Appendix C

U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

October 10, 2002

James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

In accordance with the Fiscal Year 2001 Transfer Fund Agreement between the Fish and Wildlife Service (Service) and the U.S. Army Corps of Engineers (Corps) Jacksonville District, attached is the final Fish and Wildlife Coordination Act (FWCA) Report on the Miami River Operations and Maintenance Project, Miami-Dade County, Florida. This report, provided in accordance with the FWCA, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*) and under the provisions of section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*), has been prepared as a joint effort with Gulf Engineers & Consultants to provide an evaluation of environmental effects of dredging and disposal of approximately 514,000 cubic yards of sediment from the Miami River.

Comments on the Draft FWCA Report were received from the Florida Fish and Wildlife Conservation Commission (FWC) on March 6, 2002. The Service recognizes the clarifications and supports the recommendations, which are included in the appendix of this report. This Final FWCA Report constitutes the Secretary of the Interior's views and recommendations for this project, in accordance with section 2(b) of the FWCA.

Please contact Brad Rieck at (772) 562-3909, extension 231, regarding the findings and recommendations contained in this report.

Sincerely yours,

James J. Slack
Field Supervisor
South Florida Ecological Services Office

Enclosure

cc:
FWC, Vero Beach, FL w/enclosure
NMFS, Miami, FL w/enclosure
EPA, West Palm Beach, FL (Jan Rogers) w/enclosure
DEP, Tallahassee, FL (Kent Edwards) w/enclosure
Gulf Engineers and Consultants, Baton Rouge, LA w/enclosure

FINAL

FISH AND WILDLIFE COORDINATION ACT REPORT

MAINTENANCE DREDGING OF THE MIAMI RIVER

MIAMI-DADE COUNTY

Fish and Wildlife Service
South Florida Ecological Services Office
Vero Beach, Florida

October 10, 2002

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (Corps) and Miami-Dade County, the local sponsor, are planning to maintenance dredge the Miami River. Approximately 514,000 cubic yards (cy) of material will be removed from the Miami River and eventually disposed of offsite. The Corps' preferred project alternative involves maintenance dredging and temporary onsite upland storage of sediment from the Miami River.

The project area is located between the entrance of the Miami River and the salinity control structure, which is located 5.5 miles west. The project area is within the City of Miami, Miami-Dade County, on the southeast coast of Florida. Dredging operations in the Miami River are expected to resuspend sediments and contaminants, some of which could be distributed into Biscayne Bay. The amount of silt and contaminants reaching the Bay will depend on dredging methodology, timing, spoil deposition and de-watering methodologies, and turbidity containment.

The Corps has identified an unused 8.5-acre parking lot and two nearby parcels as interim equipment staging and spoil material off-loading and temporary storage areas. The final spoil disposal site will be determined at a later date.

Fauna within the Miami River lacks the diversity and abundance of adjacent Biscayne Bay, and reflects tolerance of many years of habitat and water quality degradation. Although dredging activities would decimate a great percentage of existing benthic organisms in the river, it is unlikely that dredging or suspended solids would significantly impact motile species or any ecologically valuable biological communities in the river. Conversely, Biscayne Bay is a unique sub-tropical estuary characterized by clear water, and is a diverse and productive fishery resource, supporting benthic communities of both seagrasses and hardbottom. It also provides significant habitat and nursery for many important commercial and recreational fish and crustaceans.

The Corps submitted a letter to the Fish and Wildlife Service (Service) on January 22, 2002, providing a determination that the proposed project is not likely to adversely affect the manatee and has agreed to incorporate the Standard Manatee Protection Construction Conditions into the Construction Contract language. Therefore, the Service concurs with the Corps' determination. The Service also supports the additional Protected Species Conditions contained in the Florida Department of Environmental Protection's (DEP) Conceptual Environmental Resource Permit to the Corps for this project.

Because the project-generated sediment resuspensions have the potential to adversely affect aquatic resources in Biscayne Bay, the Service believes that the Corps must consider the following important project features in order to minimize effects to fish and wildlife resources: (1) provide the most current and least environmentally damaging dredging techniques, (2) provide the least environmentally damaging spoil deposition and decant procedures, (3) provide the least environmentally damaging debris location and removal techniques, and (4) provide at all times, turbidity containment screens and equipment.

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1.0 IDENTIFICATION OF PURPOSE, SCOPE, AND AUTHORITY

1.1 INTRODUCTION

This final report, provided in accordance with the Fish and Wildlife Coordination Act (FWCA)(48 Stat.401, as amended; 16 U.S.C. 661 *et seq.*) and under the provisions of section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C., as amended, 1531 *et seq.*), has been prepared as a joint effort with Gulf Engineers & Consultants and the Service to provide an evaluation of environmental effects of dredging and disposal of approximately 514,000 cubic yards (cy) of sediment from the Miami River. This report constitutes the Secretary of the Interior's views and recommendations in accordance with section 2(b) of the FWCA.

The original Miami River Federal Navigation Project was authorized in July 1930 and completed in 1933. The authorized channel dimensions include a 15-foot depth with a variable width of 90 to 150 feet, increasing in width from a west to east direction. Over the past 71 years, there has been considerable sedimentation and shoaling of the channel. The Corps plans to maintenance dredge the channel in order to bring the depth to authorized dimensions. Approximately 514,000 cy of material will be removed from the Miami River and stored temporarily on an upland site adjacent to the river prior to offsite transport. The portion of the Miami River subject to dredging is located between the entrance of the river and the salinity control structure located 5.5 miles west. The project is within the City of Miami, Miami-Dade County, on the southeast coast of Florida (Figure 1). There has been no maintenance dredging of the river since the implementation of the Federal Navigation Project, almost 71 years ago.

1.2 PURPOSE AND SCOPE OF THE PROJECT

Project Purpose

The project purpose is to perform maintenance dredging of the Miami River to improve navigation. The City of Miami's concern over navigation is addressed in the Miami River Master Plan, which states that sediments in the main shipping channel have accumulated, making it narrow and shallow. The plan also states that larger vessels now require movement in conjunction with high tide.

A secondary project purpose, generally supported by federal, state, and local interests, involves pollution remediation. This process requires the removal of river sediments, which may contain metals, petroleum hydrocarbons, and synthetic organic chemicals that originated from various point and non-point sources. Concern has been repeatedly expressed by federal, state, and local agencies over the transport of these contaminants from the river into Biscayne Bay, which may occur following resuspension from vessel traffic or severe storms/high flow velocities.

Removal of Miami River sediments has been identified by Miami-Dade County and the Florida Department of Environmental Protection (DEP) as being essential for improving the quality of the Miami River, and in abating continued discharge of pollutants into Biscayne Bay.

Project Scope

The existing Federal navigation project for the Miami River provides a navigation channel 15 feet deep throughout its 5.5 mile project length. The river-bottom width varies between a 150-foot bottom width, at the confluence of Biscayne Bay, to a 90-foot bottom width for the last 1.4 miles. Project boundaries are shown on Figure 1. The original project was authorized in July 1930 and constructed in 1933. Since that time, maintenance dredging has not been conducted on the Miami River, and therefore, a history of dredging and disposal is not available.

