Miami River Tracer Study

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Introduction

The Coastal and Hydraulics Laboratory (CHL) at ERDC has been tasked by the Army Corps of Engineers, Jacksonville District (CESAJ-EN-H) to perform a 2D numerical model investigation to estimate the fate of flow and suspended sediment discharged from the Miami River into Biscayne Bay. It was agreed that this would be accomplished by modeling the transport of tracers placed in the Miami River, under various freshwater discharge and wind conditions. The tracers are assigned a decay coefficient, to simulate (in a qualitative sense) the transport and deposition of sediment. The study has been conducted using a previously verified 2-dimensional TABS-MDS numerical hydrodynamic model of Biscayne Bay and Miami Harbor (Brown et al., 2001). The computational mesh used for the Biscayne Bay study was refined in the vicinity of Miami Harbor, in order to more effectively capture the local bathymetry and currents.

This report details the boundary conditions used to drive the simulations, the characteristics of the tracers applied in the simulations, and results and conclusions from the study.

Model Mesh and Boundary Conditions

The model mesh for the entire model domain is given in Figure 1. The model mesh in the vicinity of the Miami River is given in Figure 2. The existing bathymetry in Miami Harbor was updated to reflect the most recent survey data, given in Survey No. 01-097 (February-March 2001). The revised mesh consists of 28,613 nodes and 10,003 elements.

The boundary conditions applied to the model represent typical conditions for the harbor. They do not represent a specific historical event. The boundary conditions consist of a tidal boundary specified at the ocean, a flow boundary specified at the Miami River, flow boundaries specified at each of the 13 additional coastal structures in Biscayne Bay, and a wind boundary specified at the water surface.

The tidal boundary is taken from the NOAA tidal prediction at Virginia Key for August 2001 (this can be obtained at http://www.noaa.gov). The selection of August 2001 is arbitrary; the goal was merely to obtain a spring-neap sequence for the simulation. The NOAA tide data were multiplied by a factor of 1.27, in order to extrapolate the tide from Virginia Key to the offshore ocean boundary (this factor was obtained from the Biscayne Bay Feasibility Study, Brown et al., 2001). A time-series of the tide used for the investigation period is given in Figure 3 (note that this figure does not contain the tide used for the spin-up period, which consists of 14 days of simulation prior to the investigation period).

Two separate boundary conditions were considered for the flow boundary at the Miami River; a long-term average flow, or low flow condition (approximately 475 cfs) and a high flow hydrograph (6-day duration, with a maximum flow of 1,200 cfs). These are synthetic river hydrographs, estimated from historical data at coastal salinity control structures S-25, S-25B and S-26, which control freshwater inflow to the Miami River. These flow boundary conditions are given in Figure 4.

A constant flow boundary was specified at each of the 13 additional coastal structures in Biscayne Bay. The value given for each structure is based on an average value, taken from historical data. The flow assigned to each structure is given in Table 1.

Table 1: Flow Assigned to 13 Additional Coastal Structures

Coastal Structure	Flowrate (cfs)
S-29	400
G-58	0
S-28	100
S-27	200
G-93	50
S-22	200
S-123	0
S-21	200
S-21A	100
S-20G	0
S-20F	200
S-20	0
S-197	0

For modeling purposes (set-up and analysis), a constant wind was applied over the entire domain, for the entire simulation period. Two separate wind conditions were considered: a 10 mph wind from the southeast, and a 15 mph wind from the northeast. These were chosen to simulate typical conditions for a meteorological event occurring in the summer and in the winter, respectively. Note that the imposed constant wind condition could result in an exaggeration of the influence of the wind, since the natural wind conditions vary both spatially and temporally (typical meteorological events occur over a 5 –10 day period). A variable wind could be applied in the model, but this would yield results that would not be sufficiently general; i.e. they would be relevant to the applied wind condition only. Although the 10 mph steady southeast wind condition was the only condition specified and agreed to in the scope of work, the 15 mph northeast wind condition was added to demonstrate the influence of the dominant wind direction. Any additional wind conditions could be simulated in future studies, if desired.

Tracer Decay Coefficients

There are 3 separate decay coefficients used in this study. The first decay coefficient is set equal to 0; i.e. the tracer is conservative, which means that it does not decay. The 2 remaining decay coefficients were chosen in an attempt to bracket the deposition rate of fine-grained suspended sediment being transported from the Miami River. These decay coefficients were selected as follows.

