

APPENDIX D

FISH AND WILDLIFE COORDINATION ACT REPORT

AND

BIOLOGICAL OPINION

**FISH AND WILDLIFE COORDINATION ACT REPORT
ON MANATEE HARBOR
MANATEE COUNTY, FLORIDA**

**Submitted to:
Department of the Army
Jacksonville District
Corps of Engineers
Jacksonville, Florida**



**U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Vero Beach, Florida**

November 1991



United States Department of the Interior

FISH AND WILDLIFE SERVICE

P.O. BOX 2676

VERO BEACH, FLORIDA 32961-2676

November 18, 1991

Colonel Terrence C. Salt
District Engineer
U.S. Army Corps of Engineers
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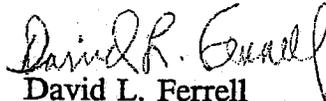
Attn: Planning Division

Dear Colonel Salt:

In accordance with the Fiscal Year 1991 Transfer Fund Agreement between The U.S. Fish and Wildlife Service (Service) and the Jacksonville District Corps of Engineers (Corps), this represents the Final Fish and Wildlife Coordination Act Report on Manatee Harbor, Manatee County, Florida, Navigation Control Project. The Corps has requested an evaluation of the environmental effects of dredging 7.5 acres of shallow bay bottom including 2.1 acres of seagrass for a turning basin. This information is needed to enable the Corps to reformulate and evaluate the authorized project to assure that it conforms to current environmental needs and criteria.

Letters of concurrence have been received from the Florida Game and Fresh Water Fish Commission and the National Marine Fisheries Service and are included in the Attachments section of the report. This report constitutes the final report of the Secretary of the Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act (16 U.S.C. 1531 et seq.) and represents the views of the Department of the Interior.

Sincerely Yours,


David L. Ferrell
Field Supervisor

cc:

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**FISH AND WILDLIFE COORDINATION REPORT
ON MANATEE HARBOR
MANATEE COUNTY, FLORIDA**

**Submitted to:
Department of the Army
Jacksonville District
Corps of Engineers
Jacksonville, Florida**

**Prepared by:
Bruce Birnhak
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Vero Beach, Florida
November 1991**

EXECUTIVE SUMMARY

As part of the expansion of Manatee Harbor, Manatee County, Florida, the Corps of Engineers (Corps) proposes to dredge a turning basin which would directly impact an additional 0.9 acres of shallow bottom of Tampa Bay. The Fish and Wildlife Service (Service) conducted a biological survey of the project area to determine what flora and fauna inhabit the area.

The original Corps proposal was to dredge a turning basin which would impact an area of 6.6 acres of shallow bay bottom including 2.4 acres of seagrass beds. The proposed new Corps plan is to dredge 7.5 acres of shallow bay bottom including 2.1 acres of seagrass for a turning basin. This would impact an additional .9 acres of bay bottom than in the original turning basin proposal. The Service determined that significant numbers of fish and invertebrate species occur within the new proposed dredging area.

Because the proposed project expansion would impact a relatively small area causing a loss of seagrass .3 acres less than originally proposed, the Service has determined the proposed project would not cause significant damage to Tampa Bay if adequate mitigation is performed. The Service's recommended mitigation plan, developed in accordance with the Fish and Wildlife Service Mitigation Policy, includes: 1) lowering an additional 1.37 acres of a spoil island to an elevation of minus 2 feet mean low water to create shallow water habitat, 2) twelve-inch long wooden stakes, spaced one meter apart, should be buried in the newly exposed substrate of the mitigation area to a depth of 8 inches, as discussed in Mr. Peter Clark's publication "Seagrass Restoration: A Non-Destructive Approach", 3) the mitigation area should be monitored for grass recruitment. Monitoring should be conducted during the initial 6 months and then at one year intervals, every year thereafter for 3 years, 4) the mitigation plan should be implemented concurrently with the start of the Corps project, 5) alternative mitigation should be provided in the event that seagrasses do not colonize the created subtidal areas (one possible alternative would be planting intertidal saltmarsh at the mitigation site on a 2.0 for 1.0 ratio), 6) the use of silt screens during all dredging and blasting operations to avoid impacting adjacent grassbeds, 7) the Service would be strongly opposed to spoiling materials from this project on any of the designated Tampa Bay spoil islands unless it can be accomplished in a manner that would not be disruptive or harmful to the shore and wading birds utilizing the islands, and, 8) the Corps should closely coordinate this project with the Tampa Bay Surface Water Improvement and Management (SWIM) program, and the Tampa Bay National Estuary Program to identify, and protect against any possible conflict in goals.

The Corps has satisfied their obligations under Section 7 of the Endangered Species Act, as amended, regarding effects of dredging and blasting operations on the endangered West Indian manatee.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Letter of Transmittal	i
Executive Summary	ii
Table of Contents	iii
List of Figures	iv
List of Tables	iv
Purpose, Scope and Authority of Study	1
Prior Studies and Reports	1
Description of the Study Area	1
Fish and Wildlife Service Planning Objectives	3
Evaluation Methods	3
Description of Fish and Wildlife Resources	3
Existing Conditions	3
Future Without the Project	6
Description of Plan Evaluated by the Service	6
Description of Impacts	6
Evaluation of the Selected Plan	9
Discussion and Justification of Fish and Wildlife Conservation Measures	9
Recommendations	10
Summary and Conclusions	10
Literature Cited	12
Attachments	13

LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1	Manatee Harbor Project	2
2	Underwater Photographs Taken at Location of Turning Basin Showing Dense Seagrass Beds	4
3	Seagrass Areas in Vicinity of Proposed Dredging for Turning Basin Relocation	7

LIST OF TABLES

<u>Number</u>		<u>Page</u>
1	Whole Wet Weight of Seagrass at Turning Basin	3
2	Fish Species Caught in a Seine at the Turning Basin Site	5
3	Invertebrate Species Observed While Snorkeling at Location of Turning Basin	5
4	Impact of Turning Basin Construction on Shallow Bay Bottoms and Seagrass Beds	8

PURPOSE, SCOPE AND AUTHORITY OF STUDY

The purpose of the Corps' study is to gather information for preparation of an Environmental Assessment concerning changes to the original navigation project, caused by the "Post-Authorization Change Report for Manatee Harbor, Florida". The study was authorized by the 1986 Water Resources Development Act (PL 99-662), dated November 17, 1986.

This Fish and Wildlife Coordination Act Report evaluates the impact of the proposed dredging modifications on fish and wildlife resources. Our comments are submitted in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Endangered Species Act of 1973, as amended. This report once coordinated with the National Marine Fisheries Service and the Florida Game and Fresh Water Fish Commission will constitute the report of the Secretary of Interior as required by Section 2(b) of the Fish and Wildlife Coordination Act.

PRIOR STUDIES AND REPORTS

Prior studies by the Corps of Engineers included the 1978 Manatee Harbor Feasibility Report and the 1990 Manatee Harbor General Design Memorandum, Supplement 1. An Environmental Impact Statement (EIS) for the Manatee Harbor Channel Maintenance Feasibility Report was prepared and approved with the main report. The EIS mitigation plan was coordinated with the Service, and was determined to be adequate. The mitigation was to compensate for impacts from dredging 6.6 acres of shallow water habitat including 2.7 acres of turtlegrass and Cuban shoalweed. The purpose of this proposed additional dredging is to construct a turning basin.

This Coordination Act Report incorporates data from a recent field study and further clarifies the Service's position regarding anticipated impacts of the project on fish and wildlife resources and presents mitigation measures based on the best biological information available.

DESCRIPTION OF THE STUDY AREA

The Manatee Harbor access channel is located on the west coast of Florida near the entrance to Tampa Bay and intercepts the Tampa Bay channel just east of the Sunshine Skyway Bridge. The channel connects Port Manatee located on the southeast side of Tampa Bay near Ruskin, Florida, to the Tampa Bay channel (Figure 1).

← CUT 'B' TAMPA
HBR. MAIN CHNL.

← ENTRANCE
CHNL.

PROPOSED
TURNING
BASIN

ISL.

FIGURE 1.
MANATEE HARBOR
PROJECT

FISH AND WILDLIFE SERVICE PLANNING OBJECTIVES

The Service's planning objectives are intended to determine what level of mitigation would offset project-induced impacts. The planning objectives consider what losses could be mitigated, what would constitute minimum effective mitigation, and what quantity of mitigation would be necessary for full compensation. Since estuarine grassbeds are important fish nursery habitat and important to the overall ecosystem of Tampa Bay, the Service is concerned about adequate mitigation of these losses.

EVALUATION METHODS

Service biologists conducted onsite inspections on April 2-3, 1991. The area where the turning basin is proposed, south of the existing channel, is 2 1/2 feet below mean low water (m.l.w.). Biomass samples of two grassbed locations were taken. The extent of estuarine submerged grassbeds was also noted in the northern area where the turning basin dredging is proposed. Water depths at the northern side were minus 4 feet m.l.w.

The standing crop of seagrass was measured in this area. Two random stations were selected and .0232 m² cores taken, the rhizomes cleaned of sand and shell, and the whole wet weight measured. A 1/2-inch mesh seine was used to collect fish. Two hauls were taken within the seagrass beds.

DESCRIPTION OF FISH AND WILDLIFE RESOURCES

EXISTING CONDITIONS

Following is the result of grassbed sampling of the turning basin:

Seagrass present at this site was predominately turtlegrass, Thalassia. The benthos was composed of sand. The water depth at this site varied from minus 2 feet m.l.w. to minus 4 feet m.l.w. Underwater photographs of seagrass coverage are presented in Figure 2. Following are the results of the detailed examination of seagrass biomass:

Table 1. Whole Wet Weight of Seagrass at Turning Basin

Sample 1	3,367.3 gm/m ²
Sample 2	2,217.6 gm/m ²
Average	2,792.5 gm/m ²

Comparison of these values with those taken during other studies shows that grassbeds in the project area are moderately dense. Visual observation confirmed the fact that the turtlegrass was growing at moderate densities.