Depths and widths along the river are shown in sample cross-sections (Figure 2). These cross-sections indicate shoaled sediments lie above a rock-layer where the channel was incised, and that the majority of those sediments are within the dredging footprint for the existing Federal project. Preliminary estimates of sediment quantities are tabulated in Table 1. The thickness of the sediment varies from one to three feet in the deeper parts of the river, to as thick as five to 10 feet along the channel sides. The sediments in some areas have a high silt-clay content, sometimes reaching as much as 80 percent.

The dredging of the Miami River to the dimensions of the original Federal Navigation Project will require the removal of 242,912 cy of dredged material. To compensate for sloughing of the channel sides and any other sources of material that may enter the channel following dredging, the Corps is proposing to initially dredge the channel to a depth of 16 feet (where accessible and not limited by limestone rock) as "advanced maintenance dredging," which will require the removal of an additional 119,235 cy of material. Additionally, in order to offset any dredging and survey inaccuracies, an additional 1-foot "overdepth" dredging to an average depth of 17 feet is proposed and will require removal of an additional 151,419 cy of material. Assuming a bulking factor of 15 to 20 percent, the total quantity of material to be dredged is approximately 600,000 cy.

Table 1. Miami River Dredging Quantities in Cubic Yards

Reach	15-Feet Deep	16-Feet Deep	17-Feet Deep
Lower Reach	143,224	212,671	302,411
Upper Reach	99,688	149,476	211,155
Total	**242,912**	**362,147**	**513,566**

Source: U.S. Army Corps of Engineers, Jacksonville, 2001. Miami River Dredging Quantities on Survey No. 00-012, 3 on 1 side slopes, and 25-foot setback from all structures.

It should be noted that approximately 500,000 cy of additional sediment would remain in areas of the river outside the Federal project's dredging limits. This sediment would have to be removed at the expense of the local sponsor, if included in this project mobilization, through a Department of the Army permit.

1.3 AUTHORITY

The Committee on Public Works of the United States Senate, on March 24, 1972, and the Committee on Public Works of the United States House of Representatives, on June 14, 1972, authorized an evaluation of the navigational and water quality issues with the Miami River. These resolutions provided the means for the Corps to investigate the water and land related resource problems and opportunities along the Miami River. In the Water Resources Development Act (WRDA) of 1974, Congress reaffirmed its continuing interest in the Miami River watershed by authorizing a feasibility study of dredging in the interest of water quality.

In the Water Resources Development Act (WRDA) of 1986, Congress again reaffirmed its interest in water resource improvement in the Miami River watershed. Their interest authorized the removal of river sediments from the Miami River and Seybold Canal, the removal of abandoned vessels from the Miami River, and the establishment of the Miami River Water Quality Commission.

The original Corps of Engineers Feasibility Study, initiated in 1974, concluded that the removal of contaminated sediments to achieve the objectives of improving water and sediment quality, must be accompanied by non-Federal actions involving pollution input control. The study was placed in abeyance in 1977 pending those non-federal actions. Upon initiation of regulatory and enforcement actions and completion of facility modifications, the study was resumed in 1985.

A Draft Feasibility Report prepared and circulated in May 1986, concluded that no quantifiable National Economic Development Benefits could be identified for the Miami River sediment removal, and, therefore, the Corps could not recommend that dredging be accomplished. Proponents stated there was a need to remove sediments to improve water quality conditions within the area of the Miami River and Biscayne Bay, and to avoid adverse economic impacts resulting from vessel draft restrictions.

In response to extensive public comments, and to the new planning capabilities legislated in the WRDA of 1986, a new feasibility report was prepared and completed in 1990. The 1990 Feasibility Report concluded that there was no apparent justification for sediment removal for water quality or navigation. However, the report noted an apparent justification for maintenance dredging, which would enable deeper draft vessels to use the Miami River in a more efficient manner.

2.0 DESCRIPTION OF STUDY AREA

The portion of the Miami River subject to dredging is located between the entrance of the river and the salinity control structure located 5.5 miles west. The project is within the City of Miami, Miami-Dade County, on the southeast coast of Florida. Water-dependent and water-related commercial and industrial operations along the Miami River include commercial shipping, marinas, ship and boat yards, marine sales, boat manufacturing, and maritime services. The

Miami Canal, which is west of the salinity structure, connects to Lake Okeechobee, and flows west to east through the Everglades watershed and associated agricultural areas. Extensive commercial, industrial, and residential developments are present along the river.

The Miami River entrance is located on the west side of Biscayne Bay and is approximately 2.5 miles from the southern end of Miami Beach, Fisher Island, and Virginia Key. Biscayne Bay is an inlet to the Atlantic Ocean, and is partially separated from the ocean by a series of barrier islands. The southern region of Biscayne Bay is managed by the U.S. National Park Service as Biscayne National Park. The north end of the bay constitutes the Biscayne Bay Aquatic Preserve, and is managed by the State of Florida.

3.0 PROPOSED PROJECT ALTERNATIVES

Dredging of the Miami River is confined by existing physical conditions. Expansion of the channel's width would require modification to existing channel banks and would result in a subsequent loss of property. Deepening of the channel is constrained by a rock layer beneath the existing federal channel. Additionally, local shipping interests have not requested channel improvements, other than channel maintenance to service their existing and projected vessel fleets. There are no project provisions for blasting or dredging rock. Therefore, only two alternatives were evaluated for the Miami River study area by the Corps. These are Alternative 1, the Base Plan, and Alternative 2, No Action.

3.1 ALTERNATIVE 1, BASE PLAN

The Base Plan consists of dredging the Miami River's Federal channel to the authorized dimensions and disposing of the material in an environmentally acceptable manner in accordance with county, state, and federal regulations. Under the Base Plan, the Corps will issue a Request for Proposals (RFP). The Corps will then select a contractor, who will work in partnership with the Jacksonville District, to restore the Miami River to its federally authorized dimensions. The RFP solicitation is proposed by the Corps as an effective means of evaluating the use of new and innovative technologies for dredging and disposing of contaminated sediments, and as a means to capturing possible cost and time savings. The Corps has stated that dredging is expected to be performed through the use of either a mechanical or hydraulic dredge, or a combination.

Under this alternative, the local sponsor will provide an interim upland staging area and interim berthing area. One option is an 8.5 acre Jai-Alai fronton parking lot and several smaller nearby parcels abutting the river. Land, easements and right-of-ways for the dredging project are the responsibility of the local sponsor, Miami-Dade County. It is the Service's understanding that the Jai-Alai fronton area is not suitable for conventional diking with open-air drying (Miami-Dade County 2001). However, if this site is the preferred storage area then dredge material would have to be physically confined with the use of geotubes or other such device, or another upland site selected that is suitable for open-air settling/drying.

3.2 NO-ACTION ALTERNATIVE

Under the No-Action alternative, the Miami River channel widths and depths would continue to decrease as a result of shoaling, particularly near bridges. It has been recorded that reduced channel widths have resulted in vessel collisions with bridges and other vessels, as well as vessel grounding. The no-action alternative would exacerbate the problem as silt continues to accumulate in the River. Also, there is concern by commercial interests that further degradation of navigation safety, as the result of no action, could force them to relocate to competing ports. There is also concern that sediments and contaminants will continue to pollute the Miami River and Biscayne Bay.

