	X	O	X
3 - (1984)	X	X	X	X	O	X
4 - (1985)	O	O	O	X	O	X
5 - (1986)	X	X	X	X	O	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-16

MEDIUM FIND - SERVICE BASE UTILITY REQUIREMENTS

UTILITY Year	Water	Sewer	Telephone	Electricity	Solid Waste	Fire
1 - (1982)	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-17

MEDIUM FIND - SERVICE BASE PORT SERVICES

PORT SERVICE Year	Guard	Maintenance Crew	Oil Spill Clean-Up	Stormwater Drainage System
1 - (1982)	X	X	X	X
2 - (1983)	O	O	O	O
3 - (1984)	X	X	X	X
4 - (1985)	O	O	X	O
5 - (1986)	X	X	O	X
6 - (1987)	X	X	X	X
7 - (1988)	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-18

HIGH FIND - SERVICE BASE LAND REQUIREMENTS

LAND USE / Year	DRILLING MUD CO.	CEMENT CO.	DRILLING TOOL & EQUIP. CO.	HELICOPTER CO.	CATERING CO.	REPAIR & MAINT. CO.	WELLHEAD EQUIP. CO.	FISHING TOOL & RENTAL TOOL CO.	PIPECOATING & STORAGE YARDS	WHARF SPACE
1 - (1982)	X	X	X	X	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X	X	X	X	O
3 - (1984)	X	X	X	X	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-19

High Find Scenario – Space Requirements

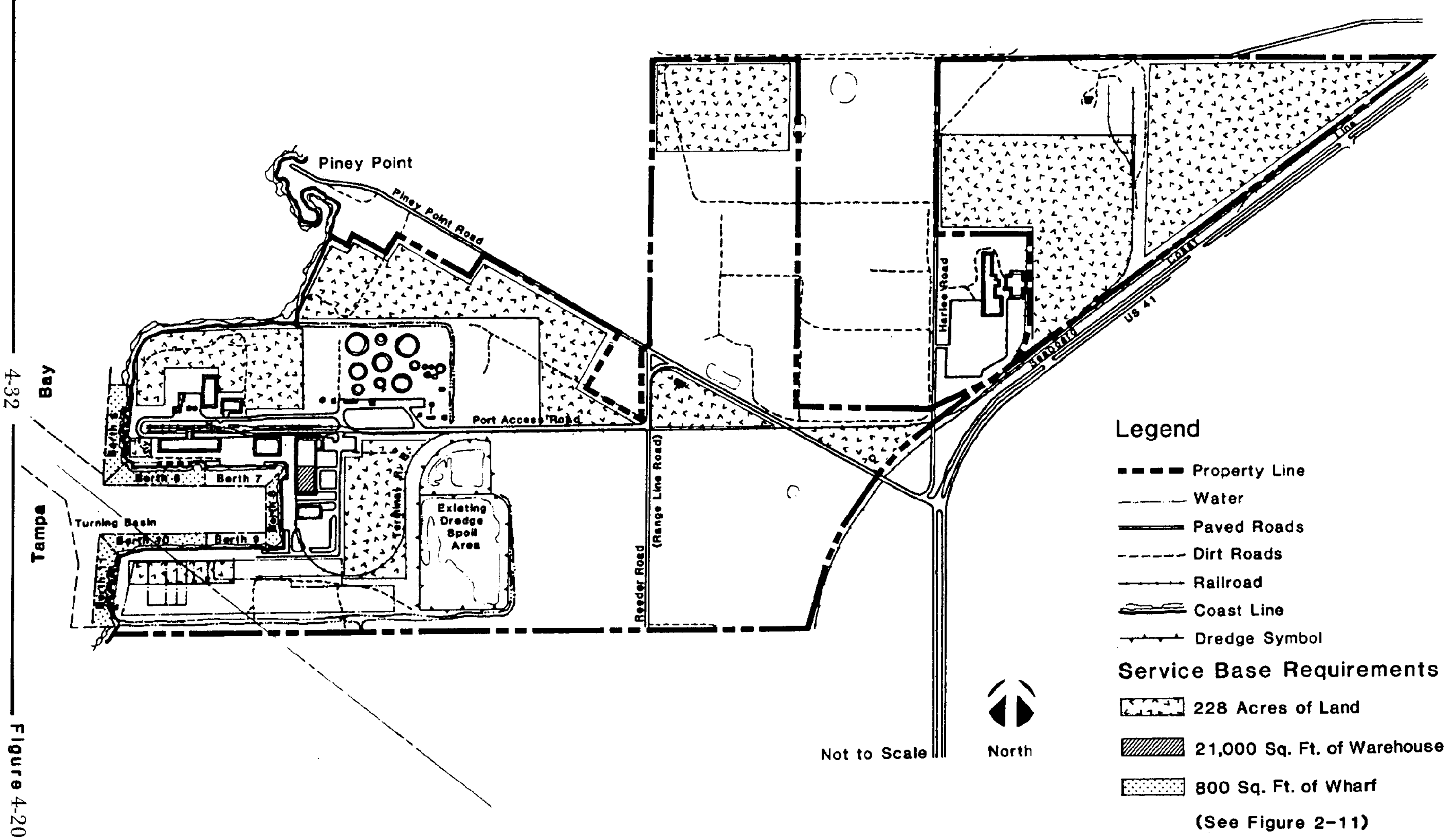


Figure 4-20

High Find - Service Base Transportation Requirements

TRANSPORTATION Year	Paved Roads	Railroads	Harbor Basin	Channel	Helipads	Airports
1 - (1982)	0	0	X	X	0	X
2 - (1983)	0	0	0	X	0	X
3 - (1984)	0	X	X	X	0	X
4 - (1985)	X	X	X	X	0	X
5 - (1986)	X	X	X	X	0	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
0 Insufficient
NA Non Applicable

Figure 4-21

High Find - Service Base Utility Requirements

UTILITY Year	Water	Sewer	Telephone	Electricity	Solid Waste	Fire
1 - (1982)	X	X	X	X	X	X
2 - (1983)	X	X	X	X	X	X
3 - (1984)	X	X	X	X	X	X
4 - (1985)	X	X	X	X	X	X
5 - (1986)	X	X	X	X	X	X
6 - (1987)	X	X	X	X	X	X
7 - (1988)	X	X	X	X	X	X

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-22

exploration and development phases in a high find situation. For example, the water company has confirmed the ability to supply in excess of 25 times the required amount of potable water required in the high find scenario.

Services (Figure 4-23)

In a high find situation, the port services will need to be upgraded to a sufficient level to handle the increase in activity at the port. Guard services may need an increase in staff from the first to third years to cover the added acreage of storage areas. Maintenance crews will probably increase in size in the first three years due to additional roads, drainage system, and acres maintained by them. The stormwater drainage system will need continual expansion to collect and dispose of additional runoff water produced by the increased developed and impervious areas. The oil spill cleanup company should consider increasing their ability to protect the waters outside the port basin in the event of an oil spill. Because two Berths (5 and 11) are outside the basin, careful consideration will need to be given to immediate containment in the event of a spill.

HIGH FIND - SERVICE BASE PORT SERVICES

PORT SERVICE Year	Guard	Maintenance Crew	Oil Spill Clean-Up	Stormwater Drainage System
1 - (1982)	O	O	X	O
2 - (1983)	O	O	X	O
3 - (1984)	O	O	O	O
4 - (1985)	X	X	X	O
5 - (1986)	X	X	X	O
6 - (1987)	X	X	X	O
7 - (1988)	X	X	X	O

X Sufficient
O Insufficient
NA Non Applicable

Figure 4-23

CHAPTER 5

ENVIRONMENTAL RESOURCE INVENTORY

Port Manatee is located on Tampa Bay which is a large (346 square mile) estuarine water body situated midway along the west coast of Florida, about 330 miles southeast of Pensacola Harbor and 220 miles north of Key West Harbor.[1] The Tampa Bay estuarine system is a relatively shallow water body having a mean water depth of 11 feet and a maximum depth of 57 feet (at the channel area near bay mouth); with most of the area under 11 feet. The topography of the surrounding Tampa Bay Region consists of low, nearly level plains and undulating areas with intermittent sands, swamps, marshes, lakes and perennial streams. These lowlands form a broad plain which slopes gently towards the Gulf of Mexico shoreline.

The geologic formations within the Tampa Bay Region are relatively complex due to the large number of both soil series and soil types. This complexity can be attributed, in part, to the rise and fall of the seas over time and the climatic conditions of the area. Within the coastal zone, the soils are primarily acidic, poorly drained sands. Older geologic formations are covered primarily by beds of sand and clay that form the parent material from which these soils are derived. In addition to the sandy soils, there are a number of muck and freshwater swamp areas, coastal marsh areas, and coastal beach and dune areas. The muck and freshwater swamp areas consist of intermingled soil materials and are characterized by dense vegetation. These soils often pose severe restrictions for development purposes, and therefore may require filling techniques in order to make them more suitable for construction.

The terrestrial biota found within the Tampa Bay Region includes a wide range of species. The emergent vegetation bordering the Bay system is predominately mangrove and salt marsh assemblages. Mangroves and associated species cover approximately 17,500 acres of shoreline while salt marsh vegetation occupies about 1,700 acres. Submergent vegetation consists of approximately five species of seagrasses and 216 species of algae.

The shore of the estuary consists of many small bays and inlets where much of this vegetation is found.

The climate of the Tampa Bay Region is influenced by the presence of estuarine waters and other large water systems such as the Gulf of Mexico and Tampa Bay. The climate consists of subtropical conditions characterized by long, humid summers and mild, relatively dry winters. The average annual rainfall for the Region is fairly high, approximately 55 inches, but it is unevenly distributed throughout the year. The majority of rainfall occurs during the summer months, June through September. These summer rainstorms are usually short and intense with more than three inches of rain often falling in less than two hours. The other eight months of the year are tairly dry with the least rainfall occurring from October through February.

ENVIRONMENTAL INVENTORY

The environmental inventory prepared for this study is a summary of the existing recorded environmental resources at Port Manatee. Resources were deemed valuable if statutory standards were established for a particular resource or element of the resource by regulatory agencies; or in cases where no statutory standard existed, value judgements were made based on comments and recommendations from agencies and special interest groups. Chapter 7 will address the extent and type of disturbance which may occur to these resources as a result of OCS activity demands (outlined in Chapter 4). Programs and strategies to minimize or eliminate these effects will be discussed in Chapter 9.

AIR QUALITY

The air humans breathe has long been recognized as a valuable resource. In Florida, local, State and Federal Governments have established a variety of air quality standards to ensure high caliber air quality throughout the State. At Port Manatee air quality studies have indicated that, with the exception of total suspended particulates (TSP), air quality at

Port Manatee is within the established local, State and Federal Standards.[6] Due to the types of activities associated with the operation of the port, TSP values have been recorded at levels in excess of established standards. These activities include bulk materials handling and manufacturing operations which both contribute substantial quantities of particulates to the atmosphere. Conservation Consultants, Inc. (CCI) performed a study between 1976-1978 which investigated the TSP conditions at Port Manatee.[2] In this study concentrations of TSP were measured by a standard high volume (Hi-Vol) samplers which were situated at various locations throughout the port. Analysis of these measurements indicated that the State air quality standards were exceeded for both the annual geometric mean of all measurements (60 micrograms per cubic meter) and the 24-hour maximum (150 micrograms per cubic meter, a value not to be exceeded more than one time in a year).[3]

The CCI study drew a number of conclusions including one that determined that the measurements performed at Port Manatee were not considered representative of atmospheric TSP concentrations in nearby areas where the general public may have access. It was indicated that employees and authorized persons within the complex are the only individuals exposed to the elevated particulate concentrations and their exposures are regulated by less restrictive occupational standards.[4]

Several recommendations were made in the CCI report which would minimize impacts on air quality. These included maintaining all paved and unpaved roadway surfaces in an essentially dust-free condition; plant all open, semi-open or sparsely vegetated areas with bahia grass to reduce soil erosion and particulate resuspension and to minimize the number of people accessing the port's property, and thereby reducing their exposure.[5]

WATER QUALITY

Groundwater

In general, the piezometric surface in the vicinity of Port Manatee slopes toward Tampa Bay. The undifferentiated surface sands and clays generally contain water under water table conditions (non-artesian) throughout southwest coastal Florida, but artesian conditions may occur locally.[6] The water in the surficial aquifer is derived from local rainfall, and the water table can generally be found within a few feet of the ground surface.

The principal artesian aquifer in Florida is the Floridan Aquifer. The water of this aquifer is replenished primarily by infiltration of rainfall in the recharge area located to the east of Tampa, in the center of the State. In addition to the Floridan Aquifer a surficial aquifer is present which is recharged by local rainfall and affected by tidal influences and irrigation runoff.[7] This surficial groundwater is generally not used as a water supply source because of its variable quality and low yield; however, its depth below the ground surface affects the type and extent of local plant and animal life which can be supported in these areas.

In Florida, groundwater is recognized as a valuable resource from both a quality and quantity viewpoint. Local, State and Federal governments have established a variety of groundwater standards. Data on existing groundwater quality/quantity at Port Manatee is extremely limited. The port and other industrial activities around the port are supplied by a 14-inch main from the Manatee County Utility System which uses the Manatee Reservoir as its potable water source. Agricultural supplies of water for irrigation are generally provided by privately owned wells.[8] Manatee County is presently investigating the potential of developing a 48 MGD Floridan Aquifer wellfield.

Two auger test borings were taken in February, 1982, at Port Manatee, immediately east of the turning basin. The results of these test borings indicated that the groundwater table was 2.0 to 2.5 feet below existing grade.[9] The observed groundwater depth is considered normal for the month of February. The water which was observed exhibited specific conductivities indicative of freshwater; however, tests were not conducted to determine its quality (see Figure 5-1, Soil Borings and Profiles).

The quality of the groundwater at the port, like other coastal areas is influenced by saltwater encroachment from Tampa Bay. Saltwater intrusion into groundwater supplies has become a serious problem throughout much of South Florida, where excessive use of the groundwater has resulted in the reduction of freshwater quantities and subsequently permitted saltwater to seep into the coastal aquifers. The various water management districts, private industry and the Florida Department of Environmental Regulation are monitoring and studying this problem throughout the State, and are working on identifying methods which would minimize this situation.

Surface Water

Port Manatee is located on Tampa Bay, which is the largest bay in southwest Florida. The Tampa Bay estuarine system is a shallow body of water, approximately 35 miles long by about 10 miles wide with 346 square miles of surface area.[10] The freshwater drainage basin surrounding Tampa Bay covers an area of about 2,162 square miles. About one billion gallons of freshwater flow into Tampa Bay daily from runoff, streams and various other discharges throughout the basin.[11] Sources of water pollution in the Bay stem primarily from stormwater runoff, wastewater discharges and industrial operations, such as phosphate plants.[12]

Local, State and Federal governments have established water quality standards to protect and maintain high quality surface waters throughout the State. The surface waters adjacent to Port Manatee have been classified, by the State of Florida, as Class III waters, for recreation, propagation and management of wildlife. Class II waters, which are waters capable of supporting shellfish harvesting, begin at the Manatee County/Hillsborough County line and continue north to the mouth of the Little Manatee River. Figure 5-2 indicates these water classifications. The Florida Department of Environmental Regulation (DER) establishes the water quality standards for waterbodies throughout the State. Chapter 17-3, FAC, water quality standards, establishes water quality standards for various classes of water.[13]

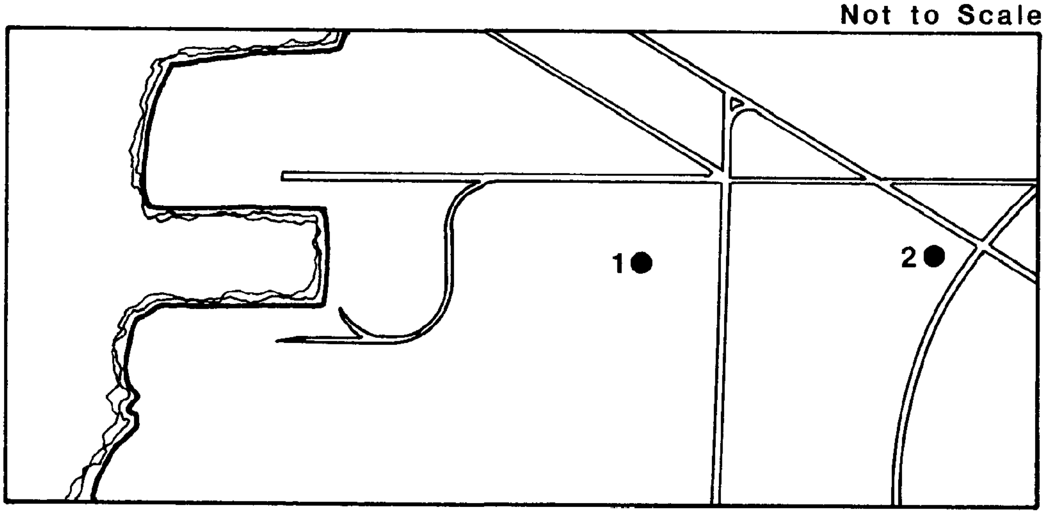
The results of water quality studies performed in 1982 by the Florida Department of Environmental Regulation (DER) are summarized in Appendix D. The DER selected two sampling sites in the vicinity of the port, as shown in Figure 5-3. The first station, MAN 1-A was located in the port's turning basin, and the second station, MAN 2-B, is located in the port's channel. Review of this data indicates that the two sampling stations at the port exhibit low Dissolved Oxygen and low Biological Oxygen Demands and high phosphorus levels. Typically, these criteria do not exceed the State standards. High concentrations of metals, oils, greases and solids were observed in Port Manatees turning basin, which may be the result of poor circulation patterns.

In 1977 and 1978, the USACOE performed water quality studies on two stations located at Port Manatee. Both stations (RWA and RWB) were established in the access channel. Figure 5-4 illustrates the location of these sites. Appendix E summarizes the results of the water quality tests. None of the values recorded at Stations RWA or RWB exceeded State Water Quality Standards.

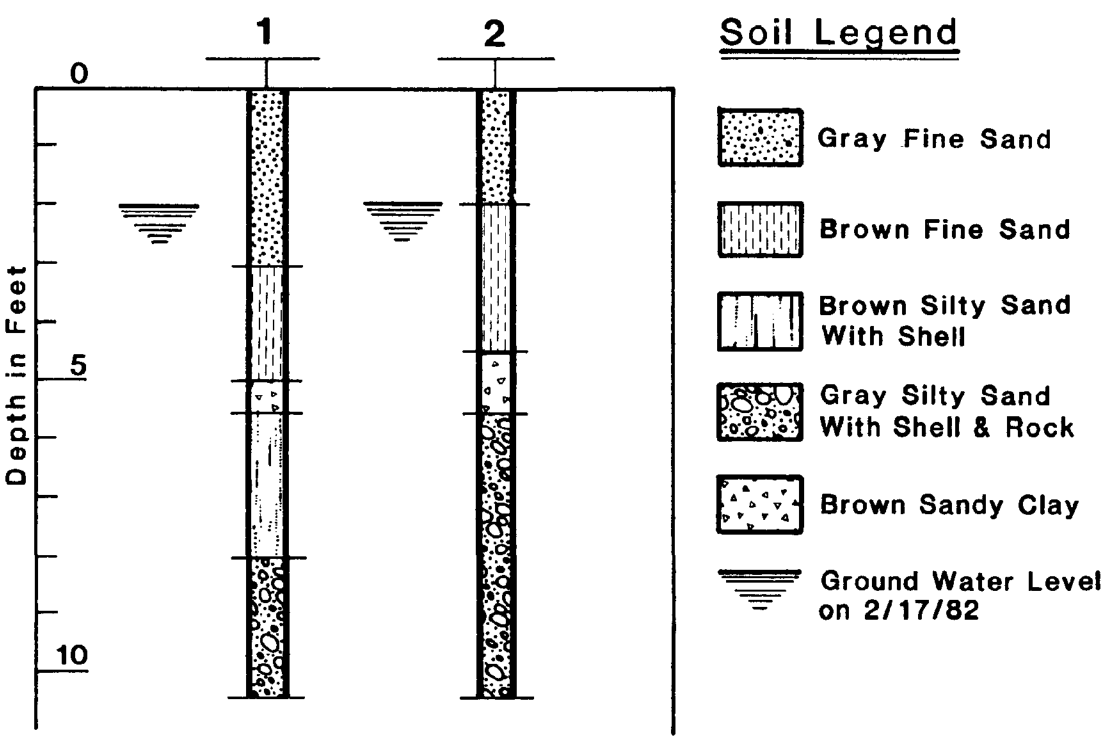
The results of water quality studies performed by the Manatee County Health Department throughout Manatee County in 1981, are summarized in Figure 5-5. Twenty-two water network stations were established throughout the County, as shown on Figure 5-6. The station closest to Port Manatee is Station Number 1, located at Piney Point. Figure 5-7 indicates yearly averages and maximum values for various parameters which were tested at

Soil Borings and Profiles at Port Manatee

Not to Scale

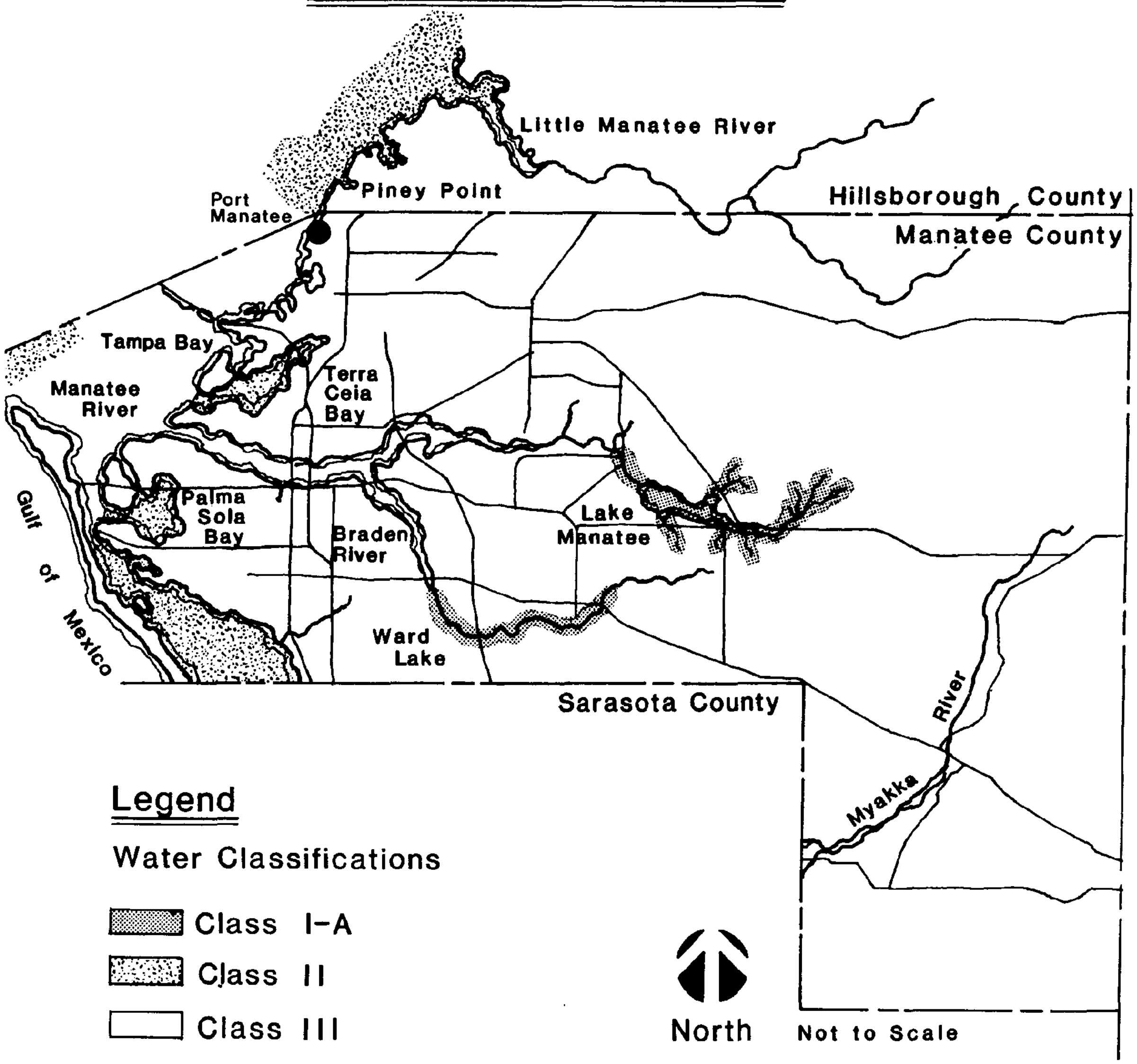


● Location of Auger Borings



Source: Ardaman & Associates, Inc. Soil Borings Profiles for Manatee County, Florida 1982

Water Classifications



Legend

Water Classifications

- Class I-A
- Class II
- Class III

North

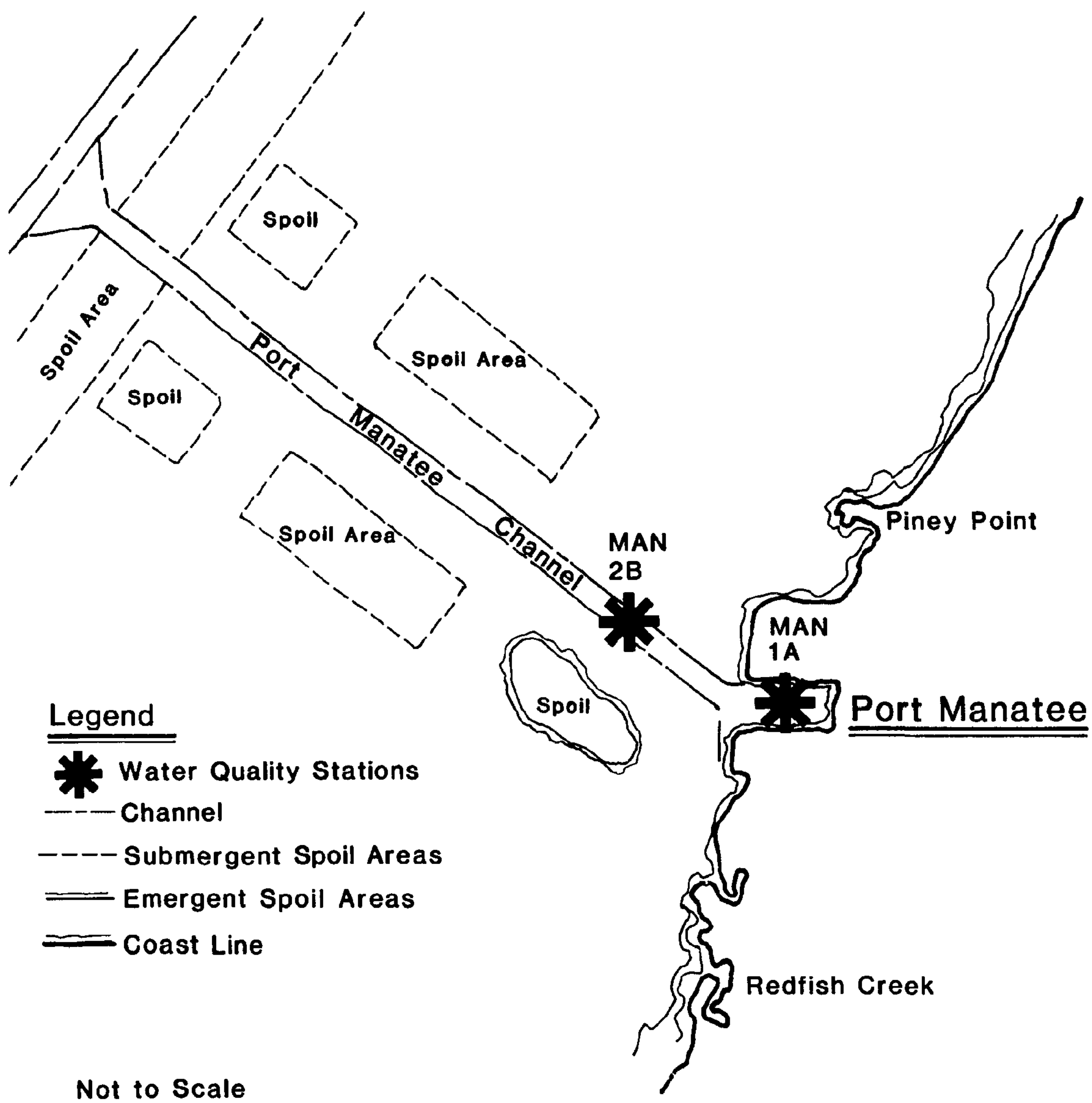
Not to Scale

Source:

Manatee County Water Quality Program, Yearly Report 1981

Figure 5-2

Location of 1982 DER Water Quality Stations



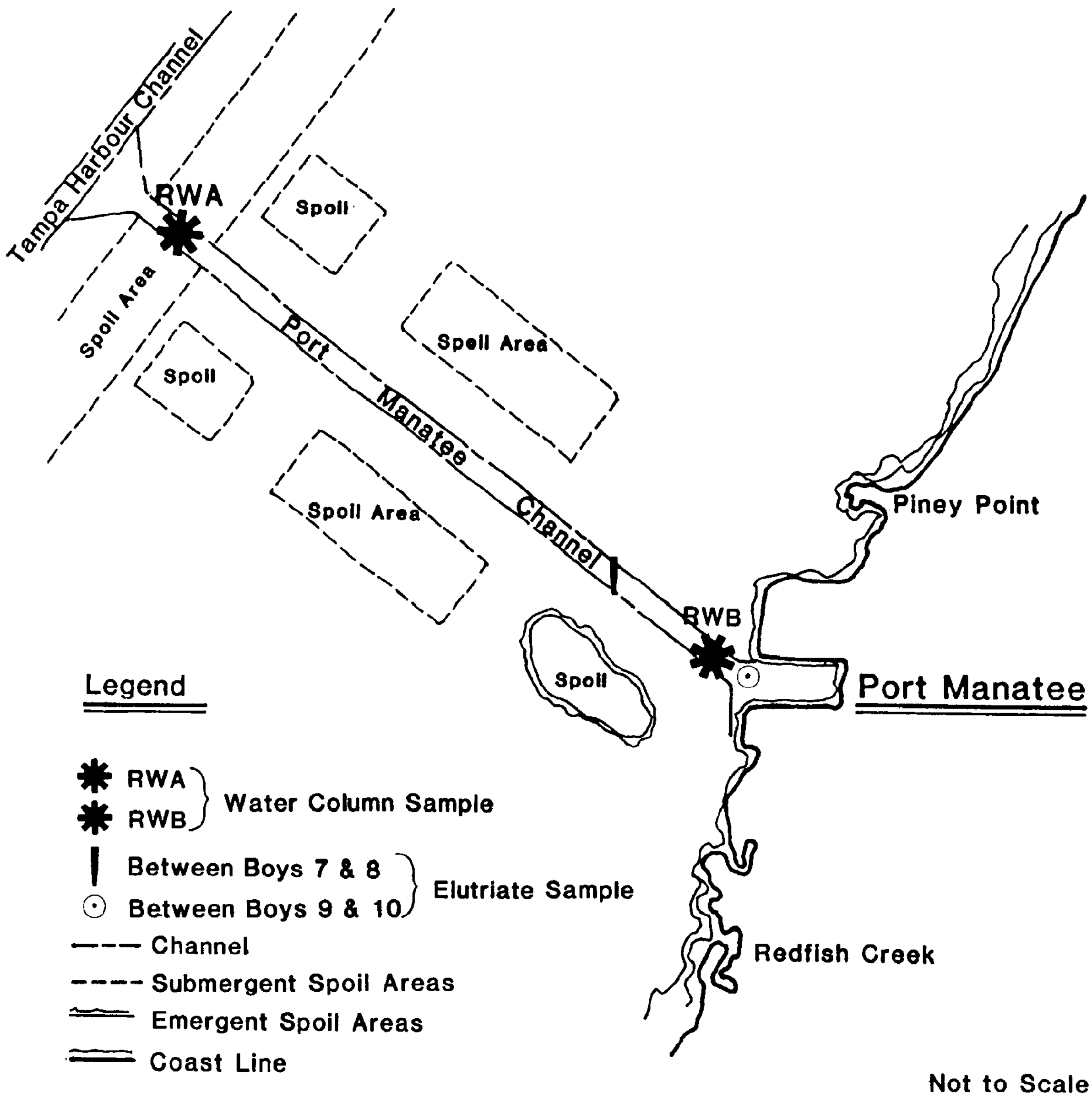
Not to Scale

Source:

NOAA Chart No. 11414 Tampa Bay, Southern Port, 25th Edition, Dated 3-29-80

Figure 5-3

Location of U.S.A.C.O.E. Water Quality Monitoring Stations



Source:

NOAA Chart No. 11414 Tampa Bay, Southern Port, 25th Edition, Dated 3-29-80

Manatee County Health Department Water Quality Study Results

YEARLY AVERAGE/MAXIMUM VALUE
1981

STATION NUMBER	D.O. mg/1	B.O.D.5 mg/1	HARDNESS mg/1 $CaCO_3$	NITRATE mg/1 NO_3-N	CHLORIDE mg/1 Cl^-	FLUORIDE mg/1 F^-	ORTHO-PHOSPHATE mg/1 PO_4-P
WN-1	5.4/7.9	2.1/4.9	5663/6300	0.02/0.04	17453/19494	1.02/1.13	0.40/0.87
WN-2	6.4/9.6	3.8/6.4	5642/6450	0.04/0.25	16786/18744	1.10/1.30	0.42/1.23
*WN-4	6.0/7.6	1.0/1.9	5863/6500	0.03/0.04	18119/19744	0.97/1.00	0.16/0.23
WN-5	6.6/8.7	2.7/4.3	5508/6800	0.02/0.03	16433/19244	0.99/1.09	0.38/0.69
*WN-6	6.0/7.7	1.9/2.4	4663/6400	0.03/0.06	14308/19244	0.85/1.00	0.31/0.58
WN-7	7.1/9.3	1.9/2.7	5529/6350	0.02/0.03	16703/19494	0.95/1.05	0.24/0.46
WN-9	4.9/7.2	1.9/5.4	4902/6600	0.04/0.07	14214/18244	0.89/1.05	0.32/0.67
*WN-10	4.2/6.6	2.0/2.3	3413/5300	0.07/0.10	10559/16245	0.72/0.94	0.46/0.78
WN-11	5.7/9.1	2.3/3.6	6192/7400	0.06/0.26	18578/20744	0.94/1.07	0.14/0.24
*WN-12	7.3/8.4	2.5/3.4	5925/6700	0.02/0.03	17932/19744	0.90/0.98	0.08/0.10
*WN-13	6.5/7.6	1.6/2.6	6263/7100	0.03/0.04	19182/20494	0.90/0.95	0.08/0.11
*WN-14	5.0/5.4	3.2/4.9	2300/4500	0.28/0.63	6389/14246	0.58/0.78	0.25/0.35
*WN-15	6.0/7.2	1.4/1.6	104/154	0.19/0.28	24/36	0.34/0.48	0.44/0.29
*WN-17	5.3/6.9	1.3/1.4	110/186	0.10/0.13	20/25	0.25/0.31	0.33/0.53
WN-19	6.9/10.2	1.3/2.1	110/218	0.47/0.93	22/39	0.35/0.46	0.37/0.68
WN-20	3.3/7.2	1.7/3.7	231/490	0.10/0.34	68/265	0.25/0.37	0.17/0.40
WN-21	4.6/6.5	125.0/880.0	4174/5650	0.38/1.42	12007/15995	0.73/0.99	0.24/0.52
WN-22	5.7/7.5	2.6/7.2	331/420	0.29/0.46	49/75	0.52/0.64	0.22/0.39

*Quarterly Samples (Remainder Monthly)

Figure 5-5

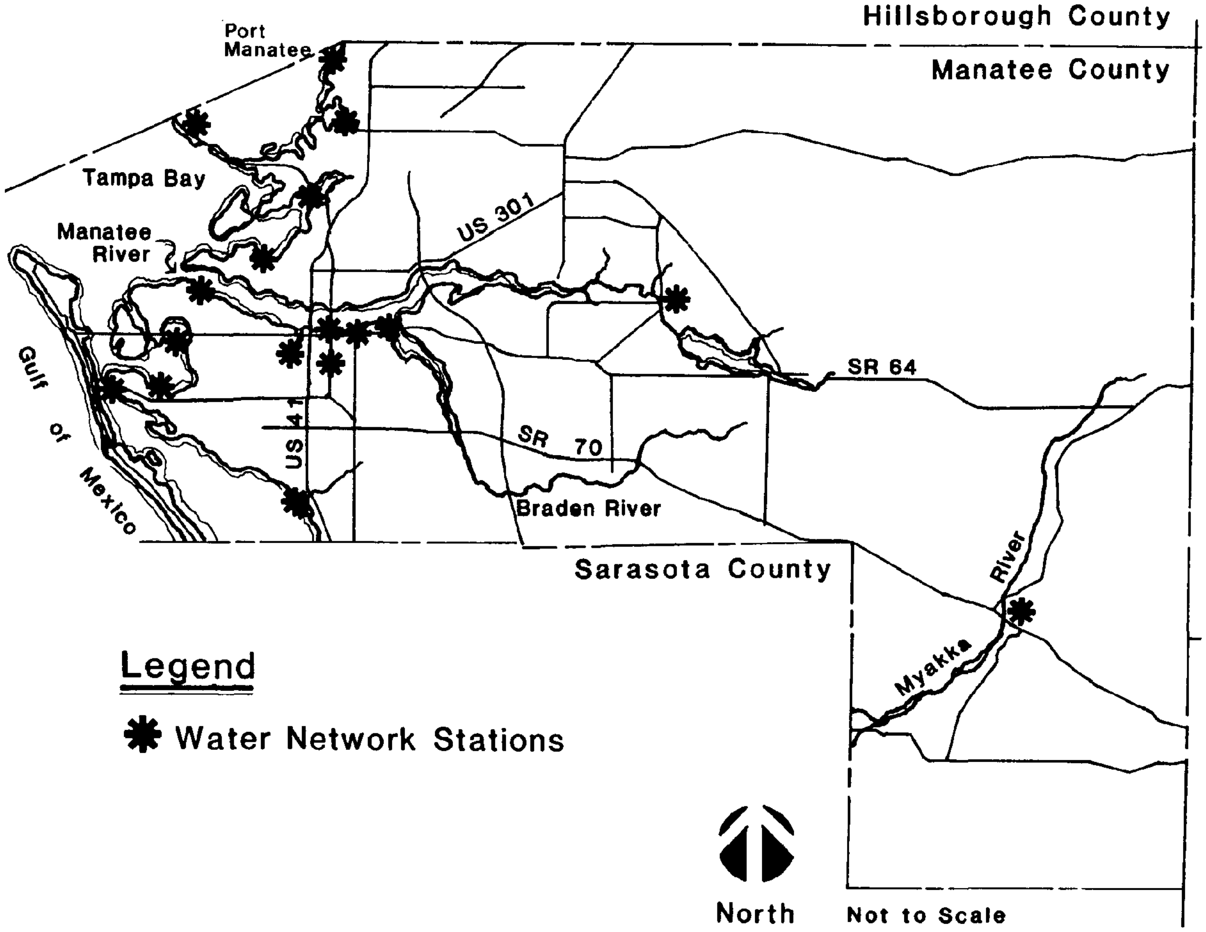
Manatee County Health Department Water Quality Study Results

YEARLY AVERAGES
1981

STATION NUMBER	FIELD TEMPERATURE °C	COLOR PCU	pH FIELD	SALINITY ppt	TURBIDITY NTU	CONDUCTIVITY micromhos/cm.
WN-1	20	12	8.2	32.1	3.2	40250
WN-2	24	18	8.3	31.8	5.2	39042
*WN-4	25	10	8.2	33.5	2.2	41725
WN-5	24	17	8.2	30.2	5.3	38242
*WN-6	25	26	8.0	25.8	3.0	33625
WN-7	24	18	8.3	30.7	3.1	38542
WN-9	24	35	7.8	27.1	3.7	33742
*WN-10	25	76	7.7	19.4	4.1	26025
WN-11	24	17	8.2	33.2	3.2	42092
*WN-12	26	13	8.4	33.3	4.4	41525
*WN-13	25	12	8.3	33.9	3.8	43125
*WN-14	24	57	7.8	13.0	7.3	14675
*WN-15	24	98	7.3	0	2.3	290
*WN-17	23	130	7.2	1.1	1.4	368
WN-19	22	95	7.6	1.2	1.9	370
WN-20	24	83	7.4	1.2	2.9	694
WN-21	24	43	8.5	23.5	22.2	29038
WN-22	23	43	7.7	2.3	7.1	792

*Quarterly Samples (Remainder Monthly)

Water Network Stations in Manatee County



Legend

✱ Water Network Stations

North

Source:

Manatee County Water Quality Program
Yearly Report 1981

Figure 5-6

Water Quality Values
Station No. 1 - Piney Point

Water Network Physical Tests
Yearly Averages 1981

Station Number	WN-1
Field Temperature °C	20
Color PCU	12
pH Field	8.2
Salinity ppt	32.1
Turbidity NTU	3.2
Conductivity micromhos/cm.	40250

Water Network Chemical Analyses
Yearly/Maximum Value 1981

D.O. mg/1	5.4/7.9
B.O.D.$_5$ mg/1	2.1/4.9
Hardness mg/1 $CaCO_3$	5663/6300
Nitrate mg/1 NO_3-N	0.02/0.04
Chloride mg/1 C1-	17453/19494
Fluoride mg/1 F-	1.02/1.13

Source:
Manatee County Water Quality Program, Yearly Report, 1981

Figure 5-7

Station 1. None of the values recorded at Station No. 1 exceeded State water quality standards. Station No. 1 lies directly adjacent to the northern boundary of Port Manatee. Because of their close proximity, sample results from Station No. 1 should be representative of water quality conditions in the nearshore areas immediately adjacent to the port, with the possible exception of the deeper channel and berthing areas.