The rate of deposition for fine-grained sediment can be estimated with the following equation developed by Krone (1962).

$$D = \frac{W_s C}{d}\beta \qquad (1)$$

where:

D = the rate of deposition (kg m^{-3} s^{-1})

W_s = the depositional settling velocity of the sediment (m s^{-1})

C = the suspended sediment concentration (kg m^{-3})

β = the shear stress ratio. It is given by the following expression:

$$\beta = \left(1 - \frac{\tau}{\tau_{dc}}\right) \qquad (2)$$

where:

τ = the shear stress at the bed (N m^{-2})

τ_{dc} = the critical shear stress for deposition (N m^{-2})

The expression for exponential decay can be expressed as follows:

$$\frac{dC}{dt} = -\kappa C \qquad (3)$$

where:

κ = the decay coefficient (s^{-1})

(Note that, if Equation 3 is integrated over time, the resulting expression is an exponential expression. This is why it is referred to as exponential decay)

By recognizing that $dC/dt = -D$, Equations 1 and 3 can be combined to yield an expression for κ.

$$\kappa = \frac{W_s \beta}{d} \qquad (4)$$

The 2 values of the decay coefficients used in this study were selected using Equation 4, together with the following values for the unknown variables:

High decay rate:

W_s = 1×10^{-5} m s^{-1}
β = 0.5
d = 2 m

Low decay rate:

W_s = 1×10^{-5} m s^{-1}
β = 0.5
d = 7 m

Note that the only difference between the 2 sets of values is the value used for the depth. These values were selected as representative shallow and deepwater conditions in the vicinity of the mouth of the Miami River.

Using these values in Equation 4, the following values of the decay coefficients are found:

κ_{high} = 2.50×10^{-6} s^{-1} (half-life=3.2 days)

κ_{low} = 7.14×10^{-7} s^{-1} (half-life=11.2 days)

Model Simulations

Eight different simulations were conducted for this study. They are as follows:

Run #	Abbreviation	Run Description
1.	*sew-lf-ld:*	southeast wind, low Miami River flow, low decay rate
2.	*sew-lf-hd:*	southeast wind, low Miami River flow, high decay rate
3.	*sew-hf-ld:*	southeast wind, high Miami River flow, low decay rate
4.	*sew-hf-hd:*	southeast wind, high Miami River flow, high decay rate
5.	*new-lf-hd:*	northeast wind, low Miami River flow, high decay rate
6.	*new-hf-ld:*	northeast wind, high Miami River flow, low decay rate
7.	*sew-lf-con:*	southeast wind, low Miami River flow, conservative tracer
8.	*new-lf-con:*	northeast wind, low Miami River flow, conservative tracer

The first 4 simulations were requested in the Study's scope of work. Simulations 5 and 6 were added to address the impact of the wind direction on the transport of the tracer.

Simulations 7 and 8 were added to address the general distribution of the water that passes from the Miami River to Biscayne Bay.

The simulations were conducted for a total of 28 days. The first 14 days were used for model "spin-up", and the remaining 14 days were used for model comparisons. In each of the simulations with a decaying tracer, the tracer was applied near the mouth of the Miami River. For the simulations with a conservative tracer, the tracer was applied together with the inflowing fresh water at the 3 coastal structures on the Miami River. The tracers were applied at a continuous rate, beginning at the first time step. Only data related to the last 14 days of the simulation (the investigation period) are illustrated and analyzed in this report. Summary time history film-loops (in .avi format) illustrating concentration contours are available from several runs for visual analysis purposes.

Results

Velocity Residuals (i.e. Long-Term Average Velocities)

Figures 5 and 6 represent residual plots of the velocity vectors near the Mouth of the Miami River. Figure 5 is taken from a simulation with a southeast wind of 10 mph, and Figure 6 is taken from a simulation with a northeast wind of 15 mph. A residual plot represents values that are averaged over several tidal cycles, thereby yielding the remaining, or residual, values. Residual velocities are significant because they tend to govern the transport in an estuarine system (i.e. the tidal velocities mix the particles, and the residual velocities transport the particles). For Figures 5 and 6, and for all the remaining residual plots in this report, the averaging interval is the 14 day investigation period.

Figures 5 and 6 demonstrate that the wind has a significant effect on the behavior of the velocity residuals. For example, at the mouth of the Miami River, the velocities are oriented toward the north in Figure 5 and toward the south in Figure 6. Also, the residual current at Government Cut is ebbing in Figure 5, and flooding in Figure 6. Finally, whereas there is no apparent residual current in Main Channel in Figure 5, there is a relatively strong flood current there in Figure 6.

