

## 6.0 PROJECT IMPACTS

### 6.1 CHANNEL MODIFICATIONS

The Service has concerns regarding the impacts to the benthic community, existing seagrasses, sediment quality, and manatees. According to past studies, the widening and deepening of this channel should cause only temporal mortality to stationary or slow-moving benthic invertebrates through suffocation or burial. Populations should return to original numbers within a few years (Nelson, 1992). Motile species such as fish will swim out of the area during dredging activities. Less motile species may suffocate during substrate removal due to suspended fine sediments. When dredging is completed, fish are expected to return within a relatively short period of time, depending on water quality. Turbidity should be anticipated, and control measures implemented to avoid adverse impacts to aquatic species.

Important sea grass beds in adjacent shallows need protection from direct impact, and associated turbidity. Actual dredging operations should not impact beds due to project location. However, burial and/or light reduction from suspended sediments could cause mortality to grasses in the immediate and surrounding areas. Measures to prevent turbidity should be made a priority. If the Service or other conservation agency member observes the grasses to be adversely affected within one year after project completion, we recommend mitigation at a ratio of 3:1 be conducted by the Corps to ensure replacement of the resource.

A major concern to the Service is the quality of bay sediments which occur in proposed dredging areas. Elevated contaminant levels such as metals, organics, and nutrients occur in Tampa Bay waters, and originate from both point and non-point sources (S. Grabe, pers. comm., 1996). These substances settle in bay bottom sediments, where they continue to degrade the surrounding habitat. The introduction of these sediments to otherwise healthy systems could be hazardous, and remains an issue of concern. Documentation of sediment characteristics for the shallows in the study area also indicate high levels of silts. We believe grain size dictates where and how the spoil material may be utilized. We recommend additional studies to determine sediment characteristics and contaminant levels to determine their effect on fish and wildlife resources.

### 6.2 TURNING BASIN

Impacts to fish and wildlife resources for plans 2-5 would be primarily to bay bottom habitat, and secondarily to shoreline habitat. The plans call for several configurations of extended docks, mooring, and turning areas to be located in and adjacent to the navigation channel, and the lagoon north of the channel.

All plans require dredging, which may cause turbid conditions due to the silty, organic sediments found in the project area. If the material is not contained, burial or suffocation

could result in mortality to benthic organisms. This should be a temporary condition, however, as re-establishment usually occurs within one year post-project.

More importantly, the location of these plans in relation to winter storm occurrence is a concern. Most winter storms in Tampa Bay come from a northwesterly direction, making this area highly prone to rough wind and water. This may result in sediment movement, and possible erosion and/or destruction of the shore and associated structures. As a result, constant maintenance dredging would be necessary, which would destroy local benthos, essentially eliminating the base of the food chain. Continual dredging also presents a constant risk of turbidity problems, resulting in mortality of organisms and/or seagrasses. Although these impacts may be temporary in nature, their constant occurrence will preclude any successional development. Should one of these plans be implemented, it is doubtful the area will ever attain the stability necessary to be biologically productive.

## **7.0 BENEFICIAL USE OF SPOIL MATERIAL**

Large dredging projects in Tampa Bay have historically been the responsibility of the U.S. Army Corps of Engineers. Disposal of dredge spoil from past projects have been placed at upland spoil sites around the bay, or spoil islands such as 2D and 3D in Hillsborough Bay. Current spoil areas are rapidly reaching their capacity. Since alternate sites are not readily available in the area, the Corps is currently working to resolve the problem.

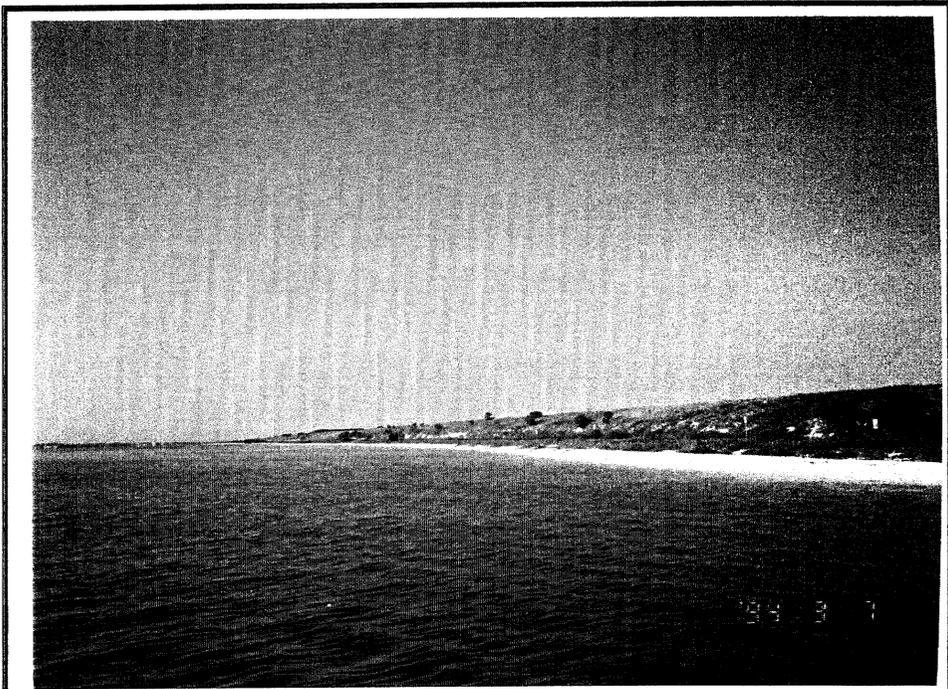
An alternative supported by the Service and the Corps for this project and others, is to utilize dredge spoil in ways beneficial to the environment. Quality spoil material would be placed in locations that would restore, enhance, or create wildlife habitat for terrestrial and aquatic species. Several meetings with interagency personnel, and various ancillary reports from the Service and others have addressed this issue. It appears a consensus regarding beneficial use exists; however, exact uses and locations are mostly undecided. The following provides a description of sites currently under consideration for spoil material placement resulting from the channel and turning basin expansion, and contains a variety of projects from a number of state and local agency personnel:

### Upland Disposal Islands 2D and 3D

These are man-made spoil islands approximately 500 acres in size, located one and a one-half miles offshore in Hillsborough Bay (figures 25, 26). The islands were constructed by the Corps, and are designed as spoil areas. The islands have become important nesting areas for a variety of birds (see Table 2). Spoil additions and enlargements are rare, and require specific timetables to avoid the nesting season (April-September). We support the previous recommendation made by the Service in a 1994 Coordination Act Report which advocates the placement of spoil at other sites, unless a critical situation exists at the islands, such as erosion of confinement berms.



**Figure 25. Disposal island 2D - southeast view**



**Figure 26. Disposal Island 3D - northeast view**

### Alafia Banks

The Alafia banks include two islands, Sunken Island and Bird Island, and were created from the side-casting of dredge materials during channel construction in the late 1920's (Paul, 1993) (Figure 27). Renourishment, creation of a cove, and the planting of vegetation has enabled the area to evolve into a mosaic of habitats. Mangrove swamps, upland beach flats, 2 small interior creeks, mussel bars, salt panne, spartina marsh, and a sand bar just off the southeastern arm currently provide nesting and feeding habitat for a rich assemblage of shore, wading, migratory birds, including occasional least terns (*Sterna antillarum*). This colony is one of the largest and most diverse in the U.S.

The western end of the chain suffers chronic erosion from winter storm events. Although nourishment has taken place through the years, erosion continues on the northwest and southwest corners of the islands. Accretion does occur at some sites, but does not balance erosional loss. Significant habitat loss has occurred in recent years. The creation of additional shallows and shoreline will help replace lost habitat, and encourage use of the area by colonial nesting waterbirds.