The results of the fish sampling are shown below:

Table 2. Fish Species Caught in a Seine at the Turning Basin Site

<u>Species</u>	<u>Number</u>
Halfbeak (<u>Hyporhamphus unifasciatus</u>)	4
Needlefish (<u>Strongylura marina</u>)	1
Pinfish (<u>Lagodon rhomboides</u>)	42
Pigfish (<u>Orthopristis chrysoptera</u>)	1
Total:	48

The results of the invertebrates observed while snorkeling at the turning basin site are shown below:

Table 3. Invertebrate Species Observed While Snorkeling at Location of Turning Basin

<u>Species</u>	
Say's Mud Crab (<u>Neopanope texana</u>)	Crustaceans
Stone Crab (<u>Menippe mercenaria</u>)	
Scud (<u>Gammarus oceanicus</u>)	
Harford's Greedy Isopod (<u>Cirolana harfordi</u>)	
Mottled Tube-maker (<u>Jassa falcata</u>)	
Red-eyed Amphipod (<u>Ampithoe rubricata</u>)	
Michelin's Sand Dollar (<u>Encope michelini</u>)	Echinoderms
Lightning Whelk (<u>Busycon contrarium</u>)	Gastropod
Florida Horse Conch (<u>Pleuroploca gigantea</u>)	
Mottled Dog Whelk (<u>Nassarius vibex</u>)	
Broad-ribbed Cardita (<u>Carditamera floridana</u>)	Bivalves
Sunray Venus (<u>Macrocallista nimbosa</u>)	
Stiff Pen Shell (<u>Atrina rigida</u>)	
Mushroom Tunicate (<u>Distaplia stylifera</u>)	Tunicates
Striped Tunicate (<u>Styela plicata</u>)	

The fish seining indicated that diversity was not high during this one-time limited survey. However, invertebrate observation revealed a high species diversity. This combination of sampling and observation, therefore, confirms that the turtlegrass beds in the project area, are important fishery habitat.

FUTURE WITHOUT THE PROJECT

The future without the project would mean that the 7.5 acres of shallow water including 2.1 acres of seagrass within the turning basin would remain undredged. These shallow water areas and grassbeds would continue to contribute to the overall resources of the Tampa Bay ecosystem by providing habitat for fish, crustaceans and mollusks. Grassbeds are, generally, important feeding resting and nursery areas for a variety of sport and commercial fish species as well as a source of primary productivity. They help stabilize the substrate, decrease turbidity, and increase surface area for sessile plant and animal attachment. If this project were not constructed, the loss of additional seagrass and shallow bay bottom caused by this project in Tampa Bay would not occur, and the risky attempts to mitigate by scraping down other habitats in the hopes of establishing other seagrass beds would not be necessary.

DESCRIPTION OF PLAN EVALUATED BY THE SERVICE

The proposed plan provides for 1) Federal maintenance of the existing 40 feet deep (m.l.w.) by a 400-foot wide entrance channel and turning basin, 2) construction of wideners at the end of the entrance channel, and 3) relocation of the turning basin.

Maintenance dredging will remove 660,000 cubic yards of material every 3 years. Upland disposal sites designated as D/A-5 and D/A-6 will receive the spoil material. These spoil sites comprise an area of 95 acres.

The original Corps proposal was to dredge a turning basin which would impact an area of 6.6 acres of seagrass beds. The proposed Corps plan is to dredge 7.5 acres of shallow bay bottom including 2.1 acres of seagrass beds for a turning basin. This would impact an additional .9 acre area of bay bottom as compared to the original turning basin proposal. Dredging of the turning basin would lower the shallow bay bottoms (minus 2 to minus 4 feet m.l.w.) to minus 40 feet m.l.w.

DESCRIPTION OF IMPACTS

Grassbed locations were taken from a copy of a map prepared for Port Manatee entitled "Seagrass Habitats, Port Manatee" dated August 1989 (Figure 3). Figure 3 was digitized from this map. Since the map received by the Service is a copy of the original, acreage measurements are approximate. As has been previously discussed under "Future Without The Project", grass is important to the ecosystem of Tampa Bay. In previous studies of productivity and diversity, Springer and Woodburn (1960) collected 249 fishes in Tampa Bay; many of which are dependent on estuarine grassbeds for food and cover. Most