4.0 FISH AND WILDLIFE CONCERNS

4.1 FISH AND WILDLIFE RESOURCES

Miami River

The Miami River is an artificially channeled waterway that is influenced by urban point and non-point discharges, commercial shipping activities, agricultural runoff, and tidally-influenced salinity changes. Organisms typical of such conditions are tolerant of low dissolved oxygen, high turbidity, chemical contaminants, nutrient enrichment, and rapid fluctuations in salinity. Seagrasses have not been documented in the river. Qualitative examinations of the benthos of the Miami River have revealed a general paucity of organisms. In a previous FWCA report (Service 1989) prepared for an earlier version of this project, the Service noted that the Miami River provided low fish and wildlife values, although striped mullet (*Mugil cephalus*) was prevalent throughout the river. The Service also noted that snook (*Centropomus undecimalis*) were known to occur throughout the river during times of discharge from the salinity control structure, and that tropical reef species such as sergeant major (*Adudefduf saxatilis*) and pink shrimp (*Penaeus duorarum*) were associated with riprap near the mouth of the river. Palmer Lake, a former borrow site connected to the Miami River, provides foraging habitat for avian species such as osprey, double-crested cormorant, kingfisher, green-backed heron, and great heron. Tarpon (*Megalops atlanticus*) have also been observed in the lake.

A Service biologist traversed the entire Miami River by boat with staff from Gulf Engineers & Consultants and Miami-Dade Department of Environmental Resources Management (DERM) on May 17, 2001. Water clarity was poor throughout the river. Scuba diving in the river was discouraged by local agency staff for health concerns, vessel traffic, and obstructions, therefore, observations were made from a boat. Most biota observed were associated with a few intermittent shoals along the river sidewalls and riprap, with the exception of free ranging mullet, which were observed in all reaches of the river. Sidewall features of the river consist of either natural rock or bulkheads. No submerged aquatic vegetation was observed, although water clarity was poor. Small gray snapper (*Lutjanus griseus*) and grunt (*Haemulon sp.*) were occasionally observed along sidewalls and shoals, as were blennies (*Labrisomus sp.*), blue crab (*Callinectes sp.*), and "upside-down" jellyfish (*Cassiopea frondosa*).

Biscayne Bay

Biscayne Bay is a shallow, subtropical lagoon. The shoreline of the northern portion of the bay has residential and commercial development along its entire length, with most of the vegetation removed and the natural shoreline replaced by vertical bulkheads. The bottom habitats of Biscayne Bay support a variety of organisms important to the coastal ecosystem. Based on substrate, the bay can be generally classified into hardbottom and softbottom habitats. The hardbottom habitat is characterized by exposed or semi-exposed limestone rock. Hard bottom habitats are dominated by plants and animals that have developed mechanisms for attachment to firm substrates, and are utilized by a myriad of marine fauna for food and shelter. The most prominent attached animals in many areas of hardbottom are the soft corals (e.g., sea whips and sea plumes) and sponges. Hardbottom habitat has not been identified in the bay in the vicinity of the Miami River. Softbottom habitat is best typified by sediment accumulations greater than five inches. Softbottoms can be dominated by burrowing animals, such as bivalves, shrimp, and polychaetes. The predominant plants of the softbottom habitats are seagrasses, which are anchored to the bottom through extensive networks of roots and rhizomes.

Seagrasses are an ecologically vital component of the Biscayne Bay ecosystem. Spatially, they provide the greatest coverage of bay bottom. Seagrasses and attached epifauna provide food for trophically higher organisms via direct consumption or from the detrital food web. Seagrasses also provide shelter and protection from predators. This combination of shelter and food availability results in the richest nursery grounds in South Florida's shallow coastal waters. As such, many important commercial and recreational fisheries (e.g. shrimp, lobster, fish) are associated with seagrass beds. Many species rely on seagrasses for at least part if not all of their life history. Seagrasses in the vicinity of ocean inlets are especially valuable habitat for juvenile snapper (*Lutjanus sp.*) and grouper (*Mycteroperca sp.*). Seagrasses contribute to improving water quality and clarity by absorbing excess nutrients, trapping suspended sediments, stabilizing substrate, and buffering wave energy. Seagrasses have declined in coverage in south Florida's coastal lagoons and estuaries due to water quality degradation and due to direct losses from dredging, filling, marine construction, and boating impacts. Dredging in the Miami River, without adequate suspended sediment minimization and containment, could likely result in sedimentation of nearby seagrass beds in Biscayne Bay.

Five species of seagrasses occur within the softbottom areas of the bay: turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*), shoal grass (*Halodule wrightii*), and two species of paddle grass (*Halophila decipiens and Halophila johnsonii*). Seagrass surveys (DERM 1992) documented seagrass beds approximately 600 feet from the mouth of the river, along the north and west shores of Claughton Island (Figure 3). Service staff, during a site visit with the NMFS in November 2001, also observed both species of paddle grass within one-half mile east-northeast of the river mouth, along with previously documented shoal grass and turtle grass (Dial Cordy 2001). The Service noted in the 1989 FWCA Report that seagrass may be declining in the vicinity of the mouth of the river because of the deleterious effects of sediments transported into the bay. An introduction of sediments from the Miami River has reportedly changed the vegetative communities in the northern part of the bay from a turtle grass climax community to an early successional stage community, with paddle grass and shoal grass as the predominant species. The U.S. Department of the Interior, National Park Service (NPS 1986) reported that pollutants from the Miami River may have contributed to the loss of large areas of seagrasses adjacent to Biscayne National Park.

Threatened and Endangered Species

The only federally threatened or endangered species known to utilize the Miami River is the endangered West Indian manatee (*Trichechus manatus*). Manatees have been observed throughout the length of the river and in such tributaries as Palmer Lake, Seybold Canal, Tamiami Canal, and the Comfort Canal. From December 1989 through July 1994, DERM has conducted 87 aerial surveys in this area. Since then, aerial surveys have been conducted at least quarterly each year. Figure 4 shows the approximate location of manatee sightings (totaling 170) during annual aerial surveys from 1995 to 2000. It should be noted that these aerial surveys reflect surface sitings only. Manatees use the river on a daily basis throughout the year, but are particularly abundant during winter, when they are attracted by warm freshwater. Generally, they travel into the river in the morning and usually leave in the afternoon to forage on the extensive seagrass beds in Biscayne Bay. Palmer Lake is used by manatees as a warm water refuge. From 1974 to 2001, 53 incidents of mortality were documented by DEP for the Miami River and its tributaries, which is 25 percent of the total manatee mortality of 209 individuals in Miami-Dade County during this same period (Table 2). In 1987, the County restricted boat speeds on the river to an "idle/no wake" zone for human safety.