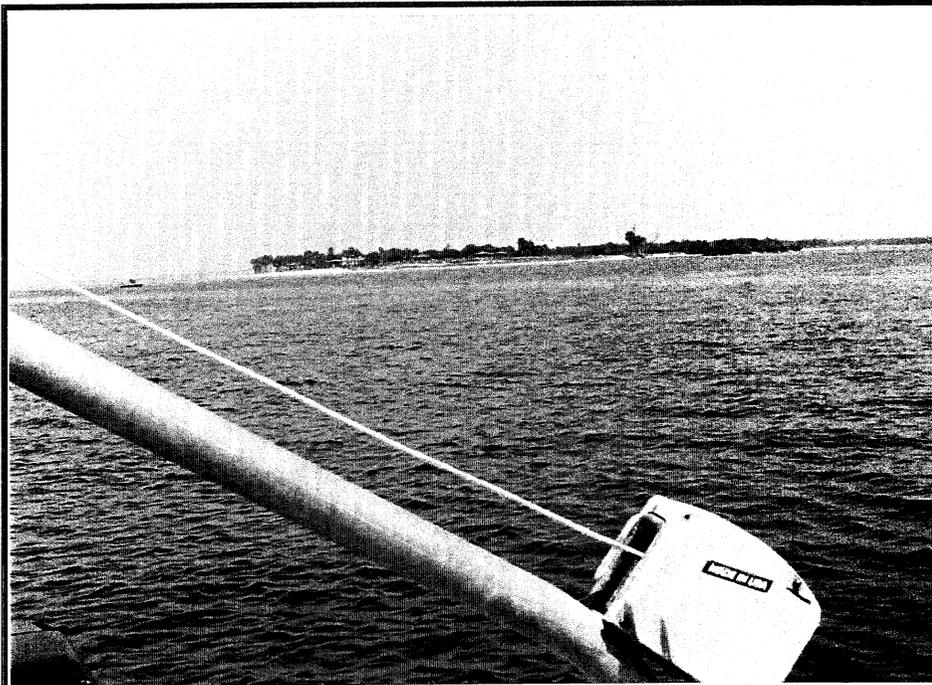
Conceptual plans for spoil nourishment include the creation of a "shark's tooth" configuration in the current fishhook/cove area on the NW/SW side of the island. Desired ecotones are low uplands (4-6 feet), with a waterward slope to shallow lagoons. A large amount of spoil material would be necessary. Preliminary calculations indicate 15-25 acres would need filling, at approximately 2-3 placement points, as well as additional land contouring. Material would not be placed in areas of seagrass beds. It is presumed this would provide a more diverse habitat for avian nesting, and encourage the return of the endangered least tern. No new material is required for Bird Island due to accretion of drifting material from Sunken Island. Limestone rock encountered in the dredging process could also be utilized as a breakwater on the northwest side of the island (R. Paul and A. Schnapf, pers. comm., 1996).

### Cockroach Bay

This area is located south of the project area, and consists of an ecologically important nursery area with an abundance of seagrasses. The Southwest Florida Water Management District's Surface Water Improvement and Management Program (SWIM) has undertaken the restoration of 500 acres of fallow farm fields and decommissioned shell pits. Two stormwater ponds designed to treat agricultural runoff require littoral shelves, which would provide fish and wildlife habitat and water quality improvements. The expected need is approximately 750,000-1 million cubic yards of spoil material. The importance of this project has been discussed with the Corps, and they appear to be interested in providing material for the project when available (Dial and Deis, 1986; B. Henningsen, pers. comm., 1996).



**Figure 27. The Alafia Banks**



**Figure 28. Picnic Island - looking north**

The old shell pits south of Apollo Beach (Leisey Pits-Section 31) were recently purchased by Hillsborough County for preservation and restoration purposes. Aerial photography indicates a complex of old pits which are currently deep water ponds (10-20 feet). Spoil material, especially if high in silt/clay content, could be placed and contained in these to provide more shallow water habitat, and create littoral shelves for habitat enhancement in the Cockroach Bay area. There also exist several other areas in Tampa Bay and Hillsborough Bay which were mined for road fill. If suitable material exists (low in fines), the holes which are readily identifiable should be considered for restoration (A. Burdett, pers. comm., 1996).

#### MacDill Air Force Base

Just off the Interbay Peninsula, southwest of the runways at MacDill, there exist several old borrow holes used for runway fill. These cuts range in depth from 1- 15 feet, and extend in a northwest-southeast orientation. The largest hole is due west of the end of the runway. Substrate material consists of fine sand and an overburden of silt. Although no vegetation occurs in within these areas, seagrasses and drift algae occur in the shallow, subtidal shelves adjacent to the scars (Dial and Deis, 1986; SWFMD, 1996; R. Johansson, pers. comm., 1996). Fish and wildlife usage is expected to be minimal in the pit areas, depending on the season. Typical inhabitants of the adjacent coastal fringe community would be pinfish, anchovy (*Anchoa hepsetus*), mullet (*Mugil cephalus*), mojarra, spot, pigfish, herring, pipefish (*Syngnathus scovelli*), and gobies (*Elecatinus oceanops*) (Schomer *et al.*, 1986). Restoration plans are to fill the deepest areas of the pits to the photic level to allow establishment of sea grass beds. This would provide additional fish nursery /invertebrate habitat. It may be beneficial for some holes to remain for fishing and refugia purposes.

A Service biologist, and marine biologist Tom Ash from EPCHC, surveyed the project area. Data collection occurred at random points within the proposed work site. The following is a description of the findings at each point.

Sample point 1 (27.49.81N; 82.32.50W); located southwest of the guidance pier, in approximately 8-9 feet of water. Water clarity was 8 feet. The bottom is described as barren, coarse sand with little to no relief, with some attached *Caulerpa* spp. It appears scouring does not occur here. Worms (*Dioptra* spp.), few starfish, and horseshoe crabs (*Limulus polyphemus*) were present. No fish were observed.

Sample point 2 (27.50.00N;82.32.50W): located shoreward from above. Sediments were composed of sands, more shell hash, and a higher content of fines than the first sample point. Uncharacteristic of this area, limerock outcrops and clay nodules occurred sporadically, with a one inch sand layer in most areas. Water depth and clarity was approximately 8-8.5 feet. This area was unlike the last in that live bottom species inhabited the substrate, and extended shoreward. The occasional rock outcrops were inhabited by sea

whips (*Leptogorgia* spp.), orange sponge (*Cliona lampa*), and *Caulerpa* spp. Tubeworms, starfish, stone crabs (*Menippe mercenaria*), blue crabs (*Callinectes sapidus*), and hermit crabs (*Coenobita clypeatus*) were also present.

Sample point 3 (27.50.31N;82.32.58W): located a quarter mile north of last sample point. Water depth and clarity was approximately 8 feet. Bottom sediments were predominantly fines mixed with organics (leaves and grass). No live bottom existed here. Starfish and tubeworms were present. This site was similar to the first site, but with more organic debris throughout.