In general, southeast winds have a tendency to set-up water levels towards the North Bay, while winds from the northeast have the opposite effect of tending to set-down water levels in the North Bay while piling water levels up in the South Bay. These reduced North Bay water levels produce a flood slope from the offshore into Biscayne Bay, resulting in residual flood currents in Government Cut, Main Ship Channel, and Norris Cut.

Further discussion of Figures 5 and 6 is given in the remaining sections of the discussion of the results.

Tracer residuals (i.e. Long Term Average Concentrations)

Figures 7-14 are residual plots of the tracer concentration. They are expressed as the percent of the maximum concentration. The maximum concentration is the maximum value observed in the model domain over the simulation period. This concentration occurs at the point of the tracer application, in the mouth of the Miami River. The concentration is expressed as a percent of the maximum concentration for two reasons (1) to avoid making the identification of the tracer concentration with suspended sediment concentration, and hence fostering the false conclusion that this tracer study is actually a sediment transport study, and (2) to emphasize that the results of this study are valid for any value of the applied tracer concentration. That is, since these simulations involve tracers with constant rates of decay, the percent contour distribution will be identical whether the initial concentration is 1 ppm, or 10 ppm, or any other value. Hence, by expressing the results as a percent of the maximum value, the simulations can be used to characterize (i.e. bracket) the distribution of any initial concentration of sediment. Note that the contour interval is geometric (i.e. 1,2,4,8,16,32 and 64). This is done to better visualize the lower end of the tracer concentration distribution.

Figures 7 and 8 depict the conservative tracer (i.e. no decay), under the southeast wind condition in Figure 7 (Run 7), and the northeast wind condition in Figure 8 (Run 8). These figures indicate that the wind direction is a dominant mechanism in determining the behavior of the transport. A significant amount of tracer is transported to the North Bay in both simulations. However, whereas Figure 7 indicates that very little if any tracer is transported south of Rickenbacker Causeway, Figure 8 indicates that low concentration tracer is transported all along the western shoreline of Middle Bay, extending as far south as Black Creek Canal.

Figures 9 – 12 depict Runs 1 – 4, respectively, with tracer decay under the southeast wind condition (Runs 1-4). These demonstrate that the decay rate is a more significant factor than the flow at the Miami River in determining the distribution of the tracer. Of the 4 simulations, the one depicted in Figure 11 (Run 3, high flow low decay) demonstrates the widest distribution of tracer concentration. It demonstrates that the maximum northern extent of the 1% contour is Biscayne Canal. Hence, very little if any tracer is expected to reach the upper North Bay and pass through Bakers Haulover Inlet.

None of these 4 simulations depict the 1% contour extending south of Rickenbacker Causeway. Hence, under the southeast wind condition, the transport is basically to the North. Note also that the 1% residual contour does not reach the protected area just west of Virginia Key in any of these simulations.

Figures 13 and 14 depict the 2 runs with tracer decay under the northeast wind condition (Runs 5 and 6). These demonstrate a dramatic difference in the distribution of the tracer, based on the Miami River flow and rate of decay chosen. An examination of Figures 9 – 12 demonstrate that the rate of decay is a more significant factor in determining the character of the tracer distribution than is the Miami River flow. Hence, we can assume that the rate of decay is the more significant factor in determining the differences

observed between Figures 13 and 14. Since the high decay rate (Figure 13) is based on a water depth of 2 m, and the low decay rate (Figure 14) is based on a water depth of 7 m, and since the average depth in the Middle Bay is close to 2 m, it is likely that the distribution observed in Figure 13 is a closer approximation of the distribution of Miami River sediment than that observed in Figure 14. Also, it should be noted that the constant 15 mph northeast wind applied for these simulations imposes a significant, persistent force driving the tracer to the south. Since a wind of this magnitude is unlikely to persist for 28 days in the field, it is likely that the simulated condition represents an extreme field condition.

Note that the 1% contour does not reach the protected area just west of Virginia Key in Figure 13, but some tracer does reach this area in Figure 14.