Table 2. Manatee Mortality Data for the Miami River

Number of Manatee deaths	Type of Mortality
6	Water-craft
11	Floodgate/lock
16	Other human related
3	Perinatal
2	Other natural
5	Verified, but not recovered
4	Undetermined, decomposed
6	Undetermined

Both the Miami River and Biscayne Bay are designated critical habitat for the manatee, although there are no seagrasses or other significant food sources available in the Miami River. Direct impacts to nearby native habitat in Biscayne Bay, including seagrass beds, could be avoided if the project design adequately controls and contains sediment transport. The project is not likely to result in adverse modification of critical habitat of the manatee, provided that excessive sedimentation is prevented through appropriate dredging methodology selection and/or implementation of water quality protection safeguards.

The Corps submitted a letter to the Service on January 22, 2002, providing a determination that the proposed project is not likely to adversely affect the manatee. The Corps has agreed to incorporate the Standard Manatee Protection Construction Conditions into the Construction Contract language. Therefore, the Service concurs with the determination of may affect, not likely to adversely affect for the West Indian manatee, and formal consultation under section 7 of the Endangered Species Act is not required. In addition, no authorization for incidental take is needed under the Marine Mammal Protection Act (section 101(a)(5)(A)).

This fulfills the requirements of section 7 of the Endangered Species Act, and no further action is required. However, reinitiation of consultation may be necessary if additional information involving potential effects to listed species becomes available; if a new species is listed; or if nearby designated critical habitat in Biscayne Bay is shown to be adversely affected through monitoring.

The Service also recommends implementation of DEP's Special Conditions in their Conceptual Environmental Resource Permit dated June 17, 2002. Specifically, the Service emphasizes the need to ensure compliance with DEP's Special Condition number 20, for the protection of manatees.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act of 1996 set forth a mandate for the National Marine Fisheries Service, Regional Fishery Management Councils (FMCs), and other Federal agencies to identify and protect "essential fish habitat" (EFH) for important marine and anadromous fish species managed under fishery management plans (FMPs). The NMFS defines EFH as: *those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity*. The estuarine and marine waters of Miami-Dade County, including Biscayne Bay, are designated as EFH (South Atlantic Fishery Management Council, 1998). The South Atlantic Fishery Management Council (SAFMC) defines estuarine inshore habitats as: *emergent vegetation (salt and brackish marsh), estuarine shrub/scrub (mangroves), sea-grass, oyster reefs and shell banks, intertidal flats, palustrine emergent and forested (freshwater wetlands), and the estuarine water column*. Because detritus-rich waters drain from much of the Everglades into Biscayne Bay, a large portion of the Everglades as well as the Miami Canal and the Miami River have been designated the "Biscayne Bay Coastal Wetlands Estuarine Drainage Area" by the SAFMC, one of 18 such areas defined along the South Atlantic Coast. The NMFS, Habitat Conservation Division must be consulted for all EFH issues and for additional direction in the analysis of potential impacts to the federally threatened seagrass, *Halophila johnsonii*.

Marine habitat areas included in the South Atlantic Fishery Management Plan (Plan), that may be affected by the proposed action, include live hardbottoms, artificial or man-made reefs, individual corals and coral reefs, pelagic *Sargassum*, and the marine water column.

4.2 HYDRODYNAMICS

Tidal exchange between the river and bay is extensive, and may result in near complete flushing of the river in a tidal cycle during certain meteorologic/tidal conditions. Given tides and rainwater input, there is a net discharge into the bay (Corps 2002). During the wet season, there will be increased frequency and amount of water discharges into the river from many point sources, especially, from the salinity control structure to the west. These events will periodically increase flushing potential of suspended materials/elements into the bay.

The Service requested hydrologic information on the Miami River, in an effort to evaluate transport of dredge-generated suspended sediment and contaminants. The Corps initiated a Miami River Tracer Study (Brown and Granat) to ascertain this information. The study was based on a previously verified 2-dimensional TABS-MDS numerical hydrodynamic model of Biscayne Bay and Miami Harbor (Brown et al., 2001). The results of this study were presented during a January 10, 2002, meeting which included Corps staff from the Jacksonville District and the Wetlands Experiment Station in Vicksburg, Mississippi, Service staff, DERM staff, and Gulf Engineers & Consultants (see Appendix).

Results of the study indicate that dredge-generated suspended sediments and contaminants will move from the Miami River into Biscayne Bay, and disperse in differing concentrations and locations depending on settling rates, river-flow velocities, prevailing winds, and tidal currents. Under an array of simulations, there were predictions of sediments moving into the bay at concentrations of 1 to 8 percent of the concentration (maximum) at the mouth of the river.

The Tracer Study is useful in determining the fate of suspended materials in Biscayne Bay, after departing the Miami River, rather than determining the transport and deposition of suspended elements as they travel through the Miami River prior to entering Biscayne Bay. The hydrodynamics of sediment transport within the 5.5 miles of the Miami River is important to the Service in order to evaluate project environmental needs. By better understanding the river's sediment transport dynamics, from the westerly control structure to Biscayne Bay interface, the Service could then provide guidance to the Corps for establishing "within river" monitoring locations and sediment/contaminant transport controls. This effort could help curb the introduction of sediment/contaminants into Biscayne Bay.

4.3 CONTAMINANTS

Contaminant accumulation in the Miami River is the result of many years of non-point and point source discharges. Concerted efforts have been made in recent years to identify, and reduce or eliminate pollution input to the river. Non-point source pollutants entering the Miami River have included agricultural pesticides, nutrients, petroleum products, and industrial waste. Point source pollutants originate from commercial and industrial facilities, storm sewer outfalls, and domestic sewage inflows. Domestic sewage inflow, once common, is now being minimized. Storm sewer outfalls have been the greatest source of pollutants to the river and are being retrofitted with sediment traps, settling basins, and percolation trenches in efforts to minimize and treat storm water flows. The City of Miami contains a number of commercial and industrial facilities that are point source contributors. According to the Permit Compliance System (PCS) 2002 Database in the U.S. Environmental Protection Agency's Envirofacts Warehouse, there are 30 listed National Pollutant Discharge Elimination System (NPDES) permits for facilities known to discharge directly or indirectly into the Miami River. There are approximately 20 other unspecified NPDES dischargers, which are believed to discharge into the Miami River system.

Background

The sediments of the Miami River and tributaries (Tamiami Canal and Seybold Canal) have been extensively studied (Corcoran et al. 1983 and 1984; Ryan et al. 1984; ENSECO, Inc. 1985; Savannah Laboratories and Environmental Services, Inc. 1985 and 1987; Vittor and Associates 1988; Markley et al.1990; PBSJ, Inc. 1992; PPB Environmental Laboratories, Inc. 1992, 2000, and 2001; and Long et al. 1999). Conclusions differ among these studies, indicating a wide range of results regarding the magnitude of contamination by organochlorine pesticides (4,4-DDT, 4,4- DDD, 4,4-DDE, chlordane, toxaphene, Lindane, etc.), polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), and resulting toxicity to laboratory test animals. Remarkably, however, all studies consistently report high concentrations of trace metals in Miami River sediments.