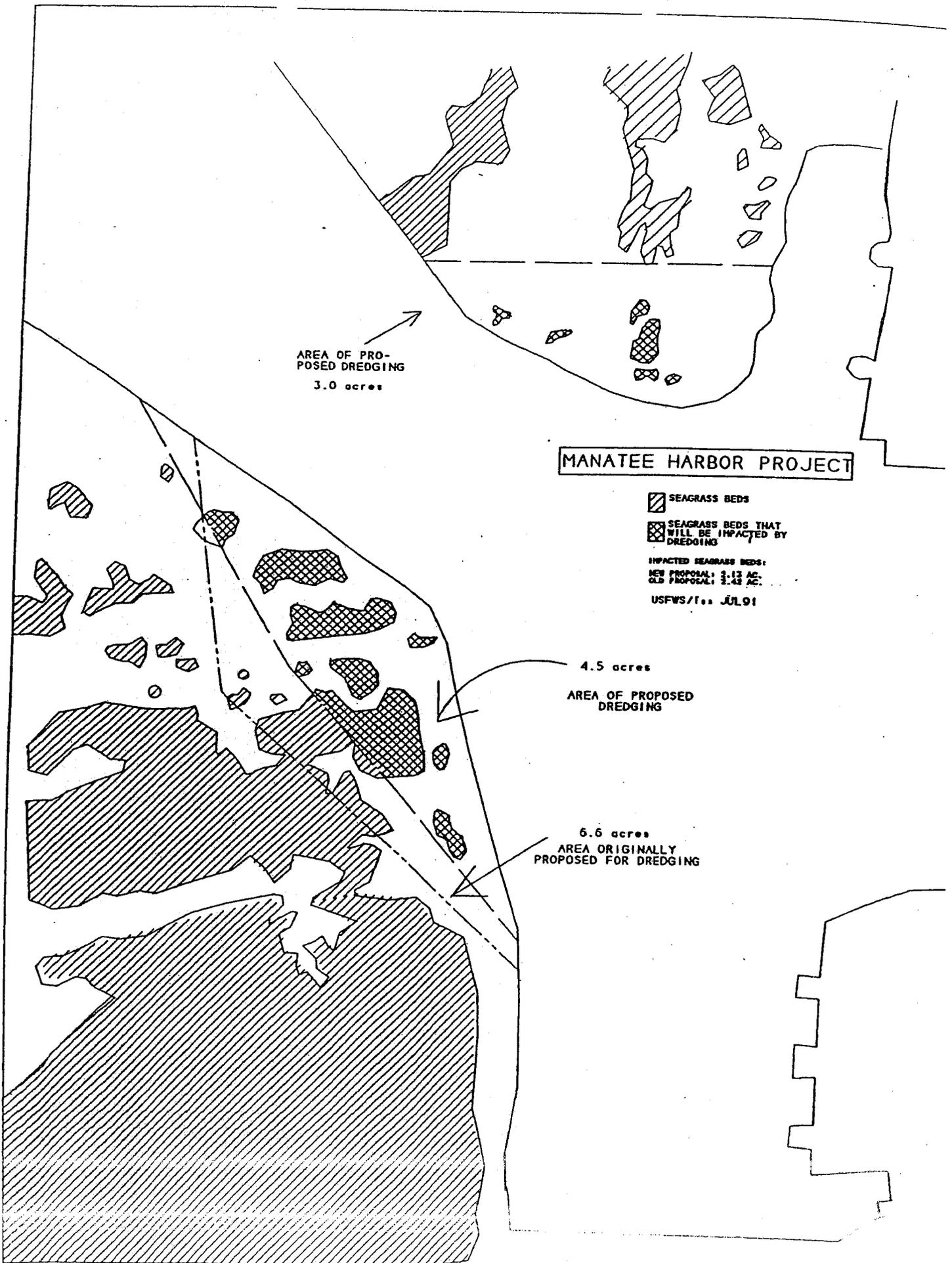


FIGURE 2

shallow water species utilize seagrass as opposed to clean sand bottom because of the vertical substrate, food and cover the seagrass beds provide. The project proposal will result in the loss of shallow water habitats and sea grass beds; both of which are generally important in the life cycle of most bay and estuarine fish.

Although the impacts of the proposed plan will eliminate .9 acres of additional shallow bay bottoms, the amount of seagrass destroyed will be .3 acres less than originally proposed. See Table 4.

Table 4. Impact of Turning Basin Construction on Shallow Bay Bottoms and Seagrass Beds.

	Shallow Bay Bottoms Seagrass Beds	
1978 Plan	6.6 acres	2.421 acres
1990 Plan	7.5 acres	2.132 acres
<u>Differences in 1978 and 1990 Plans</u>		
<i>Total Shallow Bay Bottom Impacted:</i>		
	1990 Plan:	7.5 acres
	1978 Plan:	<u>-6.6 acres</u>
		.9 acres
<i>Total Seagrass Beds Impacted:</i>		
	1990 Plan	2.132 acres
	1978 Plan:	<u>-2.421 acres</u>
		(.289 acres)

Threatened and Endangered Species

The dredging proposal could adversely impact the endangered West Indian manatee (Trichechus manatus). The manatee is fairly common throughout Tampa Bay while other Federally listed endangered and threatened species generally are not found in the project area.

A Biological Opinion dated June 24, 1991, concurred with the Corps' determination of no effect. The Service recommended that the following condition be made part of the contract: that the standard manatee conditions be included in any contract issued for the work.

EVALUATION OF SELECTED PLAN

Implementation of the Corps' plan to relocate the turning basin will result in the loss of some shallow bay bottoms including estuarine grassbeds. The dredged area (minus 40 feet m.l.w.) will be too deep to support an appreciable amount of benthic life, because it will be below the zone of sunlight penetration and low in dissolved oxygen.

DISCUSSION AND JUSTIFICATION OF FISH AND WILDLIFE CONSERVATION MEASURES

Dredging of the turning basin will destroy 0.9 acres of shallow bay bottom including 2.1 acres of seagrass beds. These areas are important nursery and feeding grounds for many fish and wildlife resources.

In evaluating the original proposal, the Service agreed to a mitigation ratio of 10 acres of shallow habitat creation for 6.6 acres of shallow bay bottoms destroyed; that ratio equals 1.52:1. Using the same ratio, the additional area required for the small increase in turning basin impact totals 1.37 acres for the 0.9 acres of bay bottom and seagrass destroyed.

Therefore, to mitigate for the amended project plan, an additional 1.37 acres of spoil island should be lowered to an elevation of minus 2.0 feet m.l.w. In summary, total mitigation for the entire project should be revised to require 11.4 acres of island to be lowered to a subtidal elevation. This would mitigate the total loss of 7.5 acres of shallow water fishery habitat including 2.1 acres of estuarine grassbeds. It is assumed that grass would naturally establish in some of the lowered area.