Residual Tracer Fluxes at Cross-Sections (i.e. Time Averaged Tracer Mass Flux)

In order to arrive at a quantitative description of the tracer mass transport for the 6 runs with tracer decay (Runs 1-6), the 14-day average (residual) mass flux was calculated at several cross-sections within the bay. The first 5 cross-sections were selected such that they capture all of the mass that is transported into the bay, less the amount that is stored or decays within the region bounded by the five cross-sections (to be described as Mid-Bay in this report). These cross-sections are as follows, starting from the northwest and going clockwise:

Number	Location
1.	West of Dodge Island
2.	Fisherman Channel
3.	Norris Cut
4.	Rickenbacker East
5.	Rickenbacker West

Two additional cross-sections were also selected, and were used to help establish the fate of the tracer. These include the following

Number	Location
6.	Main Channel
7.	Government Cut

All 7 cross-sections are depicted in Figure15.

Figure 16 shows the percent of tracer mass passing cross-sections 1-5 for Runs 1-6. Note that the total mass does not reach 100% because some of the mass is stored or decays within the area bounded by the cross-sections, the Mid-Bay area. Table 2 gives the values plotted in Figure 16.

Table 2: Percent of Tracer Mass Passing Cross-Sections 1 - 5 for Runs 1 - 6

Location/Condition	1) sew-lf-ld	2) sew-lf-hd	3) sew-hf-ld	4) sew-hf-hd	5) new-lf-hd	6) new-hf-ld
1) West of Dodge Island	58.83	54.73	58.36	55.12	26.71	28.62
2) Fisherman Channel	31.62	22.26	33.35	24.09	9.15	14.30
3) Norris Cut	0.15	0.16	0.15	0.16	0.00	0.00
4) Rickenbacker East	2.52	1.99	2.66	2.14	18.14	23.63
5) Rickenbacker West	0.67	0.54	0.67	0.54	12.67	16.55

Figure 16 (Table 2) shows that a large percentage of the mass passes through cross-section 1 (West of Dodge Island), although the percentage is higher for Runs 1-4 (southeast wind conditions) than it is for Runs 5-6 (northeast wind conditions). Tracer mass passing Fisherman Channel (cross-section 2) is decreased for the two northeast wind conditions, while tracer mass passing Norris Cut (cross-section 3) is illustrated to be virtually nonexistent for all conditions.

Note that, for Runs 5 and 6 (the northeast wind runs), the total mass that passes to the south (through cross-sections 4 and 5, Rickenbacker East and West) is between 30% and 40% of the total mass. Hence, for all 6 runs, most of the mass remains to the north of Rickenbacker Causeway.

Using information from the 7 cross-sections, together with some assumptions about the behavior of the Bay (i.e. that little or no tracer mass passes through Baker's Haulover Inlet or any of the inlets south of Norris Cut), an estimate of the fate of the tracers can be generated. This is depicted in Figure 17, and in Table 3.

Table 3: Estimated Fate of Tracer Mass, Expressed as Percent of the Applied Mass

Location/Condition	1) sew-lf-ld	2) sew-lf-hd	3) sew-hf-ld	4) sew-hf-hd	5) new-lf-hd	6) new-hf-ld
Tracer Decay in Area Bounded by Transects (Mid-Bay)	6.21	20.33	4.81	17.95	33.69	17.48
Tracer Decay in Bay North of Dodge Island	27.15	36.76	26.32	36.56	16.81	10.80
Tracer Decay in Bay South of Rickenbacker Causeway	3.19	2.53	3.33	2.68	30.81	40.18
Tracer Decay in the Offshore	63.45	40.39	65.54	42.81	19.05	32.12

Note that, for Runs 1 and 3 (southeast wind, low decay) most of the tracer (more than 50%) ends up in the offshore. Runs 2 and 4 (southeast wind, high decay) show an increased amount of decay within the bay. This trend is reasonable; i.e. higher decay rates

result in less transport out of Biscayne Bay as a result of more rapid decay (deposition) within the Bay. For Runs 5-6 (northeast wind), however, a significant percentage (more than 60%) of the mass decays within the Bay. There are 2 primary reasons for this. First, a much greater percentage of the tracer mass passes south of Rickenbacker Causeway under the northeast wind condition than it does under the southeast wind condition. The circulation south of Rickebacker Causeway is much weaker than it is in the vicinity of Miami Harbor. Hence, the residence time is higher, and the tracer has more time to decay.