In summary, the surface waters at Port Manatee are designated as Class III waters by the State of Florida. Water quality tests made in the waters adjacent to the port indicate the surface waters are generally within the standards established for Class III waters.

NOISE

On-site noise monitoring at Port Manatee has not been conducted, although levels are expected to be moderate due to the high degree of noise generating activity which normally takes place at the port. The largest sources of noise are the loading and unloading operations, construction activities associated with expansion or reconstruction of port facilities, vehicles, and machinery. The Federal government has developed acoustic noise guidelines, which vary according to the agency administering them. Manatee County has also promulgated a noise ordinance (Number 79-5) which establishes standards for vehicles, and is presently in the process of developing ambient noise standards.[14]

PLANT POPULATIONS AND HABITATS

The following vegetation associations were identified at Port Manatee in a study performed in October, 1980, by Conservation Consultants, Inc.

Agricultural Land
Ruderal Vegetation
Mixed Forest
Freshwater Swamp

Mangrove Swamp
Salt Flats
Seagrass Beds

The location of the vegetation associations is shown on Figure 5-8.[15] A description of each vegetation association is contained below.

Agricultural Land

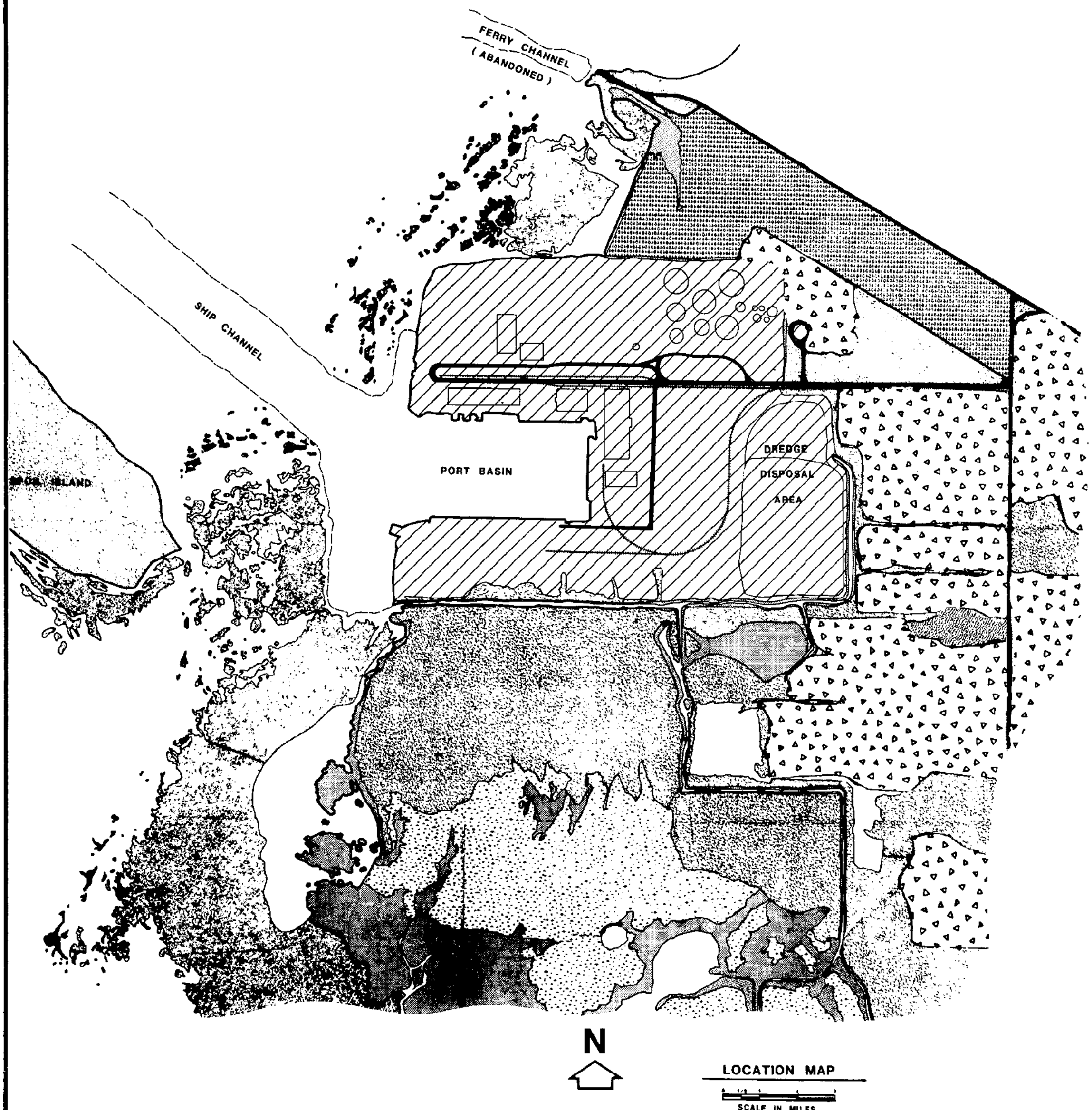
Agricultural land is land undergoing cultivation. Several areas, primarily to the east of the port, are presently being cultivated. The crops include citrus groves and various row crops (i.e., tomatoes, strawberries). Agricultural land was identified in the Manatee County Comprehensive Plan as a protected area, and is therefore considered a valuable resource.[16] However, the agricultural lands at the port are a temporary land use, conducted under short term lease agreements with the port. As such, the agricultural lands at the port will not be classified as a valuable resource by this study.

Ruderal Vegetation

Ruderal vegetation associations consist of weedy plants which overtake indigenous vegetation in disturbed areas. In the vicinity of Port Manatee, ruderal vegetation was found bordering the agricultural fields, on old dredge spoil disposal areas, and on other vacant port land. The dominant plant in these areas was typically Brazilian pepper (Schinus terebinthefolius). Other abundant species included Australian pine (Casuarina spp.), wax myrtle (Myrica cerifera), saltbush (Baccharis halimifolia), and lantana (Lantana camara).

The offshore disposal island is an area of about 60 acres with a vegetation cover predominantly of broomsedge, sea myrtle, dropseed, dog fennel and camphorweed. Scattered Australian pine trees in excess of 20 feet tall are also present. Red mangrove seedlings have been

Vegetation Associations and Land Use for Port Manatee and Tampa Bay, Florida



LEGEND :

- DEVELOPED PORT AREA
- WATER
- ROADS
- FRESHWATER SWAMP
- RUDERAL
- MANGROVE SWAMP
- AGRICULTURAL
- MIXED FOREST
- SALT FLAT
- Thalassia SEAGRASS BEDS
- Halodule SEAGRASS BEDS

Source: Conservation Consultants, Inc.

observed washed ashore but, because of heavy wave action, none are known to have rooted.

Ruderal land is not considered environmentally valuable because it is indicative of an area(s) in a disturbed state where the natural plant communities have been displaced.

Mixed Forest - This community represents the remnants of the native pine flatwoods and was found on a few undisturbed areas adjacent to the port. The mixed forest contained slash pine (*Pinus elliottii*) and saw palmetto (*Serenoa repens*), species typical of flatwoods. The areas adjacent to the port appear to have been protected from fires for many years. Fire is an important element in maintaining flatwoods associations. In the absence of fire the mixed forests are usually invaded by various hardwoods. The mixed forests near the port have been invaded by live oaks (*Quercus virginiana*). Many areas also exhibited dense growths of muscadine grapes (*Vitis rotundifolia*) draping the trees. Mixed forests often provide habitats for a number of animal species, and therefore are sometimes deemed valuable. The Federal and Florida governments have designated certain forested areas as "wilderness areas" and limit the type of activity permitted within these areas. There are no wilderness areas on or near the port's property, although there is one wilderness area designated in Manatee County known as the Town Islands State Wilderness Area. Due to the relatively small forested area, its proximity to the developed port area, and the lack of any zoning ordinances which restrict the use of forested areas for development, this area is not considered valuable for the purpose of this study.

Freshwater Swamp - One small area of freshwater swamp was found on property adjacent to the southern boundary of Port Manatee. It was dominated by willow (*Salix caroliniana*). Freshwater swamps often provide habitats for a number of animals which depend on organisms which live in these environments. The Florida Department of Environmental Regulation and the USACOE have identified these types of areas as transitional or wetland areas and subsequently require permits prior to allowing any activity to occur which may affect the resource. However, because of the isolated nature of this swamp and its small size, it is not subject to regulation by these agencies. In recognition of its size, isolation and proximity to developed port areas, it is not considered an environmentally valuable resource.

Mangrove Swamp - This association was found in a narrow band along the port's natural shoreline and along the banks of several drainage ditches within the port. The most abundant mangrove was the black mangrove (Avicennia germinans), followed by the white mangrove (Laguncularia racemosa), red mangrove (Rhizophora mangle), and buttonwood (Conocarpus erectus). Mangrove swamps are considered environmentally valuable resources because they contribute to the stabilization of shorelines and their falling leaves form detritus which contributes to the major estuarine food chains.

Salt Flats - These areas were found to the south of the port's property. Salt flats are frequently inundated by storm tides and often are devoid of vegetation. Where vegetation is present, it is typically low, herbaceous species such as sea purslane (Sesuvium portulacastrum), saltwort (Baltis maritima), and glasswort (Salicornia sp.). Since these areas are part of the transition zone from marine to upland vegetation and serve as a feeding area for a number of vertebrates, they are usually considered environmentally valuable resources.

Seagrasses - Seagrass beds were found in the shallow water areas just offshore of the port, above the minus five (-5) foot contour line and where there is enough depth of water to afford protection from waves and scour. Two different types of seagrass beds were found and are differentiated on the map in Figure 5-8. Turtle grass (Thalassia testudinum) was the dominant grass in the beds furthest from shore. These were generally much smaller beds than those found further inshore. The larger, inshore beds were dominated by Cuban Shoalweed (Halodule wrightii). Close to the shore in areas receiving freshwater runoff, widgeon grass (Ruppia maritima) comprised approximately five percent of the grasses present.

Associated with the seagrass beds is the green alga, (Caulerpa prolifera) and associated algae including Ulva lactua, Hyprea musciformes, Gracilaria verrulosa and the epiphyte, Champia parvula.

Seagrass beds are considered valuable resources because they provide shelter for juvenile fishes and invertebrates of commercial and sport value. In addition, they provide deteritus which is important in estuarine food chains and provide attachment surfaces for the production of a variety of forage animals.

RARE, THREATENED AND ENDANGERED PLANTS

In the final environmental impact statement for Manatee Harbor, Florida, the U.S. Army Corps of Engineers reported that there was no plant species classified as endangered or threatened by the U.S. Department of Interior or the State of Florida present within the project area.[17] For the purposes of the U.S. Army Corps of Engineers study, the project included Port Manatee's uplands as well as the access channel, berthing areas, spoil island and adjacent nearshore areas.

ANIMAL POPULATIONS AND HABITATS

Terrestrial

Birds are the most visible of the terrestrial wildlife forms found at Port Manatee. The mangrove and salt barrens are the most important bird habitats, and have, individually, been designated as valuable resources in a prior section of this study. These areas are typically frequented by ospreys (Pandion haliaetus), marsh hawks (Circus cyanerus), brown pelicans and occasionally bald eagles. Mangroves also provide nesting habitats for black-whiskered vireos (Vireo altiloquus), prairie warblers (Dendroica discolor), and possibly mangrove cuckoos (Coccyzus minor).[18] A large number of flooded ponds within mangrove areas provide important habitats for several heron species and many other species of waterfowl. When the shallow, temporary ponds in the salt barrens are flooded and the barren sand is saturated, birds frequently move there from the ponds within the mangroves and are joined by a large number of shorebirds, including semipalmated sandpipers (Ereuentes pusillus), least sandpipers (Erolia minutilla) and several other species.[19] Upland, drier habitats also support large assemblages of bird species preferring wooded and shrubby habitats which are common through the areas.

The offshore spoil island attracts large numbers of laughing gulls and black skimmers. Studies sponsored by the U.S. Army Corps of Engineers Waterways Experiment Station recorded 7,800 laughing gulls nesting on the central, 12.5 acres of the island in 1977. The nesting area is primarily rocky soil in character. Black skimmers, numbering 230 to 250 adults, were nested on the spoil island's southeastern and southwestern shore on high, sandy areas. Because the spoil island functions so effectively as a habitat/nesting site for the specialized requirements of the laughing gulls and black skimmers, this study will consider the spoil island and bird populations to be valuable resources.

Mammal species common to the habitats noted above are generally wide ranging and not unique. These include raccoons (Procyon lotor) which are known to inhabit almost all vegetation types. Other species which inhabit this area include the armadillo (Dasypus novemcinctus), hispid cotton rat (Sigmodon hispidus), eastern cottontail rabbit (Sylvilagus floridanus), old-field mouse (Peromyscus polionotus) and opossum (Didelphis virginiiana).[20]

Reptiles and amphibians are generally not very common in this area because the saline waters and the salt laden soils are unsuitable for most species. However, the diamond-back terrapin (Malaclemys terrapin), a species of sea turtle, is known to nest along the Beacon Key beach, north of the port. It is thought that sea turtles may use this beach as well. Various types of frogs, snakes, tortoises and toads are also indigenous to this area.

A wildlife survey has not recently been conducted on the port's property. The above information on the terrestrial and aquatic animals was taken from other studies and environmental information.

Aquatic

In 1976 Conservation Consultants, Inc. sampled and assessed the aquatic animal populations and habitats at a site approximately one mile north of the port. The stations sampled during these studies consisted of a nearshore, sandy bottom station with some seagrasses present, a deep water channel station with a mud substrate and a deep water offshore station with a sand substrate.[21] These stations correlate to habitat types found at Port Manatee.

Phytoplankton samples indicated low phytoplankton concentrations at all stations, with the maximum numbers reported at the offshore station. Almost two-thirds of the offshore total was contributed by the dinoflagellate (Gonyaulox polygramma), which reaches bloom concentrations in Hillsborough Bay during March. Algae populations at the other stations were much smaller, reflecting lower concentrations of Gonyaulox polygramma.[22]

Sampling of meroplankton was taken at all the stations. The numbers of immature invertebrates collected were quite variable, but the largest concentrations were absent at the offshore stations. Most of the meroplankton collected at these stations consisted of varying concentrations of clams (Anadara transversa) and (Crassastra virginica), unidentified snails (Gastropoda; Mollusca) and shrimp (Polyonyx).[23] Numbers were much lower at the nearshore station where the concentrations were dominated by unidentified gastropods and other organisms similar to those found at the offshore station except in reduced numbers.

Benthic invertebrates were found at all the stations, with concentrations highest at the offshore station, and lowest at the deep water channel. The inshore station also had high concentrations of organisms.[24] The dominant benthic organisms also differed between stations. Cumacid shrimp (Cumacea) dominated the collection in the less densely populated channel station while Ostracods dominated the nearshore station and the offshore station was characterized by a balanced benthic community.[25] There was also considerable difference between the nearshore and offshore stations. Only about 20% of the total taxa occurred in both stations. Although both stations seem to have similar sediments, the presence of shallower water and even a small amount of vegetation at the nearshore station affect the types of benthic invertebrates inhabiting the area.

Studies performed by the U.S. Army Corps of Engineers report that the silt in the bottom of the entrance channel is inhabited by about 3,000 organisms per square meter, predominantly microcrustaceans (Order Cumacea), but also by polychaite worms and bivalve molluscs. The sand habitat found in the bay bottom area offshore of the -5 foot contour hosts 9,000 to 10,000 informal organisms per square meter. Microcrustaceans are predominant, among which Ostracods are most numerous and more species of Crustacea, Annelida and Mollusca are represented than in the deep channel zone.

The ichthyoplankton samples which were collected indicated that the bay anchovy (Anchoa mitchilli) was the most abundant larval fish collected, and it was especially abundant at the nearshore and offshore stations. At the remaining channel station, the Spanish sardine (Sardinella anchovia) was the most abundant.[26]

Macroinvertebrates and fish samples were taken at all three stations. The catches were very different at all three of the stations sampled. The most fish were captured in the vicinity of the sandy beach, and the most abundant were the striped mullet (Mugil cephalus) and tidewater silverside (Menidia beryllina). Concentrations were much less at the other stations. The samples with the lowest concentrations were taken from the station located in the channel.[27]

The largest and most valuable concentrations of aquatic animal life are present in Port Manatee's nearshore, shallow areas and offshore, deep water areas. The channel and berthing areas have been disturbed enough to reduce the number and diversity of species present. The nearshore, shallow areas have the highest diversity of aquatic organisms because of the presence of seagrasses which provide food and protection to a variety of aquatic species.

RARE, THREATENED AND ENDANGERED ANIMALS

No rare or endangered animal species have been identified or observed at Port Manatee. It is generally agreed however, that three threatened species may be present on or in the vicinity of Port Manatee. These are the West Indian Manatee (Trichechus manatus latirostris), the Eastern Brown Pelican (Pelecanus occidentalis carolinesis) and the Green Turtle (Chelonia mydas).[28] For the purpose of this study, these species and their respective habitats will be considered valuable resources.

The manatee is a massive, fusiform, thick skinned, nearly hairless aquatic mammal. The forelimbs are paddlelike, and the hind limbs lacking, and the tail horizontally flattened. The average weight is between 790 and 1,190 pounds. The average length is 9.5 feet.[29] The diet of the manatees is strictly herbivorous but highly diverse, ranging from algae to terrestrial plants. Submerged vascular vegetation such as seagrasses are preferred. Manatees generally inhabit sluggish rivers, shallow estuarines and saltwater bays. Four factors seem to affect the choice of habitat.

They are:

1) Availability of vascular aquatic vegetation,

2) Proximity to channels of at least two meters in depth,

3) Recourse to warm water during winter cold snaps; and

4) A source of freshwater.[30]

In April, 1982 the U.S. Fish and Wildlife Service published Aerial Surveys for Manatees and Dolphins in Western Peninsular Florida which documents the findings of a 1979 study on the distribution and abundance of these two species. Figure 5-9 summarizes the number of manatees which were spotted during these surveys for all the counties in the study area. Thirteen manatees were observed in Manatee County.[31]

No known observations of manatees have been made at Port Manatee; however, aquatic habitats to the north and south of the port boundaries could provide the manatee with the type of food sources on which they depend. The map in Figure 5-10 indicates the location of the observed manatees. As noted in this figure, the majority of manatees observed in the Tampa Bay area were located in River Systems.

The eastern brown pelican is a year-round resident of the Florida coast. This bird is characterized by a long bill and dangling gular pouch. The sexes are similar in plumage, but males are slightly larger than females. Adults have a black belly and gray wings and back. The head and neck undergo complicated plumage changes on an annual cycle.[32]

In Florida, brown pelicans nest primarily in mangrove trees located from 2 to 35 feet above high tide line. Nesting is confined to coastal islands, sometimes near human habitation. Feeding occurs primarily in shallow estuarine waters, but birds have been seen as far as 20 - 40 miles offshore. Sand spits and offshore sand bars are used extensively as daily loafing and nocturnal roost areas.[33] Pelicans also frequent fish piers and fishing areas, where they dive for scraps.

No brown pelican nesting sites have been observed at Port Manatee; however, pelicans have been sited in the vicinity of the port. Due to the type of vegetation found in and around the port, pelicans could be likely to inhabit this area, because of the available sources of tood and shelter.

Summary of Manatee Observations

Numbers of Manatees Observed, by County, During Aerial Surveys in Western Peninsular Florida from July to December 1979

County	Manatees				
	July	Sept.	Oct.	Nov.	Dec.
Charlotte	4	5	6	0	1*
Collier	41	49+2C	63+1C	49	X
De Soto	0	0	0	0	X
Glades	0	0	0	1	X
Hendry	0	0	0	2+2C	X
Hernando	0	0	0	0	0
Hillsborough	16	3	0	0	47+3C
Lee	15	17+1C	7	28+1C	12*
Manatee	6	0	3	4	0
Monroe	9+1C	10	20	48+3C	28*
Pasco	0	0	0	0	1
Pinellas	0	0	0	0	7
Sarasota	2	6	11	14+1C	6
Total	93+1C	90+3C	110+1C	144+7C	102+3C

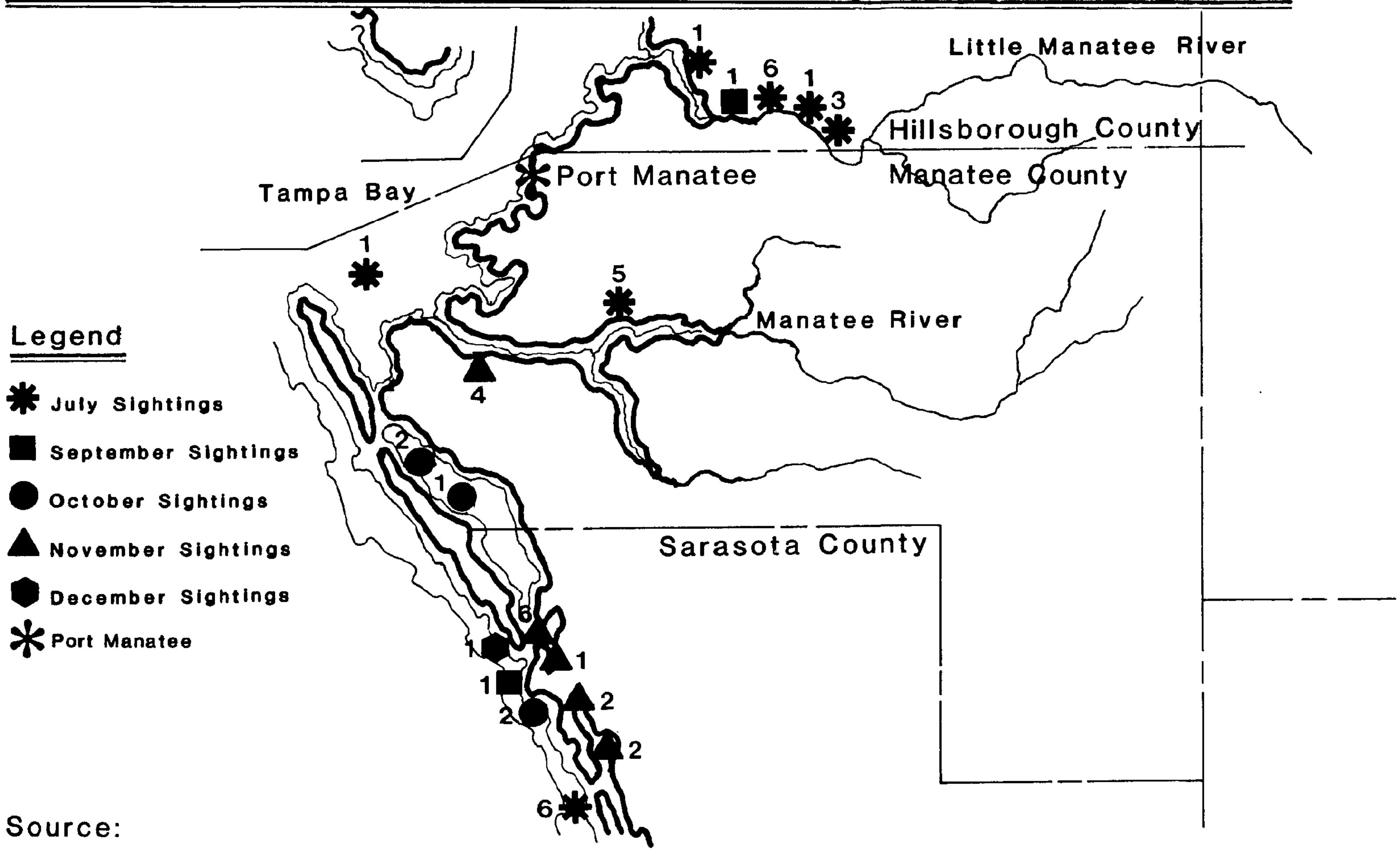
Source:

U.S. Department of the Interior, U.S. Fish and Wildlife Service, Aerial Surveys for Manatees & Dolphins in Western Peninsular Florida

Legend

C Plus Calves ✱ Incomplete Survey X Not Surveyed

Location and Numbers of Manatees Sighted During 1979 Aerial Surveys in Manatee County and Surrounding Areas



Source:

U.S. Department of the Interior, U.S. Fish & Wildlife Service, Aerial Surveys for Manatees and Dolphins in Western Peninsular Florida

Figure 5-10

The green turtle also has been known to inhabit the Tampa Bay, however they are not generally known to be located in the vicinity of the port.

AREAS OF LAND AND WATER LARGELY IN A NATURAL STATE, OR WHERE VALUES ARE DERIVED LARGELY FROM ECOLOGICAL CONSIDERATIONS

The majority of the land and water areas within Port Manatee's immediate boundaries have been disturbed to the point where they no longer exist in their natural state. Correspondingly, most ecological values have been reduced, so that they play a secondary role. The Manatee County Comprehensive Plan as amended in October, 1981, identifies the area in and around Port Manatee as planned for continued industrial development.[34] This type of planned development is not consistent with preserving areas for ecological considerations.

There are, however, some areas immediately west and northwest of the port's property boundaries which may be considered valuable, due to the types of habitats present in these areas and the plant and animal species which may inhabit these areas. Figure 5-11 shows the areas which are still in a somewhat natural state, and primarily inhabited by water-dependent plant species, such as seagrasses and mangroves. These plant species often serve as shelter, nesting grounds and food sources for those species which inhabit them. These areas will be considered as valuable resources.

The spoil island, located to the west of the port, is considered a valuable resource primarily because it functions as a habitat/nesting site for the specialized requirements of large numbers of laughing gulls and black skimmers. The spoil island is isolated from the mainland. Most of the plant species populating the spoil island are classified as ruderal vegetation.

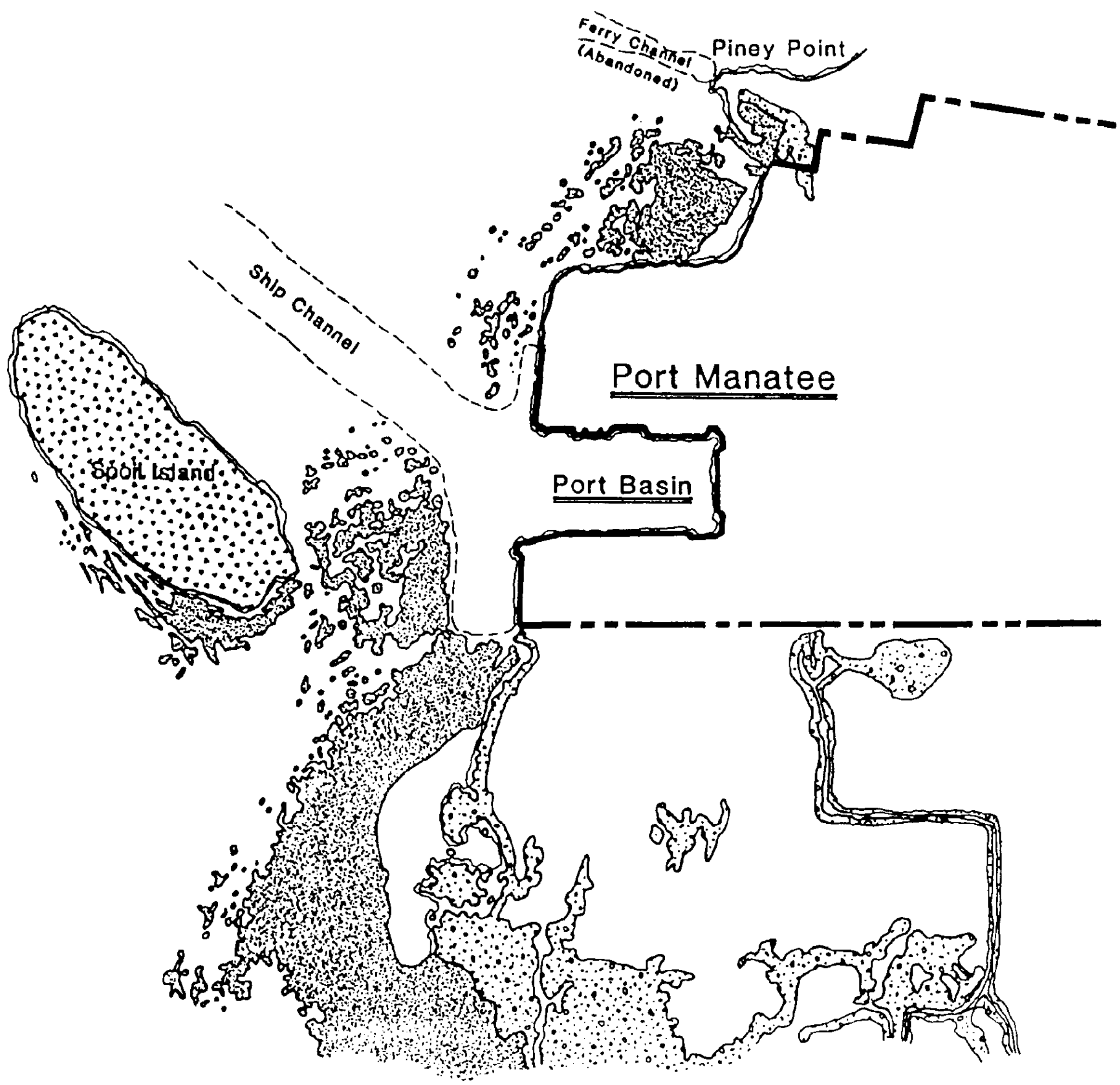
Other areas in the Tampa Bay vicinity have been designated as valuable environmental resources by local, State and Federal action. Cockroach Bay in Hillsborough County, approximately half a mile northeast of Port Manatee, has been designated as an aquatic preserve by the State of Florida. The Little Manatee River has been designated by the State of Florida as an outstanding Florida water. Passage Key, located adjacent to the southwest entrance channel into Tampa Bay is a national park. The Federal Government has designated three refuges at the entrance to Tampa Bay as part of the National Wildlife Refuge System. Both Cockroach Bay in Hillsborough County and Bishop Harbor in Manatee County, approximately two miles south of the port, are considered critical habitats because the West Indian Manatee inhabits these areas. Figure 5-12 depicts the location of these areas.

AREAS DESIGNATED IN THE COASTAL ZONE MANAGEMENT PLAN AS AREAS OF PARTICULAR CONCERN FOR ENVIRONMENTAL PURPOSES

In 1972 the Congress passed the Coastal Zone Management Act, (CZMA). CZMA was amended in 1976 and again in 1980. The Act and its amendments affirm a national interest in the effective protection and careful development of the coastal zone, by providing assistance and encouragement to coastal states to develop and implement management programs for their coastal areas. In August, 1981, the U.S. Department of Commerce and the Florida Office of Coastal Management published the Final Environmental Impact Statement (FEIS) entitled the Florida Coastal Management Program. The FEIS recommends that the entire State of Florida be included within the coastal zone (except for lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the Federal government, its officers or agents).[35]

The Florida Coastal Management Program (FCMP) is based on existing statutes and regulations, which forms the basic network of the program. The FCMP is implemented primarily through state agencies.[36] The Department of Environmental Regulation acts as the lead agency, responsible for coordinating and implementing the statues under the FCMP.

Areas in Natural State



Source: Conservation Consultants, Inc.