RECOMMENDATIONS

The Service recommends that the proposed plan be implemented by the Corps, provided mitigation to offset the loss of the additional 0.9 acres of shallow water area (including 2.1 acres of seagrass) is accomplished at a ratio of 1.52:1, as described below:

1. An additional 1.37 acres of spoil island be lowered to an elevation of minus 2 feet m.l.w., for a total of 11.4 acres of shallow-water habitat created.
2. Twelve-inch long wooden stakes, spaced one meter apart, should be buried in the newly exposed substrate of the mitigation area to a depth of 8 inches, as discussed in Mr. Peter Clark's publication " Seagrass Restoration : A Non-Destructive Approach".
3. The mitigation area should be monitored for grass recruitment. Monitoring should be conducted during the initial 6 months and then at one year intervals, every year thereafter for 3 years.
4. The mitigation plan should be implemented concurrently with the start of the Corps project.
5. Alternative mitigation should be provided in the event that seagrasses do not colonize the created subtidal areas (One possible alternative would be planting intertidal saltmarsh at the mitigation site on a 2.0 for 1.0 ratio).
6. Turbidity screens should be used during all dredging and blasting operations to protect adjacent grassbeds.
7. The Service would be strongly opposed to spoiling materials from this project on any of the designated Tampa Bay spoil islands unless it can be accomplished in a manner that would not be disruptive or harmful to the shore and wading birds utilizing the islands.
8. The Corps should closely coordinate this project with the Tampa Bay Surface Water Improvement and Management (SWIM) program, and the Tampa Bay National Estuary Program to identify, and protect against any possible conflict in goals.

SUMMARY AND CONCLUSIONS

The relocation of the turning basin will cause the loss of an additional 0.9 acres of shallow bay bottoms including the loss of 2.1 acres of estuarine grassbeds vegetated by turtlegrass and Cuban shoalweed. Mitigation should be accomplished in accordance with

the Service's Mitigation Policy to offset the loss of shallow bay bottoms, turtlegrass and Cuban shoalweed beds. The Service finds that construction of the turning basin would not cause significant damage to the Tampa Bay ecosystem if the previously outlined mitigation recommendations are made part of the authorized Federal Project.

LITERATURE CITED

Clark, P.A. 1989. Seagrass restoration: a non-destructive approach. Tampa Bay Regional Planning Council, St. Petersburg, Florida.

Springer, V.G. and Woodburn, K.D. 1960. An ecological study of the fishes of the Tampa Bay area. Florida State Board of Conservation Marine Laboratory, Professional Paper Series (1):1-104.



United States Department of the Interior

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IN REPLY REFER TO:
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MAY 21 1999

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Dear Mr. Nowicki:

This document transmits the Fish and Wildlife Service's biological opinion based on our review of the proposed Port Manatee Navigation and Berth Improvements (199801210 [IP-MN], Service Log No: 98-741) located in Manatee County, Florida, and its effects on the Florida manatee (*Trichechus manatus latirostris*). This biological opinion has been prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act). Your September 2, 1998 letter requesting formal consultation was received on September 7, 1998 and formal consultation was initiated on November 10, 1998.

DESCRIPTION OF THE PROPOSED ACTION

This project would improve facilities at Port Manatee by enlarging the turning basin, expanding two existing berths and dredging a new berth. It was originally proposed as a 10-year, 2-phase project. Phase I included dredging 646,000 cubic yards from 16.23 acres of previously dredged and undredged bay bottom, filling 0.23 acres below mean high water (MHW), replacing 470 feet of existing bulkhead and constructing 860 feet of new bulkhead. Phase II included dredging 740,000 cubic yards from 14.26 acres of shallow bay bottom and 95,000 cubic yards from lands above MHW, filling 1.58 acres below MHW, and constructing 1,353 feet of new sheet pile bulkhead. This project has been presented concurrently with a Federal dredging project to maintenance dredge and widen the Port Manatee Channel at its junction with the Cut-B Channel and its terminus at Port Manatee. The Federal project would require dredging 41.72 acres of bay bottom.

The combined bay bottom acreage to be directly affected by the two projects as initially proposed was 73.79 acres. Over the past months the project has been modified by redesigning the turning basin adjacent to Port Manatee and changing the alignment of Berth 12, the proposed new berth. The current proposal calls for the dredging or filling 57.07 acres of aquatic and wetland habitats; including 12.7 acres of seagrass, 42.19 acres of shallow unvegetated bay bottom and 2.18 acres of mangroves. Seagrass impacts have been reduced by 34.5% from the original proposal and mangrove impacts have increased by 10.7%.

For the purposes of this consultation, the action area for this project includes the eastern side of Tampa Bay, within five miles of the project location. Although the boats using this project will be large and confined to the channel and berths being dredged, construction of the project will remove manatee habitat and manatees may move 5 miles in search of food. Therefore, the travel paths and foraging sites of manatees within this 5-mile radius may be affected by the project's construction and operation.

Tampa Bay between the Cockroach Bay Aquatic Preserve and Terra Coia Island, the action area, has relatively little development, is bordered by mangrove wetlands, is fed by numerous small tributaries, has a broad littoral shelf that supports naturally expanding seagrass beds and contains two state aquatic preserves. It is recognized for its variety of habitats, fishery production and generally undeveloped shoreline.

STATUS OF THE SPECIES/CRITICAL HABITAT

This section summarizes manatee biology and ecology as well as information regarding the status and trends of the Florida subspecies of the West Indian manatee throughout its entire range. The Service uses this information to assess whether a Federal action is likely to jeopardize the continued existence of the West Indian manatee. The "Environmental Baseline" section summarizes information on status and trends of the Florida subspecies of the West Indian manatee specifically within the action area. These summaries provide the foundation for the Service's assessment of the effects of the proposed action, as presented in the "Effects of Action" section.