The second reason for an increase in the mass decay within the bay for Runs 5 and 6 can be observed in Figure 18. This Figure shows the tracer mass fluxing across cross-section 1 (West of Dodge Island), cross-section 6 (the Main Channel) and the difference between them (cross-section 1 minus cross-section 6). Note that the tracer mass flux across cross-section 6 (Main Channel) originates from tracer mass flux at cross-section 1 (West of Dodge Island). Any tracer mass that is captured by the Main Channel is pumped out to the offshore via Government Cut. Hence, this mass is not allowed to enter North Bay to decay there.

Figure 18 shows that, for the southeast wind runs, a significant percentage of the tracer mass fluxing across cross section 1 (west of Dodge Island) is diverted through the Main Channel, whereas for the northeast wind runs, very little of the tracer mass is captured by the Main Channel. Hence, for the northeast wind runs, virtually all of the mass fluxing across cross-section 1 (West of Dodge Island) passes into the North Bay and decays there.

The reason why the northeast wind runs exhibit very little transport through the Main Channel can be deduced from Figures 5 and 6. These show that the residual velocities for the runs with a northeast wind are adverse to transport through the Main Channel.

Note that Table 2 indicates that little or no mass passes cross section 3 (Norris Cut) for any of the runs. This means that all of the tracer mass applied in the Miami River that passes to the offshore (Table 3) exits Biscayne Bay through Government Cut.

Tracer Flux Time-History Plots for Selected Cross-Sections and Runs

In order to demonstrate how the mass flux at these cross-sections behaves over time, some time-history plots have been generated for selected cross-sections; i.e. cross-section 1 (West of Dodge Island), 2 (Fisherman Channel), and 4 (Rickenbacker East). These were generated for Run 3 (southeast wind, high Miami River flow, low decay rate) and Run 6 (northeast wind, high Miami River flow, low decay rate). These time-history plots are given in Figures 19 – 21. For each of these figures, ebb flux is considered positive, and flood flux is considered negative.

Figure 19 shows the time-history plot of the flux at cross-section 1 (West of Dodge Island). This plot shows that the flux for the northeast wind run (Run 6) exhibits a higher degree of variability over time than the flux for the southeast wind run (Run 3). This can

also be observed at Fisherman Channel (Figure 20). This variability is due to either the variability of the Miami River flow, or the variability in the tidal amplitude over the spring-neap cycle. Note that the average flux values given for these two cross-sections in Table 2 for Run 5 (northeast wind, low Miami River flow, high decay rate) are very close to the values given for Run 6. The values are virtually identical at cross-section 1 (West of Dodge Island), and the difference in the values given for cross-section 2 (Fisherman Channel) is likely due to the difference in the decay rate between Runs 5 and 6. This last assumption is supported by the fact that the values of the flux at cross-section 2 (Fisherman channel) for Runs 1 and 3 are virtually identical to each other (Runs 1 and 3 have the same decay rate; they only differ in the specification of the Miami River flow). Hence, since the variability of the Miami River flow has been shown to have minimal impact on the average fluxes, the variability observed in the flux for the northeast wind conditions in Figures 19 and 20 is assumed to be primarily due to the variability in the tidal amplitude over the spring-neap cycle.

Figure 21 gives a time-history of the flux at cross-section 4 (Rickenbacker East). Note that the flux is much greater for the northeast wind condition (Run 6) than for the southeast wind condition (Run 3). Note also that the spring-neap signal observed in Figures 19 and 20 is not nearly as visible in Figure 21. This is because tracer that reaches cross-section 4 (Rickenbacker East) is generally more well-mixed than the tracer that reaches cross-sections 1 and 2 (West of Dodge Island and Fisherman Channel).

Conclusions

For this tracer study, 3 quantities were determined to be significant factors in describing the behavior of a tracer as is passes from the Miami River into Biscayne Bay: Miami River flow, tracer decay rate, and wind speed and direction. An analysis of the results of this study yields the following ranking of the relative importance of these quantities with respect to tracer (and hence sediment) transport:

1. Wind speed and direction
2. Tracer decay rate
3. Miami River flow

Tracer that passes into the North Bay tends to become well-mixed within the Bay. A large percentage of the tracer passes though Government Cut and into the offshore, with the rest decaying within North Bay. For the runs with a northeast wind, the mass transport through the Main Channel is severely limited, and hence a greater percentage of the mass passing into North Bay tends to remain there. Government Cut is the only location where tracer applied in the Miami River passes to the offshore.

Little or no mass passes into the Middle Bay for the runs with a southeast wind. For the runs with a northeast wind, 30 % to 40% of the mass passes to the Middle Bay, where it spreads southward along the western shoreline.