Legend

Spoil Island

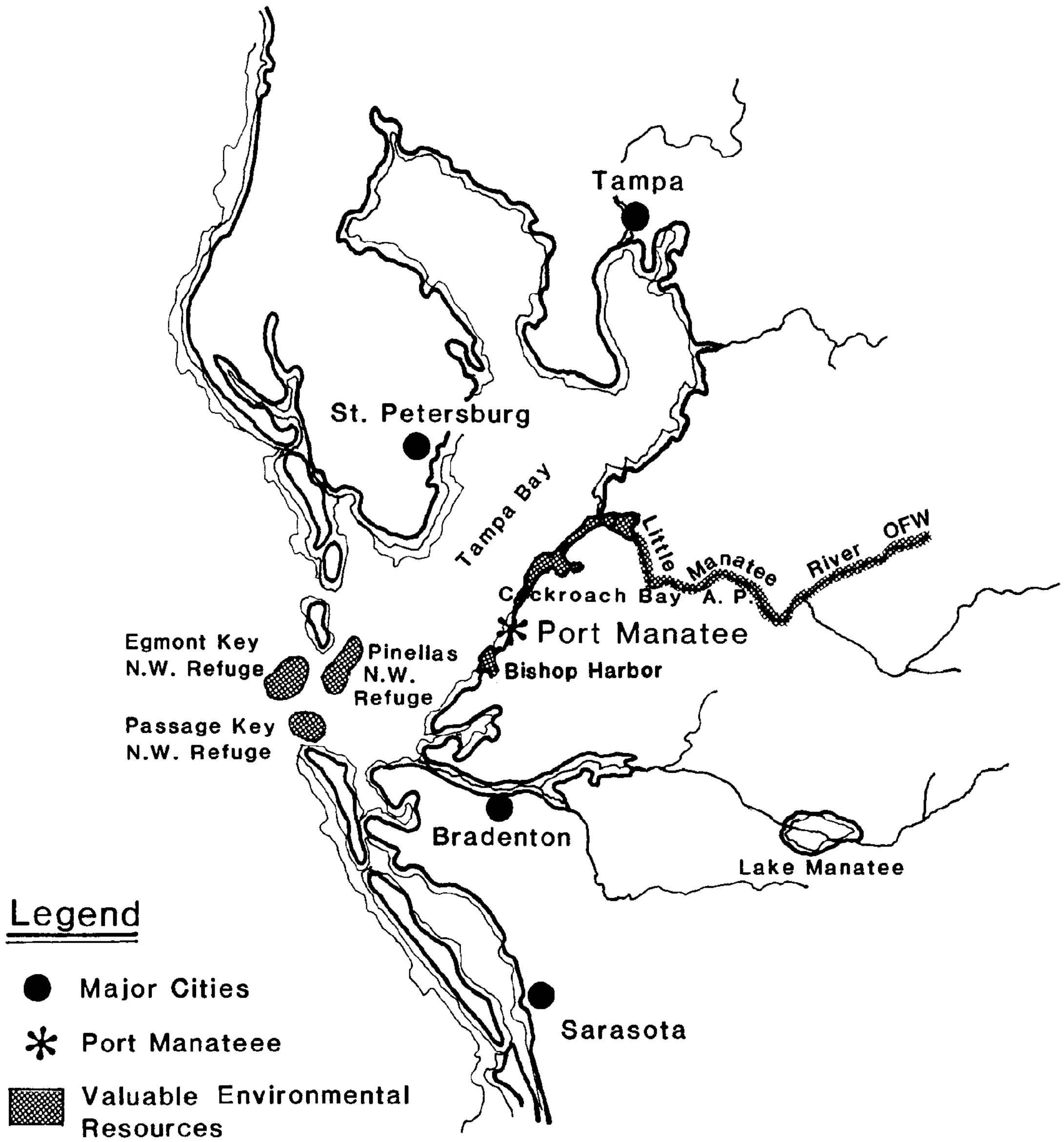
Grassy Shoals

Mangrove Swamp

Port Manatee Property Line

Figure 5-11

Areas Designated as Valuable Environmental Resources



N.W. National Wildlife
A. P. Aquatic Preserve
OFW Outstanding Florida Water
Source: Bureau of Land Management

The FEIS identifies several areas within the FCMP which are designated "geographic areas of particular concern: areas of special management".[37] The entire coastal zone in Florida is considered as a vital and important resource; however, certain areas are of even more special significance and warrant particular attention to their preservation and development. The Coastal Zone Management Act, requires in Section 305(B)(3), that each state inventory and designate the "Areas of Particular Concern". The State of Florida proposes to utilize several existing state programs which identified areas of particular interest where special management measures are applied to ensure protection of these resources. There are five areas of particular concern included in this program. They are:

- Florida's Aquatic Preserves System
- State Wilderness System
- Areas of Critical State Concern
- Conservation and Recreation Lands: Environmentally Endangered Lands
- Areas for Preservation and Restoration[38]

Presently, there are none of these specially designated areas located at Port Manatee, although there are some areas located nearby. The previous section of this chapter discusses the areas which are close to the port.

FOOTNOTES

[1]Florida Department of Commerce, Directory Florida Ports and Waterways; page 171.

[2]Conservation Consultants, Inc., Atmospheric Particulate Study; page 1.

[3]Florida Department of Environmental Regulation, Florida Administrative Code; Chapter 17-2.

[4]Conservation Consultants, Inc., Atmospheric Particulate Study; page 40.

[5]Conservation Consultants, Inc., Atmospheric Particulate Study; page 41.

[6]Tampa Electric Company, Ten Year Site Plan for Electrical Generating Facilities and Associated Transmission Lines; page 2.5-4.

[7]Ibid; page 2.5-5.

[8]Ardaman & Associates, Inc., Piezometer Installation at Port Manatee, Manatee County, Florida, March, 1982; page 2.5-18.

[9]Ibid; page 3.

[10]Teco; page 2.5-1.

[11]Ibid; page 2.5-2.

[12]City of Tampa, Tampa Nationwide Urban Runoff Program, Phase I, Final Report; page 6.

[13]Florida Department of Environmental Regulation, Florida Administrative Code, Chapter 17-3.

[14]Telephone conversation with Jo McIntosh, Manatee County Pollution Control Dept., March 5, 1982.

[15]Conservation Consultants, Inc., A Survey of Vegetation Associations, Port Manatee Area, Manatee County, Florida; page 2.

[16]Manatee County Board of County Commissioners, The Manatee Plan - Policy Document; page 7-5.

[17]Daniel B. Ward, Rare and Endangered Biota of Florida: Plants; page xxiii.

[18]Ibid; Tampa Electric Company; page 2.7-8.

[19]Ibid; page 2.7-8.

[20]Ibid; page 2.7-9.

[21]Ibid; page 2.7-9.

[22]Ibid; page 2.7-10.

[23]Ibid; page 2.7-11.

[24]Ibid; page 2.7-11.

[25]Ibid; page 2.7-11.

[26]Ibid; page 2.7-12.

[27]Ibid; page 2.7-13.

[28] Department of the Army, Corps of Engineers; Feasibility Report, Manatee Harbor, Manatee Harbor Channel Maintenance, Main Report; page 10.

[29] James N. Layne, Rare and Endangered Biota of Florida: Mammals; page 28.

[30] Ibid; page 28.

[31] U.S. Department of the Interior, U.S. Fish and Wildlife Service, Aerial Surveys for Manatees and Dolphins in Western Peninsular Florida; page 8.

[32] Herbert W. Kale, III, Rare and Endangered Biota of Florida: Birds; page 23.

[33] Ibid; page 24.

[34] Ibid; Manatee County Board of County Commissioners; page 4-33.

[35] U.S. Department of Commerce and Florida Office of Coastal Management, The Florida Coastal Management Program, Final Environmental Impact Statement; page II-10.

[36] Ibid; page xvii.

[37] Ibid; page II-144.

[38] Ibid; page II-146.

CHAPTER 6

RECREATIONAL RESOURCE INVENTORY

There is little doubt as to the immense value of Florida's natural resources in attracting both visitors and permanent residents to the State. With a 1980 population of approximately 9.5 million, and projections for approximately 11.7 million residents by 1990, Florida ranks as the third fastest growing state in the Nation. In addition, over 30 million tourists visit Florida annually to bask in the sunshine, enjoy sandy beaches, fish, swim, and indulge in a myriad of indoor activities.[1]

Manatee County is part of Regional Planning District 8. This district, composed of Pinellas, Hillsborough, Pasco and Manatee Counties, suffers an imbalance between its population (18% of State population) and recreational land (1% of State land).[2] This imbalance increases the importance of identifying and preserving those areas of real and potential value as recreational resources (see Figure 6-1 Population Compared to Recreation).

This chapter will inventory the valuable or potentially valuable recreational resources within the onshore boundaries of Port Manatee and its nearshore areas. Only those areas that affect resource-based recreational activities will be discussed. These areas include water and land areas that are useful for boating, fishing, beach activities, picnicking, swimming, visiting archaeological and/or historical sites, nature study and other outdoor activities facilitated by natural resources. Interviews with State and local agencies, businesses and recreational clubs were conducted in order to discern those areas of greatest value. Published reports and books were used in gathering general information on the recreational resources in Florida, Manatee County, and, more specifically, the area near Port Manatee.

Most of the recreational activity near Port Manatee is informally structured, resource-based recreation. The Manatee County Department of Recreation and Parks has no scheduled activities or parks in the area.

Local residents and visitors use nearshore areas for fishing and boating. Beach activities are limited to a sandy area accessible by a County road. The dearth of public recreational facilities is understandable because of the industrial zoning of the area. Future plans include development of port-related and other industry.[3] This study will identify those areas now used for resource-based recreation and areas that are potentially valuable for recreational activities.

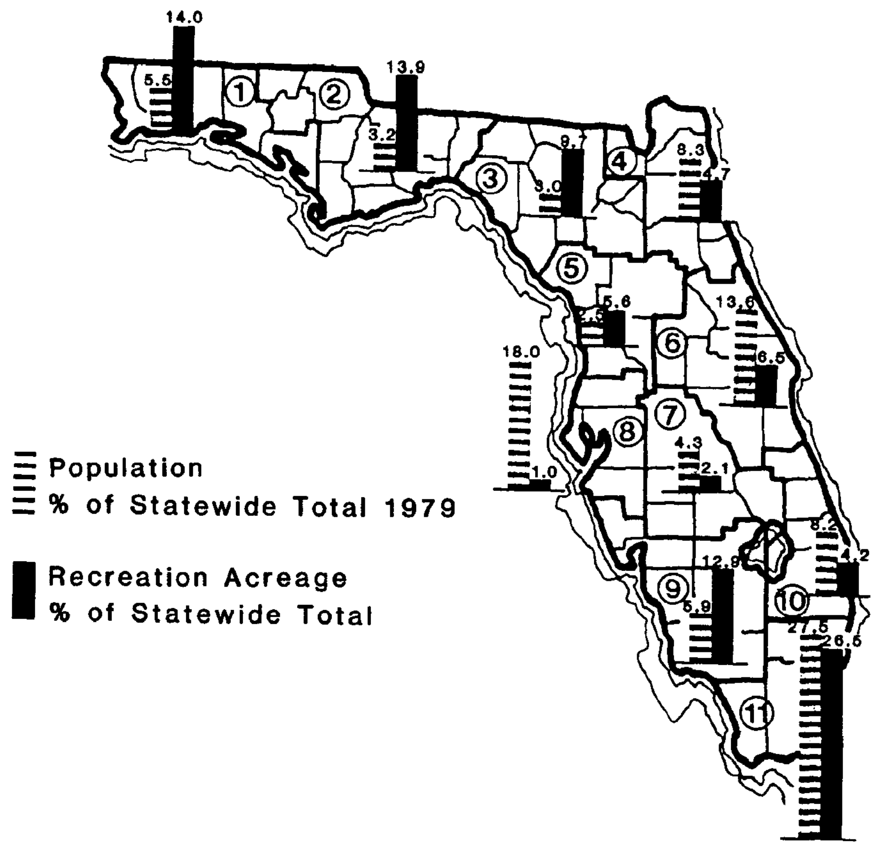
VALUABLE RECREATIONAL AREAS DESIGNATED BY THE FLORIDA COASTAL MANAGEMENT PLAN AND/OR BY STATE, REGIONAL OR LOCAL GOVERNMENT

The Florida Coastal Management Program relies on existing statutes and regulations as required by the Florida Coastal Management Act of 1978. These laws and regulations apply statewide and result in the boundary of Florida's Coastal Management Program extending throughout the entire State of Florida. All recreational areas designated valuable by existing State program, rule or regulation, therefore, are included as valuable recreational areas in the Coastal Management Program.

The State of Florida has several programs designed to provide for the outdoor recreation of its residents and visitors and for the conservation of lands. Valuable recreational areas identified by these programs include State parks, wilderness areas, aquatic preserves, environmentally endangered lands and recreational trails. In the immediate vicinity of Port Manatee there is one area that has been recognized in this manner by the State of Florida as a valuable recreational resource: Cockroach Bay Aquatic Preserve. Manatee County has also recognized an additional nearby area, Bishop's Harbor, as a valuable recreational resource.

There are no other known areas in the immediate vicinity of Port Manatee's boundaries that have been designated by the CZM plan or by State, local or regional governments as being lands of recreational value. Primary recreational areas in Manatee County are located farther south of Port Manatee.

Population Compared to Recreation Acreage by Region



Regional Planning Councils

1 West Florida
2 Apalachee
3 North Central Florida
4 Northeast Florida
5 Withlacoochee
6 East Central Florida
7 Central Florida
8 Tampa Bay
9 Southwest Florida
10 Treasure Coast
11 South Florida

Source: Fernald, Edward A. Atlas of Florida, 1981 p. 202

Cockroach Bay Aquatic Preserve

Cockroach Bay Aquatic Preserve was designated by the State of Florida in 1976 (S.258.391, Florida Statutes) as part of the aquatic preserve system under the Aquatic Preserve Act of 1975.[4] The southern boundary of Cockroach Bay Aquatic Preserve is located approximately one-half mile north of Port Manatee (see Figure 6-2).

Pursuant to Chapter 258, F.S., it is the intent of the Florida Aquatic Preserve Program to set aside forever those state-owned submerged lands having exceptional biological, aesthetic, and scientific value. Aquatic preserves receive regulatory protection in accordance with this intent. In addition, private submerged lands located within an aquatic preserve are managed as part of the preserve, provided that the landowner contracts with the State for donation or lease of his property to the State. Aquatic preserve management programs emphasize the protection of existing natural values and promotion of compatible outdoor recreational uses such as boating, fishing, skin diving and nature appreciation. Areas in Cockroach Bay Aquatic Preserve are in a 40-year lease to the Board of Trustees of the Internal Improvement Trust Fund from the Tampa Port Authority.[5]

The protected area, northeast of Port Manatee is identified as a valuable recreational resource because of its designation as an aquatic preserve.

Bishop Harbor

Bishop Harbor, located approximately two miles south of Port Manatee, is primarily submerged land covered with dense mangrove swamp. This area provides a sheltered environment for water fowl and a variety of aquatic plants and animals (see Figure 6-2).

This area was cited in the Manatee Plan: Policy Document as an area of special concern to be considered in Port Manatee development plans.[6] To insure the protection of those areas that may be considered valuable recreational resources, the Manatee Plan states that all coastal waters, estuaries, lakes, cypress domes and navigable rivers should be considered as scenic.[7] Development of these areas should preserve their scenic, recreational value.

Bishop Harbor is frequented by local residents and organized boating groups such as the Tampa Sailing Squadron.[8] Its pristine state attracts nature enthusiasts, photographers, boaters and fishermen.

VALUABLE RECREATIONAL AREAS OF CULTURAL, HISTORIC OR ARCHAEOLOGICAL SIGNIFICANCE

The Florida Department of State, Division of Archives, History and Records Management is designated by Florida Statute 267.061(2) as the State agency with responsibility to "locate, acquire, protect, preserve and promote the location, acquisition, and preservation of historic sites and properties... which have scientific or historical value or are of interest to the public..."[9]

Archaeological and historical sites are areas that provide resource-based recreation for residents and tourists. The areas are also an educational resource for research into Florida's past. For the purpose of this study, archaeological and historic sites are considered valuable recreational areas. Manatee and Hillsborough Counties are rich in archaeological and historical sites; 255 sites have been identified in Manatee County. Hillsborough County has 473 sites.[10]

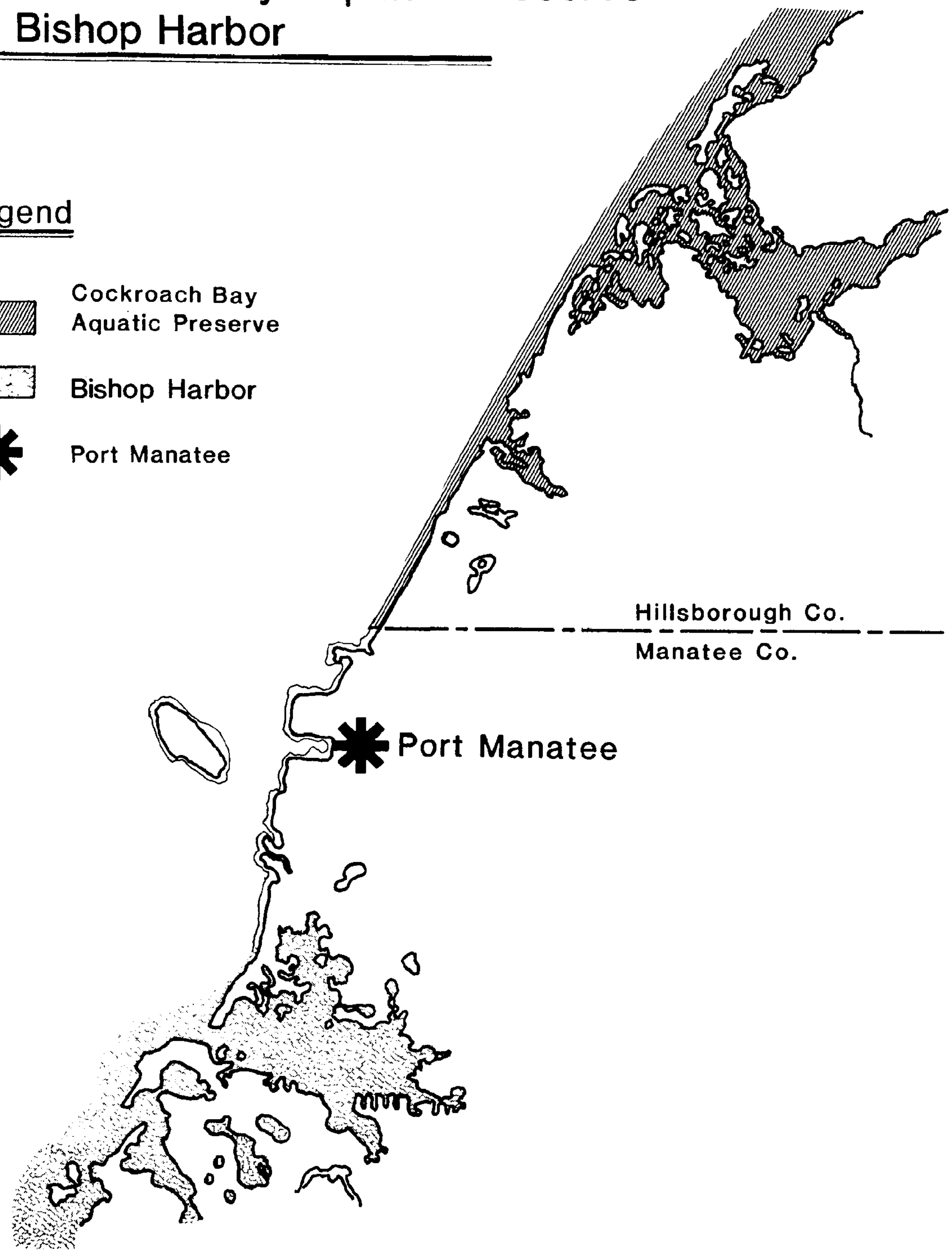
Development in unsurveyed areas would preclude identification of archaeological or historical sites; therefore, individual review of specific project areas is recommended to avoid destruction of potentially valuable recreational/cultural resources.

In order to determine whether any historic or archaeological sites exist in the vicinity of Port Manatee, a request was made to the Florida

Cockroach Bay Aquatic Preserve & Bishop Harbor

Legend

- Cockroach Bay Aquatic Preserve
- Bishop Harbor
- ✱ Port Manatee



Source: Manatee County Comprehensive Plan

Figure 6-2

Department of State, Division of Archives, History and Records Management for a cultural resource assessment. The results of the cultural resource assessment are contained in Appendix F of this study. The assessment identified 37 archaeological and historic sites within the vicinity of Port Manatee. The Division of Archives, History and Records Management determined that, with the exception of Site 8 MA 48, development elsewhere within the Port Manatee tract was unlikely to affect any sites listed or eligible for listing on the National Register.

According to the Division of Archives, History and Records Management, Site 8 MA 48 was reportedly located near Piney Point, possibly within the port's boundaries. It was reported in 1954 by Mr. W. Plowden who described it as a burial mound (80 feet in diameter by 15 feet high) separated by mangroves from a shell midden (150 feet in diameter by 18 feet high) located in Section 01, Township 33 South, Range 17 East, Manatee County. The Division of Archives, History and Records Management recommended that the reported location of Site 8 MA 48 be resurveyed to accurately locate and access the site.

A resurvey of the site was performed in November 1982 by Archaeological Consultants Incorporated. No archaeological or historical sites were located within Section 01, Township 33 South, Range 17 East, Manatee County. Based on the results of the resurvey and on an intensive background review of historical records, Archaeological Consultants Incorporated concluded that the site location data provided by W. Plowden was in error and that Site 8 MA 48 was probably confused with two sites previously recorded on Harbor Key (see Appendix G - Letter Report, Site 8 MA 48, Archaeological Consultants Incorporated). This information has been forwarded to the Division of Archives, History and Records Management as justification for the removal of Site 8 MA 48 from its presently recorded location.

OTHER VALUABLE LAND AND WATER RECREATIONAL AREAS

Piney Point

This area, located at the boundary of the northwest corner of Port Manatee is accessible by Piney Point Road (Figure 6-3). Its strategic location and sandy terrain provide a natural launching ramp for small boats.

Piney Point is a relic of the bygone ferry boat era. The remains of what was once a dock used by ferry boats that transported passengers to and from St. Petersburg stand stark and rotting against the background of the Sunshine Skyway Bridge.

Despite the lack of a constructed launching ramp, this strategic location is used daily by an average of 20-30 boats. Shallow water prevents usage as a ramp area for boats much over 18 feet; however, smaller boats can be easily launched. There are three other ramps within a five mile area of Port Manatee. These ramps are located at Palmetto, Cockroach Bay and Bishop Harbor.[11] Piney Point remains a popular launching area because of its strategic location and proximity to Port Manatee fishing areas.

Beach activities such as sunbathing, swimming and shelling constitute the most popular form of outdoor recreation activity in Florida according to the latest report by the Florida Division of Parks and Recreation. According to the report, Outdoor Recreation in Florida, rapid population growth and commercial development along the coasts pose critical problems for the continued availability of public opportunities for beach activities. Manatee County was among those areas showing a deficiency in the availability of land area for public beach access.[12]

The beach area at Piney Point is too rocky and too sparse to attract sunbathers or swimmers. On-site visits revealed some shelling activity and casual wading along the shore.

Piney Point

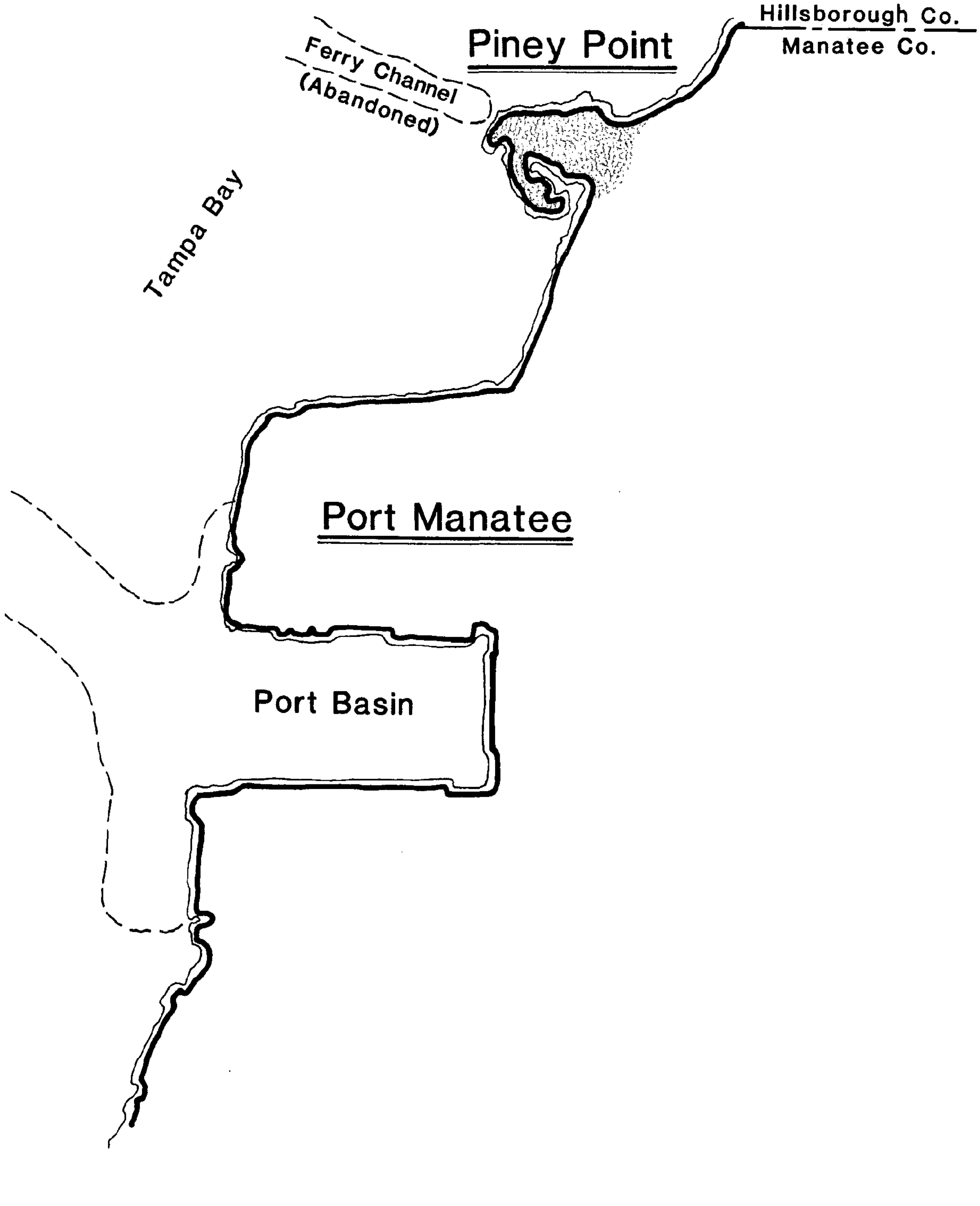


Figure 6-3

In view of the popularity of this natural landform and its strategic location, Piney Point is considered a valuable recreational resource in the Port Manatee area.

Grassy Shoals - Access Channel Area

The Port Manatee access channel provides a deepwater atmosphere for a variety of saltwater fish and other aquatic life. Grassy shoals along the channel afford an excellent habitat for spawning and feeding (Figure 6-4). These areas are hatching grounds and nurseries for fish that migrate to deeper channel waters upon maturity and during periods of excessive heat or cold.

Included among the saltwater fish that inhabit the Port Manatee area are: sea trout, redfish, mangrove snapper, crevalle jack, snook, mullet and tarpon. The area is used primarily by sport fishermen; however, there is some activity from commercial fishermen.

Use of the channel area varies, but, according to a Florida Marine Patrol official, an average of 25-30 boats are sighted daily. A few scuba divers have also been seen in the channel area.[13] Interviews with several area dive shops confirmed that, although the channel is deeper than surrounding water along the coastline, it is not a primary area for scuba diving. Area divers must go out at least seven to ten miles into the Gulf of Mexico to find water depth and clarity suitable for good scuba diving activity.

Port Manatee discourages use of the channel by small boats, snorklers and scuba divers because of the obvious danger of collision or upset by incoming and outgoing ships and barges. The access channel is privately maintained by Manatee Port Authority; however, the public cannot be prohibited from use of this area. The public is not permitted to fish from Port Manatee docks.[14]

On-site visits have revealed small boats anchored nearshore from Port Manatee in various locations. In addition, despite restrictions, there is some fishing activity from the shoreline on Port Manatee property.

In summary, the grassy shoals along the Port Manatee access channel provide an excellent habitat and feeding ground for saltwater fish and other aquatic life. This area attracts a significant number of fishermen and is considered a valuable recreational resource in northern Manatee County.

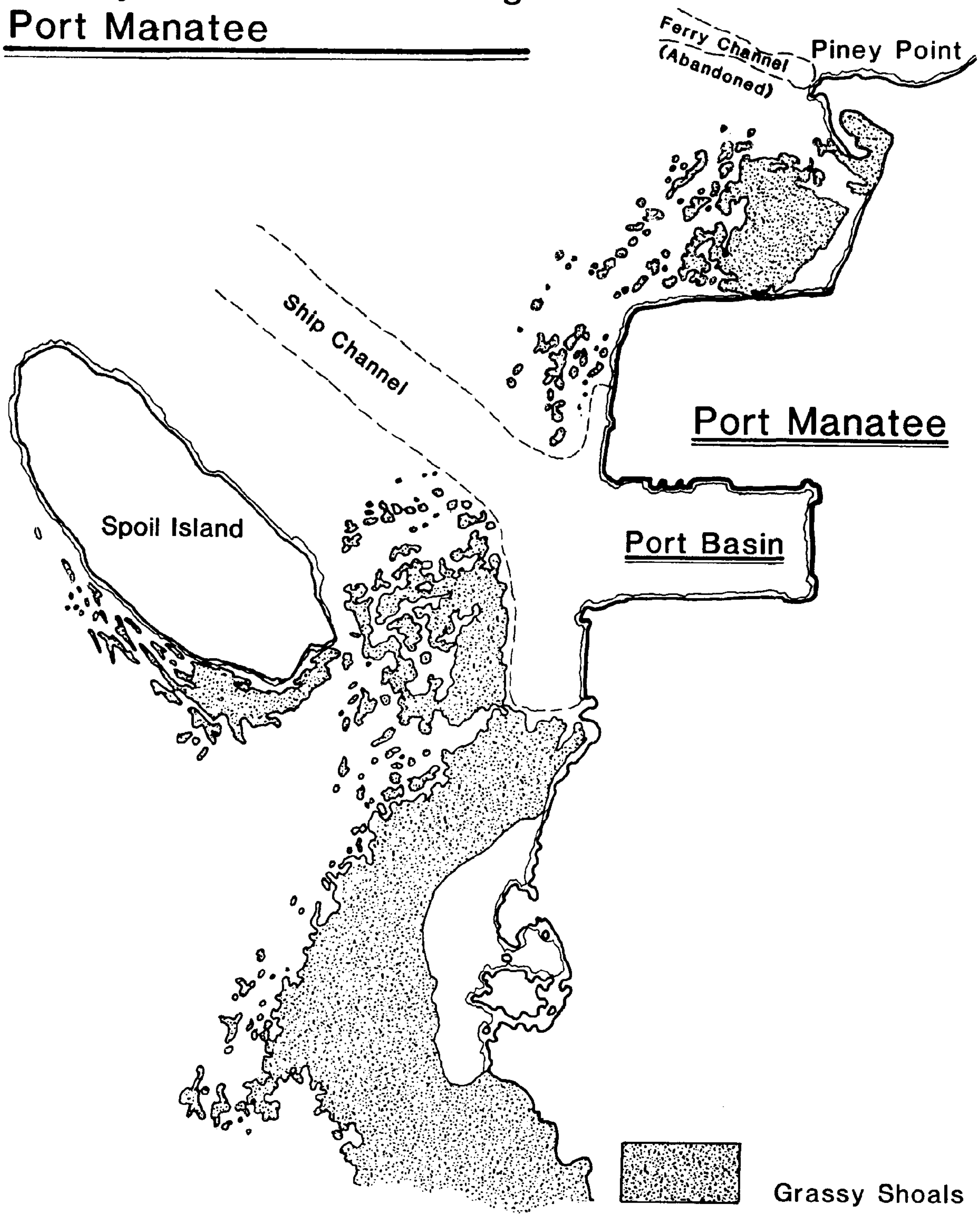
Mangrove Areas - Along Shoreline

The mangrove areas located immediately north and south of Port Manatee provide a protective habitat for many varieties of aquatic life (Figure 6-5). According to the Florida League of Anglers, the mangroves are protective habitats for non-predator fish such as the mangrove snapper and redfish. Destruction of mangrove areas could affect the composition of fish populations. Predator fish, such as jacks, quickly displace non-predator species if protective habitats are destroyed. This results in a decrease in the quality of sport fishing in the area.[15]

As previously stated, there is a significant amount of fishing nearshore. The mangrove areas are too shallow and marshy for boat access; however, they provide protection and food needed by a variety of saltwater fish and aquatic life.

The mangrove areas north and south of Port Manatee and those within Port Manatee boundaries are considered valuable as resources that provide an excellent habitat for a variety of saltwater fish in the area. The mangroves affect the quantity and variety of fish that inhabit the area and enhance the overall value of the nearshore areas for saltwater fishing and cast-netting.

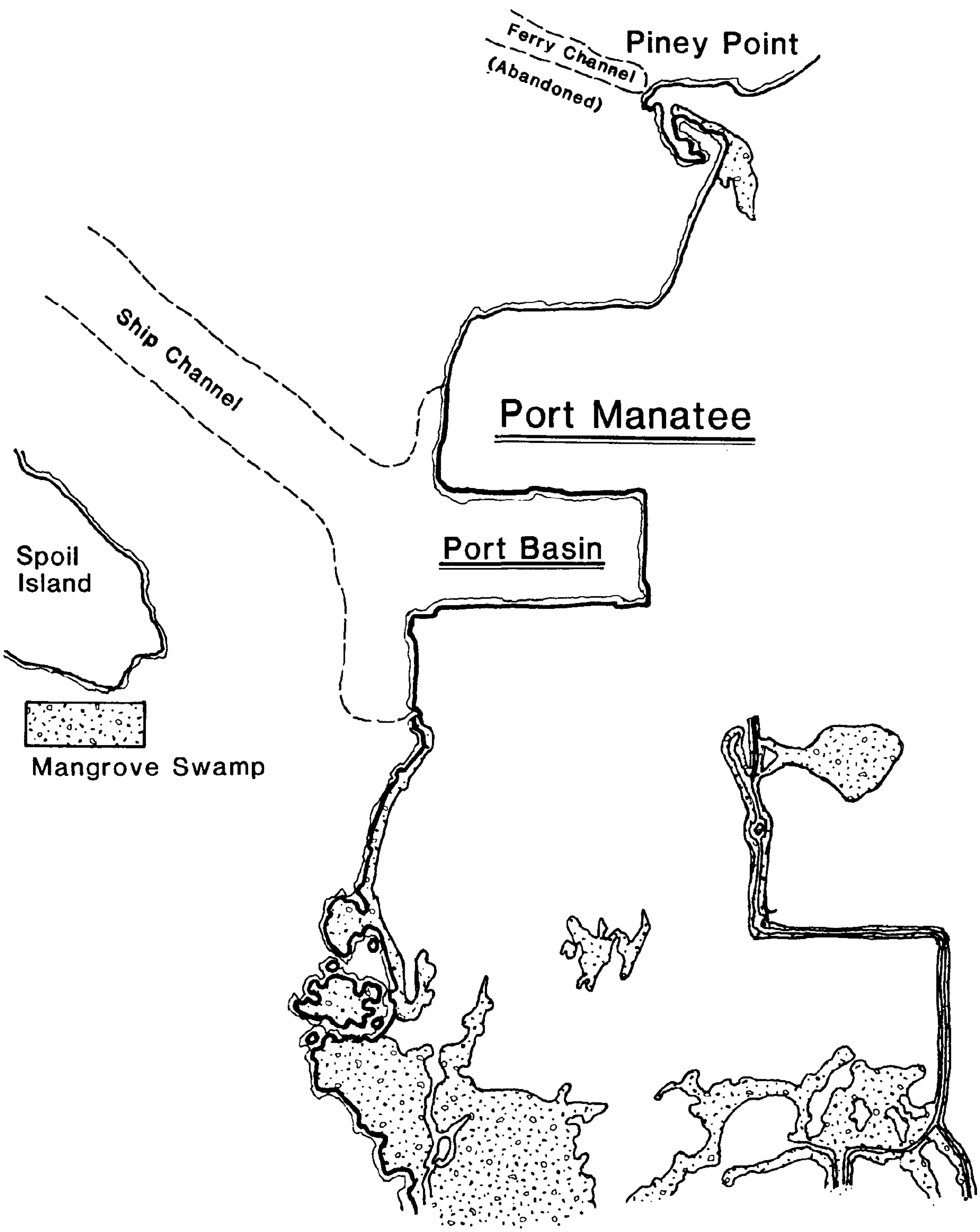
Grassy Shoals Surrounding Port Manatee



Source: Conservation Consultants, Inc.

Figure 6-4

Mangrove Areas Surrounding Port Manatee



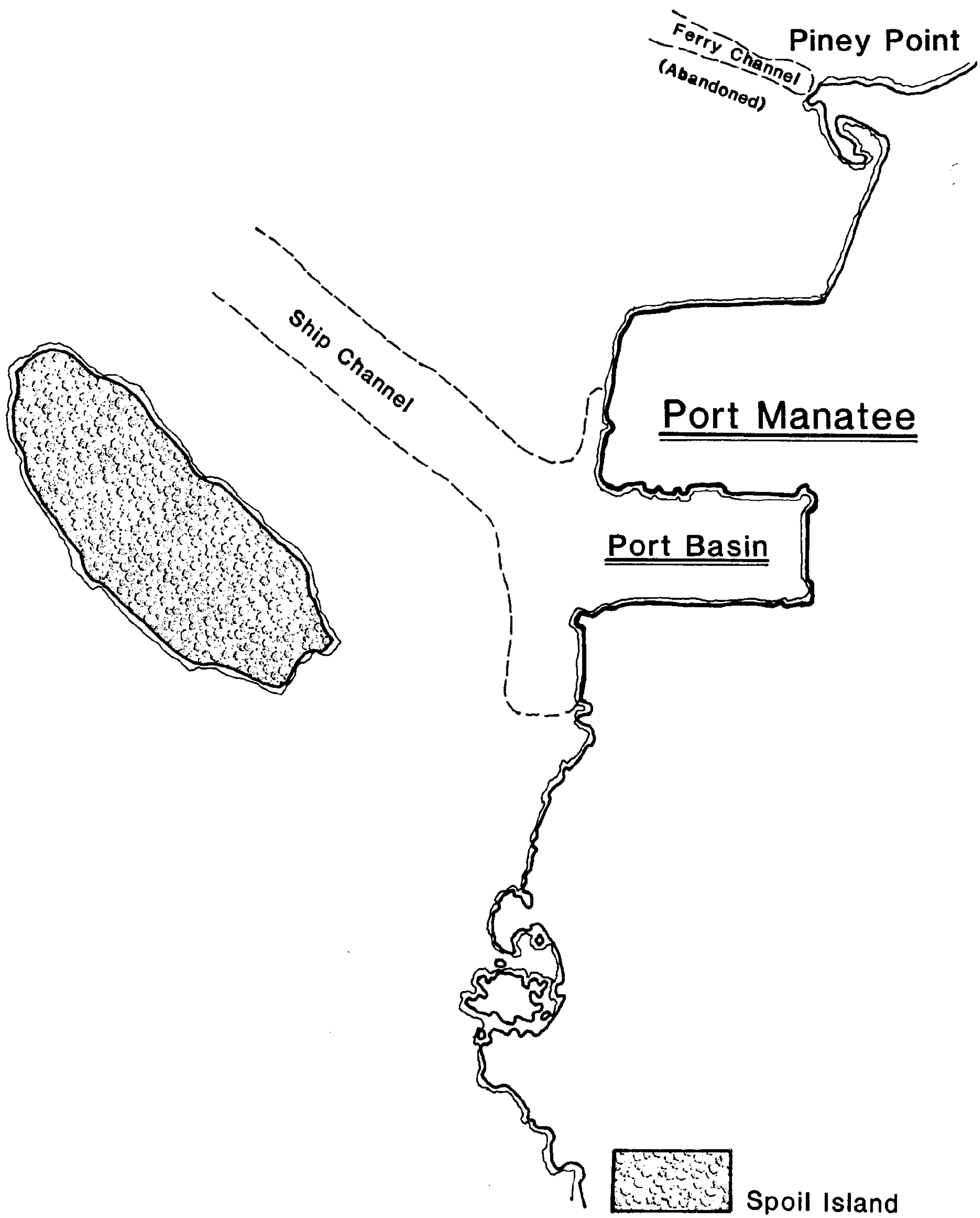
Source: Conservation Consultants, Inc.