Sample point 4: the exact location of the hole as originally requested by the Corps:

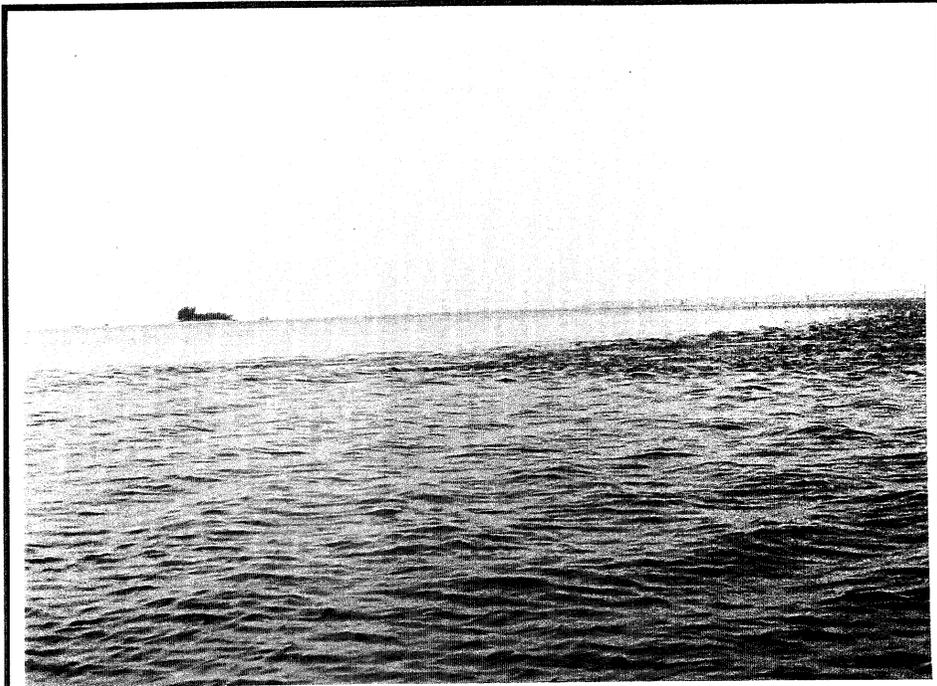
Northern boundary: 27.50.55N;82.32.78W;  
Southern boundary: 27.50.23N;82.32.55W;  
Western boundary: 27.50.23N;82.32.73W; and,  
Eastern boundary: 27.50.33N;82.32.49W.

The benthic community found at this site was consistent with prior sample points in the area, and ranged in depth from 2 feet deep on the edges, to 14 feet deep in the center. No fish were present at the time of field work.

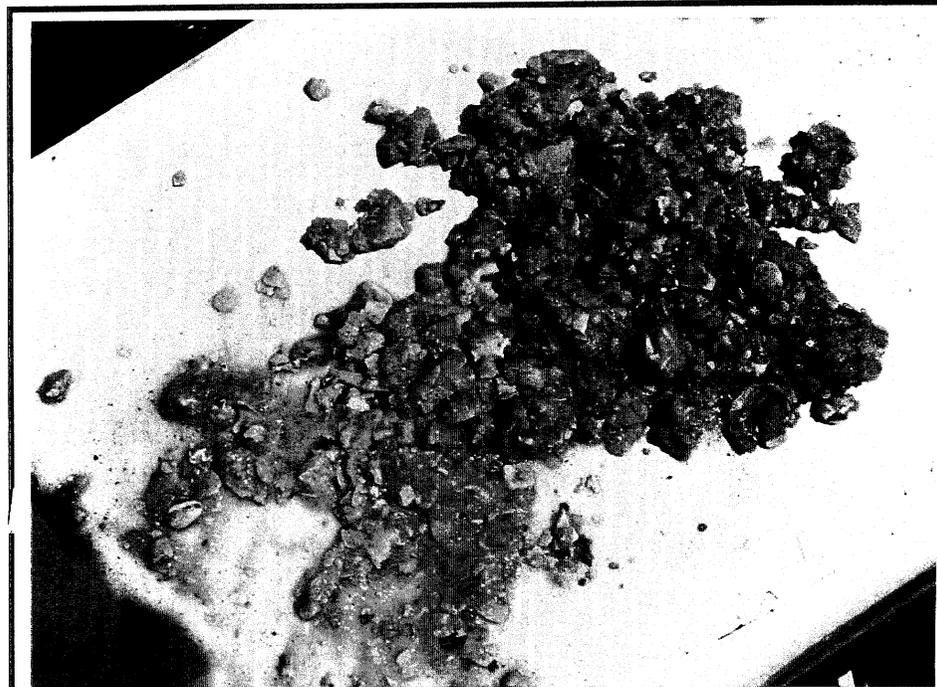
The deepest area of the runway cut off MacDill was checked per the Corps request. The hole is located southeast of Picnic Island and north of the eroded shoals (27.50.49N; 82.33.28W) (figures 28, 29). Diving took place at depths of 30-32 feet. Currents were very rough, and the bottom sediments appeared scoured. Sediments consisted of very fine, hard-packed sands with shell hash (Figure 30). A low and live bottom was present, with aquatic species which could only survive in a turbulent environment. Remnant quahog shell (*Merceneria merceneria*) and large orange sponges form extensive beds attached to sand and shell remnants in the sand (Figure 31). Tubeworms, conchs, and hermit crabs were also present. No fish were observed. We speculate fish species such as sea robins (*Prionotus* spp.) and shore lizards inhabit this community. Some attached *Caulerpa* spp. was also observed.

The rough currents in this area are due to its geographical location and topographical character. The hole is located in the narrows of Tampa Bay, and is steeply contoured. These two factors combine to create a scouring action from daily tides and normal wave patterns. Eroded shoals nearby exacerbate this by forming a "riptide" action. Filling this area would not be advisable based on the potential for severe erosion and turbidity problems, which would adversely affect seagrass beds nearby.

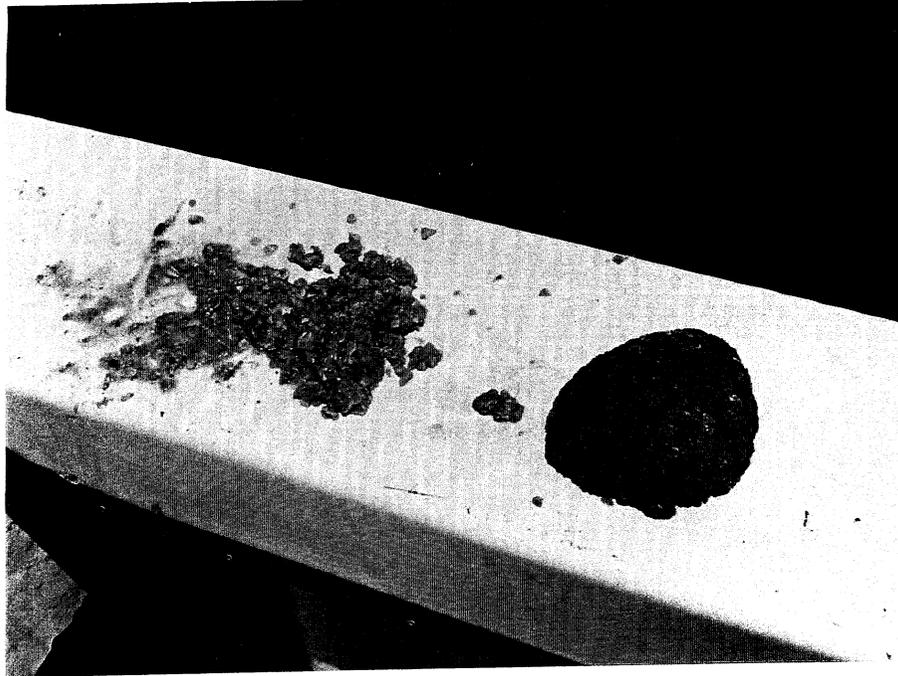
It is evident this area consists of a variety of substrate and sediments, which harbor a consistent benthic community. One area of live- bottom was found, which was atypical of



**Figure 29. Shoals south of Picnic Island - south view**



**Figure 30. Sediment sample from area north of shoals.**



**Figure 31. Quahog shell (*Merceneria merceneria*) found north of shoals.**

the other sample points. Since this is a somewhat unique community in the immediate marine scape, we recommend its preservation, if possible. Further investigation is needed to determine the topographical character of the substrate, and the extent of live-bottom communities in the study area. Subsequent restoration plans should consider these issues.

### The Palm River

Historically the river and its upstream component, Six Mile Creek, was an aesthetic and ecologically valuable waterway along the eastern fringe of Tampa's urban and industrial center. Fifty years ago, it became the dumping ground for industrial and domestic waste, which resulted in a heavy organic pollution problem. In the late 1960's to the early 1980's, this waterway was incorporated into the Tampa Bypass Canal project, which channelized the river for flood control and navigational purposes. Extensive hydrological modification and habitat loss occurred. In the 1970's, several agencies initiated efforts to eliminate point source pollutants, which have been mostly successful.