Note that this study is intended to bracket potential transport characteristics of suspended sediment passing from the Miami River to Biscayne Bay. However, this is by no means a sediment transport study. The tracers applied in this study decay at a constant rate, whereas sediment settles at variable rates, depending on sediment characteristics and local hydraulic forces. Also, sediment can re-suspend, whereas these tracers cannot. Hence, if a detailed analysis of the behavior of Miami River sediment is required, a full sediment transport study is recommended.

Additional assessments using variable wind conditions could also be performed to better identify specific flow and tracer distributions under these more realistic field conditions. An elaborate testing scenario matrix could be developed to fully resolve the associated wind impacts to Miami River and Biscayne Bay estuarine circulation processes.

Department of Environmental Protection

Jeb Bush
Governor

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3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

David B. Struhs
Secretary

CONCEPTUAL ENVIRONMENTAL RESOURCE PERMIT

PERMITTEE/AUTHORIZED ENTITY:
U.S. Army Corps of Engineers
C/O Richard Bonner
Jacksonville District
P.O. Box 4970
Jacksonville, FL 32232-0019

Permit/Authorization No.: 0180701-001-EC
Date of Issue: 06/17/02
Expiration Date : 06/17/22 as per 62-343.110 F.A.C.
County: Dade
Project: Miami River Federal Channel Maintenance Dredging

This conceptual permit is issued under the authority of Part IV of Chapter 373, F.S., Title 62, Florida Administrative Code (F.A.C.), and Section 62-343.060 F.A.C. Pursuant to Operating Agreements executed between the Department and the water management districts, as referenced in Chapter 62-113, F.A.C., the Department is responsible for reviewing and taking final agency action on this activity.

This permit also consistitutes a preliminary finding of consistency with Florida's Coastal Zone Management Program, as required by Section 307 of the Coastal Zone Management Act.

This permit also constitutes preliminary certification of compliance with state water quality standards pursuant to Section 401 of the Clean Water Act, 33 U.S.C. 1341.

The Department has hereby conceptually approved the work shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof. **Construction is not authorized at this time. Final approval from the Department would require submittal of the information outlined below and issuance of a subsequent Environmental Resource Permit(s) for the proposed activities.** Any work that exceeds the scope of activities covered herein, or any significant deviations from the proposed designs are not conceptually authorized by this permit. Such work would require an additional Environmental Resource Permit and sovereign submerged lands authorization.

ACTIVITY DESCRIPTION:

The project is to maintenance dredge approximately 877,500 cubic yards of material from the 5.5 mile length of the Federal channel in the Miami River. The dredge material will be dewatered at an interim disposal site located near the upstream end of the project. The final dredged material disposal method will be determined based on chemical analysis of the dewatered material and its leachate, and will be consistent with regulations for the protection of surface and groundwater at the disposal site. If water quality standards cannot be maintained within 150 meters of the dredging or discharge points, a variance would be required to extend the

standard mixing zone for the identified water quality parameters. This mixing zone shall not extend seaward of the mouth of the river. Existing water quality in the Miami River is currently degraded. All reasonable efforts to minimize additional water quality impacts shall be taken, and only temporary impacts will be considered allowable. Mitigation will be required from the local sponsor, for any further impacts to current water quality in the area waterward of the mouth of the Miami River, even if the impacts are temporary in nature.

ACTIVITY LOCATION:
The activity is located in the Miami River, within the City of Miami, Dade County, Sections 27, 28, 33, 34, 35 Township 53 South, Range 41 East and Section 38 Township 54 South, Range 41 East, Class III Waters, within the Biscayne Bay Aquatic Preserve, Outstanding Florida Waters.

GENERAL CONDITIONS: (to be included in subsequent Environmental Resource Permits for construction of the proposed facilities):

1. All activities approved shall be implemented as set forth in the drawings incorporated by reference and in compliance with the conditions and requirements of this document. The Corps shall notify the Department in writing of any anticipated significant deviation from this authorization prior to implementation so that the Department can determine whether a modification is required. If the Department determines that a deviation is significant, then the Corps or the local sponsor, as appropriate, shall apply for and obtain the modification prior to its implementation.

2. If, for any reason, the Corps does not comply with any condition or limitation specified herein, the Corps shall immediately provide the Department with a written report containing the following information: a description of and cause of noncompliance; and the period of noncompliance, including dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance. Compliance with the provisions of this condition shall not preclude the Department from taking any enforcement action allowed under state law to the extent that federal sovereign immunity has been waived under 33 U.S.C. 1323 and 1344(t).