Port Manatee Spoil Island

Spoil islands are a by-product of port development. Spoil islands can, with proper management and planning, prove a boon to area wildlife and recreation. The spoil island directly offshore from Port Manatee is a potentially valuable recreational resource (Figure 6-6). It is presently covered with ruderal vegetation and small trees and is a nesting area for several species of birds. The island's terrain is not suitable for picnicking and its rocky shore is not conducive to beach activities.

As the island matures it is anticipated that mangroves will root along its shores and natural ecosystems will develop and increase the value of this area to birdwatchers and naturalists.

Spoil Island off Port Manatee



Source: Conservation Consultants, Inc.

Figure 6-6

FOOTNOTES

[1]Florida. Division of Recreation and Parks, Outdoor Recreation in Florida, 1981 (Tallahassee: Florida. Dept. of State, 1981), p. 1.

[2]Edward A. Fernald, Atlas of Florida (Tallahassee: Florida State University Foundation, Inc., 1981), p. 202.

[3]Manatee County Board of County Commissioners, The Manatee Plan: Policy Document; Ordinance 80-4 (Bradenton, Fl.: Manatee County Board of County Commissioners, 1981), pp. 7-9.

[4]Florida. [Laws]. Official Florida Statutes, 1981 (Tallahassee: State of Florida, Law Book Distribution Office, 1981), p. 1493.

[5]Official Florida Statutes, 1981, pp. 1493.

[6]Manatee County Board of County Commissioners, The Manatee Plan: Policy Document, -. 12-2.

[7]Ibid; page 7-9.

[8]Interview with Mrs. Ranelli, Tampa Sailing Squadron, Apollo Beach, Florida, 15 June 1982.

[9]Official Florida Statutes, 1981, pp. 1530-1531.

[10]Interview with Frederick A. Gaske, Florida Division of Archives, History and Records Management, 30 June 1982.

[11]Interview with Richard Harding, 23 June 1982.

[12]Florida Division of Recreation and Parks, Outdoor Recreation in Florida, 1981, p. 185.

[13] Interviews with Lt. Richard Harding, Florida Marine Patrol, District #9, Bradenton, Florida, 23 June 1982, 14 July 1982.

[14] Interview with Dave MacDonald, Manatee County Port Authority, Manatee County, Florida, 25 June 1982.

[15] Interview with Raleigh Franzen, Florida League of Anglers, Inc., Boca Raton, Florida, 10 June 1982.

CHAPTER 7

ESTIMATE OF POTENTIAL ENVIRONMENTAL LOSS

The estimate of potential loss of environmental resources at Port Manatee is based on the type and amount of forecasted improvements (identified in Chapter 4) and the impact these improvements may have on the existing environmental resources (described in Chapter 5). This chapter addresses the potential losses which may occur if OCS related activity takes place at the port; but does not compare these losses to any other losses which may result from other non-OCS related activities. Measures to mitigate these potential losses are identified in Chapter 9 and methods to implement the measures are described in Chapter 10.

In addition to losses of environmental resources resulting from expansion or improvement to port owned facilities, potential losses are also associated with the presence of OCS related industrial and/or manufacturing processes. There are several OCS related industries which would be expected to locate at Port Manatee if it were to function as an OCS service base. These industries could cause a variety of losses to valuable environmental resources, depending on the nature of their operation(s). Figure 7-1 summarizes the types of OCS related industries expected to locate at the port and their potential environmental pollutants. The potential environmental losses associated with the presence of these industries are discussed as part of this chapter.

AIR QUALITY

There are two types of activities identified in Chapter 4 which have the potential to result in a minor reduction/loss in air quality. Air quality studies performed at Port Manatee indicate that total suspended particulates (TSP) appears to be the only air quality parameter which exceeds established local, State and Federal standards. Further increases in TSP may potentially be expected from OCS related construction activity associated with upgrading roads, drainageways and storage yards within the port.

Manufacturing processes also may potentially increase TSP concentrations, although it is expected that most of these activities would be conducted in enclosed areas, which would diminish their effect on the ambient air quality. In addition to TSP, increases in carbon monoxide concentrations may be expected from automobile traffic and during the construction of facilities when heavy equipment is used. However, these increases are considered insignificant because they should be adequately disbursed by the prevalent shore breezes experienced at Port Manatee. Increases in sulphur dioxide would not be expected because the burning of fossil fuels is not anticipated.

Exhaust emissions from OCS crew/supply vessels may potentially increase TSP concentrations. The largest source of emissions is expected to be related to the continuous use of onboard diesel generators while the vessels are at berth. The potential for resource loss is expected to be greatest during a medium or high find scenario where 12 or more vessels may be simultaneously at berth.

WATER QUALITY

Groundwater

The port presently obtains its potable and raw water from offsite sources with significant reserve capacity. The study area at and around the port is not a known recharge area. Much of the groundwater in the vicinity of the port is being affected by salt water intrusion, which may eventually make it impractical for use. The expansion of the port's primary drainage facilities to serve OCS land uses could potentially aggrevate the intrusion of salt water into the groundwater underlying the port by bringing tidally influenced waters further into the interior of the port.

POTENTIAL ENVIRONMENTAL POLLUTANTS FROM OCS RELATED INDUSTRIES

OCS Facilities and Activities	Air Emissions	Wastewater Contaminants	Noise	Solid Wastes
Pipe Storage Yard	Particulates, nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons	Hydrocarbons, alkaline substances, particulates metal fragments	90-100 decibels (uncontrolled)	Packaging materials, concrete, metal scraps, contaminated debris
Drilling Mud Companies	Particulates, carbon monoxide from vehicles transporting supplies	Chemical additives, particulates and weighting agents	70-90 decibels	Packaging materials, clay, muds and contaminated debris
Cement Companies	Sand and dust from storage areas, sulfur dioxide and hydrocarbons, nitrogen oxides and maybe some gases from the storage of acids	Particulates, chemical additives and heavy metals	60-90 decibels	Metal scraps, contaminated containers, cement-soiled debris and packaging materials
Drilling Tool and Equipment Companies	Particulates from operations, metal dust from drilling	Oily wastes, particulates and heavy metals	70-90 decibels	Metal scraps, oily materials, packaging materials and debris
Wellhead Equipment Companies	Carbon monoxide from transportation vehicles, particulates	Particulates, oily wastes and heavy metals	70-90 decibels	Metal scraps, oily material, packaging materials
Fishing and Rental Tool Companies	Particulates, carbon monoxides from the use of vehicles	Particulates and oily wastes	70-90 decibels	Broken pipes, discarded casings, unusable equipment and packaging materials

Figure 7-1

(Continued)

POTENTIAL ENVIRONMENTAL POLLUTANTS FROM
OCS RELATED INDUSTRIES

OCS Facilities and Activities	Air Emissions	Wastewater Contaminants	Noise	Solid Wastes
Helicopter Companies	Particulates and carbon monoxide and maybe some gases from the storage of fuel	Oily wastes, particulates and fuel	70-90 decibels at 1000 ft. elevation, 30-40 decibels over ambient	Packaging materials from workers using the facility
Catering Companies	Particulates	Soapy discharges and organic particulates	Minor	Food scraps, packaging materials and containers
Repair and Maintenance Facilities	Particulates, nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons	Hydrocarbons, particulates metal fragments	90-100 decibels	Metal scraps, packaging materials, concrete, contaminated debris
Land Site Development	Fugitive dust, particulates, carbon monoxide from machinery	Particulates, heavy metals and runoff from excavation	85-100 decibels at 50 feet	Particulates, dredged material and maybe distance discarded rocks

Surface Water

Due to Port Manatee's location on Tampa Bay, it is vital to assess any potential resource loss to surface water which may occur as a result of OCS related facilities and services. There are four major activities which have the potential to effect a resource loss to the surface waters in the vicinity of Port Manatee. These activities are fuel spills during crew and supply boat loading, product spills during supply boat loading, discharges of untreated stormwater from the port's uplands and the generation of turbidities from increased boat traffic at the port.

Fuel Spills

The potential for environmental losses related to fuel spill(s) will increase with the increase in OCS activity. At the highest projected OCS activity level, a supply vessel would be loading approximately 2700 barrels of diesel fuel every other day at Port Manatee, i.e., 180 vessel trips/yr.

The toxicity of spilled oil in the water column depends on its type and concentration. However, certain trends in toxicity have emerged from field and laboratory studies. In general, light volatile oils such as gasoline and diesel fuel are more toxic than moderate to heavy oils and residual oils. Light volatile oils contain the highest proportion of highly toxic, low molecular weight, aromatic fractions which are readily soluble in sea water and are rapidly accumulated by marine organisms. Figure 7-2 describes the behavior of various oil types during spill conditions including the effect on water quality and aquatic communities.

Product Spills

The potential for water quality losses associated with product spills will also increase with the level of OCS activity and would be highest in a high find scenario, as more products would be loaded at the port for use in offshore drilling operations. The majority of these products would be drilling mud and cement, which would be present in a liquid state for pumping into supply vessels. It is anticipated that in a high find scenario, approximately 83,000 tons/year of mud (or about two boat trips per day) and 41,000 tons/year of cement (or about one boat trip per day) would be required.

Similar losses to surface water quality would result from a product spill of either drilling mud or cement. Both products include quantities of particulates and chemical agents which could adversely impact water quality. Should a significant product spill occur, dissolved oxygen levels in the water column would be expected to drop causing marine animals and plants to be deprived of oxygen. The chemical additives often found in the products, suspended in the water column, could be toxic to marine biota, causing widespread losses. A dozen chemical additives are typically used in the drilling mud and of these, the heavy metals have the highest potential for affecting water quality.

The effects of product spills will normally be localized, as the weight of the product will cause it to sink to the water bottom prior to being completely disbursed. This condition may impact the marine environment through either direct burial of bottom organisms or through changes in the physical quality of the aquatic environment. These contaminants may be resuspended in the water column whenever the bottom sediments are agitated. Heavy, high speed boat traffic is a primary factor influencing the resuspension of bottom sediments.

Stormwater Discharges

Should additional OCS related land areas be developed at Port Manatee, there will be a potential for a corresponding increase in the discharge of untreated stormwater into Tampa Bay. This increase in the discharge volume of stormwater, if uncontrolled, could result in a potential resource loss to the water quality of the receiving water.

CLASSIFICATION AND PROPERTIES OF OIL TYPES WITH RESPECT TO THEIR BEHAVIOR DURING SPILLS

OIL TYPE	EXAMPLES	PHYSICAL/CHEMICAL PROPERTIES	TOXICOLOGICAL PROPERTIES
(1) Light, volatile oils	Distillate fuels such as gasoline, diesel, No. 2 fuel fuel oil	- Spread rapidly - High evaporation and solubility rates - Tend to form unstable emulsions - Very toxic to biota when fresh - May penetrate substrate - Can be removed from surfaces by simple agitation and low pressure flushing	- Acute toxicity is related to the content and concentration of the aromatic fractions - Aromatic fractions are very toxic due to the presence primarily of napthalene compounds and, to a lesser extent, benzene compounds - Heavy molecular weight compounds are acutely less toxic, but may be chronically toxic since many are either known or potential carcinogens - Acute toxicity or individual aromatic fractions will vary among species due to differences in the rate of uptake and rate of release of these compounds - Mangroves and marsh plants may be chronically affected due to penetration and persistence of aromatic compounds in sediments
(2) Moderate to heavy oils	Medium to heavy paraffin-based refined oils and crude oils	- Moderate to high viscosity - Toxicity variable depending on light fraction composition - In tropical climates, rapid evaporation and solution form less toxic weathered residue with toxicity due more to smothering - Light fractions may contaminate interstitial water	- Acute and chronic toxicity in marine organisms is likely to result from: 1) Mechanical or physical coverage - oil completely smothering organisms often causing death 2) Chemical toxicity - results from the exposure of very toxic aromatic fractions of the oil to marine organisms 3) A combination of mechanical or physical coverage and chemical toxicity.

Figure 7-2

(Continued)

CLASSIFICATION AND PROPERTIES OF OIL TYPES WITH RESPECT TO THEIR BEHAVIOR DURING SPILLS

OIL TYPE	EXAMPLES	PHYSICAL/CHEMICAL PROPERTIES	TOXICOLOGICAL PROPERTIES
		- Tend to form stable emulsions under high physical energy conditions - Variable penetration, a function of substrate grain size - High potential for sinking after weathering and uptake of sediment - Generally removable from water surface when fresh - Weather to tar balls and tarry residue	- Mechanical or physical smothering causes acute toxicity in many marine organisms and chronic toxicity in many marine plants (especially mangroves)
(3) Residual oils	Asphalt, Bunker C, No. 6 fuel oil, waste oil	- Form tarry lumps at ambient temperatures - Non-spreading - Relatively non-toxic due to substrate - May soften and flow when stranded in sun - Cannot be recovered from water surface using most cleanup equipment - Easily removed manually from beaches	- Acute and chronic toxicity occurs more from smothering effects than from chemical toxicity, due to the small proportion of toxic aromatic fractions found in heavy, residual oils - Toxicity is more common in marine plants (especially mangroves) and sedentary organisms than in mobile organisms - Acute and chronic toxicity also results from thermal stress, due to the elevation of temperatures in oiled habitats

Source: "The Sensitivity of Coastal Environments and Wildlife to Spilled Oil in South Florida." South Florida Regional Planning Council, January 1981

Typically, pollutants contained in stormwater runoff are characterized as organic compounds, suspended solids, heavy metals and nutrients such as phosphorous and nitrogen. Each of these pollutants can have an adverse affect on water quality. Nutrients, for example, frequently are the cause of significant water quality degradation in receiving waters. Surface waterbodies with long detention times, such as estuaries, tend to concentrate nutrients, as well as organics and metals, in the water column and bottom muds. When present in the water columns at excessive levels, nutrients promote the unnaturally rapid growth of vegetative matter, i.e., algae blooms, which, upon their decay, pull dissolved oxygen out of the water column, depleting its availability. Lowering the levels of dissolved oxygen in receiving waterbodies may destroy sensitive species of fish and other sessile organisms.

At Port Manatee, stormwater pollutants such as nutrients from fertilizers, heavy metals from fuel spills, roads and equipment maintenance and storage yards and organic compounds/suspended solids from soil erosion and product spills could potentially be generated from OCS related development.

Turbidity

Increased boat traffic in support of OCS related activities may result in increased turbidity levels within Port Manatee's turning basin and access channel. The basin and channel bottom consists of very fine grained, silty material which is easily disturbed by boat/ship propeller wash whenever a large amount of power is applied during vessel maneuvering.

The suspension and resuspension of this silty material decreases the amount of light able to penetrate the water column and the distance the light can travel into the water column. This condition leads to a reduction in photosynthesis, which is related to light intensity, and results in a decrease in productivity and a lowering of dissolved oxygen levels in the water column.

NOISE

The ambient noise levels at Port Manatee are in the moderate range, characteristic with normal port activities. Any expansion of OCS related facilities and activities would potentially increase noise levels at the port. It is expected that construction activities such as paving, erecting of storage facilities and installation of infrastructural services would result in some temporary increases in noise levels. Noise levels would be expected to temporarily increase in proportion with the increase in the level of OCS activity. A long term increase in noise level associated with an increase in helicopter traffic and the additional loading and handling of goods, servicing and maintaining of boats and equipment etc. could also occur.

PLANT POPULATIONS AND HABITATS

The potential for direct losses of valuable plant populations and habitats due to OCS related development at Port Manatee is expected to be limited to a mangrove habitat, present in a small area along the northwestern port's boundary of the property. It is expected that the general area would be used for OCS related storage, repair and maintenance facilities. The mangrove habitat in this area could face elimination in order to gain additional land for OCS development.

Considerable potential also exists for indirect losses of valuable plant population and habitats. The valuable plant populations and habitats identified in Chapter 5 included submerged and wetland habitats. These habitats could potentially incur losses from fuel or product spills, discharges of untreated stormwater, or increased turbidity resulting from additional boat traffic. Direct losses to submerged grass beds from boat propellors, groundings or wakes could also potentially occur. The nature of the loss would be dependent on the type and severity of the occurrence.

Fuel Spills

The potential loss of valuable plant populations and habitats due to a fuel spill would be dependent on the type, amount and location of the spill. Subtidal plant communities such as seagrasses appear to be less oil sensitive than intertidal communities, such as mangroves. Mangroves may be sensitive to toxic effects during a number of life-cycle stages including flowering, germination, seed formation, dispersal and sprouting. The seedlings of mangroves appear to be most vulnerable.

Product Spills

Product spills could result in similar kinds of losses as fuel spills, however, due to the heavy weight of these products it is expected that the losses to plant populations would be more concentrated at the site of the spill.

Stormwater

The discharge of untreated stormwater may cause a loss to marine plant populations and habitats from toxic constituents in the discharge and/or from suspended solids which reduce light levels in the water column limiting plant growth and reproduction.

Turbidity

It is expected that with increased OCS activity, more vessels will be using the port. An increase in vessels related to OCS activity may cause physical destruction to valuable plant habitats. Propeller wash and surface wake can cause the erosion of plant habitat, particularly intertidal grassbeds, and can cause the resuspension of bottom sediments to the degree that insufficient light reaches submerged plant communities to allow photosynthesis to continue.

ANIMAL POPULATIONS AND HABITATS

The potential for losses to valuable animal populations and habitats is directly related to the potential for loss to valuable plant populations and habitats. The potential for loss of valuable plant populations and habitats, should Port Manatee function as a service base for OCS activities, is discussed in the previous section. Animal populations can also incur direct losses from the same events that affect plant populations and habitats: fuel and product spills, discharges of untreated stormwater and elevated turbidity levels.

ENDANGERED ANIMAL SPECIES

Three endangered, and therefore valuable, animal species could potentially suffer losses should Port Manatee function as a service base for OCS activity; the species in question are the manatee, the green sea turtle and the eastern brown pelican. These three species are presumed to be present in areas surrounding the port, however only the eastern brown pelican has been observed in the immediate vicinity of Port Manatee. Mangroves, submerged grasslands, wetlands and salt barrens are traditionally the type of habitats these animals use for nesting and food sources. With the exception of a mangrove habitat located in the northwestern portion of the port, it is not expected that the habitats used by these animals will be potentially lost due to OCS related facility expansions at the port, however indirect losses to the habitats may occur if there was a fuel or product spill, a discharge of untreated stormwater, or an increase in turbidity levels. The types of indirect losses would be similar to those described earlier in this chapter.

The potential also exists for direct losses to manatees and sea turtles from collisions with OCS crew and supply vessels frequenting the port. This potential greatly increases during the medium and high find scenarios because of the increase in frequency of OCS vessel trips to and from the port. The potential for collisions within the port's channel and basin is not as great because the channel and basin depths will allow the animals to escape beneath the crew boats/supply vessels, provided the vessels are not travelling at a high rate of speed. Collision potential is at its greatest if vessels operate at high speeds in the shallows, outside the channel limits.

AREAS OF LAND AND WATER LARGELY IN A NATURAL STATE, OR WHERE VALUES ARE DERIVED LARGELY FROM ECOLOGICAL CONSIDERATIONS

On plant populations and habitats, with the exception of the mangrove area discussed in the previous section on plant populations and habitats, the remaining natural areas are not expected to suffer any significant potential for direct loss resulting from OCS related facility expansion at Port Manatee.

Cockroach Bay Aquatic Preserve could experience a potential loss to its environmental resources from the effects of untreated stormwater discharges from the port. The environmental resource loss is expected to be similar in character to those losses associated with the discharge of stormwater previously discussed in this chapter. Cockroach Bay Aquatic Preserve should not suffer significant environmental resource losses from fuel and product spills and suspended channel bottom sediments because of its distance from Port Manatee's channel and basin and its protection from these water areas by Piney Point. Potential losses to the West Indian Manatee, known to inhabit this area, are discussed in the previous section on Animal Population and Habitats.

Bishop Harbor could also experience a potential loss of environmental resources from the effects of stormwater discharges and possibly fuel spills related to OCS activities at Port Manatee. The anticipated resource losses associated with untreated stormwater discharges and fuel spills have been previously discussed in this chapter. Bishop Harbor is not expected to incur any significant environmental resource loss from product spills and suspended bottom sediments because of its distance from Port Manatee. Potential losses to the West Indian Manatee, known to inhabit this area, are discussed in the previous section on Animal Population and Habitats.

Environmental resource losses to the offshore spoil island's habitat/nesting sites for laughing gulls and black skimmers is expected to be limited to potential population displacement because of the noise generated by helicopters flying closely over the spoil island in route to or from an offshore drilling rig.

Passage Key National Park and the three national wildlife refuge areas at the entrance to Tampa Bay are too distant from Port Manatee to incur potential environmental resource losses related to the use of Port Manatee as a service base for OCS oil and gas activity.

AREAS DESIGNATED BY THE FLORIDA COASTAL MANAGEMENT PLAN AND/OR BY STATE, REGIONAL OR LOCAL GOVERNMENT

The Florida Coastal Zone Management Plan has identified five areas of particular concern for environmental purposes. The only Area of Particular Concern located within the study area is the Cockroach Bay Aquatic Preserve. The potential for the Cockroach Bay Aquatic preserve to incur a potential environmental resource loss is discussed in the previous section.

CHAPTER 8

ESTIMATE OF POTENTIAL RECREATIONAL LOSS

Chapter 6 identified three major categories of valuable recreational resources:

- Areas Designated by the Florida Coastal Management Plan and/or by State, Regional or Local Government.
- Areas of Cultural, Historic or Archaeological Significance.
- Other Valuable Land and Water Areas.

This chapter will estimate the potential losses to these valuable recreational resources should Port Manatee function as a service base for OCS activity.

AREAS DESIGNATED BY THE FLORIDA COASTAL MANAGEMENT PLAN AND/OR BY STATE, REGIONAL OR LOCAL GOVERNMENT

Two areas in the vicinity of Port Manatee have been designated by the State of Florida and Manatee County as valuable recreational areas: Cockroach Bay Aquatic Preserve and Bishop's Harbor.

Cockroach Bay Aquatic Preserve

Cockroach Bay Aquatic Preserve is located to the north of Port Manatee in Hillsborough County (see Figure 6-2). The area has been included in the Florida Aquatic Preserves Program because of its biological, aesthetic and scientific value. The recreational value is derived through the observance of the area's environmental amenities by means of boating, fishing, skin diving and photography.

The expansion of port owned facilities in order to meet the service base demands of OCS related development activities, has little potential to cause direct resource losses to the recreational value of the Cockroach Bay Aquatic Preserve. Projected OCS related facility expansion at the port is not expected to exceed the port's present boundaries.

The use of Port Manatee's facilities by OCS industry and the development of OCS related businesses at the port could potentially cause recreational resource losses at the Cockroach Bay Aquatic Preserve. These recreational losses would be primarily incurred if there were a loss in the area's environmental amenities i.e., grassbeds, mangrove swamp, and any associated plant and animal communities, etc. Therefore, the potential for a recreational resource loss at Cockroach Bay is correspondent with the potential for environmental loss to the aquatic preserve. The potential for environmental loss is discussed in the previous chapter and is related to events such as fuel spills, product spills, untreated stormwater discharges and suspension of bottom sediments. The Cockroach Bay Aquatic Preserve should be less susceptible to impacts from fuel and product spills and suspended channel bottom sediments because of its distance from the port and its protection from port waters by Piney Point.

Bishop Harbor

Bishop Harbor is located several miles south of Port Manatee. Bishop Harbor also derives its recreational value through the observance of the area's environmental amenities. The area is mainly dense mangrove swamp providing a sheltered environment for water fowl and a variety of aquatic plants and animals. This pristine state attracts nature enthusiasts, photographers, boaters and fishermen.

Because of Bishop Harbor's distance from Port Manatee, the expansion of port owned facilities to support OCS demands is not expected to have a direct impact on Bishop Harbor's valuable recreational resources. Recreational losses could result from the loss of environmental resources due to events such as oil spills and stormwater discharges related to the use of the port's facilities by OCS related industry. The potential environmental loss related to these events is discussed in the previous chapter.

The Bishop Harbor area is widely used by organized sailing squadrons. This recreational use of the area could potentially incur a loss should OCS crew boats operate outside the defined Manatee and Tampa Harbor channel areas and venture into the Bishop Harbor area as a short circuit to and from the drill rigs.

VALUABLE RECREATIONAL AREAS OF CULTURAL, HISTORIC OR ARCHAEOLOGICAL SIGNIFICANCE

The expansion/improvement of port owned facilities at Port Manatee to accommodate OCS related demands and the use of port facilities and land by OCS related industry is not expected to result in a significant loss to any valuable recreational areas of cultural, historic or archaeological significance. This statement is supported by the results of a cultural assessment conducted by the Florida Department of State, Division of Archives, History and Records Management (Appendix F) and by a background review and reconnaissance survey conducted by Archaeological Consultants Incorporated (Appendix G).

OTHER VALUABLE LAND AND WATER RECREATIONAL AREAS

Piney Point

Piney Point is a recreational use area located slightly north of the northwest boundary of Port Manatee's property. The recreational value of Piney Point is principally derived from its use as a launching area for small boats.

The expansion improvement of port owned facilities to support OCS related demands is not anticipated to extend to the Piney Point area.

Therefore Piney Point is not expected to experience a loss in recreational value should Port Manatee function as a service base for OCS related activity.

Grassy Shoals - Access Channel Area

Mangrove Areas - Along Shoreline

Port Manatee Spoil Island

Each of the above referenced areas derives recreational value from the presence of valuable environmental resources. As such, potential recreational loss is directly related to the potential environmental loss resulting from the use of Port Manatee as an OCS service base. Environmental resource losses are related to the occurrence of events such as fuel and product spills, discharges of untreated stormwaters and suspension of bottom sediments in the water column. Additional details on potential environmental losses is presented in Chapter 7.

CHAPTER 9

MEASURES TO MINIMIZE LOSSES

In general, the previous chapters have identified potential environmental and recreational losses/impacts from two categories:

1. Impacts from expansion of port-owned facilities and/or services; and

2. Impacts from the OCS related industrial facilities developing at the port.

Chapter 4 determined that the existing facilities and services at Port Manatee could assimilate the projected OCS demands with only minor upgrades to transportation, primary drainage and berthing facilities. The direct environmental and recreational losses from this upgrading were determined to be correspondingly minor. The majority of the more significant environmental and recreational losses were associated with the use of these facilities by OCS related industries which would locate at the port.

This chapter will recommend measures which could be employed to minimize the potential for environmental and recreational loss should Port Manatee function as a temporary or permanent service base for OCS exploration and development activities in the eastern Gulf of Mexico. Impact reducing measures will be developed for each resource previously identified as having the potential to incur a loss.

The following chapter will recommend methods for implementing the environmental/recreational impact reducing measures identified in this chapter.

ENVIRONMENTAL RESOURCES: PORT RELATED RECOMMENDATIONS

Air Quality

The primary factor of potential impact on air quality at Port Manatee is the increase in total suspended particulates (dust particles) from construction activities associated with upgrading of roads, drainageways and storage yards within the port. Recommended measures to be employed to minimize the air quality impact from construction activities are as follows:

1. Conduct construction activity in stages designed to minimize the amount of area under construction at any one time.

2. Whenever possible, use road surfacing material that will contribute minimally to dust/particulate formation.

3. Following construction, plant and maintain all undeveloped surfaces with grass or natural vegetative cover material.

4. Grade excavation piles and fill piles to pre-construction contours.

5. Periodically sweep and/or water exposed surfaces during excessively dry climatic periods.

6. Locate non-water dependent construction and storage yards centrally in the port property to reduce particulate impact on congested areas.

7. Cover truck and rail car beds whenever they are carrying a product capable of suspending airborne particulates.

A recommended measure to be employed to minimize the potential resource loss from OCS related crew/supply boat generator exhaust emissions is as follows:

1. During a medium or high find activity level, eliminate the use of generator power during berthing by connecting the vessels to an onshore power source.

Water Quality

Groundwater

Chapter 7 identified a potential groundwater quality resource loss associated with the intrusion of saltwater into the groundwater at Port Manatee. The rate and extent of saltwater intrusion could be influenced by the extension of the primary drainage system at Port Manatee to serve OCS related land development areas. The following measures are recommended to minimize the potential for groundwater quality loss at Port Manatee:

1. Drainage extensions to the primary drainage system at Port Manatee should function as broad grassed swales, normally dry, without encroachment of tide waters.

2. Salinity control barriers/devices should be employed to limit saltwater intrusion from the existing, tidally influenced storm systems at the port.

Surface Water

Chapter 7 identified potential surface water quality resource losses associated with four occurrences; fuel spills during crew and supply boat loading, product spills during supply boat loading; the discharge of untreated stormwater, and the suspension (turbidity) of channel bottom sediment in the water column, resulting from increasing crew and supply boat use of the port's berthing areas. The following measures are recommended to minimize the potential for water quality resource losses at Port Manatee:

- Fuel Spills

  1. Provide adequate means of containing/isolating fuel spills:

     a) All scenarios - locate fuel spill containment equipment i.e., sorbent boom, skimmers, aerators, etc., at the fueling berth and utilize to contain spills in the event a fuel spill occurs.

     b) Medium find scenario - deploy containment boom around supply/crew vessel whenever fuel is dispensed.

     c) High find scenario - construct a permanent fuel spill containment facility/structure surrounding the berthing area such that containment is permanently provided whenever vessel is at berth.

  2. Drain fueling berth surfaces to onshore retention area(s).

  3. Place automatic flow sensing/cutoff valves on fuel dispensing lines.

- Product Spills

  1. Drain berth surfaces to onshore retention area(s).

  2. Periodically remove any product buildup/concentration in sediments in the vicinity of the product berth. Material removed should be placed in a self-contained upland spoil disposal site.

  3. Medium find/high find scenario - provide product spill containment equipment at the berth, at all times, to be deployed in the event that a product spill occurs.

- Stormwater

    1. For each OCS lease area provide onsite retention/detention in accordance with local and state standards, prior to discharge to the primary drainage system; prevent direct discharge of stormwater into the primary system.

    2. Plant and maintain grass or other natural vegetative ground cover on all undeveloped surfaces.

    3. Whenever possible primary drainage system extensions required to service OCS land development areas should take the form of broad grassed swales instead of water-filled ditches.

    4. Prevent any direct discharges of stormwater into the port basins or Tampa Bay, apart from the primary drainage system.

- Turbidity

    1. Periodically remove suspendable bottom sediments from the channel and OCS berth areas. Material removed should be placed on a self-contained upland spoil site.

    2. Limit vessel speeds in the berthing area.

Noise

Chapter 7 indicated that noise levels associated with new construction activities, general industrial activities and helipad use could potentially be elevated. The major impact of the elevated noise levels would be on those homesites along Piney Point Road, adjacent to the port's northwestern property boundary. Recommended measures which could be taken to minimize potentially elevated noise levels are as follows:

1. Locate vegetation buffers between industrial activity areas and adjacent non-port owned properties.

2. When feasible, limit construction activities, which occur near the property boundaries, to daytime hours.

3. Internalize high noise level activities - locate helipads, equipment yards, etc., centrally within the port property.

Plant Population and Habitats

Chapter 7 indicated that there is potential for direct and indirect losses to valuable plant populations and habitats resulting from the use of Port Manatee as a temporary and/or permanent service base for OCS activities. The potential for direct losses of valuable plant populations due to facility expansion is limited to the potential loss of mangrove habitat present in a small area along the northwestern limit of port property.

The potential for indirect losses of valuable plant population is greater than that for direct losses. The indirect losses are primarily associated with losses to valuable submerged and wetland habitats resulting from the use of the port's facilities by OCS related industry. Potential losses may occur as a result of contact with fuel spills, product spills, stormwater contaminants/sediments and/or suspended solids from the agitation of channel bottoms. Physical destruction to valuable grass beds may potentially occur if crew vessels stray from the access channel over the adjacent grass bed areas.

The measures previously recommended in the Water Quality section of this chapter are also recommended to minimize the potential loss of valuable plant populations and habitats. The following additional measures are also recommended:

1. Preserve the existing mangrove habitat along the northwestern limits of port property unless overriding public interest benefit is demonstrated for its loss. Any loss should be compensated/ mitigated through the re-establishment of a mangrove habitat of comparable value at an alternate location.

2. Restrict crew boats to travel in channels - mark channel for use by smaller vessels.

Animal Population and Habitats and Endangered Animal Species

The measures recommended in the Water Quality and Plant Populations and Habitat sections of this chapter are also recommended to minimize the potential loss of valuable animal populations and habitats.

The manatee and green sea turtle are two animals that have been identified as valuable and potentially subject to loss from contact/collision with fast moving supply and crew vessels. Valuable animal habitat areas correlate with the valuable plant communities. The measures recommended to minimize the water quality and valuable plant population and habitat loss are also recommended to minimize valuable animal population and habitat. The following additional measure is recommended to minimize the potential adverse impact to the manatee and green sea turtle:

1. Restrict crew and supply boat to operation within defined channel and berth areas and to no-wake speeds while in the access channel between the port and the western end of the spoil island.

The measures recommended in the previous sections of this chapter are also recommended to minimize the impact on the eastern brown pelican.

ENVIRONMENTAL RESOURCES:
OCS INDUSTRY RELATED RECOMMENDATIONS

Should Port Manatee serve as a temporary and/or permanent service base for OCS activity, there are a number of OCS-related industries that are likely to locate at the port. Each industry has the potential to contribute to the loss of a valuable environmental resource(s). In order to minimize the potential for environmental resource loss, a number of industrywide and industry-specific measures are recommended:

Industrywide Measures

1. Locate non-waterfront dependent industries internal to the port.

2. Dispose of all solid waste products generated at the port at an offsite solid waste facility, approved for the disposal of the product in question.

3. Retain/detain drainage waters onsite, in compliance with state and local standards.

4. Grass or provide natural ground cover vegetation to all undeveloped surfaces.

5. Maintain vegetative buffers between industrial sites and offsite and/or public use areas.

Industry Specific Measures

Drilling Mud Companies and Cement Companies

1. Provide site drainage system designed to capture and contain product spills onsite.

2. Employ best practical control technology available to control fugitive dust and other suspended particulates during storage and handling of product.

3. Maintain spill containment/control equipment at berthside during product loading to supply vessels.

Drilling Tool and Equipment Companies, Wellhead Companies, Fishing and Tool Rental Companies, Repair and Maintenance Companies and Pipe Storage Yards:

1. Provide oil/grease separation in the stormwater system prior to discharge to the retention/detention area.

2. Isolate solvent/degreaser storage handling and use areas from site drainage system, recover and remove spent product whenever possible.

Helicopter Companies:

1. Locate helipads internally to minimize noise impacts on public use areas and fuel spill impacts.

2. Provide oil/grease separation in stormwater system.

3. Isolate fuel storage and fueling areas from site drainage system.

4. Adjust flight paths to avoid noise sensitive areas.

RECREATIONAL RESOURCES

The potential valuable recreational losses identified in Chapter 8 originate from potential losses to valuable environmental resources. The measures recommended in this chapter to minimize potential losses to valuable environmental resources are also recommended to minimize potential losses to valuable recreational resources.

CHAPTER 10
METHODS OF IMPLEMENTATION

The previous chapter recommended measures which could be employed to minimize the potential for environmental and recreational loss should Port Manatee function as an OCS service base. The development of these recommended measures will serve no effective purpose unless a method(s) by which they can be implemented is identified. This chapter will recommend methods by which the loss minimizing measures can be effectively implemented. It will remain the decision of the Manatee County Port Authority when to or whether to actually implement any or all of the recommendations in this and the previous chapters.

ENVIRONMENTAL RESOURCES: PORT RELATED RECOMMENDATIONS

Air Quality

Chapter 9 recommended seven measures that could minimize potential losses in air quality at the port. The recommended methods by which the Manatee County Port Authority could implement the measures in question are as follows:

1. Officially adopt a construction policy for those projects constructed by or on behalf of the port that will, whenever possible:

   a) Encourage the staging of construction activity to minimize the amount of area under construction at any given time

   b) Use road surfacing material that will not act as a source for dust and other suspended particulates

   c) Sweep and/or water exposed surfaces during excessively dry periods

d) Cover truck and rail car beds whenever products with high potential for particulate suspension in air are carried

e) Grade excavation and fill piles to approximate preconstruction contours

f) Plant and maintain undeveloped surfaces with grass or other natural vegetative cover.