Species/critical habitat description

The Federal government has recognized the threats to the continued existence of the manatee for almost 30 years. The West Indian manatee was first listed as an endangered species in 1967 under the Endangered Species Preservation Act of 1966 [16 U.S.C. 668aa(c)] (32 FR 48:4001). The Endangered Species Conservation Act of 1969 [16 U.S.C. 668aa(c)] continued to recognize the West Indian manatee as endangered (35 FR 16047). The West Indian manatee was listed as an endangered species pursuant to the Endangered Species Act of 1973, as amended. Critical habitat was designated for the manatee in 1976 (see 50 CFR 17.95:205). There were no primary constituent elements included in the critical habitat designation. The West Indian manatee is represented by two subspecies, the Florida manatee (*T. m. latirostris*) and the Antillean manatee (*T. m. manatus*).

The Florida Manatee Recovery Plan (Plan) was most recently revised on January 29, 1996, and contains a complete discussion of the life history and other relevant factors related to the survival and recovery of the manatee. Recovery goals include a growing or stable population, mortality factors controlled at acceptable levels or decreasing, and critical habitats secure and threats to habitat controlled or decreasing. The information below and in the following sections is either referenced in the Plan, summary information from the Plan, or additional information most germane to the evaluation of this Project.

Life history

A discussion of the general life history traits of the manatee can be referenced in the Florida Manatee Recovery Plan Second Revision (U.S. Fish and Wildlife Service, 1995).

Population dynamics/status

The Florida Department of Environmental Protection (DEP) organized three synoptic surveys in 1999, resulting in total counts of 1,873, 2,034, and 2,353 animals, respectively (Bruce Ackerman, pers. comm.). During the March 6, 1999 survey, 956 manatees were counted on the east coast and 1,397 on the west coast. However, it is important to realize that due to variables in annual surveying such as weather, manatee behavior, and sampling methods, it is difficult to correlate manatee population estimates with overall manatee population trends. The Service has recognized the importance of determining the status and trends of the manatee population since an organized recovery effort was started in the early 1970's. The Service's initial recovery plan for the species, developed in 1980, and revised plans (1989 and 1996), stressed the importance of collecting and analyzing this type of information.

A manatee population biology workshop was held at the University of Florida in 1992. The goals of the workshop were to provide: (1) a synthesis of information about manatee population biology, (2) an evaluation of the strengths and weaknesses of existing data sets and approaches to manatee population research, and (3) recommendations for future research. The proceedings from this workshop (O'Shea *et al.* 1995) provide the most intensive analysis and overview available on the population biology of the Florida manatee.

Several papers in the proceedings provide a thorough analysis of original data and overview perspectives on the population biology of the Florida manatee. Eberhardt *et al.* (1995), using a population model based on the best available life-history data derived from records of photo-identified individuals, estimated that the Blue Spring population had been growing at a rate of 6%, Crystal River at 7% and the Atlantic coast at 1%. They concluded that population growth rate is most sensitive to changes in adult survival and that the most effective management strategy for promoting population growth is to implement actions to reduce mortality, especially of adults.

Garrott *et al.* (1994), using statistical analysis of aerial survey counts at power plants during winter, estimated that temperature-adjusted counts at East coast power plants increased at a rate of 9.8% per year (95% CL=7-12%). However, the authors are very careful in indicating that these counts may not reflect population trends. Given the large discrepancy between these results and those of Eberhardt *et al.*'s (1995) population model for the Atlantic coast, it seems likely that a number of factors, other than population increase, contributed to the increasing counts.

More recently, Marmontel *et al.* (1997) used age-specific data from a sample of 1,212 carcasses collected from 1976-1991 to conduct a population viability analysis (PVA) to identify the relative importance of the factors affecting the population and to evaluate management alternatives. The PVA estimated the probability of persistence of the Florida manatee over 1,000 years under various scenarios of initial population size, environmental variables, and mortality and

reproduction. They accommodated uncertainty associated with some of the estimates by bracketing values (modeling potential upper and lower bounds) to evaluate the probability of extinction. For the most "realistic" scenario, the PVA projects a slightly negative growth rate $r = -0.003$ and a low probability (0.44) that the population will survive for 1,000 years. Catastrophes drastically increase the probability of extinction. For example, an unusual mortality event in early 1996 caused by exposure to high concentrations of the microorganism *Gymnodinium breve* ("red tide") resulted in 149 manatee deaths in southwest Florida. The model concluded that a 10% increase or decrease in adult mortality rate determines whether the population would correspondingly decline toward extinction or slowly increase in size.

Langtimm *et al.* (*in press*) reports a detailed analysis of annual adult survival in Florida manatees, based on a mark-recapture approach. Naturally and boat-inflicted scars distinctively "marked" individual manatees that were cataloged in a computer-based photographic system. Photo-documented resightings provided "recaptures". They found that at Crystal River and Blue Spring, annual adult survival probabilities were best estimated as constant over the study period at 0.96. The high, constant survival rates are consistent with mammalian life history theory and empirical data available for large, long-lived mammals. On the Atlantic coast, annual survival rates varied unpredictably over time and were significantly lower than those found at Crystal River and Blue Spring. This variability is contrary to what is known about large, long-lived mammal and is cause for concern. The author was unable to utilize the technique on the Gulf Coast south of Crystal River.