Early studies of the Miami River and Biscayne Bay, reported high levels of petrogenic hydrocarbons (Corcoran et al. 1983), as well as metals, pesticides, and PCBs in concentrations an order of magnitude greater than those found anywhere else in Florida and relatively equal to those concentrations found in the New York Bight, Chesapeake Bay, and the Providence River (Corcoran et al. 1984). In 1984, the Florida Department of Environmental Regulation (FDER) reported data on the Miami River as part of a comprehensive study of Florida's deepwater ports (Ryan et al. 1984). Consistent with the Corcoran study (1984), the FDER study found high levels of metals, pesticides, PCBs, and PAHs in Biscayne Bay proximal to the Miami River that were higher than those found in any other Florida port studied. The FDER study also indicated that the Miami River was a source of contamination to Biscayne Bay.

A more recent comprehensive investigation performed and documented by the National Oceanographic and Atmospheric Administration (NOAA) corroborated these earlier findings, providing a very thorough examination of Biscayne Bay and its tributaries. Surficial sediments from 226 locations randomly selected within Biscayne Bay were sampled and analyzed for numerous organic and inorganic contaminants (Long et al. 1999). A total of 20 sites in the Miami River and tributaries were sampled, 14 of which were in the Miami River channel. Chemistry and toxicity relationships were analyzed and examined to determine reasonable patterns of correlations (i.e., toxicity increases with concentration increases). Additionally, chemical concentrations (dry) were compared to Threshold Effects Levels (TELs) and Probable Effects Levels (PELs) as described by McDonald et al (1994 and 1996) in order to describe a statistical probability of adverse effect for each sample site. These effects levels, as set forth in the Florida Sediment Quality Assessment Guidelines (SQAGs), are based on existing published data on the toxicity of contaminants to biological receptors in Florida sediments. In addition to chemical analyses, several laboratory toxicity tests were performed as indicators of potential ecotoxicological effects in sediments, providing a range of toxicological endpoints from acute to chronic sublethal responses. These tests included reduced amphipod survival (solid phase sediment), induction of Cytochrome P-450 reporter gene (in exposures to solvent extracts), impairment of sea urchin fertilization success and abnormal development of embryos (pore waters), reduced metabolic activity of a marine bioluminescent bacteria (in exposure to solvent extracts), and reduced reproductive success in marine copepods (solid phase sediment). Data were analyzed statistically to determine extent of toxicity (slightly, moderately, highly) in comparison to positive and negative controls, and correlation of toxicity to contaminant characteristics was performed for each test method. Chemical analyses indicated high concentrations of lead, mercury, copper, silver, and zinc in addition to low molecular weight PAHs, total PAHs, total chlordane, 4,4-DDT, 4,4-DDE, and 4,4-DDD. Probable Effects Levels were exceeded for these analytes across most sample sites. Results from amphipod survival and *Microtox* tests indicated all sites in the Miami River exhibited significant toxicity except for the mouth of the river. Long et al. (1999) concluded that the Miami River sediments are the most toxic in the Biscayne Bay area and this toxicity is attributed to a combination of metal and organic contaminants. They also suggested that the Miami River was a significant source of contamination to Biscayne Bay.

Studies performed by PPB Environmental Laboratories, Inc. (2000 and 2001) indicated that contaminants detected in sediment samples of the Miami River were primarily metals. Arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc were detected in significant concentrations throughout the majority of samples analyzed. However, in sharp contrast with the above-mentioned studies, concern about organic contaminants such as PAHs, organochlorine pesticides, and PCBs was discounted as these contaminants were not found in significant concentrations and were mostly undetectable. When compared to toxicity criteria described by McDonald (1996), data from the most recent PPB study (PPB Environmental Laboratories, Inc. 2000) (data were collected in 1999) indicated that all sample sites demonstrated concentrations of mercury that exceeded the PEL (100%), four sample sites exceeded the PEL for lead and silver (80%), two sample sites exceeded the PEL for zinc and copper (40%), one sample site exceeded the PEL for cadmium (20%), while arsenic and chromium were not detected above the PEL at any location sampled in the River. Although organochlorine pesticides, PAHs, and PCBs were not detected in sediment samples, sediment elutriates demonstrated detectable concentrations of aldrin, beta-BHC, total DDT, endosulfan, endrin, heptachlor, methoxychlor, PCB 1016 and PCB 1260. These detections were found only in sample sites from the mouth of the Miami River and below the confluence of the Seybold Canal and Miami River. When compared to Florida State Water Quality Standards maximum limits; DDT, endosulfan, endrin, heptachlor, and methoxychlor exceeded screening values for these sediment elutriates. Bioassays performed on these sediments (PPB Laboratories, Inc. 2000) exhibited high survival in Mysid shrimp, indicating no significant toxicity. Results of this study suggest that high concentrations of metals and detectable levels of organochlorine pesticides and PCBs exist in Miami River sediments, however, not at toxic levels.

Chemical Data Discussion

Careful review and comparison of these studies reveal a high degree of variability among the results, most notably in regard to pesticides, PAHs, and PCBs. Conversely, results for mercury, lead, silver, zinc, and copper appear to be more consistent. Results from toxicity testing are also inconsistent among these studies, most notably between the PPB Environmental Laboratories Inc. (1992 and 2000) studies and the NOAA study (Long et al. 1999). PPB Laboratories, Inc. (2000) reported results of acute toxicity tests using Mysid shrimp exposed 96 hours in 100% suspended solid phase. Survival was high, ranging from the lowest survival rate of 85% to 100% survival in 3 out of 5 sample sites tested. On the other hand, Long et al. (1999) documented acute toxicity testing using *Ampelisca abdita*, an amphipod with relatively little sensitivity to grain size, ammonia, and organic carbon. Results were dramatic, demonstrating a very high degree of toxicity with survival rates less than 50% in 11 of 13 sample sites in the main Miami River channel. The lowest survival rate was 2%. Additionally, *Microtox* testing indicated similar results, with 12 of 13 sample sites demonstrating significant toxicity. PPB Environmental Laboratories, Inc. (1992) also exposed *A. abdita* to Miami River sediment and reported results consistent with the NOAA study. This study also exposed Mysid shrimp (*Mysidopsis bahia*) to the same sediment testing, indicating significant toxicity (survival range = 58% to 86%) but not as dramatic as that exhibited by *A. abdita* (survival range = 2% to 54%). Remarkably, these results are not consistent with later studies documented by the same investigators (PPB Environmental Laboratories, Inc. 2000).

When considering the high degree of variability among several investigators/investigations throughout an 18-year period of record, it is important to note the likelihood of heterogeneity in sediment quality (1) along the entire length of the lower reach of the river, and (2) across the spectrum of time over which these studies were performed. It is also important, however difficult, to rank each study regarding overall applicability to the proposed project in order to appropriately "weigh" their respective interpretations of the data. Sample size and site juxtaposition, objectivity, quality of laboratory analyses, and level of data interpretation, could be compared among these studies in an effort to appropriately select which of these studies best characterize contaminants in the sediment of the Miami River.