A study conducted by HDR Engineering for the Palm River Management Committee (1994) drew the following conclusions about the current problems which plague the river:

1. altered bathymetry adversely affects the dissolved oxygen levels of the river;
2. untreated stormwater adversely affects the water quality on a local basis;
3. the surficial sediments underlying the river appear to be highly contaminated;
4. an abandoned landfill on the river's north bank adversely affects habitat and aesthetic values, and possibly water quality; and,
5. despite constraints with flood control functions, opportunities for habitat restoration exist.

Recommendations from the report advocate data collection and restoration efforts to include a reevaluation of the Corps canal design, modification of the river bathymetry, sediment analysis, total elimination of point source and non-point source pollution, and re-creation of historic upland and wetland communities.

A Service biologist toured the river with Tampa Baywatch and DEP personnel on October 10, 1996. Several interconnected problems currently affect the normal functioning of the river, including a 9-foot elevation sill at the highway 41 bridge, reduced tidal flushing, heavy algal blooms, subsequent low dissolved oxygen, a benthic saltwater wedge throughout the river, and reduced oligohaline habitat due to minimal freshwater input from an upstream dam. It appears an overall substrate change is necessary to restore dissolved oxygen levels. Fish species found are mullet, tarpon, snook, and redfish. Other aquatic species such as crabs and other fish are limited due to the problems listed above (T. Cardinale, P. Clark, B. Musser, pers. comms., 1996).

Conceptual restoration plans for the three and one-half mile segment of the river include using suitable spoil material to reduce the current depth, and remove the sill in the river channel to improve mixing. Flood control protection would remain a consideration, thus approval from the Corps and SWFMD is required. The spoil would also be used to create shallows and substrate for intertidal wetland habitat.

### Whiskey Key/Green Key

These are two natural islands in a biologically rich area known as "The Kitchen." The area consists of mangrove and marsh shorelines, and shallow sand flats with water depths of 1-3 feet. Seagrasses have recently begun to reestablish. The islands are part of the National Audubon Society Sanctuaries. The impact area consists of two dredge cuts to the west and east of Whiskey Key. The cuts cover 8 hectares, and are approximately 9 feet deeper than the surrounding substrate. A low dissolved oxygen environment is the primary concern. Both keys have low, but consistent bird usage. Whiskey Key supports nesting; Green Key does not.

The restoration plan includes filling the holes to surrounding elevations. This would benefit the benthic community, provide a photic zone for seagrasses, and improve the dissolved oxygen level. However, appropriate silt content of the dredge material is crucial, as resulting turbidity could hamper recovery efforts (Dial and Deis, 1986; R. Paul, pers. comm., 1996; TBRPC, 1996).

### 7.1 BENEFICIAL USE OF SPOIL MATERIAL (TURNING BASIN)

The Service requested input from various state and federal agencies regarding the beneficial use of spoil material resulting from the construction of a new turning basin. In a meeting on August 27, 1997, the consensus of the group was that the alternatives chosen for the Alafia Navigation Channel Project should be utilized, with the addition of the littoral shelf creation off the eastern shorelines of spoil islands 2 and 3D (described below).

#### Marsh creation

This proposal involves the creation of low and high salt marsh habitat around islands 2D and 3D around for fish and wildlife. Before work could be initiated, the currents in the bay should be studied to determine areas of avoidance and planting viability. It appears the south and southeastern sides of the islands would be most favorable for marsh creation because of northwest storms in the winter months. Although this alternative was given serious consideration, it was inadvertently not ranked among the selections below.

## **8.0 SERVICE CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 RECOMMENDATIONS FOR BENEFICIAL USE SITES**

The Service has evaluated the following sites for beneficial use of dredge spoil material resulting from the expansion of the Alafia channel and associated turning basin. The selection combines sites suggested for previous projects, with new sites suggested by key agency restoration personnel. The following are prioritized recommendations for the enhancement of fish and wildlife resources:

#### **1. The Alafia Banks**

Renourishment of this area would be most beneficial to regional, as well as Tampa Bay avian resources. The importance of this site was agreed upon by representatives from the Tampa Bay National Estuary Program, the National Marine Fisheries Service, EPCHC, FDEP, Tampa Baywatch, and the National Audubon Society. The addition of spoil material to create additional wetland and upland habitat would likely attract and maintain a diversity of bird and aquatic species. Erosion would be inhibited as well. This project is also advantageous economically, for its location, and its requirement for a significant amount of material, which help to minimize transport costs.

Issues to address are a construction window for nesting birds, sediment quality, and agreement from the Corps to utilize more than one placement point for dredge material. Construction activities would be allowed during the non-nesting season only. If unacceptable sediment contaminant levels are found, other uses should be considered to avoid potential environmental hazards.

#### **2. The Palm River**

The Service believes the river has significant environmental restoration potential, which would offer multi-faceted wildlife benefits. Issues of low DO, increased tidal flushing, and creation of oligohaline habitat need to be addressed.

The distance between the river and the project site is a major consideration due to transport costs. Barging the spoil material to the river would most likely be cost prohibitive. Possible alternatives include hydraulic pipeline transport, or trucking material to the site. The restoration would require large amounts of material. Sponsorship and funding are also critical obstacles to overcome. Efforts are currently underway to secure sponsorship from interested parties. SWFMD is a possible candidate, but has not yet committed. The Corps' Section 1135 program is a possible funding source, based on eligibility. A revision of the Corps river management plan from one of flood control, to one of restoration is necessary. Once resolved, we support full restoration of this system.

### 3. MacDill AFB

The filling in of old runway dredge scars is considered beneficial in this area due to the large, established seagrass beds nearby which support significant numbers of nursery fish and invertebrates. We believe the expansion of suitable substrate and proximity to the established beds will promote future seagrass establishment. This will aid in the TBNEP's efforts to increase seagrass acreage in Tampa Bay (TNEP, 1993).

Transport costs could be prohibitive due to the transport distance from the Alafia site, however, the scars require large amounts of material to raise the bottom contours from their current depth of up to 13 feet. Turbidity could be a problem unless precautionary measures are taken. Studies of shoreline wave patterns and erosion rates should be conducted to avoid future hazards.

### 4. Cockroach Bay

The old shell pits could be filled to create wildlife habitat and achieve overall landscape assimilation. Past visits to this area indicate extensive wading bird and raptor presence. The addition of wetland habitat would help native, as well as passerine species. This would work in conjunction with current plans of the SWIM program. Another suggestion is to create upland habitat for endemic species traveling north from southern displacement. This would benefit the threatened scrub jay (*Aphelocoma coerulescens*) (J. Beaver, pers. comm., 1996).

The economics to transport material to this area is probably cost prohibitive. However, there are several pits which need restoration. The benefits to be gained would justify the costs incurred.

### 5. Whiskey Key/Green Key

The filling of old dredge scars would benefit the benthic community, promote seagrass establishment, and raise the dissolved oxygen level of the nearby water column.

The economics of transport are a consideration as the project requires only minimal amounts of material. Location is a minor consideration. A construction window may be necessary. This could be considered an auxiliary project to a larger one.

### 6. Spoil Islands 2D and 3D

This is the least preferred choice based on the minimal environmental benefits to be gained. They would be encouraged only if nesting areas were in need of nourishment. Timing of spoil placement is critical, and could disrupt nesting patterns. Management of the islands to maintain them as suitable habitat would be required.

The Service advocates renourishment of the Alafia Banks. This would inhibit erosion and preserve the island chain, thereby increasing habitat for several endangered/threatened avian species in the bay. The logistics and costs are minimal. Our second choice is the restoration of the Palm River. In terms of beneficial use, filling the holes at MacDill warrant serious consideration, but may have some constraints. We are opposed to filling spoil islands 2D and 3D.