Although the work discussed above does not provide definitive answers to the current status of the Florida manatee population and its long-term prospects for survival, it represents the best scientific data available. There is general consensus among scientists that the observed increases in manatees in winter aggregation areas reflect an increase in the Florida population from the 1970's through the 1980's. It is uncertain if this trend has continued into the 1990's. However, the rate of increase for the population is probably less than that observed at some of the aggregation sites. The status of the population differs by region of the state. The Blue Spring and Crystal River segments have increased significantly, which is consistent with low human-related mortality and sufficient habitat in these regions. On the other hand, based on these studies, there could be a serious manatee population decline on the Atlantic coast of Florida in the foreseeable future if human-related mortality cannot be reduced.

From 1974 through 1998, 3,502 manatee carcasses were recovered in the southeastern United States. Of these, 1,065 deaths (30 percent) were attributed to human related causes. Of human-related deaths, 828 (77 percent) were caused by collisions with watercraft, 145 were flood gate/canal lock-related, and another 92 were categorized as other human related. Ackerman *et al.* (1995) found that the number of carcasses collected between 1974 and 1992 increased at 5.9% per year. However, deaths caused by watercraft strikes increased at 11.9% per year. Watercraft-related mortality was highest on the east coast and disproportionately involved adult manatees. Mortality from boat strikes, therefore, has a major effect on manatee population dynamics and long-term survival.

Distribution

The Antillean manatee is found throughout the West Indies, along the Caribbean coasts of Mexico and Central America, and along the Atlantic coast of South America to Central Brazil. The Florida manatee occurs in the southeastern United States. The cooler winters along the United States coast of the Gulf of Mexico, in combination with the deep water and strong currents of the Straits of Florida, creates an effective barrier between the two subspecies.

The range of the Florida manatee varies seasonally, depending upon changing water and air temperatures. During the summer months, manatees may rarely travel as far north as Rhode Island on the Atlantic Coast and west to Texas on the Gulf Coast. However, the only year-round populations of Florida manatees occur throughout the coastal and inland waterways of peninsular Florida and a small group that overwinters in extreme southeast Georgia. There are several major winter aggregation sites on both the east and west coasts of Florida.

Analysis of the species/critical habitat likely to be affected

Year-round populations of manatees occur throughout the coastal and inland waterways of peninsular Florida. During the summer, manatees may travel north along eastern coastal states, while returning in the winter to seek warm water refugia. Several documented manatee winter aggregation sites are located on Florida's east coast.

Collisions with watercraft account for between 23 and 25 percent of annual manatee mortalities, which is the largest, controllable cause of manatee mortalities. The risk to manatees is high where boat traffic occurs in waterways frequently used by manatees. These risks can be reduced by selecting suitable sites for the development and location of future navigation channels and docking facilities and by controlling the manner in which boats are operated. Therefore, increasing the number of watercraft may only increase the risk of manatee mortalities unless there is an adequate Manatee Protection Plan and/or established and enforceable speed zones.

ENVIRONMENTAL BASELINE

Status of the species in the action area

The population and distribution of manatees in Tampa Bay varies throughout the year. They may be found throughout the bay most of the year but have concentrated or restricted distributions during winter and calving seasons. Approximately 50 - 60 manatees live in Tampa Bay during the summer and about 200 may be found in the bay during the winter (Manatee Protection Strategies Task Force [MPSTF] 1998) as they concentrate near thermal refugia. The closest winter concentration to the action area is Tampa Electric Company's Big Bend Power Plant about 6 miles north of the action area. More manatees are counted in the thermal discharge from this plant in the winter than in any other thermal refuge in the Tampa Bay system. During the winter of 1998-99 up to 130 manatees were counted in the discharge on a single count (Bruce Ackerman personal communication). Another time that manatees seek habitats more restricted than their normal distribution is during calving. Females seek quiet, protected areas for giving birth. The

Little Manatee River is recognized as a preferred calving site for Tampa Bay. It empties into the bay about 1 mile north of the action area for this project.

Although the action area is not a concentration area such as a thermal discharge or freshwater source it is an area of expanding seagrass beds and has a history of manatee use. Florida Marine Research Institute satellite telemetry data and visual observations indicate manatees may be found in the action area at any time of the year and during all hours of the day. They use the area for travel and rest as well as feeding. Manatee use of the action area may be expected to increase in the future as seagrass beds continue to expand.

Factors affecting species environment within the action area

Water quality and boat activity are two factors with the potential to dramatically affect the environment of the action area. From the 1960's to 1980's Tampa Bay experienced a period of extended poor water quality and resultant decline in the quality of aquatic habitats (Johansson 1995). Management actions to reduce nutrient input from waste water treatment facilities and large fertilizer plants began to produce results in the bay by the mid-1980's. Water quality parameters improved and the recovery of lost seagrass meadows began. The action area for this project is in bay segments that have experienced seagrass expansion as water quality continues to improve (Tampa Bay National Estuary Program 1996).

The Cockroach Bay and Terra Ceia Bay Aquatic Preserves are located in the action area. Both contain seagrass beds which may be used by manatees for foraging and loafing and both were identified by Sargent *et al.* (1995) as having moderate to severe prop scarring of their seagrass beds. Efforts were undertaken to protect the remaining seagrass and restore lost seagrass in Cockroach Bay. Signs were placed to restrict boating and to inform boaters of the presence of seagrass beds. Planting and fertilizer applications were made to accelerate the recovery of prop scarred areas. Those efforts have been successful (MPSTF 1998) and directly address one of the recovery goals of the Florida Manatee Recovery Plan (U.S. Fish and Wildlife Service 1996). Plans for installing similar information signs at the Terra Ceia Aquatic Preserve are being considered by Manatee County.