Sample size and site juxtaposition to potential contaminants sources varied among the studies regarding the Miami River. Long et al. (1999) with 14 sample sites, PPB Environmental Laboratories, Inc. (2001) with 15 samples sites, and Ryan et al. (1984) with 9 sample sites within the river channel, were designed with the greatest degree of adequacy regarding sample size and juxtaposition to potential contaminant inputs. Other studies (ENSECO, Inc. 1985; Savannah Laboratories and Environmental Services, Inc. 1987; PPB Environmental Laboratories 1992 and 2000; PBSJ, Inc. 1992) utilized only 5 or 6 sample sites, providing significantly less coverage and representation.

Application of objective analysis (i.e., hypothesis testing) using applicable statistical analyses is also important to note. PPB Environmental Laboratories, Inc. (1992) performed bioassays and bioaccumulation tests using controls and a reference site to compare sample values. High mortality in the marine reference sediment precluded statistical analysis. Comparisons between sample sites and the control site were expressed in % difference. PPB Environmental Laboratories, Inc. (2000), ENSECO (1985), and Savannah Laboratories and Environmental Services, Inc. (1987) utilized no controls for reference in evaluating chemistry results for metals and organics, precluding any realistic analyses on this data. However, the Savannah Laboratories study did present statistical analyses on bioassay tests in accordance with the "Green Book" (EPA and Corps 1991). Ryan et al. (1984) applied "One-Way Analysis of Variance" to data regarding trace metals data to substantiate comparisons among sample locations. Long et al. (1999) compared PEL values (SQAGs) to chemistry results to predict toxicity and, as well, attempted to correlate chemistry data to bioassay and toxicity tests with correlation statistics and scatter plots. The report dedicated an entire section on how statistical methods were used for each test. Authors of this study effectively tested several hypotheses, which were set forth *apriori* to sample collection and analysis.

Two important aspects of high quality laboratory analysis used in studies such as these are the documentation of 1) Quality Assurance/Quality Control (QA/QC) analysis to validate data accuracy and equipment precision and 2) instrument detection limits (DLs) which are low enough to detect trace concentrations of analytes at levels consistent with PELs and statutory water and sediment quality standards (i.e., EPA and State of Florida). All studies evaluated here were consistent with EPA laboratory methods, including QA/QC analyses, DLs for water analysis and DLs for sediment metals. However, detection limits for organic sediment analyses varied among studies. The PPB Environmental Laboratories, Inc. (2001) study applied DLs which sometimes exceeded PEL values (McDonald et al. 1994 and 1996) for organochlorine pesticides, PCBs, and PAHs by 2 orders of magnitude. Detection limits presented in PPB Environmental Laboratories, Inc. (2001) also exceeded PEL values for these analytes. As a result, both studies indicated that these organic contaminants did not constitute significant toxicity in Miami River sediments. ENSECO (1985) reported DLs below PEL values while Savannah Laboratories and Environmental Services, Inc. (1987) reported DLs for organochlorines higher than PEL values. Most DLs for PAHs in this study were below PEL values (note: these studies were performed and documented prior to McDonald et al. (1994). Long et al. (1999) presented DLs which were lower than PEL values for a wide range of organochlorines, PCBs, and PAHs, providing a thorough data base for interpretation.

Abundant and well placed sample sites (with replication), objective analysis incorporating hypothesis testing by statistical analyses, and high quality laboratory analyses contribute immeasurable credibility to studies such as those evaluated for this project. Long et al. (1999) consistently surpassed most other studies regarding all these criteria, providing a recently published comprehensive contaminants investigation of the entire Biscayne Bay area, including the Miami River, which adequately characterized contaminants in the sediment and its potential for contributing toxicity to the estuarine ecosystem. The authors neither "reached" beyond the limits of their analyses with unfounded conclusions, nor did they neglect to carefully comment on even the least significant of their data. Authors also had the advantage of incorporating SQAG comparisons, lending additional credibility to conclusions regarding potential toxicity of resuspended sediments to the Biscayne Bay estuarine ecosystem. This information was unavailable for studies planned and designed prior to 1994.

Conclusion

It is likely that sediment quality across the Miami River is very heterogenous and dynamic over time and space. Sediment heterogeneity in addition to study purpose and varying levels of comprehensiveness, explain the majority of variance among these many studies. Some recent studies did not indicate that significant levels of organochlorine pesticides or PCBs existed in Miami River (PPB Environmental Laboratories 2000 and 2001). However, enough strong evidence exists to characterize the river's sediments as significantly contaminated throughout the project action area with trace metals, organochlorine pesticides, PCBs, and PAHs.

Long et al. (1999) concluded that the Miami River sediments are highly toxic throughout the reach between the mouth and approximately one mile upstream of the Tamiami Canal confluence. The Tamiami Canal and the Seybold Canal sediments are the most toxic in the Miami River study area. Toxicity decreases dramatically at the mouth and seaward into Biscayne Bay, suggesting that the Miami River is a source of contamination to the bay. Findings of this study are consistent with previous studies (Corcoran et al. 1983 and Ryan et al. 1984), discounting any probability that the quality of these sediments is improving over time, as previously suggested regarding studies performed between 1987 and 1988 (Corps 1990). Sediment toxicity is likely attributed to a combination of metals (copper, lead, mercury, silver and zinc), organochlorine pesticides (chlordane, 4, 4-DDD, 4, 4-DDE, and 4, 4-DDT), total PCBs, and PAHs (low molecular weight and total).

There is a significant probability that dredging operations, such as that proposed for the Miami River project, will resuspend some or all sediment contaminants into the water column. Subsequently, at least some of these resuspended contaminants would likely be transported into Biscayne Bay, a relatively high quality estuary supporting significant aquatic resources and related consumptive human use. Resuspension of sediments throughout the duration of short-term dredging and disposal activities will likely enhance introduction of bioaccumulating compounds such as methyl-mercury, organochlorine pesticides, and PCBs, into the food chain of fish and wildlife that feed in the estuary. Although resuspension of contaminants would only continue throughout the active phase of the project, associated bioaccumulation and biomagnification of these contaminants could significantly contribute to cumulative adverse affects to the Biscayne Bay ecosystem.

Relevant to both historic source discharges and this maintenance dredging event, it should be noted that a study (Browder, McClellan, Harper, and Kandrashoff 1993) of fish morphology in Biscayne Bay has detected abnormalities in selected species which may be associated with introduced pollutants. Stunted or missing dorsal spines or rays, sometimes accompanied by a depression in the dorsal profile ("saddleback"), were found in 10 fish species in six families from North Biscayne Bay. Another morphological abnormality, scale disorientation, was found in six species. Pugheadedness, jaw deformities, and other abnormalities were also observed. The occurrence of similar deformities across such a spectrum of fishes from the same location suggests the deformity was induced by something in the environment common to all these species. Although there could be other explanations for the unusual cluster of abnormalities, it is suspected that the same environmental contaminant or group of contaminants is adversely affecting a common developmental pathway of these fishes.

5.0 PROJECT IMPACT EVALUATION

The Service has evaluated the project alternatives, specifically, the Base Plan and the No-Action Plan and would like to offer the following discussions and recommendations.