## 8.2 RECOMMENDATIONS FOR CHANNEL DEEPENING AND TURNING BASIN

The Corps requested a Fish and Wildlife Coordination Act Report from the Service regarding the environmental impacts of widening and deepening the existing Alafia River Main Shipping Navigation Channel, the possible construction of a new turning basin, and the possible beneficial uses of the resultant spoil material. We believe channel dredging will have minimal adverse effect on fish and wildlife resources; however, sediment studies are recommended in the channel and proposed turning basin areas to determine their local characteristics and their suitability for other uses. The construction of a new turning basin may adversely affect trust resources depending on its final location. Based on our evaluation, we recommend plan 1, which would expand the existing basin and limit environmental impacts to previously disturbed areas. In terms of new construction, plan 4 creates the least impacts; however, we emphasize our support for no new impacts in previously undisturbed areas. Adequate protection for the manatee for both projects is outlined in the biological opinion.

## 9.0 FEDERALLY LISTED THREATENED AND ENDANGERED SPECIES

The following represents the biological opinion of the U.S. Fish and Wildlife Service (Service) pursuant to Section 7(a) of the Endangered Species Act of 1973, as amended (Act) regarding the U.S. Army Corps of Engineers (Corps) expansion dredging of the Alafia River main shipping navigational channel, and its effects of that action on the West Indian manatee (*Trichechus manatus*). An administrative record of this consultation is on file in the Jacksonville, Florida, Field Office.

### 9.1 CONSULTATION HISTORY

The Service's Vero Beach Field Office conducted informal section 7 consultation with the Corps in conjunction with the preparation of the February 1994 Fish and Wildlife Coordination Act report. The Service concluded that the project was not likely to adversely affect the manatee, based on the commitment by the Corps to condition construction contracts with the standard manatee conditions, and to prohibit dredging between November 15 and March 31.

## 9.2 BIOLOGICAL OPINION

### DESCRIPTION OF PROPOSED ACTION

The Corps has proposed to expand the main shipping channel to the Alafia River in Hillsborough County, Florida. The mouth of the Alafia is located on the eastern shore of Hillsborough Bay, wherein a harbor serves Cargill Fertilizer, a private phosphate manufacturer. The present facilities offer a 3.6-mile channel, 200 feet wide and 30 feet deep. The berthing wharf is 2,200 feet long with depths of 30 feet. The Corps Reconnaissance Report (January 1991) indicated the need for an expanded channel, berthing, and turning areas to accommodate the newer, larger incoming vessels.

### STATUS OF THE SPECIES/CRITICAL HABITAT

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 Part 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 and the Antillean manatee (*T. m. manatus*).

The Florida manatee is a native marine mammal restricted to the coastal waters of Florida and Georgia. Manatees are commonly found in bays, inlets, and rivers occurring in fresh, brackish, and salt water environments. They are herbivorous, and prefer to feed on submerged aquatic vegetation.

At present, there are at least 2,639 manatees in Florida and Georgia. The only year-round populations of manatees in the United States occur throughout the coastal and inland waterways of peninsular Florida, and a small group that overwinters in extreme southeast Georgia. The population appears to be evenly divided between the Gulf and east coasts of Florida.

Manatee deaths resulting from human activities are well documented through a carcass recovery program initiated in 1974. Causes of death include collision with large and small boats, crushing by barges and man-made water control structures and navigation locks, entanglement in nets and lines, entrapment in culverts, poaching, and entanglement in and ingestion of marine debris (e.g., monofilament).

From 1974 through 1994, 2,456 manatee carcasses were recovered in the southeastern United States. Eight hundred and two (33 per cent) were attributed to human-related causes. Of these 613 were caused by collisions with watercraft, 111 were flood gate/canal lock-related, and another 78 were categorized as other human-related. Collision with watercraft accounted for 83 per cent of human-related causes of death during this period.

## ENVIRONMENTAL BASELINE

### Action Area

The action area for this biological opinion is defined as the immediate area of the project site. The project location is on the east side of Tampa Bay, in Hillsborough Bay, at the mouth of the Alafia River. Hillsborough Bay is a estuarine, open water environment with generally low tidal amplitudes and extensive shallows. Characteristic vegetative shoreline communities are lacking in most areas due to the presence of heavy urbanization and industry. The bay bottom is extensively and routinely dredged for berthing and shipping channels. Few areas of submerged aquatic vegetation exist; however some does occur in the shallows immediately south of the project site. The Alafia River is heavily used by small watercraft, which travel at high speeds once in the bay. Large ships also frequent the area. A public marina is located upstream.

### Status of the Species in the Action Area

Aerial survey counts in Tampa Bay indicate a steady population increase since 1984, mostly due to better sampling as a result of improved equipment and refined methodology, and also due to migration from Crystal River, plus an overall marginal population increase. Surveys from 1987-1994 indicate a total of 5,358 sightings in Tampa Bay. A record high of 190 animals have been observed at one time (1994). Hillsborough Bay, Big Bend, and MacDill Air Force Base (project area) have documented 229, 1,539, and 95 manatee sightings, respectively, in a 7-year period (1987-1994) (B. Ackerman, pers. comm., 1996).

Manatees use Tampa Bay, Hillsborough Bay and the Alafia River for foraging, freshwater drinking sites, and refuge in warm water outfall areas. The immediate action area receives year-round use, with higher numbers in the warmer months, where they are usually sighted along the east-west shipping channel, mouth, and nearby bay shallows (B. Ackerman, pers. comm., 1996). In winter months, three warm-water discharge sites (Big Bend, Bartow, and Pt. Sutton) attract 75% of the total winter population of Tampa Bay, compared with 25% in the warmer months. The onset of autumn signals winter aggregating behavior for 40% of the animals, with the remainder arriving in December. Two of the plants, Pt. Sutton and Big Bend, are located three miles to the north and south of the Alafia River, respectively. The animals occur in the project area due its location in an established north-south travel route discharge points between the Big Bend and the Port Sutton power plants (B. Ackerman, pers. comm., 1996), where the animals seek discharge outfalls. Most gather at the Big Bend power

plant, with only intermittent use of the Pt. Sutton plant. This information confirms animals are present year round, and as such the project area requires adequate protection measures.

Thirty-two manatee mortalities are documented for Hillsborough Bay over an 18-year period (1977-1995). These mortalities resulted from watercraft, natural, perinatal, and undetermined causes. In that time period, there were eight manatee mortalities in the action area. Two were determined as natural, four were undetermined, one was caused by watercraft, and one was perinatal. There are no designated manatee zones, or speed zones (Ackerman *et al.*, 1995; Wright *et al.*, 1995)

Manatee presence and protection at potential "beneficial use" sites is also a concern. MacDill AFB, Whiskey Key, Cockroach Bay, and the south and west sides of the Alafia banks possess seagrass beds which act as attractants for manatees. The Palm River and spoil island areas have no seagrass, but do harbor manatees. There are documented mortalities for the years 1977-1995 for MacDill AFB, Cockroach Bay, Palm River, and the spoil islands. To adequately protect the manatees at these locations, we recommend the standard manatee construction conditions be made a condition of any work contract or Corps proposal for beneficial spoil placement.

#### Effects of the Proposed Action

Dredging activities typically involve the use of either a standard clamshell dredge with a sealed bucket, or a hydraulic dredge with a cutter head. It is possible that the dredge head could make contact with a manatee as the dredge head moves through the water column. Because manatees usually avoid areas of ongoing dredging operations, and we expect small numbers of animals in the vicinity during dredging, we believe the 100-yard observation zone required in the standard construction conditions eliminates this hazard.