2. Modify the Master Development Plan Update to reserve/designate lands located centrally in the port's property for those land use activities with high potential for generating suspended particulates, i.e., construction and storage yards.

3. Condition the lease agreement with any OCS tenant operating crew boat/supply vessels to require vessel use of onshore power, in lieu of onboard generators, whenever the vessels are at berth.

4. Provide OCS berths with capability to supply onshore power to OCS vessels.

Water Quality

Groundwater

Chapter 9 recommended measures be taken to minimize the intrusion of saltwater into the groundwater at Port Manatee.

The following are recommended methods by which the Manatee County Port Authority could implement the measures in question:

1. Officially adopt a construction policy that requires the use of broad grassed swales for any new extensions of the port's primary drainage system serving OCS tenant lease areas, whenever the engineering and construction of swales is feasible.

2. Contract for services to perform a study(ies) necessary to determine the location, general design features and effectiveness of employing saltwater control barriers/devices in the existing tidally influenced drainage ditches.

Surface Water

The previous chapter recommended measures be taken to reduce the potential for environmental resource loss associated with fuel spills, product spills, stormwater discharges and channel sediment turbidity.

The following are the recommended methods by which the Manatee County Port Authority could implement the measures in question:

- Fuel Spills

  1. As a condition to construction of fuel service connections in an OCS designated berth, secure agreement from fuel carrier/ dispenser to purchase fuel spill containment equipment to be located at the fuel berth.

  2. Include as a condition to lease agreement between port and each OCS tenant employing crew and supply vessels:

     a) That the OCS tenant will utilize fuel spill containment equipment whenever oil spill occurs (all scenario fuel demands) and

     b) That the OCS tenant will deploy containment boom around its supply/crew vessel(s) whenever fuel is dispensed (medium find scenario fuel demand) or

     c) That the OCS tenant(s) will construct a permanent fuel spill containment facility/structure that surrounds the berthing area (high fuel scenario fuel demand)

3. Design and construct any new berth structures to be used for fueling OCS crew/supply vessels to drain to onshore retention areas.

4. As a condition to construction of fuel service connections at an OCS designated berth, secure agreement from fuel carrier/dispenser to place automatic flow sensing/cutoff valves on fuel dispensing lines.

- Product Spills

1. Design and construct any new berth structures, to be used for loading product on OCS crew/supply vessels, to drain to onshore retention areas.

2. Schedule the harbor bottoms in the vicinity of the product berth for periodic maintenance dredging. Designate an upland disposal area for the maintenance of dredged material.

3. Medium find/high find scenario - as a condition to the use of a product berth, secure agreement from OCS tenant requesting use of the berth that the OCS tenant will provide spill containment equipment at the berth at all times, to be deployed in the event that a product spill occurs.

- Stormwater

1. Place a condition in the OCS tenant lease agreement requiring the OCS tenant to provide onsite retention/detention in accord with State and local standards prior to discharge to port primary drainage system, the port basins or Tampa Bay.

2. Place a condition in the OCS tenant lease agreement requiring the OCS tenant to plant and maintain grass or other natural ground cover on all undeveloped surfaces.

3. Officially adopt a construction policy that requires the use of broad grassed swales for any new extensions of the port's primary drainage system serving OCS tenant lease areas, whenever the engineering and construction of the swales is feasible.

- Turbidity

1. Schedule the channel and OCS berth bottoms for periodic maintenance dredging. Designate a self-contained upland spoil site for the material removed during the maintenance dredging.

2. Place a condition in the lease agreement of the OCS tenant(s) operating the crew/supply vessels, requiring that the vessels operate only within the defined channel and berth areas and they maintain no wake speed within the berth and near channel area.

Noise

Chapter 9 identified several measures which could be taken to minimize potentially elevated noise levels resulting from OCS related activities at Port Manatee. The use of vegetation buffers, a limitation on the hours during which construction activities take place and the isolation of high noise potential activities were all recommended measures. The recommended methods by which the Manatee County Port Authority could implement the above referenced measures are as follows:

1. Whenever OCS industry leases, land lying adjacent to non-port owned property, the lease agreement should be conditioned to require the OCS tenant to:

   - Plant and maintain an adequate vegetation buffer between the lease area and adjacent off site property.

- Limit high noise generating construction activities to daylight hours.

2. Modify the Master Development Plan Update to reserve/designate lands in the central portion of the port's property for activities with potential for generating high levels of noise, i.e., helipads, equipment yards, etc.

Plant Populations and Habitats

Valuable plant populations and habitats are subject to potential loss from both the expansion of port facilities and the use of the port's facilities by OCS related industry. The majority of the potential plant populations and habitat losses can be minimized by instituting the measures and implementation methods recommended in the Water Quality section of this chapter and Chapter 9. Chapter 9 also recommended a restriction on crew/supply boat operation and on development in mangrove habitats. The recommended methods by which the Manatee County Port Authority could implement these additional measures are as follows:

1. Modify the Master Development Plan Update to show the mangrove habitat area along the northwestern limits of port property as a preservation area. In the event the port determines that overriding public interest will be served by eliminating the mangrove area, the port should require, as a condition of the lease agreement with the OCS user, that the OCS tenant in question mitigate/compensate for the habitat loss through the re-establishment of a habitat of comparable value at an acceptable alternate location, require that the OCS tenant perform the mitigation prior to completion of site improvements.

2. Condition the lease agreement with any OCS tenant operating crew boats/supply vessels to restrict the OCS vessels to travel within the ports' channel and basin/berth areas.

3. In order to facilitate the effectiveness of number 2 above, the port should also employ channel markings with more frequent spacing designed for use by smaller vessels.

Animal Population and Habitats and Endangered Animal Species

The implementation methods recommended for the Water Quality section and Plant Populations and Habitats section of this chapter also apply to this section. The following additional implementation method is recommended.

1. Condition the lease agreement, with any OCS tenant employing crew boat/supply vessels, to restrict vessel movement to defined channel and berthing areas and to no wake speeds while in access channels between the port and the western end of spoil island.

ENVIRONMENTAL RESOURCES: OCS INDUSTRY RELATED RECOMMENDATIONS

The following implementation methods are recommended for action/adoption by the Manatee County Port Authority to effect the measures recommended in Chapter 9 for minimizing potential environmental losses associated with the presence of OCS industry at Port Manatee.

Industrywide Implementation Methods

1. Modify the Master Development Plan Update to reserve/designate land in the immediate vicinity of the berths for water dependent industry. Locate non-water dependent industry internal to the port.

2. Condition the OCS tenant lease agreements to require that OCS tenants dispose of all solid waste products generated at the port at an offsite solid waste disposal facility approved for the disposal of the product in question.

3. Condition the OCS tenant lease agreements to require the OCS tenant to retain/detain stormwater onsite, in compliance with local and state standards.

4. Condition the OCS tenant lease agreements to require the OCS tenant to plant and maintain grass or other natural ground cover vegetation on all undeveloped surfaces.

5. Condition the OCS tenant lease agreement to require the OCS tenant to plant and maintain vegetative buffers between industrial sites and offsite and/or public use areas.

Industry-Specific Implementation Methods

The following industry-specific implementation methods are recommended:

Drilling Mud Companies and Cement Companies

1. Condition the lease agreement with these tenants to require the following:

    a) Construction of site drainage system designed to capture and contain product spills

    b) Installation of best practical control technology available to control fugitive dust and other suspended particles during storage and handling of product

    c) Presence of spill containment/control equipment at berthside during product loading to supply vessels

Drilling Tool and Equipment Companies, Wellhead Companies, Fishing and Tool Rental Companies, Repair and Maintenance Companies and Pipe Storage Yards

1. Condition the lease agreements with the tenants to require the following:

   a) Installation of oil and grease separators in the onsite stormwater treatment system at a point(s) prior to discharge into the retention/detention area.

   b) Isolation/separation of any solvent/degreaser storage, handling and use areas from the stormwater drainage system. Recapture and dispose spent solvent/degreaser at approved waste disposal facility.

Helicopter Companies

1. Condition the lease agreements with the Helicopter Companies to require the following:

   a) Oil and grease separators, prior to discharge of site drainage waters into stormwater detention/retention areas

   b) Isolation/Separation of fuel storage and fuel dispensing areas from site drainage system. Installation of fuel spill recovery systems for these areas

   c) Adherence to flight paths which will avoid noise sensitive areas such as public use areas, bird rookeries (Spoil Island, Bishop's Harbor, Cockroach Bay) etc.

   Modify the Master Development Plan Update to reserve/designate land centrally within the port property for helicopter pads and support facilities.

CHAPTER 11

OCS-RELATED REGULATIONS AND PERMITS

The use of Port Manatee as an OCS service base will necessitate compliance with Federal, State, regional and local statutes; and potentially require the Manatee County Port Authority to obtain permits and/or approvals from regulatory agencies. The exact nature of this regulatory process will be dependent on the type and level of activity which may occur at the Port and the forecasted improvements needed to meet OCS industry demands.

The following information is provided to the Manatee County Port Authority as a general guide to federal, state, regional and local statutes and permits which may be applicable to the continued development of the port as an OCS service base.

FEDERAL STATUTES AND PERMITS

Submerged Lands Act (P.L. 83-31)

This Act establishes state title to lands beneath navigable state waters and to the natural resources within such lands and waters. Florida's state boundary on the Gulf Coast extends three marine leagues (approximately 10.5 miles). Local governments in coastal areas should be aware that the term "natural resources" as it is used in this Act "includes oil, gas, all minerals, and all marine animal and plant life, but does not include water power or the use of water for the production of power." State or local water controls may be needed considering the high demands for water especially during OCS exploration. The Act also maintains the right of the federal government to control these lands and waters for the production of power.

Clean Air Act (P.L. 84-159, as amended by P.L.s 88-206 and 91-604)

This Act provides for air pollution prevention/control activities and is administered by the Environmental Protection Agency (EPA). National Ambient Air Quality Standards (Section 109) have set permissible atmospheric levels for air pollutants. These standards are divided into two categories: primary standards to protect public health, and secondary standards to protect welfare, including property and aesthetics. Air emissions from certain stationary (industrial) and mobile (automotive) sources are also specifically regulated.

Federal Water Pollution Control Act (FWPCA) or Clean Water Act (P.L. 845 as amended by P.L.s 579 and 660)

The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The Act directs the EPA Administrator to establish Federal Standards of Performance for new source facilities and establishes the National Oil and Hazardous Materials Pollution Contingency Plan. Section 303 of the Clean Water Act establishes water quality standards. Sewage water contains large concentrations of organic matter, suspended solids and plant nutrients (nitrogen and phosphorus compounds) and is an excellent medium for the transfer of disease. For these reasons, sewage wastewater discharges are carefully regulated and treatment is required to allow receiving waters to continue to be utilized to support freshwater or marine aquatic life, swimming, and shellfish harvesting.

Section 402 of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) program. This program regulates the discharge of pollutants from point sources and related activities into United States' waters. All such discharges or activities are unlawful without an NPDES permit. A permitted discharge that does not comply with the terms and conditions of the permit is also unlawful. A discharge of a pollutant is defined as 1) any addition of any pollutant or combination of pollutants to waters of the U.S. from any point source, or 2) any addition of any pollutant or combination of pollutants to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (40 CFR 122.3).

Section 404 of the Clean Water Act regulates the discharge of dredged or fill materials into the waters of the United States, including adjacent wetlands. The program is administered by the Army Corps of Engineers (COE), which has primary responsibility for issuing discharge permits, while EPA holds veto power over the location of the disposal site. The Section 404 program requires that adverse impacts be assessed prior to the discharge of dredged or fill material into waters of the United States. In addition to a public interest review by the COE prior to issuing Section 404 permits, environmental and social factors, and the existence of alternate sites must be considered. Losses to the public as a result of damage to an aquatic ecosystem must be balanced against the public benefits derived from a project.

Marine Resources and Engineering Development Act of 1966, Including Title III, Coastal Zone Management Act of 1972 (P.L. 89-454, as amended by P.L.s 89-688 and 92-583, respectively)

Title III of this Act is the Coastal Zone Management Act (CZMA) of 1972. This Act, administered by the Department of Commerce (DOC), sets major goals for the following: protection, development, and restoration of natural and historic resources; increased recreational access and management of coastal development; and coordination/streamlining of federal and state decisions affecting coastal resources. The CZMA is a major tool which states can use to coordinate the many federal regulatory measures enacted during the 1970s, such as the National Flood Insurance Program, the Deepwater Port Act of 1974, Fishery Conservation and Management Act of 1976, and the OCS Lands Act Amendments of 1978. The CZMA allows affected states the opportunity to participate in and plan for the impacts on their coastal areas from oil and gas production in federal OCS area. Also, the CZMA has the potential for use as a mechanism to delay oil and gas operations in federal territories.

<u>The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190 as amended by P.L.s 94-52 and 94-83)</u>

NEPA requires that all federal agencies proposing actions significantly affecting the quality of the human environment consult with other agencies having jurisdiction by law or expertise over such environmental concerns and prepare a detailed statement including:

- The environmental impact of the proposed action;
- Any adverse environmental effects which cannot be avoided if the proposal is implemented;
- Alternatives to the proposed action;
- The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and;
- Any irreversible and irretrievable resource commitments involved in the proposed action is implemented.

<u>Solid Waste Utilization Act as amended by the Resource Recovery Act</u>

This Act requires that EPA establish criteria for identifying hazardous wastes and a federal permit program (similar to the NPDES program) to regulate their handling and disposal.

In cases of specific hazardous toxic substances (such as cyanide), the federal government becomes involved in waste management. Generally, however, solid waste management is a state responsibility.

Solid wastes generated by service base operation may include dunnage (material used to protect cargo) collected during boat unloading, garbage from supply and crew boats (approximately 6.5 lbs. per person per day) and garbage/refuse from service base employees. These wastes can be incinerated, disinfected and used as landfill or, in the case of garbage, ground up and disposed of with the sewage. Little adverse environmental impact is anticipated if these materials are disposed of in accordance with existing regulations.

National Historic Preservation Act of 1966 (P.L. 89-665 as amended by P.L.s 91-243, 93-54, 94-422, 94-558 and 96-625 and Executive Order 11593)

The National Historic Preservation Act (NHPA) of 1966, as amended, authorizes the Secretary of the Interior to expand and maintain a National Register of districts, sites, structures, and objects significant in American history, architecture, archaeology, and culture. The Act provides for the nomination of properties of national, state, or local significance for placement in the National Register but prohibits the listing of privately owned property when the owner objects in writing. The criteria for including properties in the National Register (36 CFR 60.2) provides the standard to judge whether a cultural property is important enough to warrant special consideration during the planning of federal undertakings.

Occupational Health and Safety Act of 1970 (P.L. 91-596 as amended by P.L.s 93-237 and 95-251)

This Act protects workers from excessive, injurious noise and limits noise levels to 90 decibels for an eight hour day. It also stipulates that the permissible exposure time must be halved for every five decibel increase. For instance, noise levels of 100 decibels are allowed for only two hours/day. Noise will be produced during construction of OCS facilities and at marine terminals from compressors and boilers and to some extent from tankers and barges.

Marine Mammal Protection Act of 1972 (P.L. 92-522 as amended by P.L.s 93-205, 94-265, 95-136 and 95-316)

This Act (50 CFR Part 216) establishes a national policy designed to protect and conserve marine mammals and their habitats. The Act specifically prohibits the harassing, hunting, capturing, or killing of any marine mammal unless otherwise exempted under its provisions. The Marine Mammal Commission is responsible for advising federal agencies on the protection and conservation of marine mammals. The Commission has a Committee of Scientific Advisors to provide advice on actions needed to fulfill the purposes of the Act. Authority has been delegated to the DOC, which is responsible for all cetaceans and pinnipeds (except walrus) and to the DOI, which is responsible for walrus, sea otters, manatees, and dugongs. DOI is responsible for determining which OCS oil/gas activities will threaten marine mammal populations or violate provisions of the Act.

Marine Protection Research and Sanctuaries Act of 1972 (P.L. 92-532 as amended by P.L.s 93-254, 93-472, 94-62, 94-326 and 95-1523)

The purpose of the Marine Sanctuaries Program is to: 1) identify distinctive areas in the ocean, from the coast to the edge of the continental shelf; 2) preserve and restore these areas by designating them as marine sanctuaries; and 3) provide appropriate regulation and management. Program emphasis is on the protection of natural and biological resources.

Endangered Species Act of 1973 (P.L. 93-205 as amended by P.L. 94-325)

Under the Endangered Species Act (ESA), consultation authority is delegated to the Director of the Fish and Wildlife Service (FWS) and the Assistant Administrator for Fisheries, National Marine Fisheries Service (NMFS).

The Secretary of Interior or Commerce, and all federal agencies in consultation with them, are required to ensure that any program authorized, funded or carried out by a federal agency is not likely to jeopardize the existence of any endangered or threatened species, or result in the destruction or adverse modification of critical habitat.

This Act defines the terms "critical habitat" and "endangered species" (Section 3(5) and (6)) and empowers the Secretary of the Interior to determine critical habitat boundaries and to specify species as endangered or threatened. However, the Secretary of the Interior may not list, remove from any list, or change the status of any endangered/threatened species listed before enactment of this Act without a prior favorable determination by the Secretary of Commerce (Subsection 4 (a)(2)(c)). An exemption for an agency action will not be considered a major federal action provided that an EIS discussing the impacts upon the endangered/threatened species or upon their critical habitats has been prepared previous to the action (Special Provisions, Section 7(k)).

Mineral Leasing Act (Section 28), Amended and National Wildlife Refuge System Administration Act, Amended

These Acts require approval by the FWS of rights-of-way for pipeline construction across national wildlife refuges and other federal lands under its control.

Title 50 incorporates the requirements of the Act to amend Section 28 of the Mineral Leasing Act of 1920, to amend the National Wildlife Refuge System Administration Act of 1974. The amendment to Section 28 establishes special requirements for pipeline rights-of-way for oil, natural gas, synthetic liquid or gaseous fuels. The National Wildlife Administration Act, as amended, establishes criteria for granting rights-of-way across lands of the National Wildlife Refuge System.

Applications for all rights-of-way over lands administered by the FWS must be submitted to the Regional Director who determines if the right-of-way is compatible with the purposes established for units of the National Wildlife Refuge System (50 CFR 29.21-1(a)).

The Fish and Wildlife Coordination Act (P.L. 73-121 as amended by P.L.s 732, 80-697, 86-624 and 89-72)

Under the Fish and Wildlife Coordination Act, any pipeline project that would affect a water body of the United States requires that the FWS and the NMFS recommend that wildlife conservation receive equal consideration with other project features throughout the planning and decision-making process. The Secretary of the Interior is authorized to make recommendations and issue reports on the wildlife aspects of proposed water-related projects. These reports and recommendations, and those of the head of the state agency exercising authority over the wildlife resources of the state, are included in the final report by the responsible federal agency (16 USC 662(b)). Wildlife agencies can recommend that permits, including COE permits issued under Section 404 of the FWPCA, be denied. However, the COE is not required to heed the counsel of the wildlife agencies.

The River and Harbor Act of 1899 (Sections 9 and 10 only)

This Act regulates permitting for any work in or affecting navigable waters of the United States. Section 9 specifically addresses permits for pipeline construction of elevated crossings over such waters.

Section 9 of the Rivers and Harbors Act prohibits construction of any dam or dike across any navigable waters of the United States without congressional consent and approval by the COE. Where the navigable portions of a water body lie exclusively within the jurisdiction of a single state, the structure may be built under the authority of the state legislature if the plans are approved by the COE. Section 9 also applies to elevated bridges, causeways, and pipeline crossings. The Secretary of Transportation delegated authority with respect to elevated crossings to the Coast Guard Commandant. The Coast Guard's function in reviewing plans for pipelines across navigable waters (for the purpose of this program) is to ensure that structures meet the requirements of navigation.

Section 10 permits are required for all structures or work in, or affecting, the navigable waters of the United States, for work on artificial islands, and for all installations and other devices permanently or temporarily attached to the seabed on the outer continental shelf (Section 4(e), OCS Lands Acts of 1953, as amended).

FLORIDA STATUTES AND PERMITS

Pollutant Spill Prevention and Control Act, Chapter 376, Florida Statutes

Subsection 376.021, F.S. of the Pollutant Spill Prevention Control Act acknowledges that the seacoast is a source of private and public recreation and, as such, should be protected. In enacting this legislation, the legislature found that the transfer of pollutants between vessels, and between terminal facilities and vessels within the jurisdiction of state waters and pollutants occurring as a result of procedures involved in the transfer, storage and transportation of such products pose threats of danger and damage to the environment of Florida. For purposes of the legislation, pollution was defined as the presence of substances in the air or water in quantities potentially harmful to human welfare, animal/plant life or property, or in quantities which may unreasonably interfere with the enjoyment of life or property including outdoor recreation. Pollutants include oil of any kind and in any form, gasoline, pesticides, ammonia, chlorine and derivatives thereof. With regard to storage facilities, the Act provided that operation of terminal facilities shall require an annual registration certificate and adhere to regulations formulated to govern the operation and inspection of such facilities. Subsection 376.021(6) further declared that it was the intent of this legislation to support and complement applicable provisions of the Federal Water Pollution Control Act as amended. The Florida Department of Natural Resources was empowered to carry out the duties and powers of this Act (Subsection 376.051, F.S.).

Energy Resources Part I, Regulation of Oil and Gas Resources, Chapter 377, Florida Statutes

Public policy, as defined in Chapter 377, F.S. is to conserve and control the natural resources of oil and gas in said state and the products made therefrom (Subsection 377.06, F.S.). The Florida Department of Natural Resources is responsible for governing all phases of the exploration, drilling and production of oil, gas, or other petroleum products in the state including exploration, drilling, and production in the offshore waters of the state (Subsection 377.22, F.S.). Subsection 377.24, F.S. mandates that a permit is required prior to the drilling of an exploration well. No permit will be granted to drill for oil or gas within the corporate limits of any municipality unless the governing authority approves the application for such permit by resolution. No permit will be granted in tidal waters within three (3) miles of a municipality or county unless approved for permit by resolution of the governing body (Subsection 372.24(6), F.S.). Subsection 377.242, F.S. states that no structure intended for the drilling or production of oil may be located within one mile seaward of the coastline of the state. No permit shall be granted within one mile inland from the coastline unless it is determined that the estuaries, beaches, and shore areas of the state will be adequately protected in the event of an accident. Under the provisions of Subsection 377.243, F.S. two conditions must be met prior to obtaining a drilling permit. These are: the ownership of a valid deed or lease which grants the right to explore for oil and/or gas; and, satisfactory evidence that the applicant will implement a program for the control of pollution which may occur as a result of the activity. In order to protect the gas and oil fields in the state, Subsection 377.40, F.S. declared it to be unlawful for any person to permit negligently any gas or oil well to go wild or to get out of control. The owner of any such well shall, after 24 hours written notice by the Division of Resource Management given to him or the person in possession of such well, make reasonable effort to control such well.

Environmental Land and Water Management Act, Chapter 380, Florida Statutes

The purpose of this Act is to develop growth and management policies to protect the natural resources, environment, and water quality of the state which may be implemented to the maximum extent possible by local governments through existing processes (Subsection 380.021, F.S.). Subsection 380.05, F.S. provides for the designation of areas of critical state concern by the Administration Commission (Governor and the Cabinet) if these areas contain or have a significant impact upon environmental, historical, natural or archaeological resources of regional or statewide importance. An area of critical state concern may be designated if it is affected by, or has a significant effect upon, an existing or proposed major public facility or other area of major public investment. Once an area is designated, the Land Planning Agency may recommend specific principles for guiding the development of the area. The local government having jurisdiction over the land area designated has the opportunity to develop land use plans and regulations for these lands which are consistent with the specific principles established by the State Land Planning Agency. Development permits issued for activities within these areas must be in accordance with these development plans and regulations.

Subsection 380.06(1), F.S. defines the concept of Developments of Regional Impact (DRI) to be any development which, because of its character, magnitude, or location would have a substantial effect upon the health, safety, or welfare of citizens of more than one county. Proposals for DRIs must be reviewed by Regional Planning Councils (RPCs) which request comments from local governments as part of the review process and then make recommendations to local governments whether to approve, deny or approve with conditions the proposed DRI. Local governments are responsible for implementing the recommendations made by RPCs. Chapter 27F-2, Florida Administrative Code contains the standards which identify developments presumed to be of regional impact. Industrial parks/plants must provide parking for more than 1,500 vehicles or occupy a site greater than one square mile to be considered a DRI. Petroleum storage facilities are assumed to be DRIs if the facility would be located within 1,000 feet of any navigable water and have a storage capacity of over 50,000 barrels or if the facilities would have a storage capacity exceeding 200,000 barrels (Subsection 2.08, Ch. 27F FAC). Therefore, it is probable that the only OCS facilities that might be reviewed as developments of regional impact would be the petroleum storage facilities.

Land Acquisition Trust Fund, Chapter 253, Florida Statutes

The Board of Trustees of the Internal Improvement Trust Fund (BTIITF) of the state is vested and charged with the acquisition, administration, management, control, suspension, conservation, protection and disposition of all lands owned by, or which may hereafter insure to, the state or any of its agencies or departments (Subsection 253.02(1), F.S.). Lands vested in the BTIITF according to Subsection 253.03, F.S. include all:

- Swamp and overflowed lands held by the state;
- Lands owned by the state by right of sovereignty;
- Internal improvement lands;
- Tidal lands;
- Lands covered by shallow waters of the ocean, gulf, or bays/lagoons, and all lands owned by the state covered by fresh water;
- Parks, reservations or land/bottoms set aside in the name of the state excluding lands held for road and canal rights-of-way; and

- Lands which may accrue to the state from any source excluding road and canal rights-of-way or spoil areas/borrow pits; or land which is or may become vested in any port authority, flood control, navigation, or water management district created by any general or special act.

Beach and Shore Preservation Act, Part I: Regulation of Construction, Reconstruction and Other Physical Activity, Chapter 161, Florida Statutes

Part I of this law provides for the regulation of construction along the coast by the Division of MArine Resources, Department of Natural Resources (DNR). Subsection 161.041, F.S. provides for permits which are required for any coastal construction or reconstruction specifically undertaken for shore protection purposes, if upon lands of the state below mean high water line.

Subsection 161.051, F.S. declares that the state shall not be liable for any damages arising out of construction, maintenance, or improvements of permitted coastal works.

Subsection 161.052, F.S. establishes coastal construction setback lines on a statewide basis. A 50-foot construction setback line from the mean high water line is established which prohibits construction seaward of the line without a waiver or variance approved by DNR. These setback requirements do no apply to coastal locations having vegetative non-sandy shores. The DNR may authorize the construction of pipelines or piers extending outward from the shoreline, unless it determines such construction would cause erosion of the beach in the area of the structure(s). Also the DNR may exempt portions of the coastline from the setback provision if, because of their nature, they are not subject to erosion of a substantially damaging effect to the public.

State Parks and Preserves, Chapter 258, Florida Statutes

Subsections 258.17-258.32, F.S. are known as the "State Wilderness System Act". The Department of Natural Resources is directed to give early consideration to wilderness areas which:

- Are in close proximity to urban or rapidly developing areas;
- Are in imminent danger from some other source;
- Are designed to protect rare or endangered species or other unique natural features; and
- Constitute the last vestiges of natural conditions within a given region.

Subsections 258.35-258.46, F.S. are known as the Florida Aquatic Preserve Act of 1975. Section 258.16, F.S. establishes the Boca Ciega Bay Aquatic Preserve, Pinellas County, specifies its boundaries and prohibits dredging, drilling, and excavation for minerals.

Subsection 258.391, F.S. designates Cockroach Bay in Hillsborough County as an aquatic preserve for a period of 40 years under a lease with Tampa Port Authority and gives the exact boundaries.

Subsection 258.42(3)(a), F.S. limits dredging and filling in aquatic preserves to certain activities which require a permit. These include:

- Minimum dredging and spoiling as authorized for public navigation projects;
- Minimum dredging and spoiling as authorized for the creation and maintenance of marinas, piers, docks, and associated navigation channels;

- Other maintenance dredging as required for existing navigation channels;
- Reasonable improvements as may be necessary for public utility installation or expansion; and
- Installation/maintenance of oil and gas transportation facilities.

Florida Archives and History Act, Chapter 267, Florida Statutes

Subsection 267.061, F.S. states it is the policy of the state to protect and preserve sites and properties which have scientific, cultural or historical value or are of interest to the public. This Act provides for the acquisition and preservation of historic sites and properties and includes, but is not limited to, fossil deposits, Indian habitations and sunken or abandoned ships. It is also state policy that treasure found on state lands (including submerged state lands) shall belong to the state. A permitting process to regulate field investigation activities upon publicly designated archaeological sites is provided for in the law. Subsection 267.11 provides a procedure for publicly designating an archaeological site. Once a site is so designated, no person may conduct field investigation activities without first securing a permit from the Division of Archives, History and Records Management.

Game and Freshwater Fish, Chapter 372, Florida Statutes

Subsection 372.85, F.S. prohibits contamination of fresh waters by the introduction of any substance in sufficient quantities to injure, stupify, or kill fish. Thus any drilling operations located on or near the fresh waters of the state must employ precautionary measures to prevent pollution of those waters as required by the Florida Game and Fresh Water Fish Commission.

Water Resources Act, Part I: State Water Resources Plan, Chapter 373, Florida Statutes

The Florida Water Resources Act of 1972 covers all waters in the state unless specifically exempted by general or special law (Subsection 373.023, F.S.). Subsection 373.016, F.S. provides for the comprehensive management of water and related land use including but not limited to: the development of dams, impoundments, reservoirs and other works and to provide water storage for beneficial purposes; and to prevent damage from floods, soil erosion and excessive drainage.

Water Resource Management Act, Part II: Permitting of Consumptive Uses of Water, Chapter 373, Florida Statutes

Subsection 373.219, F.S. sets forth the requirement for a permit for the consumptive use of water and imposes reasonable conditions to assure that the permitted use is consistent with the overall objectives of the water district or DER and is not harmful to the water resources of the area. No permit is required for domestic consumption of water by individual users. Subsection 373.223, F.S. sets forth the conditions for a permit. The use to which the water is to be put must be a "reasonable-beneficial" one. This means the use must be reasonable from the standpoint of other landowners and the public.

Environmental Control, Part I: Pollution Control, Chapter 403, Florida Statutes

Subsection 403.021, F.S. declares that the pollution of the air and waters of the state constitutes a menace to public health and welfare and is harmful to industrial, recreational and other beneficial uses of air and water. Parts II and III proclaim that it is the public policy of this state to conserve the air and waters of the state and to protect, maintain and improve the quality thereof. The propagation of wildlife and aquatic life is protected for domestic, agricultural, industrial, recreational and other beneficial uses. No wastes are allowed to be discharged into any waters of the state without the necessary treatment to protect the beneficial uses of the water. Waters of the state include rivers, lakes, streams, and all other bodies of water such as saline, brackish and tidal waters. Subsection 403.088, F.S. mandates that permits are required for stationary installations which will reasonably be expected to be a source of air or water pollution. No discharge into water within the state of any waste that reduces the quality of the water is permitted without authorization. Permits are to be denied if the discharge of waste will lower the water quality below established levels. Subsection 403.085, F.S. requires permits for ocean outfalls. Secondary treatment or other treatment as may be required is necessary before the permit will be granted.

Subsection 403.061, F.S. grants authority for pollution control to DER, which must establish ambient air and water quality standards, determine sources of pollution and establish a permit system for operations or construction activities that may be a source of air or water pollution.

Air Pollution, Chapter 17-2, Florida Administrative Code

Chapter 17-2.03(4)(b), FAC, Prevention of Significant Deterioration, provides standards for determining when significant deterioration of air quality occurs in three specified types of areas, and contains guidelines to prevent air quality from being degraded below significant levels. The rule states that each area of the state shall be placed in one of three specified deterioration classes. Allowable deterioration of air quality in each class of area is estimated or measured from a 1974 air quality baseline. The air quality areas are labelled Class I, II or III. Standards are established for maximum allowable annual increase in micrograms per cubic meter of particulate matter and sulfur dioxide in each area. Twenty-four hour maxima are established for both types of pollutants, and three hour maxima are instituted for sulfur dioxide. Restrictions on increased concentrations of these pollutants are most severe with Class I areas; Class II areas have moderate restrictions on allowable increases in air quality degradation; and

Class III areas are least restrictive. The rule establishes no significant deterioration standards in any class of area for carbon monoxide, lead, nitrogen dioxide, or any known air pollutants other than the two already mentioned. The Tampa Bay Region is a Class II area.

REGIONAL STATUTES AND PERMITS

Tampa Bay Reginal Planning Council

A function of the Tampa Bay Regional Planning Council is to offer leadership, assistance and coordination for the programs that carry out the achievement of an excellent quality of life for all people in the region. In concert with this goal, and by design of its objectives, a regional policy was set forward as a guide to future growth in the Tampa Bay Region. This regional policy, entitled Future of the Region, was adopted in July 1975 and subsequently amended in 1976, 1977 and 1980, following the rules contained in Chapter 120, F.S. The following policies related to industrial and environmental issues were taken from the Future of the Region.

It shall be the policy of the Council to ensure that industrial land uses are planned to meet the needs of the resident population in areas most suitable with respect to the protection of environmental and natural resources, energy efficiency, economic development objectives and the orderly extension and expansion of public facilities and services.

It shall be the policy of the Council to encourage open space as a means of providing the population with visual relief from the urban environment as well as a means of preserving and conserving special lands. Aside from broad expanses at the urban fringe, such as green areas, open space should be included within urban areas, especially near high density areas.

It shall be the policy of the Council to ensure a continuing supply of good potable water for the entire Tampa Bay Region. In addition, wherever desirable and attainable, a standard of water quality should be achieved that allows for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the waters in the region.

It shall be the policy of the Council to plan for and support an efficient system of ports and waterways designed to serve the goods movement, passenger and recreation water transportation needs of the Tampa Bay Region. Toward this end:

- Port development and expansion for passenger movement as well as goods movements is encouraged.

- Port facilities and waterways should be developed to assure an optimum balance between economic costs and benefits and environmental and social costs.

- Coordination and development of ground transportation facilities that efficiently serve port facilities are encouraged.

- Regional and local port development and expansion plans should protect needs for port and water-related industrial expansion and relate these needs to other uses of the waterways.

- It shall be the policy of the Council to recognize the region's coastal zone as a unique resource upon which constant and competing demands are being made in terms of its vital environmental, economic, social and cultural significance to the health, safety and welfare of the region's residents. Furthermore, it shall be the policy of the Council to encourage and promote sound coastal management to ensure that maximum long-term benefits are attained in the use of the coastal zone by and for the region's residents.

LOCAL STATUTES AND PERMITS

Manatee County

Land Use Element	Policy: All development permitted within corridors shall be compatible with existing adjacent uses in the applicable sector, village, or industrial area, considering factors such as land use intensity, scale, adequacy of public facilities and services, and the potential for nuisances.
Conservation Element	Objectives: Locate activities which do or may emit pollutants, including noxious odors, excessive noise, and others, so as to minimize the adverse effects of these pollutants upon surrounding areas. Promote the efficient use of water resources in agriculture, industry, and urban development. Policy: Because industry can produce high levels of noise, protection should be provided to contiguous land uses.
Port Element	Goals: Provide port facilities which serve the needs of industry, and encourage environmentally acceptable port-related industrial development that will provide a diversified tax base and create jobs that can utilize local manpower resources. Provide a port facility that is responsive to the region and the community and its needs and that specifically will endeavor to minimize its own and its surrounding port-related industries' adverse environmental effects. Objectives: Construct cargo handling facilities which minimize pollution to the greatest degree technologically practicable.

Encourage industrial development which minimizes the emission of pollutants.

Review port development proposals for potential effects on Bishop's Harbor.

Land Use Element	Goal: Provide for the best possible distribution of land use, by type and intensity, in support of the social, cultural and economic needs of the present and future resident and tourist population in a manner which would maintain or improve the quality of the natural and man-made environment.
Conservation Element	Goal: Protect and enhance the community's environment by protecting sensitive areas from irreversible commitments and by minimizing the effect of pollutants.
	Policy: In recognition of the endangered status of the Florida manatee and that the County is the manatee's namesake, the County shall encourage the protection of the manatee and its habitats.
Coastal Zone Protection Element	Goals: Restore, maintain and enhance the coastal zone environment.
	Avoid coastal management practices within the coastal zone which can create serious or irreversible consequences and base coastal management practices on conservation of coastal values.
	Policies: Marine grass bends, mangrove forests, and tidal marsh systems should be preserved to the fullest extent possible. Modification should be considered only in the case of overriding public interest.

Review for all development proposals in or adjacent to such ecologically sensitive areas as mangroves and tidal marshes shall include specific consideration of anticipated water quality and quantity changes, vegetative removal or restoration after development, and the consideration of cumulative effects of prior development in the area.

There should be no open bulk storage of fertilizers, chemicals, pesticides, or other potentially polluting materials in floodplains.

Special protective efforts should be made regarding the preservation of rare, endangered, or threatened species as identified by federal and state agencies and the habitat required to support these species in the coastal zone.

APPENDIX A

TYPICAL OFFSHORE MATERIAL REQUIREMENTS

Foodstuffs and domestic, laundry and medical supplies: for fully comprehensive catering and accommodation facilities.

Films, periodicals, and magazines: for recreation facilities.

Fuel: to operate power plants, vehicles, and helicopters.

Water: for domestic purposes (potable), and for drilling fluids and coolants.

Lubricants and greases: for engines, pumps, generators, compressors, winches, motors, hydraulic systems, and other uses.