5.1 Project Impacts

The fauna of the Miami River is generally impoverished due to historic use and degradation. Resident benthic organisms are tolerant of environmental fluctuations and extremes, especially with respect to salinity, dissolved oxygen, and turbidity. Although dredging activities would likely adversely impact individual species present in materials dredged from the river, it is unlikely that the dredging or the resuspension of solids would remove any significant numbers of natural communities in the river. However, the Service is focusing on potential impacts to Biscayne Bay, and the prevention of adverse impacts to the bay's biological communities.

It is anticipated that dredging operations will resuspend elements and that these elements will reach the mouth of the Miami River and enter Biscayne Bay. This certainly may be the case, since dredging plans for the easternmost portion of the Miami River channel extend out into the bay for approximately one-half mile to the north, adjacent to the mainland. Furthermore, the amount of silt and contaminants reaching Biscayne Bay, as a result of a traditional clamshell dredging, is expected to be greater than the current resuspended and transported sediment caused by shipping operations. The concluding paragraph in the preceding Contaminants section of this report addresses, in detail, potential pollutant introduction and impacts to Biscayne Bay. However, due to the lack of specific dredging and disposal methodologies, lack of information concerning suspended sediment/pollutant transport within the river, and lack of proposed transport control, it is extremely difficult to fully evaluate project impacts.

As stated previously, tidal exchange between the river and bay is extensive, and may result in near complete flushing of the river in certain conditions. However, during the wet season, there will be increased frequency and amount of water discharges into the river from many point sources, increasing ebb tide velocity and carrying capacity of suspended elements into the bay. Therefore, these issues should dictate the importance of when to time or schedule dredging activities, in order to avoid sediment transport peaks.

<u>Special Dredging Considerations</u>

Unclassified and miscellaneous debris expected in the river may require the use of a mechanical overwater crane to remove the debris before initiation of area sediment dredging. Current bathymetric surveys do not sufficiently identify miscellaneous debris in the Miami River. Dredging contractors have indicated that the river may be "dragged" to locate and remove the debris for disposal. Sediment resuspension and transport, as a result of this dragging, will depend on equipment and methodology. It may be necessary for mechanical dredges to be used for miscellaneous debris removal, regardless of the equipment selected for sediment removal.

Measures to be taken to reduce sediment resuspension and to contain turbidity include dredge techniques, operational controls, and barriers, which could be very effective if used together. The contractor is required by state law to comply with the state of Florida turbidity standards. Additional safeguards are needed in order to comply with additional state water quality standards, as noted in DEP's permit. The Corps has indicated that turbidity is the only monitoring parameter necessary for this project. However, the concentration, transport, and fate of resuspended contaminants is not directly tied to suspended solids. Once sediments are resuspended, contaminants will become soluble at varying rates and concentrations. The availability of these contaminants to biological communities is dependent upon synergistic relationships, specifically contaminants and other abiotic and biotic components of the aquatic ecosystem. Turbidity alone cannot address the availability of sediment contaminants during dredging. Also, due to the transport and compounding accumulation of material east of the river, turbidity standards alone are not reflective of the potential for sedimentation damage to aquatic resources, including seagrasses. River core borings show silt/clay percentages frequently reach 50 to 80 percent (Law Engineering, 1995). Settling tests indicate that fines remain suspended and available for transport, for test duration of 24 hours.

With respect to fish and wildlife resources, the Service stresses utilization of the least environmentally damaging techniques for dredging, spoil deposition and de-watering, and debris removal and placement, all of which would help minimize sediment and contaminant suspension in the water column. Dredging is projected to take approximately 18 months to complete.

Types of Dredges Available

There are two general types of dredges available for the removal of sediments: mechanical and hydraulic. The Corps' Engineering Manual (EM) 1110-2-5025 discusses various dredge and disposal methods. However, the selection of the method has not been made by the Corps for this project. It is the Service's understanding that, in accordance with Selection Criteria Guidelines, a contractor's methodology will be a factor in bid competition, especially as it pertains to environmental safeguards. It is the Corps position that innovative dredging technologies may exist, but may not be revealed until a contractor is selected.

Hydraulic pipeline suction dredges use centrifugal pumps to remove sediments in a liquid slurry form. Material can be pumped directly to an upland holding site. A cutterhead attached to the pipe intake can dislodge denser material and minimize clogging by debris. Mechanical dredges include clamshell, dipper, and bucket dredges, of which the latter two have comparatively poor fine sediment retention and handling capabilities. The most commonly used mechanical dredge, the clamshell, physically dislodges and scoops material, and in this case, would load material onto a barge for transport to the upland holding site. A modified, watertight clamshell may also be available, which would reduce sediment resuspension. Of these two types of dredges, the hydraulic dredge system better minimizes suspension of sediments. Another type of dredge, the pneumatic dredge, is a recent development used specifically for contaminated sediments, and would also be expected to further minimize sediment suspension.

Evaluation of Dredging, Handling, and Disposal Alternatives

Various dredging and disposal alternatives analyzed with input from commercial, industrial, and governmental interests are detailed in a document entitled *Alternatives for the Dredging and Disposal of Sediments from the Miami Harbor (Miami River) Project, Florida* (U.S. Army Corps of Engineers, 1993).

Since the Corps' Base Plan is to select project methodology through an RFP, it is not possible for the Service to adequately evaluate potential impacts from project elements, ranging from actual dredging, through material handling/transport, offloading, interim placement/containment, de-watering, and final treatment and destination, without presenting and evaluating a myriad of possible scenarios. In addition, there may be other scenarios that neither the Service nor the Corps are presently aware of since another aspect of the RFP process is to reveal new technologies and methods.

5.2 Future Conditions With and Without Project

Under the No-Action Alternative or "without project condition," biological resources within the Miami River would remain unchanged. Furthermore, current boat traffic would continue to resuspend sediments, which would then be flushed into Biscayne Bay.

Assuming that the Miami River is efficiently dredged as a result of the Base Plan Alternative or "with project condition," the vast majority of presently accumulated sediments and contaminants would be removed and no longer available for resuspension and downstream transport. As such, the "with project condition" is expected to be an ecological improvement, as well as an improvement to navigation and subsequent boater safety.

It is also anticipated that the biological utilization of the river may improve as a result of reducing contaminated sediments and vessel perturbation within the river. The removal of contaminated sediments in the Miami River is expected to reduce the existing adverse effects to Biscayne Bay. Not only will a source of potential contamination be removed, but eliminating shoals and deepening the channel would reduce the amount of material resuspended in the water column during shipping activities.

6.0 RECOMMENDATIONS

The Corps submitted a response on March 25, 2002, to the Service's Draft FWCA Report recommendations (appendix). The Service's Draft FWCA Report recommendations are listed below, followed by a synopsis of the Corps' responses, followed by the Service's final position.

1. Submit project RFP bid responses to the Vero Beach South Florida Ecological Services Office for review. The Service will then provide an evaluation and recommendations as

to the preferred methods and selection of contractor. This information will then be added or supplemented to the Final FWCA Report.

Corps: This type of review must follow Federal Acquisition Regulations. The Service can opt to participate on the Source Selection Team (SST) for this project.

The Service is interested in this option and is presently discussing the specifics of SST participation with the Corps.