Vessels used in standard operations include a barge which houses the dredge, a tugboat to tow the barge, a storage barge to transport dredge material, and ancillary crew boats to service the barge. Barges, in and of themselves, are not considered a threat to manatees, as they move slowly through the water, giving adequate warning to manatees. Tugboats are more hazardous due to their powerful engines and propellers, which can "draw" a manatee to it, or cause injury from blades. Since the tugs are also relatively slow moving, manatees should be able to avoid contact. Small watercraft which commute through the work area several times a day to move personnel, or perform environmental monitoring, pose the most threat. Their small size and high speed prevent slow-moving manatees from avoiding a collision. This may result in injury or mortality. The standard conditions state all watercraft travel at idle/no wake speeds while in the construction area, and in water where the draft of the vessel provides less than a four-foot clearance from the bottom. Adherence to this condition is critical to avoid injury and /or mortality to manatees. Because the Alafia River is a significant distance (approximately three miles north) from a manatee sanctuary, and small numbers traverse the work area, we believe the "no-dredge" window as recommended in the

Service CAR of 1994, is not necessary in this project; that recommendation was appropriate only for the area immediate to the Big Bend warm-water discharge point.

### 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 Endangered Species Act.

The cumulative effect of actions that will increase the likelihood of manatees being struck by boats or dredge equipment include those actions that are not accounted or monitored for in the action area. We are aware that the Tampa Port Authority has jurisdiction over the Alafia turning basin, and will periodically perform maintenance dredging. The standard manatee conditions will be implemented. We are not aware of any other proposed private or state projects in the immediate vicinity. Adverse cumulative impacts on the endangered manatee can be minimized through crew awareness, education, and strict adherence to the standard manatee precaution conditions.

### CONCLUSION

After reviewing the current status of the Florida manatee, the environmental baseline for the action area, the effects of the proposed action, cumulative effects, and the fact that there are no documented watercraft-related or dredge-related mortalities in the action area, it is the Service's biological opinion that this project is not likely to jeopardize the continued existence of the Florida manatee, or adversely modify critical habitat.

### 9.3 INCIDENTAL TAKE

Sections 4(d) and 9 of the Endangered Species Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of listed species of fish and wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7 (b) (4) and 7 (o) (2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The Service does not anticipate that the proposed action will incidentally take any manatees. In the accompanying biological opinion, the Service determined that this project is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat. If death or injury of a manatee occurs, dredging operations must cease, and the incident reported immediately to the Florida Marine Patrol at 1-800-DIAL-FMP and to the Service Jacksonville Field Office at (904) 232-2580 or Tampa sub-office (813) 840-2907.

#### 9.4 CONSERVATION RECOMMENDATIONS

Section 7 (a) (1) of the Endangered Species Act directs Federal agencies to utilize their authorities to further the purposes 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 affects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

To minimize potential impacts to the manatee, the Service recommends that the following be incorporated into the project plans:

1. The standard manatee construction conditions be included in any contract issued for the work, and/or in the final Corps EIS, and implemented by all crew personnel.
2. Education in the form of signage, brochures, and discussion, pertaining to the manatee be included as a part of crew training.

#### 9.5 REINITIATION OF CONSULTATION

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an affect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take occurs, any operations causing such take must cease pending reinitiation.

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## 10.2 PERSONAL COMMUNICATIONS

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Planning Division  
Environmental Branch

JUL 05 2000

Mr. David Hankla  
Field Supervisor  
U.S. Fish and Wildlife Service  
Suite 310  
6620 Southpoint Drive South  
Jacksonville, Florida 32216

Dear Mr. Hankla:

This is in reference to the Alafia River Navigation Expansion Feasibility Study. Your office recently completed a Fish and Wildlife Coordination Act Report and provided comments in response to public coordination of the Environmental Assessment (EA).

It has come to our attention that blasting would be required to remove rock substrate from the channel. Your agency has recommended using specific conditions in other projects to protect manatees (See enclosed). We are proposing to incorporate these conditions into this project and will update the EA accordingly.

We have made a "No Effects" determination on species listed as threatened or endangered and are asking for your concurrence. If you have any further questions, please feel free to contact me.

Sincerely,

James C. Duck  
Chief, Planning Division

Enclosure

bcc:  
CESAJ-CO  
CESAJ-DP-I (Murphy)

*F*  
Fonferek/CESAJ-PD-ER/2803/als 6/29/00  
*R. D.*  
Dugger/CESAJ-PD-ER  
*SM*  
Smith/CESAJ-PD-E  
*Strain*  
Strain/CESAJ-PD-A  
*Murphy*  
Murphy/CESAJ-DP-I  
*Duck*  
Duck/CESAJ-PD

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William J Fonferek  
06/23/2000 10:26 AM

To: Brian\_Pridgeon@fws.gov@exchange  
cc:  
Subject: Alafia River Navigation Channel Expansion

It has come to my attention from comments on the report that our engineering bunch has said we need to blast. Therefore, I would like to informally consult on this and have our BO amended. We plan to incorporate into our work the following conditions which your Jacksonville Office has recommended for the construction of the Palm Valley Bridge on the IWW:

#### CONSERVATION RECOMMENDATIONS FOR BLASTING

There may be blasting involved with this project which may adversely impact the manatee. Therefore, additional manatee protection measures should be implemented. We recommend that the following conditions be made part of the permit, if issued:

1. That the standard manatee conditions be included in any contract issued for the work.
2. For each explosive charge placed, detonation will not occur if a manatee is known to be (or based on previous sightings, may be) within a circular area around the detonation site with the following radius:

$$r = 260w^{1/3}$$

where

r = radius of the danger zone in feet  
w - weight of the explosive charge in pounds (tetryl or TNT)

3. A manatee watch will be conducted by no less than two qualified observers from watercraft, aircraft or high vantage point for at least one half hour immediately before and after each detonation, in a circular area at least three times the radius of the above described danger zone.
4. Any manatee(s) in the danger zone or the watch zone shall not be forced to move out of those zones by human intervention. Detonation shall not occur until the manatee(s) move(s) out of the danger zone on its own volition.
5. In the event a manatee is injured or killed during

blasting, notify the Resource Alert Hotline in Tallahassee at 800-342-1821 and the Florida Department of Natural Resources' Marine Mammal Recovery at 813-896-8626.



# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
6620 Southpoint Drive South  
Suite 310  
Jacksonville, Florida 32216-0958

IN REPLY REFER TO:  
FWS/R4/ES-JAFL

September 5, 2000

James C. Duck  
Chief, Planning Division  
Jacksonville District Corps of Engineers  
P.O. Box 4970  
Jacksonville, Florida 32232

Dear Mr. Duck:

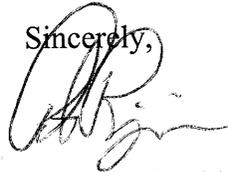
This is in response to your letter of July 5, 2000, regarding the need to blast for the Alafia River Navigation Expansion Project. Your letter included proposed conservation recommendations for blasting and determined that the project would have no effect on manatees. After reviewing the proposed conservation recommendations, we concluded that they were insufficient to protect manatees. A Service biologist consulted informally with your staff and provided an example of an Endangered Species Watch Program that we believe adequately addresses manatee observation requirements. A copy of that Endangered Species Watch Program is enclosed.

Our greatest concern with the recommendations proposed in your July 5<sup>th</sup> letter is with the manatee watch. The proposal indicates that as few as two observers in a watercraft could be used to satisfy the observation needs. We do not believe that this is adequate. Observers will have to be placed above water level to see the area to be monitored. The attached example incorporated a combination of aerial and ground based observers, an approach that we believe appropriate for the Alafia River Expansion Project.

We do not concur with your "no effect" determination. Based on the information provided to date, it is our view that the Alafia River Expansion Project may affect, and is likely to adversely affect, manatees because of the insufficient manatee observation protocols.

If you have any questions regarding these comments please contact Bryan Pridgeon at (727) 570-5398, extension 13.

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Hankla', written over the word 'Sincerely,'.