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the species and critical habitat and its interrelated in interdependent activities. To determine whether the proposed action is likely to jeopardize the continued existence of threatened or endangered species in the action area, we focus on consequences of the proposed action that affect rates of birth, death, immigration and emigration because the probability of extinction in plant and animal populations is most sensitive to changes in these rates.

Factors to be considered

Factors to be considered include actions associated with the construction and operation of this project. Construction will address dredging operations and bulkhead construction. Operation will include the movement of commercial vessels and the loss of shallow bay bottom habitat.

Analysis for effects of the action

Dredging and bulkhead construction are actions that may negatively affect manatees. They are both common construction activities in coastal habitats and a standard set of manatee construction precautions have been developed over time that minimize the potential for negative effects. Those precautions will be made a condition of the Section 404 permit if it is issued and will be implemented during construction. The applicant has indicated that it may be necessary to blast before dredging can occur in some areas. If so, they will submit a blast plan before they begin to blast. The plan will be developed in consultation with the Florida Department of Environmental Protection and the Service.

A turning basin and additional slip space for large commercial ships will be constructed. Being crushed, either beneath the keel or between the hull and a bulkhead or dolphin, is the greatest threat manatees have from the vessels that will use the project. Large, commercial vessels will be confined to the deep basin and channel and will be moving at slow speeds which will reduce the probability of manatees being hit or crushed. Between 1974 and 1997 there was one watercraft related mortality within five miles of the project site and none within one mile of the project site over the same time period, an indication either that manatee use of the project area is light or that they can avoid the large, slow commercial vessels.

Being crushed while a ship is berthed also poses a potential threat to manatees. Fenders that provide 3 feet of clearance between a vessel's hull and bulkhead or dolphin are proposed. If they are constructed so that they are above highwater, they will provide protection for most manatees, but not all. Building fenders that provide 4 feet of clearance will offer protection to large manatees and offer additional protection to the segment of the manatee population recognized as critical to the species' survival (Marmontel *et al.* 1997).

Almost 55 acres of shallow bay bottom will be lost in perpetuity as potential manatee habitat as a result of this project. Over 12 acres of existing seagrass habitat and 42 acres of unvegetated shallow bay bottom will be dredged for berth expansion, a new berth and a turning basin. Mitigation is proposed for the seagrass impacts; however, wherever seagrass mitigation occurs it will not result in the accrual of new habitat for manatees. Transplanted seagrass will either go into sites where natural expansion is presently taking place or into sites where natural revegetation would eventually happen. The mitigation project may accelerate coalescence or revegetation, but in Tampa Bay, it will not establish seagrass in locations that would not naturally revegetate. The 42 acres that will be dredged and are not presently vegetated have a high probability of supporting seagrass in the future if they are not dredged.

Species' response to the proposed action

Given that manatee construction precautions will be implemented, that the port has a history of operating compatibly with manatees, that fenders will be constructed to provide clearance between vessels and bulkheads and that seagrass beds should continue expanding within the action area and continue to supply foraging and loafing habitat for manatees, we believe the area's use by manatees will continue into the future much as it has been in the past or increase as seagrass beds expand.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the Act. We are not aware of any future State, local or private actions that are planned for the action area.

CONCLUSION

After reviewing the current status of the manatee, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of the manatee, and is not likely to destroy or adversely modify designated critical habitat. Appropriate measures have been included in the project plans to protect manatees during construction of the project and during operation of the facility. Additionally, the Service concludes that the loss of seagrass beds associated with project construction will not affect use of the area by manatees to any significant degree, as the extent of seagrass beds is continuing to expand in the project area and availability of suitable habitat is not considered to be a limiting factor in the foreseeable future.

INCIDENTAL TAKE

In meeting the provisions for incidental take in section 7(b)(4) of the Act, the Service has reviewed the biological opinion and other available information relevant to this permit action. Based on our review, incidental take is not anticipated for the manatee. If an incident involving a manatee occurs, all work should cease and our office should be contacted immediately (904-232-2580).

CONSERVATION RECOMMENDATIONS

Section 7 (a)(1) of the Act directs Federal agencies to utilize their authorities to further the purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends that the following be made special conditions of the permit, if it is issued to minimize potential impacts to the manatee:

1. The standard manatee construction conditions must be implemented.
2. If night time construction occurs, lights must be in place that illuminate a 100 foot radius around the construction site.
3. If blasting is necessary, a blast plan must be developed that includes the conditions stated in Gee and Jenson's January 15, 1999 submittal to the Florida Department of Environmental Protection addressing their request for additional information on Port Manatee Navigation and Berth Improvements.

REINITIATION OF SECTION 7 CONSULTATION

This concludes formal consultation on the actions outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required when discretionary Federal agency involvement or control over the action has been retained and if: (1) New information reveals effects of the agency action that may effect listed species or critical habitat in a manner or to an extent not considered in this biological opinion, (2) the Corps' action is subsequently modified in a manner causes an effect to the listed species or critical habitat not considered in this biological opinion, or (3) a new species is listed or critical habitat designated that may be effected by the action.

Sincerely,



For David L. Hankla
Field Supervisor

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