Paints: for interior and exterior structural maintenance, deck protection, plant maintenance, and other uses.

Gases: for diving, welding, and other purposes.

Hoses: for water, fuel, and bulk chemical transmission, circulating hoses, fire hoses, and general purpose hoses.

Wire, synthetic rope, and manila rope: for cranes, barge mooring systems, drilling lines, tension systems, vessel moorings, general purpose lashings.

Cargo handling equipment: for onshore/offshore cargo operations, i.e., hooks, slings, shackles, nets, baskets, chains, pallets, waterproof covers, food containers, load binders, and transit tank for helicopter fuel.

Safety clothing: for workers offshore and onshore, e.g., boots, gloves, goggles, helmets, and foul weather clothing.

Safety equipment: for firefighting and other safety functions, e.g., gas detectors, breathing apparatus, resuscitators, flash lights, liferafts, lifeboats, life jackets, flares, lifelines and nets.

Welding equipment: for a range of welding tasks, including maintenance repairs, tool dressing, pipework and fabrication, e.g., welding machines, rods, conductors, and other equipment.

Pipe (not drilling tubulars): for air, water, fuel, and other services.

Pipe fittings: for miscellaneous uses, e.g., unions, couplings, and pressure controllers.

Marine equipment: for boats and offshore facilities, e.g., mooring anchors, buoys and chains, riser wires, miscellaneous cordage and terminal fittings, chain stoppers, barometers, chronometer, anemometer, wave recorder, portable radios, tension metering equipment for main mooring system, and navigational charts.

Navigational aids and helipad: for helicopters and offshore facilities, e.g., navigation lights, helipad lights, landing nets, illuminated wind socks, and safety nets.

Engineering tools: for interior and exterior uses on facilities and in engineering workshops.

Electrical: for interior and exterior uses on facilities.

Spares and service engineers: to support continuous operation of the main offshore equipment.

APPENDIX B

OIL SPILL REACTING AGENT AGREEMENT

Port Manatee Environmental Protection Committee (hereinafter called "Committee") and A & A Coastal Pollution Cleanup Services, Inc. (hereinafter called "A & A Coastal") hereby agrees as follows:

1. The Committee shall utilize the services of A & A Coastal as the Reacting Agent for the containment of all oil spills for which the Committee has been requested to respond, whether it be on water and/or land within Port Manatee.

   A & A Coastal agrees to directly invoice the responsible party for services performed and not the Committee. A & A Coastal shall not charge a Committee member for the use of equipment owned by the Committee.

2. A & A Coastal shall store and maintain at Port Manatee the following equipment and materials:

   Sorbents

   5 boxes - 3M oil sorbent type 151

   5 boxes - 3M oil sorbent type 156

   5 rolls - 3M oil sorbent type 100

   5 bales - 3M sorbent type 270

   10 boxes - oil snare

   14 ft. Jon Boat & motor

   5 Dip nets

   3" high pressure pump

A & A Coastal shall use Committee owned equipment when available. Additional equipment and materials will be made available by A & A Coastal when and if required at the spill site, by approval of the On-Scene-Coordinator.

3. The Committee shall provide adequate space, up to 1/2 acre, at Port Manatee for A & A Coastal to store above equipment and materials. Storage space provided by the Committeee shall be at no expense to A & A Coastal. A & A Coastal shall be responsible for the equipment and shall protect and indemnify the Committee and its member companies against all claims for damage and/or loss of A & A Coastal's equipment and/or materials stored at Port Manatee in accordance with this agreement.

4. A & A Coastal agrees to perform the work described in this agreement as an independent contractor and not as a subcontractor or employee of the Committee or any of its agents or members. The Committee retains no control or direction over A & A Coastal and its employees, and A & A Coastal, its agents, members, employees, subsidiaries, officers or directors, upon acceptance of this agreement, agrees to release, indemnify and hold the Committee, its agents, members, officers or directors free and unharmed against any claims and liabilities whatsoever, whether or not due to or caused by negligence of Committee, its agents, members, officers or directors, arising out of or in connection with the performance of the desribed work by A & A Coastal, its employees or subcontractors, and resulting in damages to property, personal injury or death.

5. A & A Coastal represents that it has and will maintain in force, at its sole expense, for the term of this agreement, insurance in such amounts and in such form as A & A Coastal deems appropriate and adequate under the circumstances. A & A Coastal shall furnish to the Committee Certificates of Insurance evidencing coverage.

6. This agreement shall become effective on the date executed by both parties and shall remain in force for a period of two (2) years and from year to year thereafter, provided, however, that either A & A Coastal or the Committee may terminate this agreement at anytime during the term hereof by giving ninety (90) days written notice to the other party, Breach of this Contract by either party shall render this agreement immediately null and void.

7. This agreement contains all the terms and conditions agreed upon by the parties hereto, and no other agreements, oral or otherwise, regarding the subject matter of this agreement shall be deemed to exist or to bind either of the parties.

A & A COASTAL POLLUTION CLEANUP SERVICES, INC.

BY: Patrick Bennett President DATE: 3/10 82

ATTEST: Jack E. Bace DATE: 3-12-82

ATTEST: David H. McDonald DATE: 3/12/82

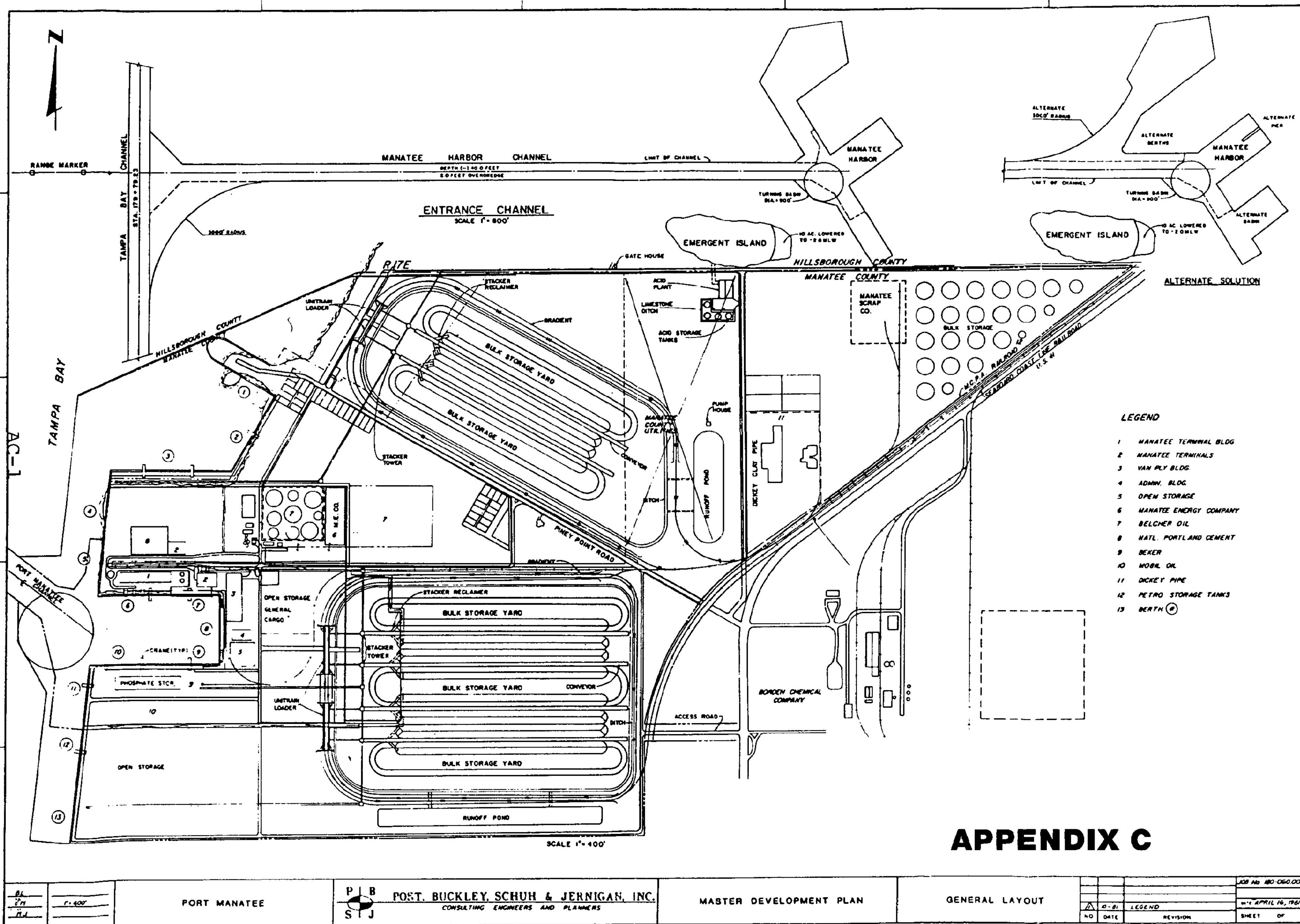
PORT MANATEE ENVIRONMENTAL PROTECTION COMMITTEE

BY: Cary D. Silvester - PRESIDENT DATE: 3/12/82

ATTEST: Jack E. Bace DATE: 3-12-82

ATTEST: David McDonald DATE: 3/12/82

APPENDIX C



MANATEE HARBOR CHANNEL
DEPTH (-)40.0 FEET
2.0 FEET OVERDREDGE
LIMIT OF CHANNEL
RANGE MARKER
TAMPA BAY CHANNEL
STA. 179 + 79.23
ENTRANCE CHANNEL
SCALE 1" = 800'
TAMPA BAY
MANATEE HARBOR
TURNING BASIN DIA. = 900'
EMERGENT ISLAND
10 AC. LOWERED TO -2.0 MLW
HILLSBOROUGH COUNTY
MANATEE COUNTY
R17E
GATE HOUSE
ACID PLANT
LIMESTONE DITCH
ACID STORAGE TANKS
PUMP HOUSE
RUNOFF POND
MANATEE COUNTY UTIL. HE.
DITCH
CONVEYOR
STACKER RECLAIMER
GRADIENT
BULK STORAGE YARD
BULK STORAGE YARD
UNITRAIN LOADER
STACKER TOWER
PINEY POINT ROAD
M.E. CO.
OPEN STORAGE GENERAL CARGO
CRANE (TYP)
PHOSPHATE STOR.
OPEN STORAGE
PORT MANATEE
BULK STORAGE YARD
BULK STORAGE YARD
BULK STORAGE YARD
RUNOFF POND
SCALE 1" = 400'
ACCESS ROAD
DICKEY CLAY PIPE
BORDEN CHEMICAL COMPANY
MANATEE SCRAP CO.
BULK STORAGE
M.C.P.A. RAILROAD
SEABOARD COAST LINE RAILROAD
U.S. 41
ALTERNATE 3000' RADIUS
ALTERNATE BERTHS
ALTERNATE PIER
ALTERNATE BASIN
ALTERNATE SOLUTION
LEGEND
1 MANATEE TERMINAL BLDG
2 MANATEE TERMINALS
3 VAN PLY BLDG
4 ADMIN. BLDG.
5 OPEN STORAGE
6 MANATEE ENERGY COMPANY
7 BELCHER OIL
8 NATL. PORTLAND CEMENT
9 BEKER
10 MOBIL OIL
11 DICKEY PIPE
12 PETRO STORAGE TANKS
13 BERTH (#)
PORT MANATEE
POST, BUCKLEY, SCHUH & JERNIGAN, INC.
CONSULTING ENGINEERS AND PLANNERS
MASTER DEVELOPMENT PLAN
GENERAL LAYOUT
1" = 400'
JOB No. 180-060.00
DATE APRIL 16, 1981
LEGEND
NO DATE REVISION
SHEET OF

APPENDIX D

GENERAL PHYSICAL AND CHEMICAL
WATER QUALITY CHARACTERISTICS
TAMPA/MANATEE

Parameter	TPA 1-A		TPA 2-A		TPA 3-B		TPA 4-B		TPA 5-B		TPA 6-B		TPA 7-C		MAN 1-A		MAN 2-B		STANDARD**
Temperature (0C)	25		23		24		25		24		25		24		26		25		-
Salinity (ppt)	26		28		28		28		27		27		35		34		34		-
pH	8.2		8.1		8.0		7.9		8.2		8.1		7.4		7.9		6.6		-
Dissolved Oxygen (mg/l)	3.2		4.6*		4.2		2.2		5.2		3.6		5.5		4.6		5.4		4
Dissolved Oxygen (% Saturation)	45		63		58		31		72		51		79		68		79		-
Turbidity (NTU)	8.5		15.0		17.3		9.0		12.5		4.5		1.3		8.1		7.5		-
Conductivity (mhos)	368		363*		370		369		350		371		440		430		420		-
Ammonia (mg/l)	0.10	0.01	<0.01	-	0.01*	-	<0.01	-	<0.01	-	<0.01	-	<0.01	-	0.01*	-	<0.01	-	0.02
Nitrate (mg/l)	0.07	0.02	0.08	0.01	0.06	0.01	0.06	0.01	0.06	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.03	0	-
Total Kjeldahl Nitrogen (mg/l)	0.4	0.1	0.2	0.1	0.3	0.1	0.09	0.02	0.2	0	0.3*	-	0.07	0.03	0.1*	-	0.1*	-	-
Phosphate (mg/l)	0.57	0.01	0.59	0.03	0.51	0.01	0.58	0.04	0.57	0.01	0.51	0.01	0.09	0.01	0.21	0.02	0.23	0.02	-
Total Phosphorus (mg/l)	0.59	0.06	0.69	0.01	0.56	0.01	0.63	0.02	0.60	0.02	0.59	0.03	0.31	0.03	0.28	0.02	0.28	0.02	-
Total Organic Carbon (mg/l)	8.5	0.7	7.9	0.2	9.4	0.4	6.7	1.0	8.7	0.2	5.6*	-	4.6	0.9	5.1	0.3	5.0	0.2	-
Biological Oxygen Demand (mg O_2/l)	1.9	0	2.4	0.5	2.6	0.1	1.8	0.1	2.6	0.3	2.7*	-	1.3	0.4	2.0	0.2	3.0	0.7	-
Total Suspended Solids (mg/l)	45*	-	93	4	21	3	16	0.6	85	5	38	4	8.5	1.4	19	2	23*	-	-

REMARDS:

* Mean of surface and bottom
** Water quality standards for selected parameters in predominantly marine waters, Chapter 17-3, Florida Administrative Code for Class III waters.

NOTES:
1) Units for standard are /l for this parameter.
2) For parameters listed below "conductivity", the left column contains the mean and the right column contains the standard deviation of replicate samples for each station.

ORGANIC WATER QUALITY
AND PHYSICAL CHARACTERISTICS
TAMPA/MANATEE

μg/Liter	TPA 1-A		TPA 2-A		TPA 3-B		TPA 4-B		TPA 5-B		TPA 6-B		TPA 7-C		MAN 1-A		MAN 2-B		STANDARD*
	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	
Pesticides																			
Mirex	<0.03	---	<0.03	---	<0.03	---	<0.03	---	<0.03	---	<0.03	---	<0.03	---	<0.03	---	<0.03	---	0.001
Toxaphene	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	0.005
DDT	<0.01	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	<0.01	---	0.001
Aldrin	<0.005	---	<0.005	---	<0.005	---	<0.005	---	<0.005	---	<0.005	---	<0.005	---	<0.005	---	<0.005	---	0.003
Chlordane	<0.2	---	<0.2	---	<0.2	---	<0.2	---	<0.2	---	<0.2	---	<0.2	---	<0.2	---	<0.2	---	0.004
Other Chloronated (DDE)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
PCB's	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	<0.25	---	0.001
Phenols																			
2 - chlorophenol	<0.1	---	<0.1	---	---	---	---	---	---	---	---	---	<0.1	---	<0.1	---	---	---	---
phenol	<1.0	---	<1.0	---	---	---	---	---	---	---	---	---	<1.0	---	<1.0	---	---	---	---
2,4 - dichlorophenol	<0.05	---	<0.05	---	---	---	---	---	---	---	---	---	<0.05	---	<0.05	---	---	---	---
2,4,6 - trichlorophenol	<0.07	---	<0.07	---	---	---	---	---	---	---	---	---	<0.07	---	<0.07	---	---	---	---
4 - chloro-m-cresol	<1.0	---	<1.0	---	---	---	---	---	---	---	---	---	<1.0	---	<1.0	---	---	---	---
2,4 - dinitrophenol	<0.7	---	<0.7	---	---	---	---	---	---	---	---	---	<0.7	---	<0.7	---	---	---	---
pentachlorophenol	<0.04	---	<0.04	---	---	---	---	---	---	---	---	---	<0.04	---	<0.04	---	---	---	---

NOTES:

* Water quality standards for selected parameters in predominantly marine waters, Chapter 17-3, Florida Administrative Code for Class III waters.

INORGANIC WATER QUALITY CHARACTERISTICS TAMPA/MANATEE

ug/Liter	TPA-1A		TPA-2A		TPA-3B		TPA-4B		TPA-5B		TPA-6B		TPA-7C		MAN-1A		MAN-2B		*STANDARD
	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	
Radium 226 **	---	---	---	---	---	---	N/A***		---	---	---	---	---	---	---	---	---	---	5 pCi/l
Antimony																			0.2 mg/l
Arsenic																			0.05 mg/l
Cadmium	0.07	0.01	0.09	0.01	0.12	0.01	0.07	0.02	0.07	0.06	0.04*	---	0.04	0.01	0.04	---	0.04	0.01	5.0 μg/l
Chromium	1.9	0.3	1.3	0.7	---	---	---	---	---	---	---	---	0.55	0.15	0.53	0.10	---	---	0.05 mg/l
Copper	1.4	0.2	0.5	0	0.53	0.03	0.6	0.1	0.47	0	0.59	0.14	0.44	0.07	0.49	0.12	1.1	0.1	0.015 mg/l
Iron	390	80	850	50	1000	61	640	150	440	110	280	73	190	25	510	55	740	160	0.3 mg/l
Lead	0.76	0.06	0.77	0.10	2.0	0.2	0.6	0.1	0.72	0.04	0.39	0.05	0.28	0.05	0.25	0.05	0.27	0.07	0.05 mg/l
Mercury	0.1	0	<0.1	---	<0.1	---	<0.1	---	<0.1	---	<0.1	---	<0.1	---	<0.1	---	<0.01	---	0.1 /l
Nickel	1.1	0.1	1.1	0.1	0.95	0.24	1.5	0.1	1.2	0.3	0.87	0.16	0.32	0.07	0.41	0.03	0.46	0.06	0.1 mg/l
Silver	<0.01	---	<0.01	---	---	---	---	---	---	---	---	---	<0.01	---	<0.01	---	---	---	0.005 mg/l
Zinc	24	4	28	4	38	4	27	8	24	5	22	2	36*	---	21	5	130	15	0.03 mg/l
Fluoride	1.1	0.1	1.2	0.1	1.1	0.1	1.1	0	1.1	0.1	1.1	0.1	1.0	0.1	0.9	0	1.0	0	5.0 mg/l

NOTES:

* mean determined from 2 replicate values

** Station TPA-4B only

N/A Data not available at this time

REMARKS:

1) Water quality standards for selected parameters in predominantly marine waters, Chapter 17-3, Florida Administrative Code for Class III waters.

GENERAL PHYSICAL AND CHEMICAL SEDIMENT QUALITY CHARACTERISTICS TAMPA/MANATEE

Biological Oxygen Demand (Mg 02/l)	TPA-1A		TPA-2A		TPA-3B		TPA-4B		TPA-5B		TPA-6B		TPA-7C		MAN-1A		MAN-2B	
Biological Oxygen Demand (mg 02/l)	3600	310	1100	290	3300	610	6300	57	2600	120	2600	310	---	---	6400	1100	11400	2900
Nitrate - N (mg/l)	1.8	0.1	0.72	0.09	0.93	0.21	0.33	0.06	1.02	0.14	1.01	0.08	---	---	0.90	0.08	0.57	0.57
Phosphate (mg/l)	2900	450	3800*	---	4100	640	7400	810	2700	310	3500	710	---	---	3100	510	2900	610
Specific Gravity	2.78	0.05	2.47	0.03	2.66	0.03	2.41	0.04	2.71	0.07	2.84	0.03	---	---	2.72	0.02	2.76	0.03
TKN (mg/l)	3200	400	790*	---	3400	520	5400	200	1300	260	2200	400	---	---	2000*	---	7200	210
Total Organic Carbon (mg/l)	23000	2600	7700	1700	19000*	---	41000	3600	20000	1000	24000	5600	---	---	28000	5700	31000	11000
Total Phosphorus (mg/l)	3100	300	4300	360	4500	570	8100	1100	3200	120	3300*	---	---	---	4600	600	5000*	---
Total Solids (%)	24.5	1.9	43.6	6.2	28.3	4.3	17.4	1.2	30.5	0.7	27.0	4.9	---	---	24.0	2.3	25.1	4.4

Notes: * Mean determined from 2 replicate values

ORGANIC SEDIMENT QUALITY
TAMPA/MANATEE

ppm (dry basis)	TPA-1A		TPA-2A		TPA-3B		TPA-4B		TPA-5B		TPA-6B		TPA-7C		MAN-1A		MAN-2A	
	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ	MEAN	σ
Pesticides																		
Mirex	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	---	---	0.001	---	0.001	---
Toxaphene	0.02	---	0.02	---	0.02	---	0.02	---	0.02	000	0.02	---	---	---	0.02	---	0.02	---
DDT	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	---	---	0.001	---	0.001	---
Aldrin	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	0.001	---	---	---	0.001	---	0.001	---
Chlordane	0.006	---	0.006	---	0.006	---	0.006	---	0.006	---	0.006[1,2]	---	---	---	0.006	---	0.006	---
Other Chlorinated (DDE)	---	---	---	---	---	---	0.001[1]	---	---	---	---	---	---	---	---	---	---	---
PCB's	0.002	---	0.002	---	0.002	---	0.001	---	0.002	---	0.002	---	---	---	0.002	---	0.002	---
Oil and Grease	2000*	---	835*	---	---	---	---	---	---	---	---	---	---	---	820	120	---	---
Phenols																		
phenol	0.2	---	0.2	---	0.2	---	0.2	---	0.2	---	0.2	---	---	---	0.2	---	0.2	---
2 - chlorophenol	0.02	0.01	0.01	---	0.01	---	0.01	---	0.01	---	0.01	---	---	---	0.01	---	0.01	---
2,4 - dichlorophenol	0.1	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1	---	---	---	0.1	---	0.1	---
2,4,6 - trichlorophenol	0.01	---	0.01	---	0.01	---	0.01	---	0.01	---	0.01	---	---	---	0.01	---	0.01	---
4 - chloro-m-cresol	0.2	---	0.2	---	0.2	---	0.2	---	0.2	---	0.2	---	---	---	0.2	---	0.2	---
2,4 - dinitrophenol	0.3	---	0.3	---	0.3	---	0.3	---	0.3	---	0.3	---	---	---	0.3	---	0.3	---
pentachlorophenol	0.007	---	0.005	---	0.005	---	0.005	---	0.005	---	0.005	---	---	---	0.005	---	0.005	---

NOTES:

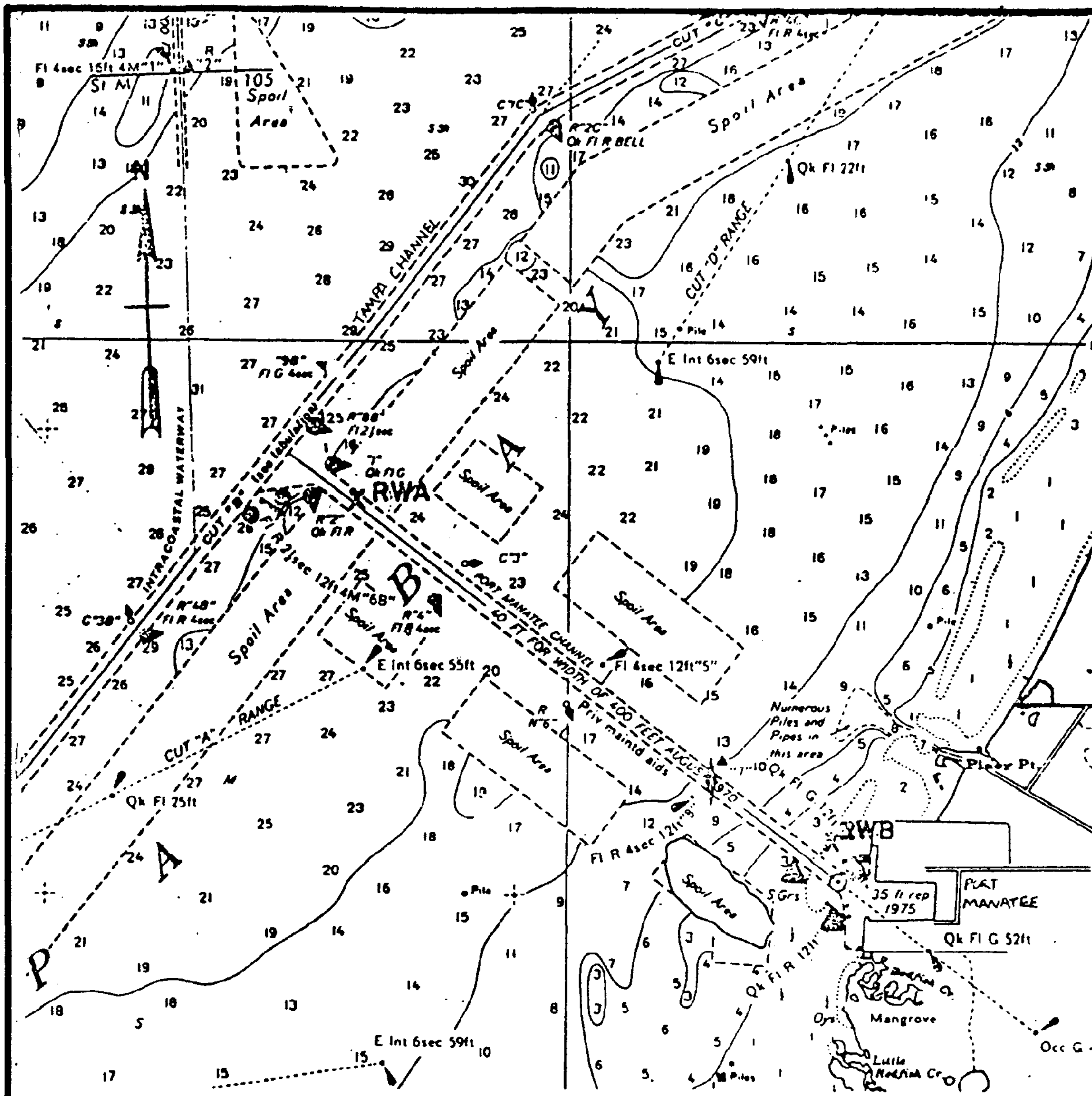
1) Observed in one replicate only.
2) Possible trace (TR) observed in one replicate only.
* Mean determined using 2 replicate values.

INORGANIC SEDIMENT QUALITY CHARACTERISTICS TAMPA/MANATEE

ppm (dry basis)	TPA-1A MEAN	TPA-1A σ	TPA-2A MEAN	TPA-2A σ	TPA-3B MEAN	TPA-3B σ	TPA-4B MEAN	TPA-4B σ	TPA-5B MEAN	TPA-5B σ	TPA-6B MEAN	TPA-6B σ	TPA-7C MEAN	TPA-7C σ	MAN-1A MEAN	MAN-1A σ	MAN-2B MEAN	MAN-2B σ
Aluminum	2200	150	1300	300	2200	150	3600	500	3600	290	3500	210	---	---	1800	210	1900	310
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	---	---	NA	NA	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	---	---	NA	NA	NA	NA
Cadmium	2.2	0.2	0.96	0.21	1.4	0.25	3.6	0.40	0.60	0.11	1.5	0.3	---	---	0.64	0.10	0.65	0.35
Chromium	100	10	54.5*	---	---	---	---	---	---	---	---	---	---	---	57	4	---	---
Copper	130	6	4.0	1.0	6.6	1.1	22.0*	---	5.3	1.7	14	3	---	---	10	1	10*	---
Fluoride	14	3	8.1	1.1	23	5	62	3	13	1	20	4	---	---	22	3	17	2
Iron	19000	1500	7500	610	14000	1500	22000	2000	24000	1000	12000*	---	---	---	14000	1000	14000	3600
Lead	130	10	7.5	1.6	15	4	40	6	14	4	45	---	---	---	10	1	10	2
Mercury	1.2	0.4	0.20	0.05	0.55	0.05	1.2	0.2	0.69	0.13	0.42	0.08	---	---	0.29	0.08	0.31*	---
Nickel	47	8	9.3	2.7	14*	---	26*	---	16*	---	11	3	---	---	12	1	17	6
Silver	0.92	0.07	0.21	0.04	---	---	---	---	---	---	---	---	---	---	0.20	0.04	---	---
Zinc	320	25	29*	---	52	6	160	6	31	3	180*	---	---	---	77	9	32	9

Notes: * mean determined from 2 replicate values
NA refers to data presently not available

APPENDIX E



LEGEND

- COMBINED SAMPLE FOR TESTS A
- COMBINED SAMPLE FOR TESTS B
- RWA, RWB } RECEIVING WATER
- BETWEEN BUOYS 7 & 8
- BETWEEN BUOYS 9 & 10

FEASIBILITY REPORT

MANATEE HARBOR, FLORIDA

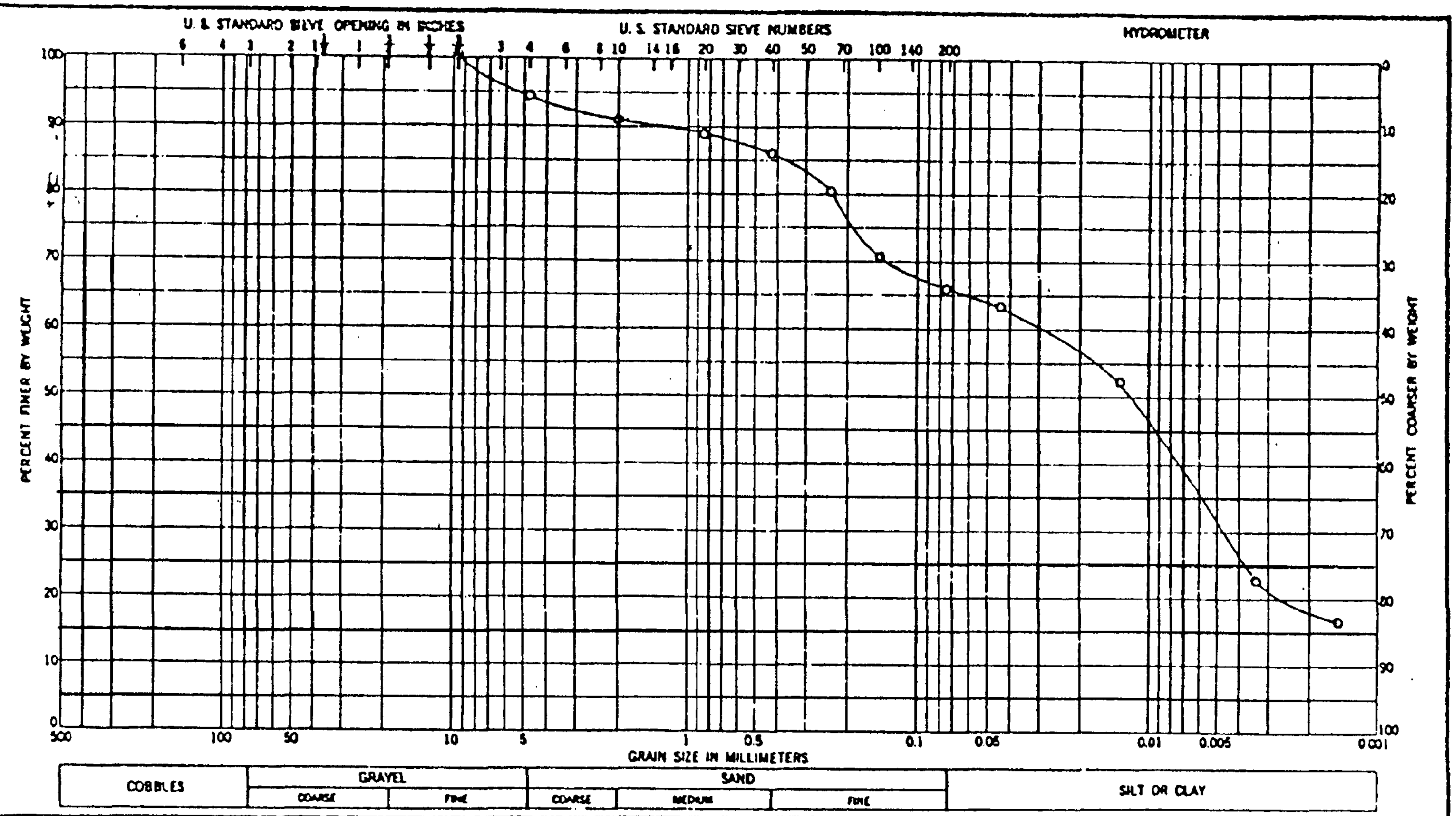
SOIL AND WATER SAMPLE TEST

INDEX MAP

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT, CORPS OF ENGINEERS
JACKSONVILLE, FLORIDA

D O FILE NO 57 32,789 PLATE E1

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

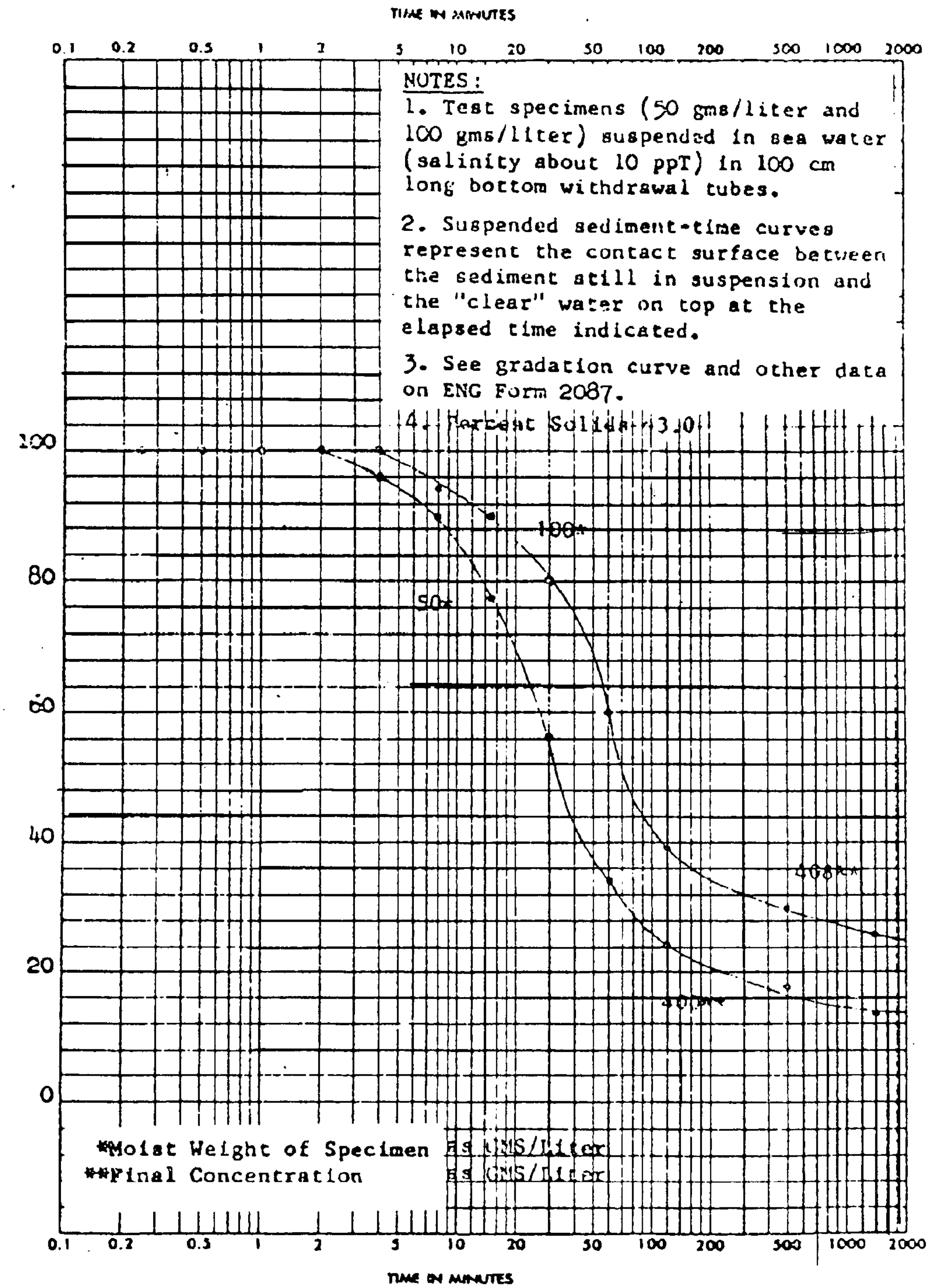


Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI	
-	-	Gray fat clay (CH) with a little gravel size, coarse-medium sand size shell fragments	104.9	-	-	-	Project: JACKSONVILLE DISTRICT Manatee Harbor Project
							Lab. No. 3S-358
		Shell approximately 11%					Area: --
							Boring No. CB-MTH-A
		GRADATION CURVES					Date: 25 May 1977

Sedimentation rates reported on SAD Form 3023.