*File* David L. Hankla  
Field Supervisor

Enclosure

S: alafiaman\BP\acm\9.5.00

L group / Pde / alafia / blasting 2

U.S. Fish and Wildlife Service  
9549 Koger Blvd., Suite 111  
St. Petersburg, FL 33702

Phone: 727-570-5398, extension 13  
Fax: 727-570-5450

From: Bryan Pridgeon

Date: 7/24/00

No. of pages including cover 10

To: BILL FOWFEREK

Fax: 904-232-3442

Subject: ALAFIA R. MANATEE MONITORING

Bill,

The observer requirements stated in the proposed blasting plan are not adequate for the Alafia R. project. A plan developed for the Atlantic Drydock project is attached. The use of aerial observers similar to those ~~used~~ need in the Atlantic Drydock project will be required.

Bryan

## MARINE WILDLIFE SAFETY PLAN

The Marine Wildlife Safety Plan has been prepared to ensure the protection of those species large enough to be located visually within the zone of influence where blasting activities will be taking place.

Historical data from blasting underwater-buried charges is very limited. Some of the important characteristic and parameters to be considered are as follows:

- Substrata Characteristics
- The amount and type of stemming
- Decking and/or delaying
- type of Explosives Used
- Blast Pattern and Geometry
- Geology

Note: The density, strength, and variety of the geology has a significant impact on energy attenuation and the path of pressure wave being transmitted. A number of pre-blast procedures will be employed to provide the maximum level of protection for Marine Mammal Wildlife.

The danger zone radius in feet from the blast can be determined by using the Safety Formula from the U.S. Navy Dive Manual for an uncontrolled blast suspended in the water column. This formula is extremely conservative since the charge(s) to be used for Atlantic Dry Dock are confined within the rock which is the most effective way of reducing both the pressure and impulse of a water shock wave. In addition, the borehole will be stemmed at the collar to further contain the pressures.

The danger zone radius in feet is determined by the following formula:

**Safety Formula**             $R = 260(W)^{1/3}$

R = Radius

W = Weight of Explosive in pounds per delay

The anticipated maximum pounds per delay for the Atlantic Dry Dock Facility is approximately 70.8 lbs.

$R = 260 (70.8)^{1/3}$

$R = 260 (4.12)$

R = 1073 ft.

To ensure the maximum protection for manatees, the Safety Zone radius is set by the direction of the Florida Department of Environmental Protection at 3422 ft.

**MANATEE, MARINE MAMMAL, AND SEA TURTLE  
SURVEY WATCH PLAN**

The plan is intended to minimize the impact on large marine wildlife of the explosive pretreatment of sub-aqueous rock during the construction of a floating dry dock facility. This Plan addresses the concerns of relating to the potential impacts of the activities to manatees, other marine mammals and sea turtles. This plan is intended for use during the non-migratory season for manatees in north Florida, December 1 through February 28. Changes to this plan will require written concurrence by the U.S. Fish & Wildlife Service.

1. No less than thirty (30) days prior to the first detonation event, the following information will be provided to the U.S. Fish and Wildlife Service (USFWS) for review and approval:

- (a) Proposed observer list with individuals' qualifications/experience.
- (b) Detailed survey procedures and aerial survey route with map.
- (c) Detonation schedule.
- (d) Communications plan and procedures.
- (e) Sample log sheets.

2. A formal Plan Coordination Meeting will be held no later than three days before the first detonation event to review the above listed items, to discuss the responsibilities of all parties, and to review and approve the schedule of events. Attendees will include the US Army Corps of Engineers, Area Engineer, the Dredging contractors representative, the entire Marine Wildlife Safety Observer team, the Blasting Consultant (CDB), the U.S. Fish & Wildlife Service (USFWS), the Florida Department of Environmental Protection (FDEP), the U.S. Coast Guard (USCG), and other interested parties such as the Florida Marine Patrol. The agenda will be coordinated by Corps with CDB, the USFWS, and the FDEP. It will include the latest information about the possible presence of manatee, other marine mammals, and sea turtles during

the operation, the logistics of the detonation schedule, the communications plan and the responsibilities of all parties involved.

3. The Marine Wildlife Safety Observer team will consist of five members. A Chief Observer, who will be the aerial observer in a helicopter, and four stationary ground or waterborne observers. The Manatee observers will have no other duties. The Chief Observer will have prior survey experience. Inexperienced observers will be trained in methods of surveillance, and this training will be documented. Training records will be kept until the completion of the operations covered by this plan.

4. Observers shall follow the protocol established for the Plan and shall conduct the survey in good faith and to the best of their ability. Detonation events will be conducted during daylight, on or about slack tide (high or low water) to maximize the ability to observe manatees, other marine mammals and sea turtles. Weather conditions such as high winds, precipitation, fog and any other situation in which any one of the observers cannot conduct an effective search will be taken into account. The Chief Observer will make the determination as to whether acceptable observation conditions exist to allow the survey to be initiated before the detonation event.

5. The perimeter of the safety zone will be marked with brightly colored buoys, and a 1000 ft. radius perimeter will be marked with white buoys for aerial reference. The ground observers will be positioned to maximize observations of the Safety Zone, with at least two observers at the 3400 ft. radius. The observer locations will be submitted for approval to the FDEP prior to the Plan Coordination Meeting.

6. The aerial survey of the safety zone will be conducted by helicopter beginning one hour prior to each detonation event and will continue for 30 minutes following each detonation event.

7. The aerial safety survey plan will be submitted prior to the Plan Coordination Meeting. It will generally include surveillance within a 1.5 mile-radius (upstream and downstream) of the project site for one hour prior to the detonation event with emphasis on the safety zone. During the final 30 minutes before each detonation, the Chief Observer will concentrate on the area within the 3400 ft.

radius. At the 15 minute notice to blast, aerial concentration will be within the 1500 ft. radius. The aerial survey plan must comply with all FAA and military air restrictions. The brightly colored buoys marking the perimeter of the safety zone must be clearly visible from the air.

8. All observers will be equipped with a two-way radio that will be dedicated exclusively to the Safety Watch. The Chief Observer will be equipped with both a two-way radio and a marine band radio to ensure back-up communication. Observers will be equipped with polarized sunglasses, binoculars, and a sighting log with a map to record sightings in the Safety Zone. Each observer will also have two brightly colored flags, one to indicate all clear and a second color for mammals present. These flags will be used in the event of loss of radio contact.

9. The Marine Wildlife Safety Observer team will be in close communication with the Blaster in Charge in order to halt the detonation in the event that a manatee, marine mammal or sea turtle is spotted within, or approaching the Safety Zone around the blast site. The blasting countdown will be immediately halted by the chief observer upon the request of any of the observers. The blast countdown will not resume until the animal moves away from the area of its own volition. Manatees, other marine mammals and sea turtles must not be herded away or harassed into leaving. If the animal is not sighted a second time, the event will not resume until 30 minutes after the sighting.

10. All communications will be in accordance with the approved communications plan. Radio checks will be periodic to ensure that communications links are maintained. At the 5 and 1-minute to Blast an All Clear must be received from all observers in order for the countdown to continue.

11. After detonation, the Chief Observer shall continue to survey the Safety Zone for 30 minutes before departing. If an injured or dead manatee, or other marine mammal, or sea turtle is sighted after the detonation event, the observers will contact the FDEP through the Manatee Hotline 1-800-DIAL-FMP (342-5367) and the Florida Marine Research Institute NE Field Station (904-448-4300 Ext. 229).

12. Any problems encountered during blasting events shall be evaluated by the observers and contractors and logistical solutions shall be presented to the USFWS and DNR. Corrections to the WP shall be made prior to the next blasting event.

13. If an injured or dead manatee, marine mammal or sea turtle is rescued/recovered within the Safety Zone during the detonation period, operations shall be ceased until the Florida DEP or USFWS determines that the cause of injuries or mortality was not likely a result of the detonation event. If injuries are documented to be caused by detonation events occurring at the project site, all detonation events will cease until a review of the circumstances are completed and the Florida DEP and USFWS authorizes operations to resume.