2. Considering the present dredging technologies that the Service is aware of, pneumatic dredging is recommended because of its relatively low flow rates and potential for minimal bottom agitation. Other options may include another type of hydraulic method or a sealed precision closed-bucket clamshell with sealed transport. These types of techniques are especially critical since tidal exchange, in the eastern section of the river, becomes more influential in sediment and contaminant transport.

   Corps: These techniques are not practical or necessary.

   The Service maintains its recommendation.

3. The Service also emphasized to the Corps, the need to comply with Special Conditions 6 through 20 of the Florida Department of Environmental Protection's Draft Conceptual Environmental Resource Permit dated December 5, 2001 (see Appendix). The Service should be given the opportunity for input on the development and finalization of the plans for water quality monitoring, biological resources monitoring, flow monitoring, and de-watered spoil monitoring.

   Corps: Will comply with the requirements of the Water Quality Certification.

   The Service maintains its recommendation.

4. Supplement the Miami River Tracer Study with hydrodynamics data and evaluation within the Miami River. This should provide a better understanding of suspended sediments and contaminants as they travel through the river and enter the bay. Perhaps a similar tracer study and/or mixing model will suffice, with maximum concentration simulations at various locations, from the salinity structure down the river to the bay. This should provide important guidance for selecting turbidity and contaminant controls, as well as water quality monitoring locations.

   Corps: Additional modeling is not necessary.

   The Service maintains its recommendation.

5. Devise a contingency plan, based on in-river hydrodynamics, including tidal and high-flow based criteria to temporarily stop work if sediment is transported to the bay. This

would require a contractor to be familiar with South Florida Water Management District's water-routes and control procedures. Also utilize in-river hydrodynamics data to determine the final selection of water quality monitoring stations, the frequency of sampling, and the types of sediment and contaminant containment equipment.

Corps: Dredging will cease if DEP turbidity limits are exceeded.

The Service maintains its recommendation.

6. Submit to the Service a plan utilizing knowledge of flows and tidal-scheduling to determine when dredging should be suspended at certain locations of the river.

   Corps: Turbidity requirements will be met.

   To clarify the Service's recommendation, we were requesting a plan involving flow timing as a possible preventative trigger for when to consider temporaily or intermittently suspending operations. We maintain our recommendation.

7. Submit to the Service a plan indicating special site considerations, dredging techniques, material disposal methods, and environmental safeguards needed for the eastern-most project cut, just outside the mouth of the river.

   The turbidity allowable mixing zone is 150 meters.

   The Service maintains its recommendation.

8. Install turbidity containment devices at the dredging site and spoil de-watering outfall.

   It is difficult and unnecessary to install turbidity containment devices in the river.

   The Service maintains its recommendation, if there is a device or method that would assist in containment.

9. Ensure compliance with the Standard Manatee Protection Construction Conditions during all dredging activities (see Appendix). The Service also supports additional protection measures as contained in Special Condition number 20 of the DEP's Permit dated December 5, 2001.

   Corps: We will comply with the requirements of the ESA and the Water Quality Certification.

   The Service maintains its recommendation.

10. Provide a current seagrass survey of the project vicinity prior to dredging. This survey should target at least a one-quarter mile radius from the mouth of the river, to supplement

Dial Cordy and Associates' summer 2000 seagrass survey, contained in their Environmental Baseline Study for Miami Harbor (Final Report, revised November 2001). In addition, a seagrass monitoring plan should be incorporated into the overall project monitoring, which is designed to capture any project-related impacts.

Corps: Seagrass surveys and monitoring are not necessary.

The Service maintains its recommendation.

11. Provide the Service with details of any preferred plan for a final off site spoil disposal area.

    Corps: We will provide details once the contract is awarded.

    The Service is amenable to this process.

12. Notify the Service 30 days prior to the commencement of dredging.

    Corps: Can do this.

13. Provide monitoring data, as it is recorded during construction, as well as post-construction.

    Corps: Can do this.

7.0 SUMMARY OF POSITION

The Service supports the maintenance dredging and removal of accumulated sediments in the Miami River, along with sensitivity to protecting Biscayne Bay during construction activities. The Service also advocates incorporating adequate environmental safeguards in the project design to help reduce the potential for project impacts to fish and wildlife resources in the Bay. The Service will continue to assist the Corps in project planning, including the selection of dredging techniques and deposition methodologies, development of monitoring plans, and the final offsite disposal.

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U.S. Fish and Wildlife Service
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960

Re: Draft Fish and Wildlife Coordination Act Report on the Miami River Operations and Maintenance Project, Miami-Dade County

Dear Mr. Slack:

The Office of Environmental Services of the Florida Fish and Wildlife Conservation Commission has reviewed this Coordination Act Report, and provides the following comments. A copy of this letter will be sent to the U.S. Army Corps of Engineers, Jacksonville District, in compliance with the Fish and Wildlife Coordination Act.

In Section 4.0 Fish and Wildlife Concerns, under the paragraph titled Threatened and Endangered Species (p. 5), some clarification of a few of the statements should be noted. Manatees have been observed in several tributaries of the Miami River in addition to the ones listed. Manatees have also been observed in the Tamiami Canal and the Comfort Canal. Also, aerial surveys have been conducted on a more than annual basis by DERM since 1989. From December 1989 through July 1994, 87 flights were conducted. Since then, surveys have been flown at least quarterly each year and are on-going, in order to monitor the manatee distribution patterns in the county.

There is also no mention in this section of data collected from tagged manatees using the Miami River system. Six tagged manatees have been recorded using the Miami River and its tributaries. The Miami River is one of the most important manatee areas in Miami-Dade County. Also, the Florida Manatee Recovery Plan identifies Palmer Lake as a category 2 cold weather aggregation site. During a winter synoptic survey, 32 manatees were recorded at one time in Palmer Lake. Researchers have noted that Palmer Lake is 2-3 degrees warmer than Biscayne Bay.

Another point that should be made in the report is that the actual in-water dredging associated with this project poses a significant risk to manatees. Currently, manatees are at risk for vessel impacts and have been killed by vessels using the river. Manatee carcasses have been recovered from the river that were crushed between large vessels and the wharf where they were moored. Also, one carcass was cut into three pieces, indicating collision with a very large propeller. This project will involve the use of barges and tugs that could cause the same types of injuries to manatees. In order to reduce the potential for these impacts, extra precautions should be followed in addition to the Standard Construction Conditions. We provided recommendations to the Florida Department of Environmental Protection (copy enclosed) that were included in their conceptual permit and referenced in this report. We encourage the U.S. Fish and Wildlife Service to require the inclusion of all these recommendations into the Construction Contract language to allow a finding that the project is "not likely to adversely affect" the manatee. We believe that without these extra precautions there is a potential for adverse impacts to manatees.

We appreciate the opportunity to comment on this report. Please do not hesitate to call me, or Ms. Carol Knox of my staff at (850)922-4330, if you have any questions.

Sincerely,

Bradley J. Hartman, Director
Office of Environmental Services

BJH/CAK
Enclosure: Comments dated November 16, 2001
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cc: U.S. Army Corps of Engineers, Jacksonville