PLATE E-2

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30061

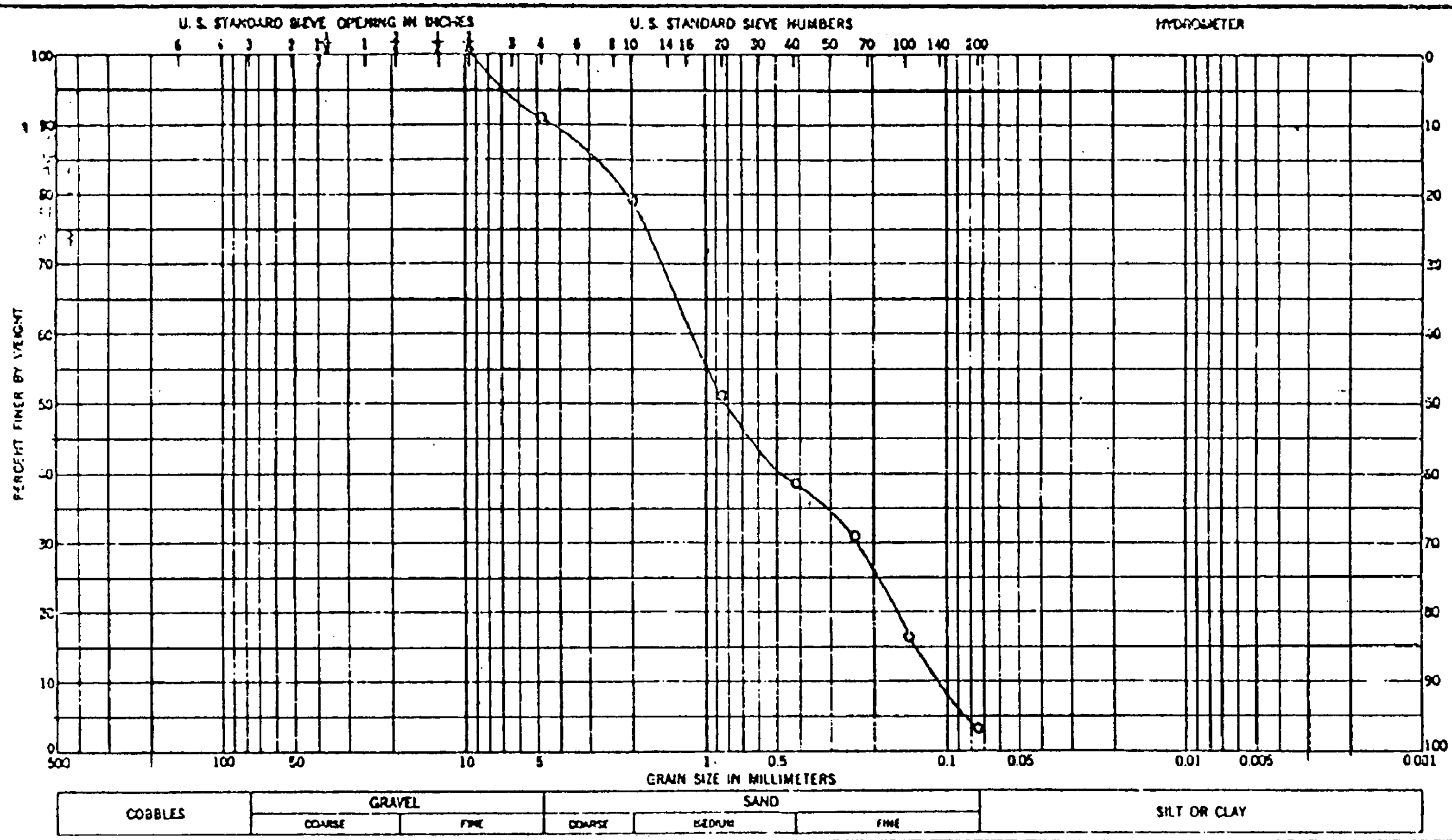


PROJECT	JACKSONVILLE DISTRICT, Manatee Harbor Project		
AREA	Lab. No. 39-358		
BORING NO. CB-MTH-A	SAMPLE NO -	DEPTH EL -	DATE 25 May 1977
SUSPENDED SEDIMENT-TIME CURVES			(TRANSLUCENT)

SAD Form 3023
26 Oct 72

Gradation curves reported on ENG Form PLATE E-3

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
-	-	Grayish tan poorly graded	-	-	-	-
		shelly sand (SP). Shell is				
		gravel size, coarse-medium				
		sand size.				
		Shell approx. 49%.				

Project JACKSONVILLE DISTRICT
Manatee Harbor Project
Lab. No. 3S-359
Area --
Boring No. CB-MTH-B
Date 25 May 1977

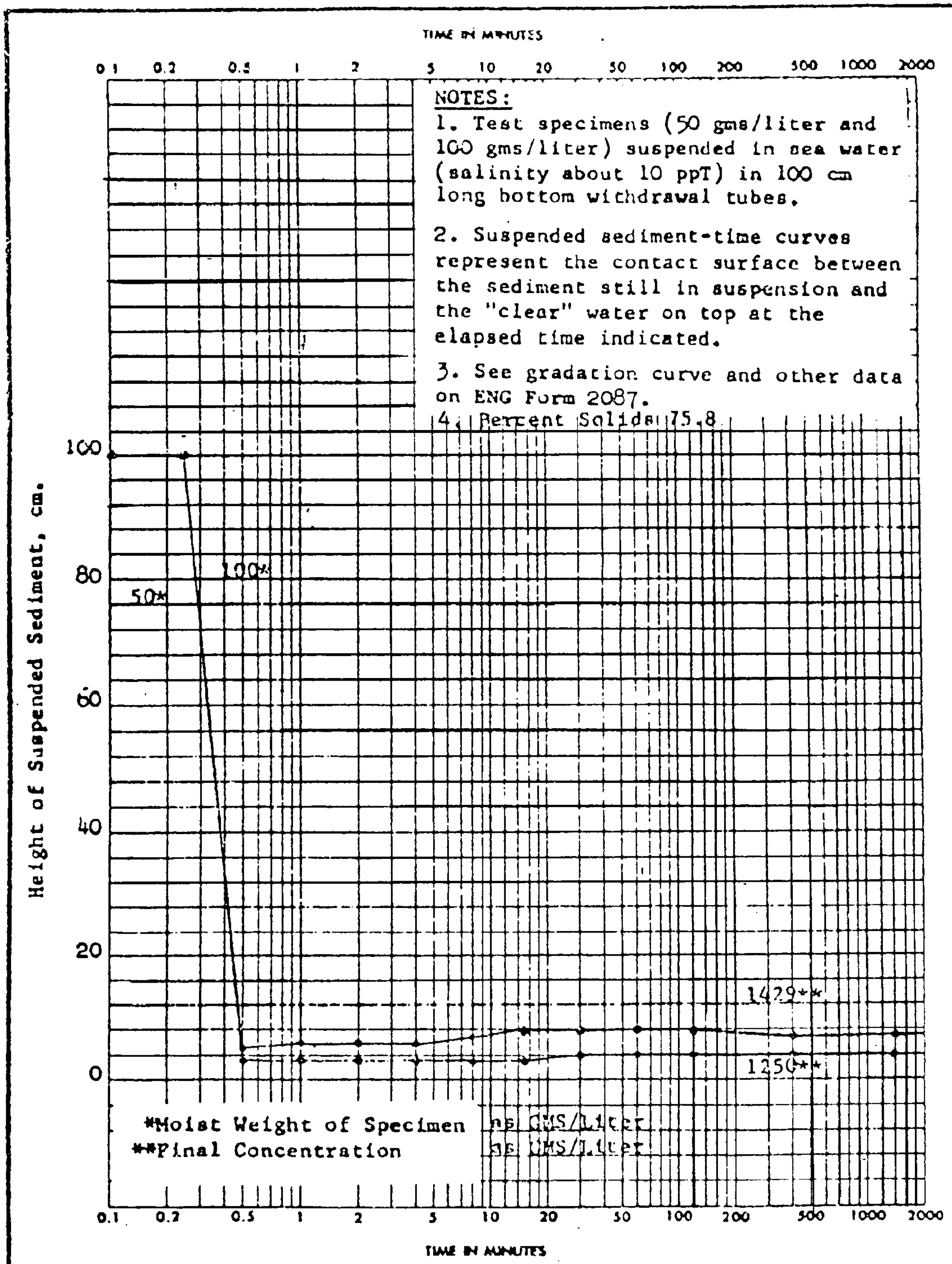
GRADATION CURVES

ENG FORM 1 MAY 63 2087

Sedimentation rate reported on SAD Form 3023.

PLATE E-4

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30061



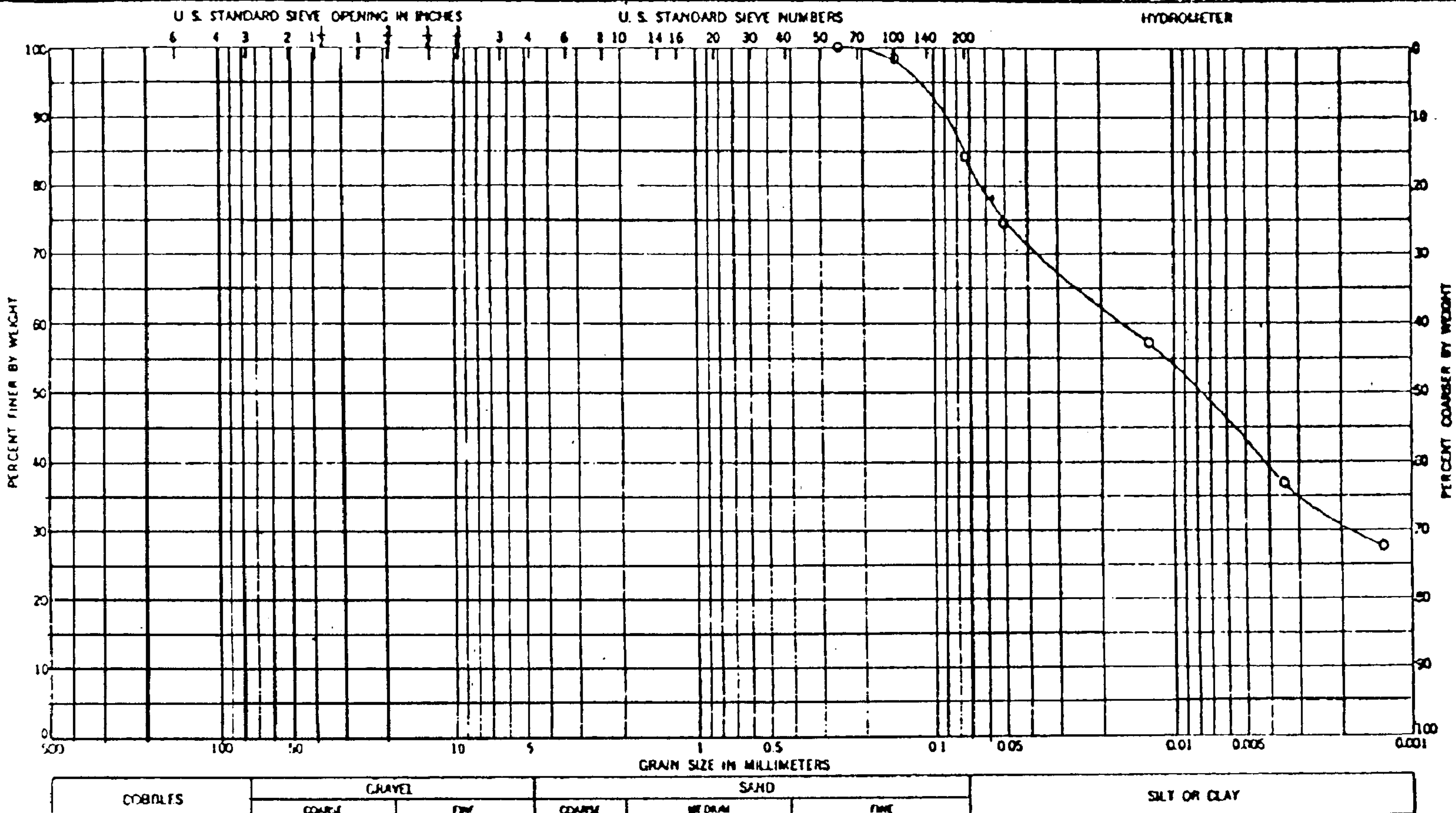
PROJECT	JACKSONVILLE DISTRICT, Manatee Harbor Project
AREA	Lab. No. 3S-359
BORING NO. CB-MTH-B	SAMPLE NO. -- / DEPTH ft - / DATE 25 May 1977
	SUSPENDED SEDIMENT-TIME CURVES (TRANSLUCENT)

SAD Form 3023
26 Oct 72

Gradation curves reported on PLATE E-5

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION ...
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

Req. No. 08-123-ENG-127-78
Ref. Regn ED-78-185



Sample No	Elev or Depth	Classification	Nat w %	LL	PL	PI
-		Black fat clay (CH) with a little sand	223.6	-	-	-

Project	Jacksonville District Port Manatee, Fla. Lab. No. 3E-482*
Area	Between 7" & 8" Buoys
Boring No.	
Date	26 June 1978

GRADATION CURVES

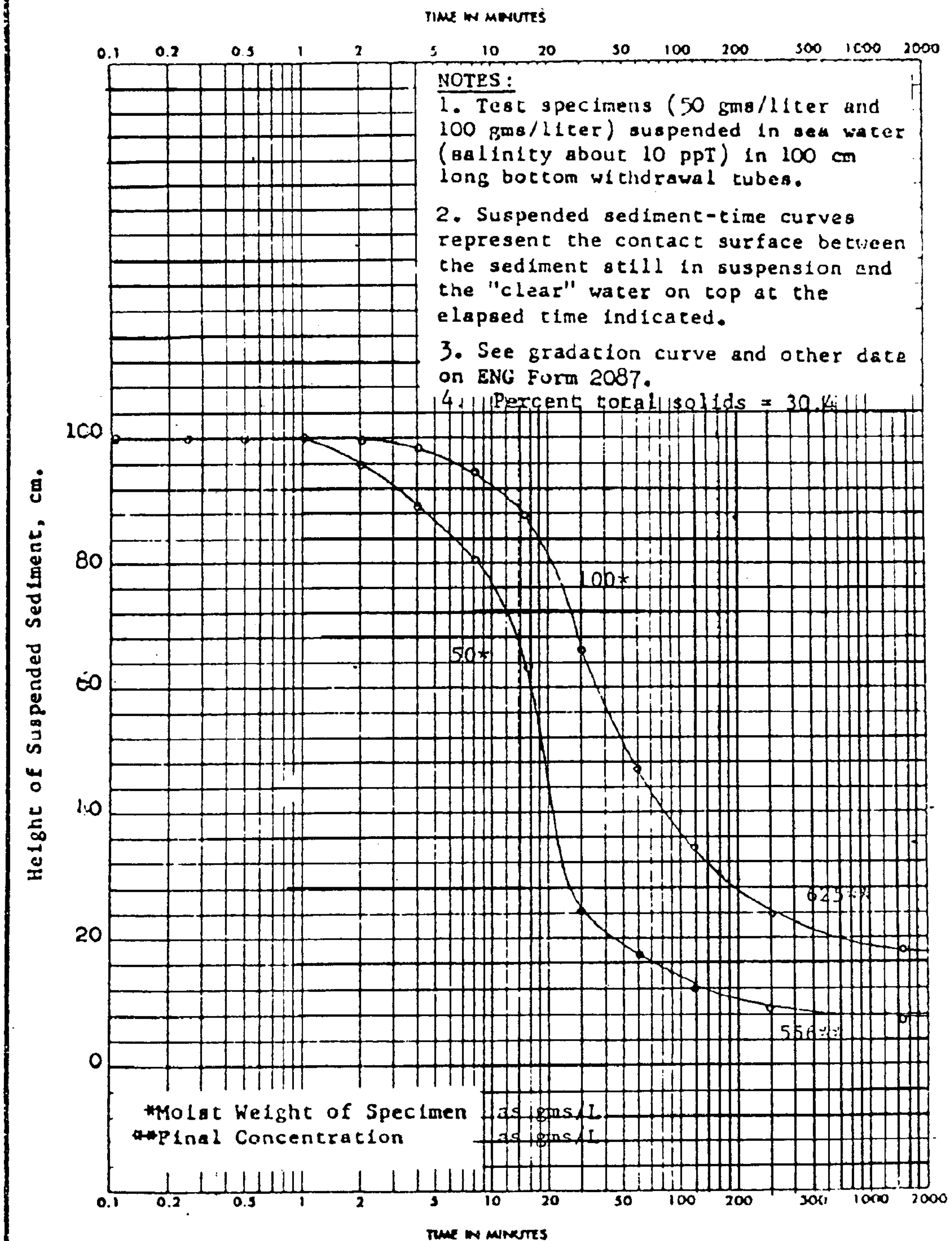
ENG FORM 1 MAY 63 2087

*Chemical Analysis reported on SAD Form 158-R
*Sedimentation Rates reported on SAD Form 3023.

PLATE E-6

Ref. Reqn No. ED-78-1
Reqn. No. 08-123-ENG-14/-78
Work Order No. 1275

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30061



PROJECT Jacksonville District, Port Manatee, Fla.

AREA Between 7" & 8" Bouys Lab. No. 3E-482***

BORING NO.	SAMPLE NO.	DEPTH EL.	DATE
--	--	--	26 June 1978

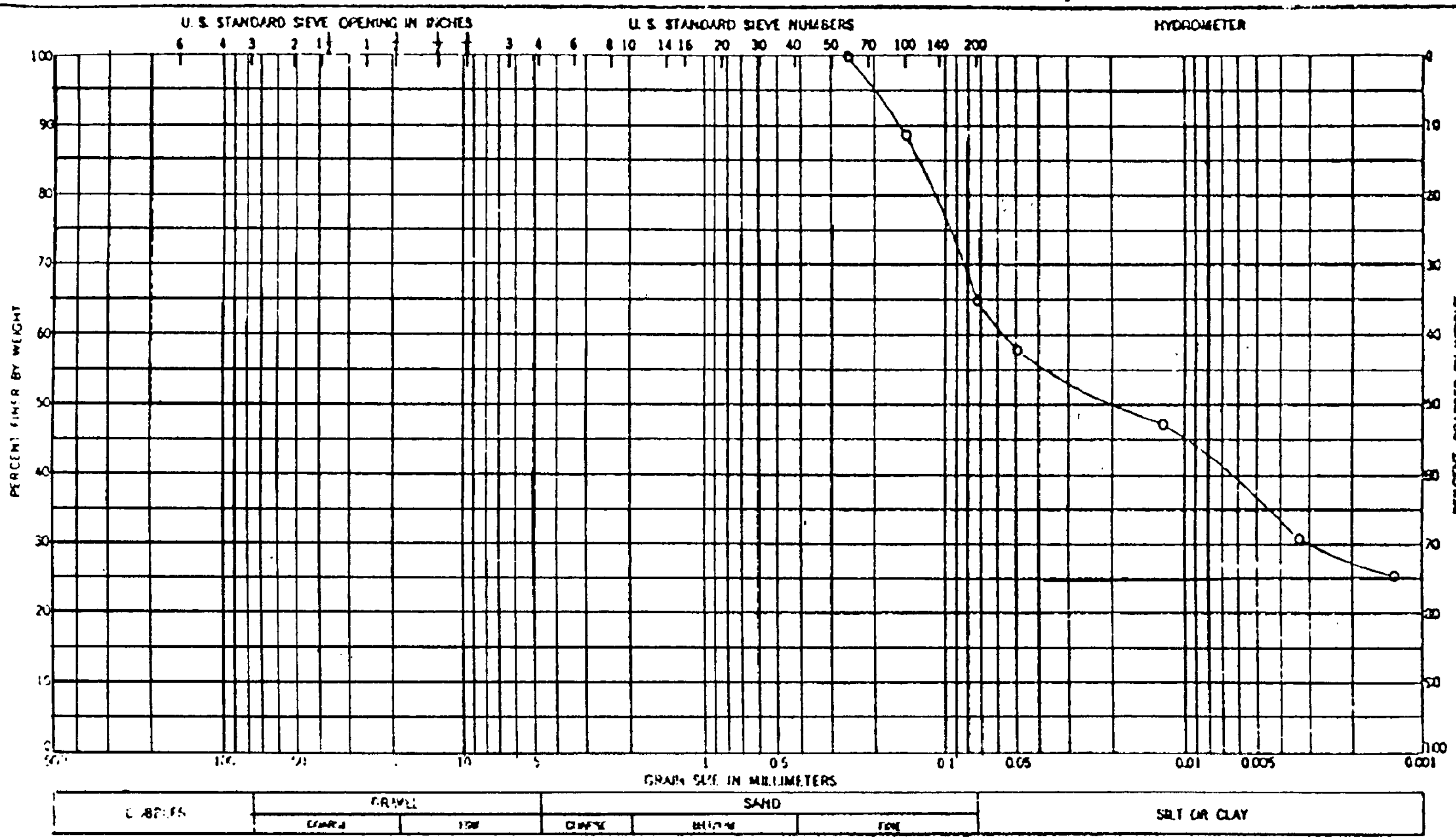
SUSPENDED SEDIMENT-TIME CURVES (TRANSLUCENT)

SAD Form 3023
26 Oct 72

***Chemical Analysis reported on SAD Fm PLATE E-7

CORPS OF ENGINEERS, 611 SOUTH COBB DRIVE, MARIETTA, GA. 30061

Ref. Reqn ED-78-185



Sample No.	Elev or Depth	Classification	Nat w %	LL	PL	PI
		Black fat clay (CH) with some sand	204.9	-	-	-

Project: Jacksonville District, Port Manatee, Florida

Lab. No. 3E-483*

Area: Between 9" & 10" Buoys

Boring No.

Date: 26 June 1978

GRADATION CURVES

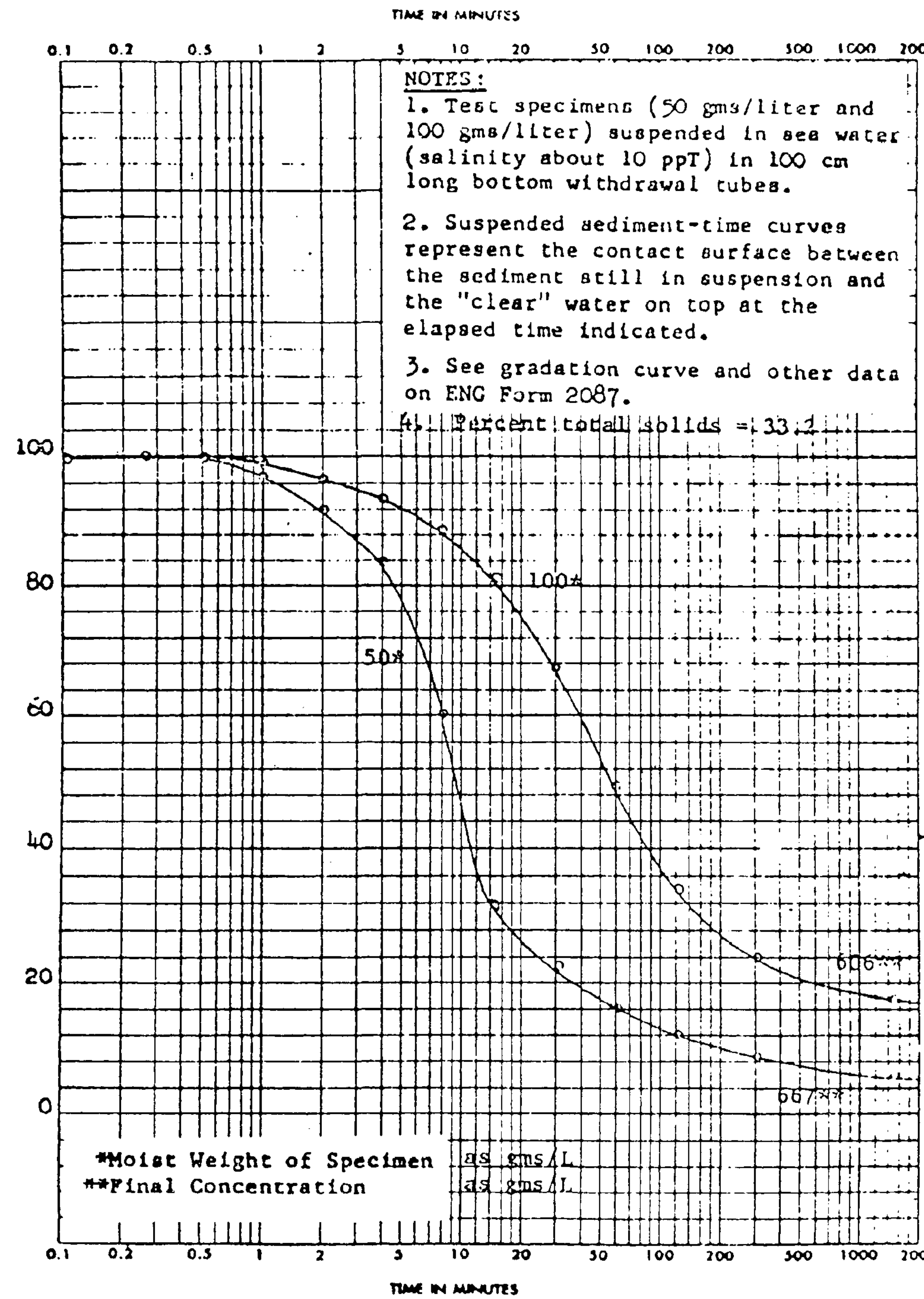
*Chemical Analysis reported on SAD Form 158-R.
*Sedimentation Rates reported on SAD Form 3023.

ENG FORM 1 MAY 63 2087

PLATE E-8

Ref. Reqn No. ED-78-185
Reqn. No. 08-123-ENG-127-78
Work Order No. 1275

DEPARTMENT OF THE ARMY, SOUTH ATLANTIC DIVISION LABORATORY,
CORPS OF ENGINEERS 611 SOUTH COBB DRIVE, MARIETTA, GEORGIA 30061



PROJECT	Jacksonville District, Port Manatee, Fla.		
AREA	Between 9' & 10" Bouys	Lab. No. 3E-483***	
BORING NO. --	SAMPLE NO. --	DEPTH EL --	DATE 26 June 1978

SUSPENDED SEDIMENT-TIME CURVES (TRANSLUCENT)

SAD Form 3023
26 Oct 72

*** Chemical Analysis reported on SAD Form PLATE E-9

U. S. ARMY ENGINEER DIVISION LABORATORY, SOUTH ATLANTIC
CORPS OF ENGINEERS
MARIETTA, GEORGIA

DISTRICT: Jacksonville
PROJECT: Manatee Harbor
CONTRACT NO.:

CORRECTED REPORT*
GENERAL TEST REPORT
(STANDARD ELUTRIATE TEST)

DATE REPORTED: 1 Apr 1977*
WORK ORDER NO.: 0506

DESCRIPTION: Sediment and Water
REQN. NO. 08-123-ENG-79-77
Ref. Reqn. No. 77-144

SOURCE:

FOR USE AS:
DATE SAMPLE RECEIVED: 3-8-77

TESTED FOR: Chemical Analysis (See Below)
LAB NO.: See Below

☐ MEETS SPECIFICATIONS ☐ FAILS SPECIFICATIONS (See below)

Lab. No.		3E357A	3E358	3E357B	3E359
Field Sample No.		Receiving Water Disposal Site	Elutriate CB-MTH-A	Receiving Water Disposal Site	Elutriate CB-MTH-B
Total Organic Carbon	mg/l	7	12	9	9
Nitrogen, Ammonia	"	0.48	8.24	0.19	0.80
Nitrogen, Kjeldahl	"	0.85	8.74	0.54	0.80
Oil and Grease	"	2.5	0.0	2.6	0.0
Total Phosphorus as P	"	0.229	0.362	0.280	0.295
Ortho Phosphorus as P	"	0.222	0.345	0.264	0.175
Lead	ug/l	5.5	7.0	6.0	5.5
Zinc	"	24	15	44	14
Mercury	"	<0.5	<0.5	<0.5	<0.5
Iron	"	18	26	13	8.0
Cadmium	"	0.25*	1.1*	0.5*	0.25*
Arsenic	"	<5	<5	<5	<5
Chromium	"	7	<5	<5	<5
Nickel	"	3	4.5	3.0	3.5
Copper	"	1.7	1.2	1.5	1.3
Beryllium	"	<0.25	<0.25	<0.25	<0.25
Selenium	"	<5	5	<5	<5

REMARKS:
*This corrects cadmium data and supersedes original report dated 31 Mar 1977.

REPORTED BY: ☐ PHONE ☐ WIRE
DATE
TESTED BY: JL, JN, KB, DW
CHECKED BY: DW
SAMPLED BY

SAD FORM 158-R
10 OCT 73
Previous editions of this form are obsolete.

PLATE E-10

U. S. ARMY ENGINEER DIVISION LABORATORY, SOUTH ATLANTIC CORPS OF ENGINEERS MARIETTA, GEORGIA	DISTRICT Jacksonville PROJECT Port Manatee, Florida CONTRACT NO. --
GENERAL TEST REPORT (Standard Elutriate Test)	DATE REPORTED 26 June 1978 WORK ORDER NO. 1275
DESCRIPTION Sediment and Water	REQ. NO. 08-123-ENG-127-7 Ref. Reqn ED-78-185
SOURCE Port Manatee, Florida	BASE UNIT COST --
FOR USE AS:	DATE SAMPLE RECEIVED 1 June 1978
TESTED FOR: Chemical Analysis (see below	LAB NO. See below

☐ MEETS SPECIFICATIONS ☐ FAILS SPECIFICATIONS (See below)

Lab. No.		3W 482	3E 482*	3E 483*
Field Sample No.		Rec. Water	Elutriate Bouy 7 & 8	Elutriate Bouy 9 & 10
Total Organic Carbon	mg/l	7	17	25
Nitrogen, Ammonia	mg/l	0.004	1.20	11.53
Nitrogen, Kjeldahl	mg/l	0.060	0.200	1.50
Oil and Grease	mg/l	1.0	1.1	1.0
Total Phosphorus as P	mg/l	0.028	0.700	2.200
Ortho Phosphorus as P	mg/l	0.027	0.650	1.900
Lead	ug/l	<1	1	<1
Zinc	ug/l	20	18	12
Mercury	ug/l	<0.5	<0.5	<0.5
Iron	ug/l	<5	26	<5
Cadmium	ug/l	0.8	0.2	<0.2
Arsenic	ug/l	<5.0	<5.0	<5.0
Chromium	ug/l	<6	<6	<6
Nickel	ug/l	14	3	2
Copper	ug/l	1	1.2	0.5
Beryllium	ug/l	<0.25	<0.25	<0.25
Vanadium	ug/l	5	4	6

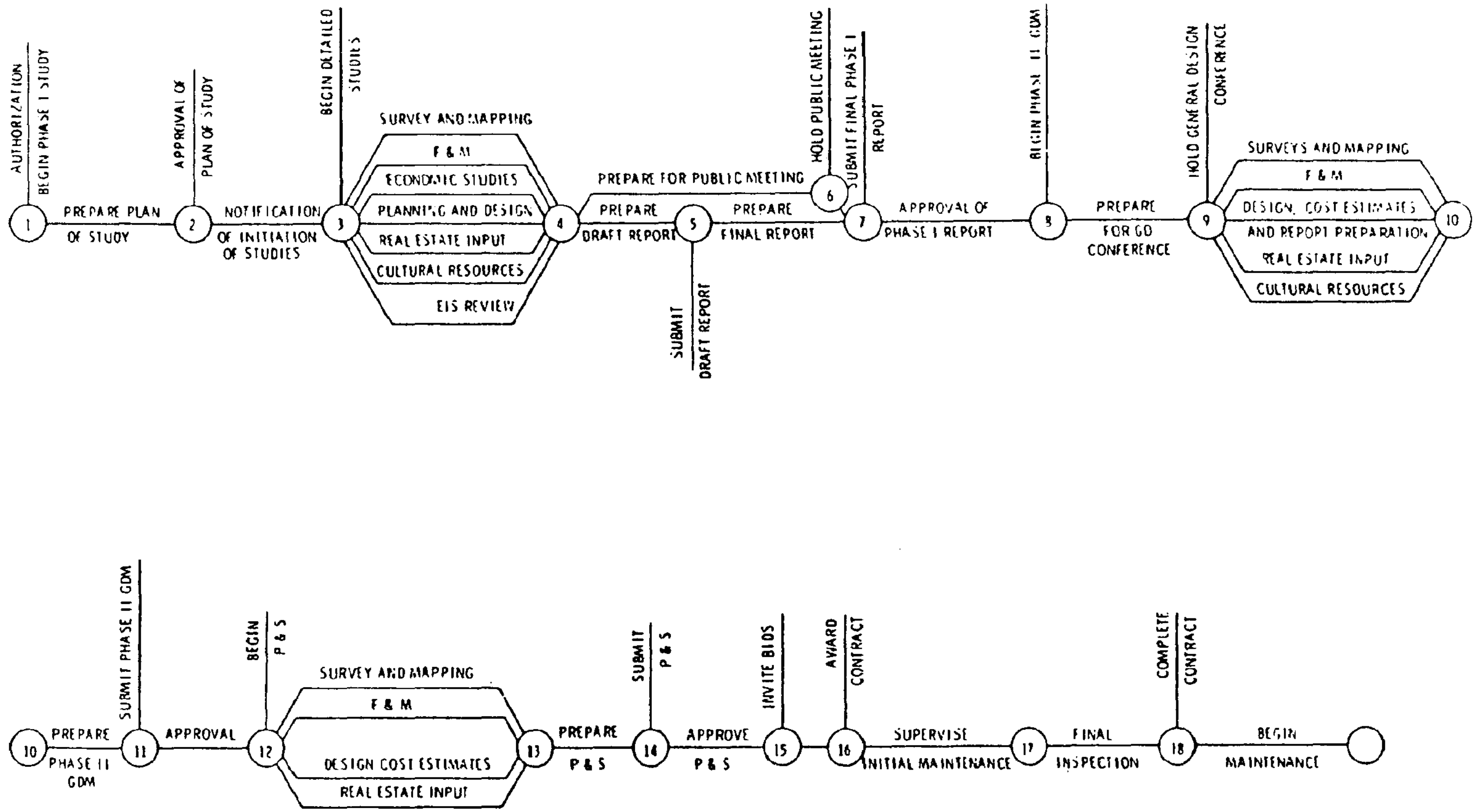
REMARKS:
*See gradation report on ENG Form 2087.
*Sedimentation rates reported on SAD Form 3023.

REPORTED BY: PHONE WIRE DATE	TESTED BY JL, JN, KB, DW	CHECKED BY DW
	SAMPLED BY	

SAD FORM 158-R
10 OCT 73

Previous editions of this form are obsolete

PLATE E-11



LEGEND

STEP	TIME (MONTHS)	FUNDING
1-7	6	54,000
8-11	8	160,000
12-14	6	140,000
15-18	6	450,000

MANATEE, FLORIDA

MANATEE HARBOR CHANNEL MAINTENANCE

CPM FOR AE & D AND CONSTRUCTION

PLATE E-12

FLORIDA DEPARTMENT OF STATE
George Firestone
Secretary of State

DIVISION OF ARCHIVES,
HISTORY AND RECORDS MANAGEMENT
The Capitol, Tallahassee, Florida 32301
(904) 488-1480

June 7, 1982

In Reply Refer To:

Mr. Louis Tesar
Historic Sites Specialist
(904)487-2333

Ms. Jacqueline M. Zaborski, Research Librarian
Gee and Jenson
Engineers, Architects, Planners, Inc.
2090 Palm Beach Lakes Boulevard
Drawer No. 4600
West Palm Beach, Florida 33402

Re: May 13, 1982 Letter and Attachments
Cultural Resource Assessment Request
Port Manatee and Surrounding Areas
Manatee and Hillsborough Counties, Florida

Dear Ms. Zaborski:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Procedures for the Protection of Historic and Cultural Properties"), we have reviewed the above referenced project for possible impact to archaeological and historical sites or properties listed, or eligible for listing, in the National Register of Historic Places. The authorities for these procedures are the National Historic Preservation Act of 1966 (Public Law 89-665) as amended by P.L. 91-243, P.L. 93-54, P.L. 94-422, P.L. 94-458, and P.L. 96-515 and Presidential Executive Order 11593 ("Protection and Enhancement of the Cultural Environment").

A review of the Florida Master Site File indicates that there are 37 archaeological and historic sites within the study area (see attached list and map). However, it should be noted that only the area from Bishop Harbor south has been systematically surveyed for such sites. Thus, the lack of recorded sites along the coast in the area north of Port Manatee is not deemed to indicate a lack of sites, since we would expect numerous presently unrecorded sites to be recorded should a survey be conducted. While a lesser site density is expected for the interior area east of the Seaboard Coast Line, comparing the physiographic locales in which sites 8Ma43, 8Ma49 and 8Ma171 are located leads us to believe that perhaps as many as ten unrecorded sites may be present in the 35-40 comparable locales represented in the area.

We would, therefore, request specific project tract review within the study area outside the Port Manatee tract in order to assess specific project impact potentials. While some areas may have low site probability and would be able to be developed without the need for field checks (such as the NE¼ of the NE¼ of Sec. 12 and the NW¼ of the NW¼ of Sec. 7 - both tracts adjoining the south side of Port Manatee), other areas may be deemed likely to contain presently unrecorded sites and thus need to be subjected to an archaeological and historic site assessment survey before a final evaluation of project impact can be offered. However, you should be aware of the fact that the mangrove area north of Bishops Harbor and containing sites 8Ma13-15, 8Ma147-149 and 8Ma172 is State owned and should be excluded from any proposed development.