14. Within two weeks after completion of all the detonation events, the Chief Observer will submit a summary report to the Florida DEP and to the USFWS. This report will forward the observers' logs, provide the names of the observers and their positions during the event, the number and location of manatee, other marine mammals or sea turtles sighted and the actions that were taken when the animals were observed.

#### **GROUND OBSERVER PROTOCOL**

- 1) Observers will be at their observation site at least one-hour prior to the blast event and be equipped with the previously mentioned materials.
- 2) Observers will look for manatees, marine turtles & bottle nosed dolphin. Observers will keep continual watch over their entire safety area using polarized sunglasses and will periodically scan the area with binoculars.
- 3) Observers will be located in areas that optimize both visual accuracy and coverage of ingress/egress points. A map showing observer locations is attached to this document.
- 4) The observer will spot any animals in the area and alert the aerial team as to their location. This includes any animals in their visual range even if they are outside the blast safety zones.

3) Observers will remain on watch at all times unless there is a long delay, if that is the case, we will then need to re-establish the one hour prior watch before the next blast will take place.

6) Observers will have a 15-minute interval check in with the aerial observers via radio. In the case of radio failure, green and red signal flags will be used to indicate clear/not clear status of the observers' position.

7) Observers will keep their green signal flag in a position that can be easily seen from the helicopter thus establishing a visual reference for the aerial crew during the aerial observations.

8) If an animal is spotted in the area, the observer will alert the helicopter via radio and give directions to the helicopter until the aerial crew confirms the sighting. If the radio is not working, the observer will have a red signal flag to wave indicating to the helicopter that an animal is in the area. The observer will visually direct the aerial crew to the location of the animal and radio communication will be re-established.

9) Immediately prior to blast (1 minute), a radio check for all observers will be done to establish an "all clear" status.

8) Data Sheets and Maps:

All observers will have maps and aerial photos with safety circles at 3400 ft and 100 ft. drawn in to give a visual reference on where the danger zone is for animals. Any animal spotted will be recorded on the map using the common name of the animal (M= Manatee, T= Turtle, D= Dolphin), the number of animals in the group, the direction the animals were traveling and all the subsequent spottings of that group.

Additionally, written data sheets will be used to record all spotting information and weather & blasting data. One set of data sheets will be used for each blast event. There are comment sheets at the back of the clipboard to write any information important to the observers' watch. Observations will be written down every 15-min, even if no animals are seen. Weather conditions will be recorded at the beginning of the watch and every hour thereafter.

9) Observers will remain on site and observe for one-half hour after the last blast to make sure there are no animals that need help.

10) At the end of each watch, all maps, aeriels, comment forms etc will be attached to the data sheets and turned into the aerial observer at the site trailer. The aerial observer will review all data packets and clarify any questions before retiring the observers.

11) If an animal is spotted inside the safety circle after a blast, we need to follow it to determine its condition. The observer will be put in a boat, operations will be halted and the animal will be tracked, with the help of the aerial crew until it is determined that the animal is fine, injured and needs rescue or dead. The observer will fill out an incident report for any of those three scenarios.

### **AERIAL OBSERVATION PROTOCOL**

1) The primary observer will first coordinate all ground observers and be sure the entire watch team is prepared for the blasting event.

2) The aerial team will begin its watch one-hour prior to the blasting event.

3) The primary observer will be seated in the front of a "bubble-type" helicopter with doors affixed.

4) The observer will first visually confirm the locations of all ground observers and check to make sure they are all in the correct place. A radio check to all observers will be made and the time recorded as the official start time of the watch.

5) The aerial survey will be done in progressively smaller circles up to the point of the blast event where the survey will be conducted in the smallest possible radius outside the danger zone of the blast. The outermost survey circle will reach from the inlet to the Dames Point Bridge. All waters will be surveyed to establish the presence and size of a general "population" in the area. Within 30 minutes of the blast time, the survey area will be reduced to in and around the 3400' safety radius.

6) The aerial ground observers will track animals near or inside the 3400' radius until the animals are in confirmed safety zones. These animals will be subsequently tracked during the normal survey until they move out of the survey area.

- 7) A radio and visual check will be made to the ground observers each 15 minutes.
- 8) Locations of all animals will be recorded on maps and on data sheets.
- 9) The aerial survey will continue one-half hour after the blast event to insure that there are not injured animals.
- 10) Upon Landing, the aerial observer will compile and review all data sheets and release the ground observers or make arrangements for the next blast event depending on the circumstances.

Manatee, Marine Mammal, Sea Turtle Survey Watch  
Standard Operating Procedure (SOP)

Prior to the formal Plan Coordination Meeting, all parties involved with the SOP will have reviewed the Plan and Procedures as outlined. This is to include all key players including the Drill Boat Captain(s), Senior Blaster, Project Superintendent, Safety Coordinator(s), and Owner Representative(s).

The following protocol will be followed for each detonation. Conditions and Methods of Operation are discussed in general.

At the Plan Coordination Meeting all observers and players will be identified as to their area of responsibility (AOR).

Each observer will be required to have the following equipment:

- Data Sheets
- Maps of the Area
- Clip Boards
- Pencils
- Disposable Camera
- Signal Flags
- Written Instructions for observation
- Communicative Radios
- Polarized Sunglasses
- Binoculars
- Watch
- Suitable clothing for inclement weather
- Steel toes boots

During the Plan Coordination Meeting tide charts with preferred time of detonation for the first blast will be discussed. For future blast day(s), the report time for observers will be confirmed at the conclusion of the previous blast.

All observers are required to report on or before the designated time at the Manatee Control Station to secure company issued equipment to include radio communication.

If for some reason an observer is unable to report, then he or she is to notify the Chief Manatee Observer the evening prior to or 24 hours in advance of a scheduled conflict with a blast so that an alternative may be called in. *Failure to do so may result in removal from the active observer list.*

Observers will be required to park in the designated parking area and will be taken to the Control Station, then positioned at their station by a company vehicle/vessel.

Each observer will be given a station number to be referred to in all communication with the Chief, Drill Boat Captain(s) and all other observers.

Upon completion of the watch, all observers will return to the Control Station to submit inspection forms of the day and place their radio(s) on charge.

Prior to dismissal for the day, each observer will confirm their next report time and date with the Chief observer(s).

#### Communication Program

All observers, drill boats, watercraft and key personnel will be equipped with marine handheld radios.

All observers will carry two (2) brightly colored safety flags. One color will indicate an "All Clear" and the other a "Sighting". In the event of loss of radio communication, the appropriate flag will be used.

Observers will "radio check" on the hour and at 15-minute intervals with an "All Clear" or status.

Should a "Sighting" occur, the observer will alert the Chief Aerial observer and track the animal as directed by the Chief Aerial Observer.

## Window of Opportunity

The necessary notification for the "Window of Opportunity" is as follows:

- 2-Hour notice to blast (see call list)
- 1-Hour notice for the aerial observer and land observers
- 30-Minute warning - CH 7A
- 15-Minute warning - CH 7A, CH 13, CH 16 (VTS Marine)
- 5-Minute warning - CH 7A, Audio Signal
- 1-Minute warning - CH 7A, Audio Signal
- Countdown CH 7A
- Blast
- All Clear - CH 7, CH 13, CH 16, Audio

**Note:** Because of the marine environment and potential intrusion of marine mammals or vessels into the Safety Zone, the 15-minute and 5-minute warning maybe accelerated, *provided a full one hour survey watch has been completed; however, the 1-minute must be completed.* The last 10-seconds of the 1-minute warning will be broadcast on CH 7A beginning with 10. Counts 3 and 2 will be silent with all radios unkeyed allowing any Safety Zones or Manatee Observers to "Abort" the blast.