3. The Corps shall obtain any applicable licenses or permits which may be required by federal, state, local or special district laws and regulations. Nothing herein constitutes a waiver or approval of other Department permits or authorizations that may be required for other aspects of the total project. Projects shall not proceed until any other required permits or authorizations have been issued by the responsible agency.

4. Nothing herein conveys title to land or water, constitutes State recognition or acknowledgment of title, or constitutes authority for the use of sovereign land of Florida seaward

of the mean high-water line, or, if established, the erosion control line, unless herein provided, and the necessary title, lease, easement, or other form of consent authorizing the proposed use has been obtained from the State.

5. Any delineation of the extent of a wetland or other surface water submitted as part of the application, including plans or other supporting documentation, shall not be considered specifically approved unless a specific condition of this authorization or a formal determination under Section 373.421(2), F.S., provides otherwise.

6. Nothing herein conveys to the Corps or creates in the Corps any property right, or any interest in real property, nor does it authorize any entrance upon or activities on property which is not owned or controlled by the Corps or local sponsor, or convey any vested rights or any exclusive privileges.

7. This document or a copy thereof, complete with all conditions, attachments, modifications, and time extensions shall be kept at the work site on the authorized activity. The Corps shall require the contractor to review this document prior to commencement of the authorized activity.

8. The Corps specifically agrees to allow Department personnel with proper identification, at reasonable times and in compliance with Corps specified safety standards access to the premises where the authorized activity is located or conducted for the purpose of ascertaining compliance with the terms of this document and with the rules of the Department and to have access to and copy any records that must be kept; to inspect the facility, equipment, practices, or operations regulated or required; and to sample or monitor any substances or parameters at any location reasonably necessary to assure compliance. Reasonable time may depend on the nature of the concern being investigated.

9. At least forty-eight (48) hours prior to the commencement of authorized activity, the Corps shall submit to the Department a written notice of commencement of activities indicating the anticipated start date and the anticipated completion date.

10. If historic or archaeological artifacts are discovered at any time on the project site, the Corps shall immediately notify the State Historic Preservation Officer, and if a significant deviation is necessary, shall also notify the Department.

11. Within a reasonable time after completion of project construction or a periodic maintenance dredging event, the Corps shall submit to the Department a written statement of completion. This statement shall notify the Department that the work has been completed as authorized and shall include a description of the actual work completed. The Department shall

be provided, if requested, a copy of any as-built drawings required of the contractor or survey performed by the Corps.

SPECIFIC CONDITIONS:

Abbreviations used in the Specific Conditions:
Department or DEP: Department of Environmental Protection
BBWR: Bureau of Beaches and Wetland Resources
USACE: U. S. Army Corps of Engineers
FWCC: Florida Fish and Wildlife Conservation Commission
DERM: Miami-Dade County DERM
NMFS: National Marine Fisheries Service
USFWS: U.S. Fish and Wildlife Service
ERP: Environmental Resource Permit
OFW: Outstanding Florida Water

1. This permit constitutes approval only of the details reflected in the staff report, and the attached drawings. This permit is binding on the issuance of future construction permits only to the extent that adequate data has been submitted for review by the applicant during the review process.

2. The Department's issuance of this conceptual approval permit provides the conceptual approval permit holder with assurance that the concepts upon which the engineering and environmental designs are based, are capable of providing for systems that meet Department rule criteria within the level of detail provided in the submitted plans and designs. A conceptual permit does not assure that a specific application for a construction permit will be granted. Future approvals shall be authorized only to the extent they are consistent with that information and the conditions of this conceptual approval permit. Primary areas for consistency comparisons include but are not limited to allowable discharge, wetland and other surface water impacts and proposed mitigation.

3. Pursuant to 62-343.110, F.A.C. the duration of conceptual permits is as follows: "twenty years from the date of issuance of the conceptual approval permit, provided that a standard general or individual permit to construct the initial phase of construction is obtained, and construction of the initial phase has commenced within two years of the issuance of the conceptual approval permit. However, if the activity approved by the conceptual approval permit is undergoing a development-of-regional-impact review pursuant to Section 380.06, F.S., and an administrative appeal of that review has been filed, the permittee may toll the two year time period for permitting and undertaking construction by notifying the Department, in writing, within two years of issuance of the conceptual permit, that the development-of-regional-impact

review has been appealed. The applicant shall also notify the Department, in writing, of the final action resolving such administrative appeal. If proper notice is given as indicated above, the two year time period for permitting and undertaking construction shall be tolled from the date the administrative appeal of the development-of-regional-impact review is filed, to the date of final action resolving such administrative appeal."