With regard to the Port Manatee tract itself, site 8Ma48 is reportedly located near Piney Point (see map attachment). This site was reported in 1954 by W. Plowden. It is described as a burial mound (80' in diameter X 5' high) separated by mangrove from a shell midden (150'X18'), and located in the NE¼ of Sec. 01, T33S-R17E. We have insufficient data to evaluate the significance of this site and recommend that the area in its vicinity be resurveyed to accurately locate and access these features. It may be eligible for listing in the National Register of Historic Places. Development elsewhere within the Port Manatee tract is deemed unlikely to affect any sites listed, or eligible for listing on the National Register and may proceed without further involvement with this agency.

If you have any questions concerning our comments, please do not hesitate to contact us.

Sincerely,

George W. Percy
Deputy State Historic
Preservation Officer

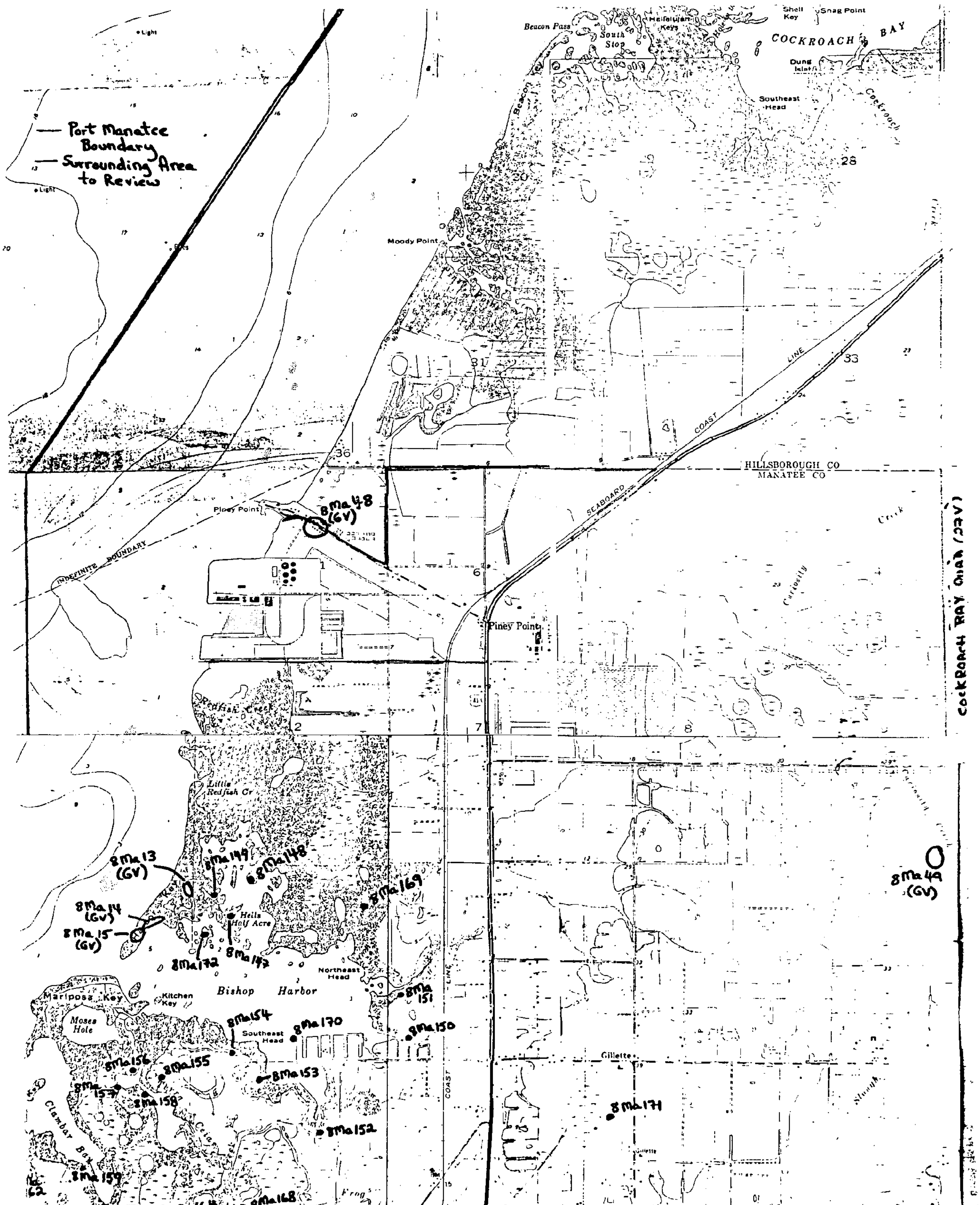
GWP:Teb

Enclosures(2)

SITE NO.	SITE NAME	CULTURAL CLASSIFICATION	FUNCTIONAL CLASSIFICATION
8Hi2	Cockroach Key (National Register)	Prehistoric (Glades II & III)	Burial mound and shell midden
8Ma13	Harbor Key No. 1	Historic (Safety Harbor)	Temple mound
8Ma14	Harbor Key No. 2	Prehistoric	Burial mound
8Ma15	Harbor Key No. 3	Prehistoric	Midden
8Ma43	No Name	Prehistoric	Burial mound
8Ma48	No Name	Prehistoric	Shell & Burial mounds
8Ma49	No Name	Prehistoric	Earthworks
8Ma81	No Name	Prehistoric	Shell deposit
8Ma133	Terry 1	Prehistoric (Glades)	Midden
8Ma134	Terry 2	Prehistoric (Archaic)	Lithic scatter
8Ma135	Terry 3	Prehistoric	Lithic and shell scatter
8Ma147	Hell's Halfacre 1	Prehistoric (Perico Island/Weeden Island/Safety Harbor)	Shell midden
8Ma148	Hell's Halfacre 2	Prehistoric (Perico Island/Weeden Island)	Shell midden
8Ma149	Hell's Halfacre 3	Prehistoric (Perico Island/Weeden Island/Safety Harbor)	Shell midden
8Ma150	Northeast Head	Prehistoric (Weeden Island/Safety Harbor)	Mound & Shell midden
8Ma151	Kersey Midden	Prehistoric	Shell midden
8Ma152	Moses Hole Roadside Midden 1	Prehistoric (Weeden Island/Safety Harbor)	Shell midden
8Ma153	Moses Hole Roadside Midden 2	Prehistoric	Shell midden
8Ma154	Southeast Head	Prehistoric/Historic (Weeden Island/Safety Harbor/Seminole)	Shell midden

SITE NO.	SITE NAME	CULTURAL CLASSIFICATION	FUNCTIONAL CLASSIFICATION
8Ma155	Oaktree Hammock	Prehistoric (Perico Island/ Weeden Island)	Shell midden
8Ma156	Moses Hole Exit Canal Midden	Prehistoric/Historic (Weeden Island/Safety Harbor/ 19th Century American)	Shell midden
8Ma157	Campsite Midden	Prehistoric	Shell midden
8Ma158	Handaxe	Prehistoric	Lithic scatter and shell midden
8Ma159	Clambar Hammock	Prehistoric	Shell midden
8Ma160	William Bayou 1	Prehistoric (Weeden Island)	Shell midden
8Ma161	William Bayou 2	Prehistoric	Shell midden
8Ma162	William Bayou 3	Prehistoric	Shell midden
8Ma163	Terra Ceia River 1	Prehistoric	Shell midden
8Ma164	Terra Ceia River 2	Prehistoric/Historic (Ceramic/ 19th century American)	Midden
8Ma165	Terra Ceia River 3	Prehistoric/Historic	Midden
8Ma166	Terra Ceia River 4	Prehistoric/Historic (Indeterminate/19th century American)	Midden
8Ma167	Terra Ceia River 5	Prehistoric	Shell midden
8Ma168	Devil's Elbow	Historic (19th & 20th century American)	Shell midden
8Ma169	Northeast Head Hammock	Prehistoric	Shell midden
8Ma170	Burger Fill	Prehistoric (Archaic)	Shell midden
8Ma171	Gillette Bayhead	Prehistoric	Dirt mound and shell scatter
8Ma172	Hell's Halfacre 4	Prehistoric	Shell midden

Prehistoric	-	30	sites
Historic	-	2	sites
Prehistoric/Historic	-	5	sites
Total		37	



— Port Manatee Boundary
— Surrounding Area to Review
COCKROACH BAY
Beacon Pass
South Stop
Shell Key
Snag Point
Dung Islet
Southeast Head
Moody Point
HILLSBOROUGH CO
MANATEE CO
Piney Point
INDEFINITE BOUNDARY
SEABOARD
COAST LINE
Redfish Creek
Little Redfish Cr
Hells Half Acre
Northeast Head
Bishop Harbor
Mariposa Key
Kitchen Key
Moses Hole
Southeast Head
Clambar Bay
Gillette
Frog Creek
Cabbage
Slough
COCKROACH BAY QUAD (22V)
8Ma48 (GV)
8Ma13 (GV)
8Ma14 (GV)
8Ma15 (GV)
8Ma149
8Ma148
8Ma169
8Ma172
8Ma147
8Ma151
8Ma154
8Ma170
8Ma150
8Ma156
8Ma155
8Ma153
8Ma157
8Ma158
8Ma152
8Ma171
8Ma159
8Ma164
8Ma168
8Ma163
8Ma165
8Ma167
8Ma166
8Ma49 (GV)
8Ma43 (GV)

AF-5

ARCHAEOLOGICAL
CONSULTANTS
INCORPORATED

POST OFFICE BOX 5103 · TELEPHONE (813) 349-2190 · SARASOTA, FLORIDA 33579
(813) 531-2152 · CLEARWATER, FLORIDA
(813) 349-1821 answering service

Mr. J. Scott Benyon
Gee & Jensen Engineers
Drawer No. 4600
West Palm Beach, FL 33402

November 26, 1982

Dear Mr. Benyon:

The following letter report is submitted in response to our agreement for a background review and field reconnaissance survey to determine whether or not prehistoric site 8-Ma-48 exists upon any portion of the property owned by the Manatee County Port Authority within the NE¼ of Section 1, Township 33 South, Range 17E. As a result of this effort no archaeological or historical sites were located. Further, it is the opinion of ACI that development of the Port Manatee Tract is unlikely to affect sites listed in or eligible for listing in the National Register of Historic Places.

Background. As requested in Mr. Percy's letter of June 7, 1982 (G. Percy to J.M. Zaborski) a "specific project tract review within the study area outside of the Port Manatee tract" (figure 1) was conducted "...in order to assess specific project impact potentials." In addition, a review of specific data regarding the Port Manatee tract itself was conducted to help determine more precisely the whereabouts of 8-Ma-48, the shell midden and burial mound in question.

The specific project tract review was greatly facilitated by prior completion of a thorough background review of cultural resources contained within a five mile radius of the proposed W.C. MacInnes Station site, located immediately to the north of the Port Manatee tract. This preliminary assessment and later field reconnaissance was conducted by the authors in working association with the firm of Piper Archaeological Research, Inc. (Piper et.al. 1982). Since the boundaries of the Port Manatee study area are roughly identical to those for the W.C. MacInnes project area, the data contained in this earlier study were most useful.

Combining both the MacInnes and Port Manatee study areas, a total of 46 prehistoric and historic sites have been previously recorded in this larger zone. This total figure includes the three aboriginal sites (8-Hi-1054, -1055, -1056) located as a result of the W.C. MacInnes project survey. In general, over three-fourths of the sites in the study sample are situated along the coast at Bishop Harbor and Terra Ceia Island immediately to the south. The majority of these are multi-component shell middens, dating to the Manasota, Weeden Island and/or Safety Harbor periods. The high density of cultural resources located in this coastal zone, while clearly reflecting the geographical biases of previous archaeological investigators, probably also provides a good estimate of the actual number of archaeological sites present in this locality. North of Port Manatee, in the Cockroach and Little Cockroach Bay area, on the other hand, the true archaeological potential of this coastal sector has not yet begun to be tapped. Based on data from environmentally similar areas, at least a dozen new prehistoric sites could probably be predicted. The Port Manatee tract, which occupies an intermediary position between Cockroach Bay and Bishop Harbor, is not believed to have such a high site location potential. Recent intensive, systematic reconnaissance and subsurface testing along the coast from Piney Pine Road north to the salt barrens just south of Piney Point Creek (Piper et.al. 1982), due north of Port Manatee, revealed a complete absence of prehistoric or historic period cultural materials and/or remains.

The review of specific data regarding the whereabouts of the burial mound and shell midden in question revealed that 8-Ma-48 had apparently been recorded twice - at two different locations. Two sources, a University of Florida Archaeological Site Survey Form compiled by William Plowden in 1954 and a map at the South Florida Museum in Bradenton attributed to Plowden (Burger 1982:68), place the location of 8-Ma-48 in the general vicinity of the NE¼ of Section 1, Township 33South, Range 17 East. However, further literature research disclosed that Montague Tallant, an amateur archaeologist active in Manatee County in the 1930s-1950s, had previously located a similarly described sand burial mound and nearby shell ridge on Harbor Key, in Section 14, Township 33South, Range 17 East (figure 3) south of Port Manatee (Burger 1982:69). Apparently, "...Plowden, a University of Florida graduate student, conferred with Tallant in the early 1950's in order to record the numerous sites of which he was aware. But a curious anomaly exists....While the Tallant map contains 90 specific, numbered points, the Plowden map (figure 2) mostly delineates site locations by shaded quarter sections. Site locations do not correlate between the two maps" (Burger 1982:68).

Additional support for the actual location of the components of 8-Ma-48 at Harbor Key was found in an article about the Harbor Key site. Professional archaeologist Ripley Bullen, recorded "...a low burial mound, built of sand, about forty feet in diameter" adjacent to a shell ridge "...somewhere near the ... ramp of the (Harbor Key) temple mound (Bullen,Reeder, Bell and Whisenant 1952). This site on Harbor Key, designated 8-Ma-14 (burial mound) and 8-Ma-15 (shell midden) in the Florida Master Site File in Tallahassee, was recently described as one of "...eleven sites... found to have multiple designations...in Manatee County" (Burger 1982:72). Burger, then a graudate student at the University of South Florida, noted that his extensive research disclosed that 8-Ma-48 was actually part of previously recorded sites 8-Ma 13 and 14 (1982:71). Burger suggests that some of the discrepancy causing multiple designations for sites and different locations may have been due to the fact that Dr. John Goggin, a professor at the University of Florida, "... advised his graduate students to conceal exact location information so as to discourage site vandalism..." Burger adds that "Due to the above practices, poorly described and located sites were often repeatedly 'discovered' and added to the Master Site Files" (Burger 1982:68-69).

Thus, the background research revealed that not only was there a distinct possibility that 8-Ma-48 was never located near Port Manatee, but also that the probability of encountering any prehistoric sites in the Port Manatee tract was negligible.

Field Survey. Fieldwork entailed a systematic survey of portions of the NE¼ of Section 1, Township 32 South, Range 17 East for the purpose of accurating locating and assessing site 8-Ma-48. Since that part of the NE¼ of Section 1 located north of Piney Point Road was recently subjected to an intensive archaeological survey with negative results (Piper et.al. 1982), this acreage was excluded from the Port Manatee tract survey. Rather, the remainder of the NE¼ of Section 1 lying south of Piney Point Road was the focus of investigation.

Field survey involved a walk-over and ground surface inspection of the property. In addition, a series of shovel tests were judgementally placed, and all soil recovered was screened through one-quarter inch mesh. Surface survey and subsurface testing revealed disturbance of varying degrees throughout the property. Specifically, to the east of Reeder Road agricultural land uses resulted in an upper disturbed plow zone level extending approximately 30 to 50 centimeters below ground surface. Similarly, to the west of Reeder Road, excavation of drainage ditches, railroad construction, dumping, vehicle passage, and other activities related to the development and maintenance of the port similarly resulted in a disturbed upper soil zone. In general, the survey area was characterized by level, poorly drained sands. Ground surface visibility was poor, except in that portion of the tract recently cleared and prepared for cultivation.

As a result of field survey no remains of the burial mound or shell midden were located. Further, no previously unrecorded sites were found, nor were any finds of isolated cultural materials made.

Conclusions. On the basis of background investigation and field survey it is the opinion of the authors that site 8-Ma-48 is not presently, nor never was located in any part of the NE¼ of Section 1, Township 32 South, Range 17 East. It is believed that the site locational data provided by Plowden is in error. Additionally, we concur with Burger that the burial mound and shell midden complex now recorded as 8-Ma-48 is actually the same as two sites previously recorded on Harbor Key. However, we wish to point out that in correcting for this multiple site designation Burger apparently errs in correlating 8-Ma-48 A and B with 8-Ma-13 and 8-Ma-14, a temple mound and burial mound respectively. We believe that Burger meant to use 8-Ma-14 and 8-Ma-15, a burial mound and shell midden respectively.

In conclusion, development of the Port Manatee facilities in the NE¼ of Section 1 will have no adverse impact on significant cultural resources.

Sincerely,

Marion M. Almy

Marion M. Almy, M.A.
President

Joan Deming

Joan Deming, M.A.
Vice President

cc: Louis Tesar

Figure 1. Location of Port Manatee and study area noted by Florida Division of Archives, History and Records Mgt. (Percy 1982).

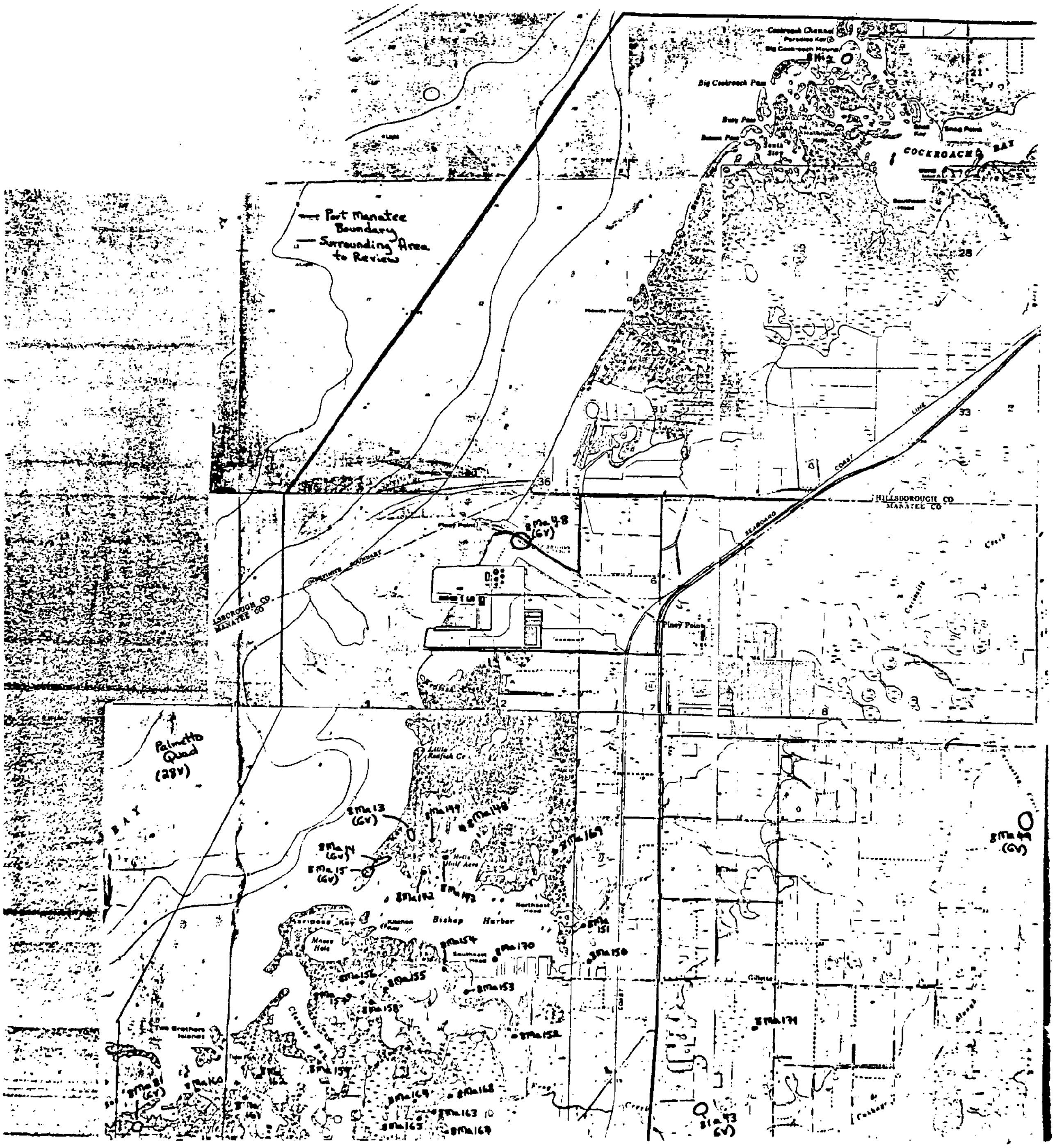
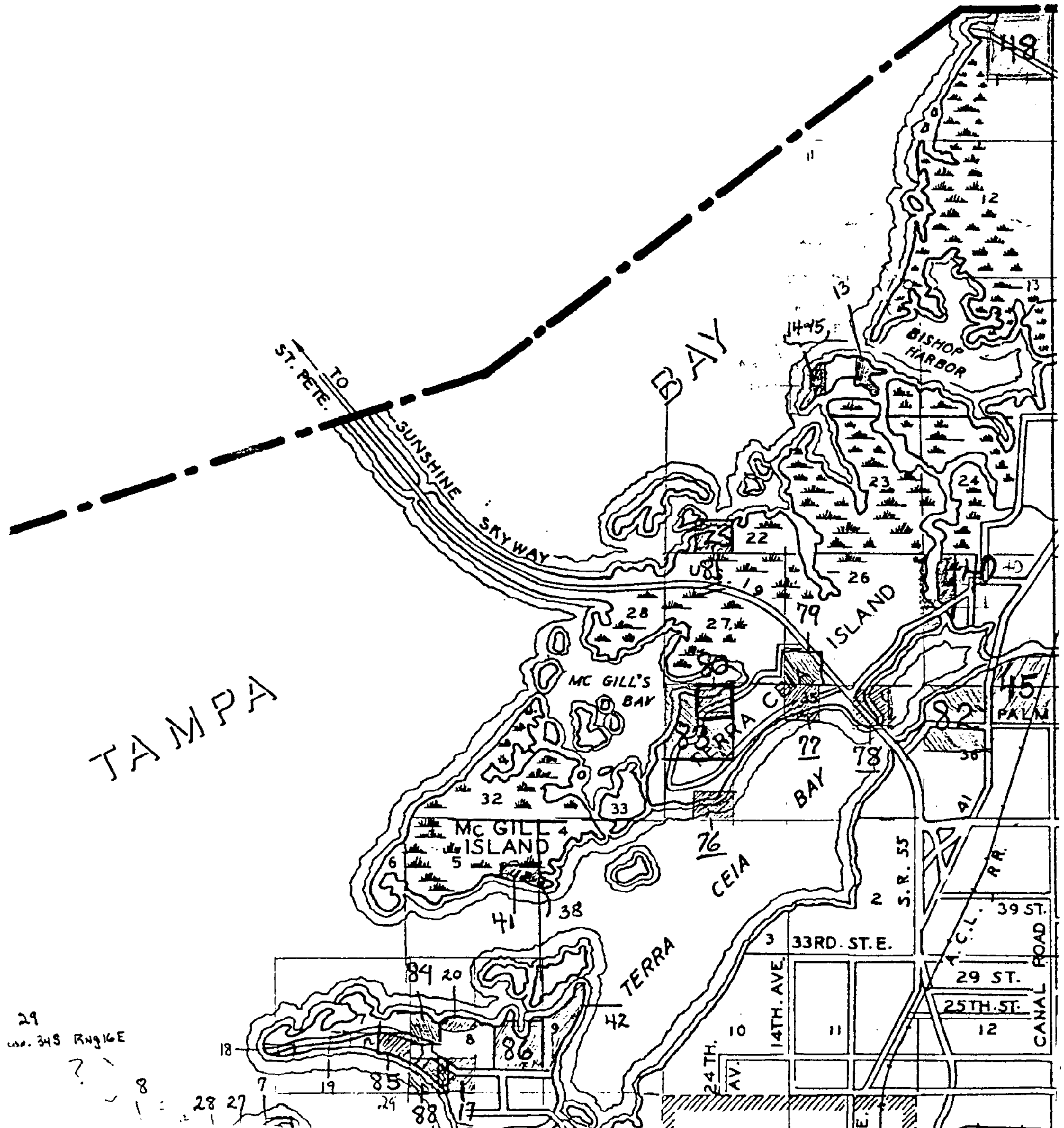
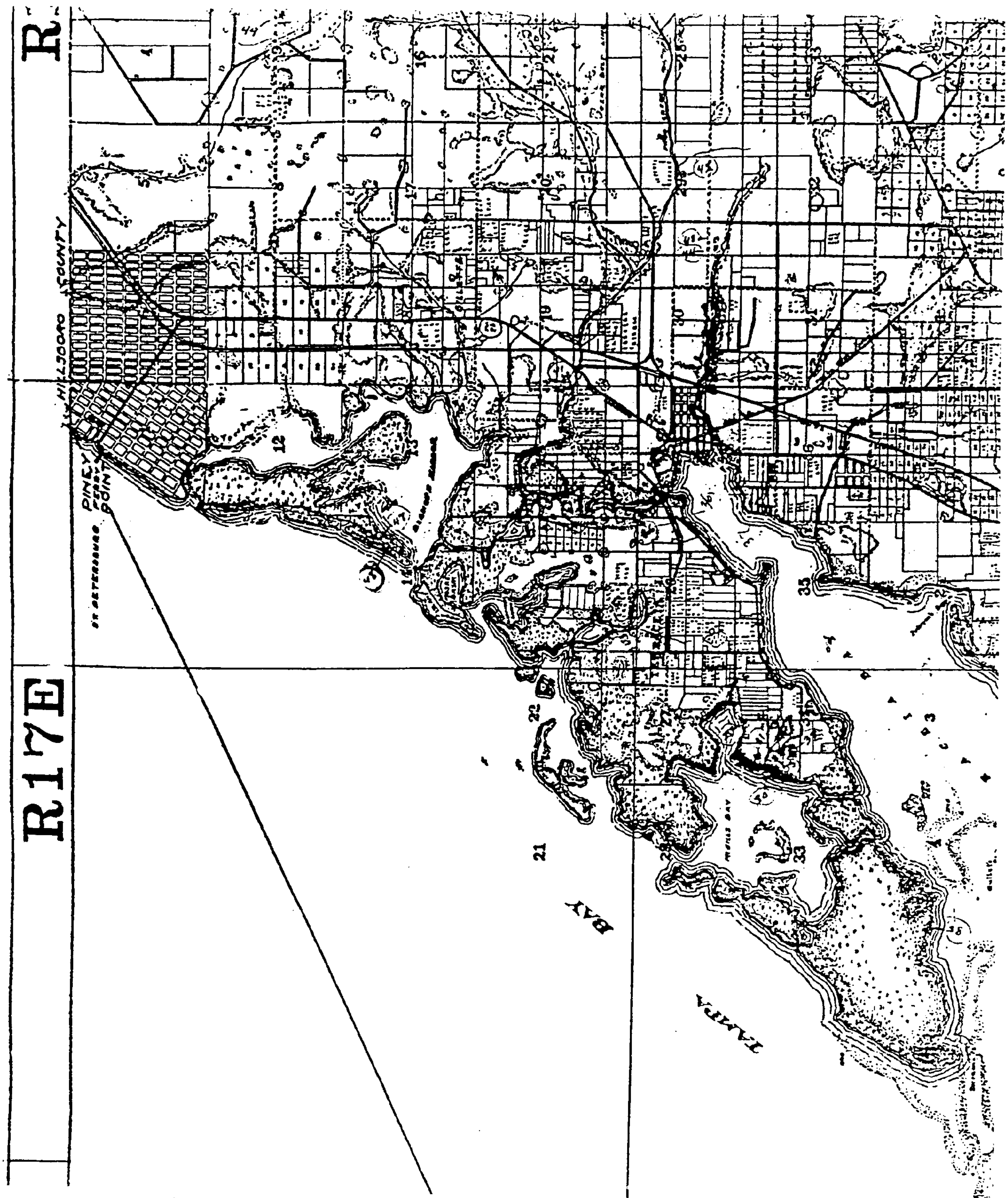


Figure 2. Portion of map attributed to William Plowden at South Florida Museum showing approximate location of 8-Ma-48 (noted in red).





Florida Museum showing approximate location of 8-Ma 13,14, and 15 (noted in red).

REFERENCES CITED

Bullen, Ripley P., Graham R. Reeder, Bonnie Bell and Blake Wisenant
1952 The Harbor Key Site, Manatee County, Florida. Florida Anthropologist 5:21-23.

Burger, B.W.
1979 Man in the Coastal Zone: Bishop Harbor/Terra Ceia Island, Manatee County, Florida. Baccalaureate thesis on file, New College Library, Sarasota.
1982 Cultural Resources Management in Manatee County, Florida: The Prehistoric Resource Base. Masters thesis on file, University of South Florida Library, Tampa.

Percy, George W.
1982 Letter dated June 7, 1982 to Ms. Jacqueline M. Zaborski, Gee and Jenson Engineers, West Palm Beach, Florida.

Piper, Harry M., Joan G. Deming, Marion M. Almy, Kenneth W. Hardin, Jacquelyn G. Piper and Mark M. Thomsen
1982 Archaeological and Historical Survey of the Proposed W.C. MacInnes Station Site and Transmission Line Corridors in Hillsborough and Manatee Counties, Florida. Manuscript on file, Archaeological Consultants, Inc., Sarasota.

REFERENCES

Chapter 1

Alvarado, Alex, Minerals Management Service, Metairie, Louisiana. Oral communication, April 1982.

Beasley, Fred, Minerals Management Service. Oral communication, April 1982.

Bureau of Land Management, December 1980, Final Environmental Impact Statement, OCS Oil and Gas Proposed 1981 Sales A66 and 66.

Florida Coastal Policy Study: Impact of Offshore Oil Development. A report submitted to the Florida Energy Office and the State University system of Florida, by the Department of Urban and Regional Planning, the Florida State University and the Department of Geography, University of South Florida. December 1975.

Kash, Don E., Energy Under the Oceans. University of Oklahoma Press, Norman Oklahoma, 1973.

New England River Basins Commission (NERBC), Onshore Facilities Related to Offshore Oil and Gas Development. Boston, Massachusetts, November 1976.

Chapter 2

Dalhousie Ocean Studies Programme, Volume 2, Issue 2, May 1982. New Directions in Ocean Law, Policy and Management. "Coastal Communities: Continuity and Change." Dalhousie University, Halifax, Nova Scotia.

Department of Urban and Regional Planning, The Florida State University and Department of Geography, University of South Florida. Final Report, "Florida Coastal Policy Study: the Impact of Offshore Oil Development", December 1975. Reston, Virginia.

Havran, Kenneth J., Gulf of Mexico Summary Report 2, August 1981. Prepared for the U.S. Department of the Interior, U.S. Geological Survey, U.S.G.S. Open-File Number 81-620.

New England River Basins Commission, "Estimates for New England", November 1976. Boston, Massachusetts.

New England River Basins Commission, Onshore Facilities Related to Offshore Oil and Gas Development, "Factbook", November 1976. Boston, Massachusetts.

Research and Planning Consultants, Inc., for Texas Coastal Management Program, "Offshore Oil: Its Impact on Texas Communities", Volume II, Local Impact Scenarios. June 1977, Austin, Texas.

Kash, Don E. and others, Energy Under the Oceans, University of Oklahoma Press, 1973.

Alaska Consultants, Inc., Marine Service Bases for Offshore Oil Development, prepared for the Alaska Department of Community and Regional Affairs, July, 1976.

Chapter 3

Port Manatee Engineers Annual Inspection Report. Gee & Jenson Engineers, Architects, Planners, Inc., June 1982.

Port Manatee Master Development Plan Update. Post, Buckley, Schuh & Jernigan, Inc., November 1981.

Manatee Harbor Channel Maintenance, Feasibility Report. U.S. Army Corps of Engineers, December 1978.

Port Manatee Engineers Annual Inspection Report. Gee & Jenson Engineers, Architects, Planners, Inc., June 1982.

Port Manatee Master Development Plan Update. Post, Buckley, Schuh & Jernigan, Inc., November 1981.

Manatee Harbor Channel Maintenance, Feasibility Report. U.S. Army Corps of Engineers, December 1978.

Chapter 5

Tampa Electric Company, Ten Year Site Plan for Electrical Generating Facilities and Associated Transmission Lines April 1, 1980.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, Aerial Surveys for Manatees and Dolphins in Western Peninsular Florida Biological Services Program, FWS/OBS-80/50, April, 1981.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, Rare, Threatened and Endangered Plant Species of Southwest Florida and Potential OCS Activity Impacts, Biological Services Program, FWS/OBS 81-50, November, 1981.

Ward, Daniel B., Rare and Endangered Biota of Florida: Plants, University Presses of Florida, 1978.

U.S. Department of Commerce and Florida Office of Coastal Management, The Florida Coastal Management Program, Final Environmental Impact Statement, August, 1981.

Conservation Consultants, Inc., Atmospheric Particulate Study, Port Manatee, August, 1978.

Manatee County Board of County Commissioners, The Manatee Plan - Policy Document, October, 1981.

Florida Department of Commerce, Directory Florida Ports and Waterways, 1973, 1973.

Post, Buckley, Schuh and Jernigan, Inc., Master Development Plan Update, Manatee County Port Authority, (Port Manatee), November, 1981.

Department of the Army, Corps of Engineers, Feasibility Report, Manatee Harbor, Manatee Harbor Channel Maintenance, Main Report, 1979.

Conservation Consultants, Inc., Upland Dredge Spoil Evaluation, Manatee County Port Authority, 1977.

Conservation Consultants, Inc., A Survey of Vegetation Associations, Port Manatee Area, Manatee County, Florida, October, 1980.

Manatee County Health Department, Water Quality Program, yearly Report, 1981, 1981.

Manatee County Health Department, Air Quality Program, Yearly Report, 1981, 1981.

Florida Department of Natural Resources, Florida Administrative Code; Chapter 16Q-20, 1981.

Florida Department of National Resources, Florida Statutes; Chapter 258, 1979.

Florida Department of Environmental Regulation, Florida Administrative Code; Chapter 17-3, 1981.

Manatee County Planning and Development Department, Future Land Use Element, Executive Summary, 1981.

City of Tampa, Department of Public Works, Tampa Nationwide Urban Runoff Program, Phase I, Final Report, 1981.

Ardaman & Associates, Inc., Piezometer Installation at Port Manatee, Manatee County, Florida, March, 1982.

Florida Department of Environmental Regulation, Deepwater Ports Project Spring Sampling Results, 1982.

Greiner Engineering Services, Inc. Pier Protection System for Sunshine Skyway Bridge Replacement, March, 1982.

Chapter 6

Ditton, Robert B., and Stephens, Mark. Coastal Recreation : A Handbook for Planners and Managers; Executive Summary. Washington, D.C. : U.S. Office of Coastal Zone Management, 1976.

Fernald, Edward A. Atlas of Florida. Tallahassee : Florida State University Foundation, Inc., 1981.

Florida. [Laws]. Official Florida Statutes, 1981. Tallahassee : State of Florida, Law Book Distribution Office, 1981.

Florida. Division of Recreation of Parks. Outdoor Recreation in Florida, 1981. Tallahassee : Florida Dept. of State, 1981.

Manatee County Board of County Commissioners. The Manatee Plan : Policy Document; Ordinance 80-4. Bradenton, Fl., Manatee County Board of County Commissioners, 1981.

U.S. Dept. of Commerce. Office of Coastal Zone Management. The Florida Coastal Management Program : Final Environmental Impact Statement. Washington, D.C. : U.S. Dept. of Commerce, 1981.

Franzen, Raleigh. Florida League of Anglers, Inc., Boca Raton, Florida. Interview, 10 June 1982.

Froemke, Richard. Supervisor of Recreation Services, Florida Division of Recreation and Parks, Tallahassee, Florida. Interview, 15 June 1982.

Gaske, Frederick A. Florida Division of Archives, History and Records Management, Tallahassee, Florida. Interviews, 23 May 1982, 18 June 1982, 30 June 1982.

Goddard, A.J. Local resident for 36 years. Interview at Piney Point, 19 June 1982.

Harding, Lt. Richard. Florida Marine Patrol, District #9, Bradenton, Florida. Interview, 23 June 1982, 14 July 1982.

Long, John. Tackle Box (fishing and diving supplies), Sarasota. Interview, 14 July 1982.

MacDonald, Dave. Manatee County Port Authority, Manatee County, Florida. Interviews, 25 June 1982, 18 July 1982.

Ocean Pro Dive Shop, Sarasota, Florida. Interview, 14 July 1982.

Pascuzzi, Mike. Manatee County Recreation and Parks Dept., Bradenton, Florida. Interview, 18 June 1982.

Ranelli, Mrs. Tampa Sailing Squadron, Apollo Beach, Florida. Interview, 15 June 1982.

Chapter 11

Comptroller General of the United States. Report to the Congress of the United States: Impacts of Regulations - On Outer Continental Shelf Oil and Gas Development, February 27, 1981

Manatee County Planning Department. Manatee County Comprehensive Plan, Bradenton, Florida. 1980.

Tampa Bay Regional Planning Council. Coastal Energy Facilities Siting Study, St. Petersburg, Florida. 1982.

Tampa Bay Regional Planning Council. Future of the Region, (amended). St. Petersburg, Florida. 1981.

NOAA COASTAL SERVICES CENTER LIBRARY
3 6668 14103 6642