4. This Conceptual Environmental Resource Permit (ERP) does not authorize any of the construction activities mentioned herein. Any such authorization shall require issuance of an Individual ERP. Subsequent Individual ERP's to conduct the work outlined in this Conceptual ERP shall include specific conditions to protect water quality and biological resources.

5. In the subsequent Individual ERP application(s), the permittee shall provide final construction details of the dredging project, conceptually approved herein. At a minimum, this information shall include the following:

- construction drawings (8 ½ X 11 and full size)
- construction schedule
- details regarding construction materials and methods
- plans to protect water quality (surface water and groundwater)
- plans for final disposal of spoil including design, residence time, and capacity of diposal sites
- plans for the protection of threatened and endangered species

6. Dredging operations shall be managed to minimize turbidity and dissolution of contaminants. Considerations shall include:

- monitoring river flows and adjustment of operations accordingly
- interaction with and scheduling of boat traffic on the river
- scheduling work on incoming tide, especially as work progresses toward the river mouth
- begin dredging at the upriver extent of the project and working toward the mouth

7. Dredging by hydraulic or sealed mechanical method is preferred, in order to minimize turbidity. The permittee is advised that open clamshell dredging may not be able to meet water quality standards, even with turbidity barriers and procedural modifications.

8. If use of a polymer or flocculant is proposed, adequate information will be necessary regarding the toxicity and water quality characteristics of the compound. This information shall include but not be limited to a Material Safety Data Sheet, toxicity to aquatic organisms, concentration in decant, and half-life. Information describing the method of introducing and

mixing the polymer will also be needed. Written approval by the Department would be required prior to the use of any polymer or flocculant.

9. If state water quality standards for turbidity and other water quality parameters cannot be met at the edge of the standard 150 meter mixing zone, issuance of the Individual ERP would require issuance of an associated variance for an expanded mixing zone. The application for this variance shall list the water quality parameter(s), and demonstrate that there are no practicable means known to meet the water quality standards within a 150 meter mixing zone. Issuance of the variance also requires assurance that water quality standards for an OFW can be met at the edge of the expanded mixing zone, pursuant to 62-302, 62-4.242 and 62-4.244, F.A.C. Also see the Water Quality Monitoring specific condition.

10. The Individual ERP shall include a mixing zone, pursuant to Sections 62-4.242 and .244 F.A.C., which shall not extend waterward of the mouth of the river. For the purposes of this project, the mouth of the river is defined as a line extending due north from the eastern boundary of Brickell Park.

11. Discharge from the disposal site, if proposed, shall be managed to reduce contaminant concentrations at the compliance point (edge of mixing zone), e.g. timed according to tide, discharge flow control, adjust discharge according to river flow.

12. Water Quality Monitoring
A Water Quality Monitoring Plan, designed cooperatively by the Department, the USACE, FWCC, Miami-Dade County DERM, NMFS, and USFWS, shall be developed prior to the issuance of an Individual ERP for this project. The plan will be included in the Individual ERP.

Depending on the selected design for dredging and disposal activities, the Water Quality Monitoring Plan may include the following items, or other items reasonably necessary to provide adequate protection of water quality. When the actual project design is selected, the monitoring will be designed to address specific concerns.

Prior to initiating dredging, and for a period adequate to establish background conditions, a pre-dredge monitoring program will be performed. The monitoring program will entail water quality sampling at the mouth of the river, an interim point, and at the disposal site. The monitoring report shall include the data and findings, shall be submitted to the Department prior to the initiation of dredging, and shall be adequate for establishing background conditions that will be used for comparison to data obtained during project monitoring. Flow data and other information shall also be collected, adequate to run a mixing model for the river.

At initial start up and prior to any discharge of decant water from the disposal area, water in the disposal area will be monitored for those constituents which have the potential to cause an exceedance of their respective surface water standard, pursuant to 62-302 F.A.C. (e.g. eight RCRA metals, hardness, turbidity, pesticides/PCB's by EPA Method 8081/8082, PAH, tributyltin, Dioxin, etc.) and toxicity bioassay.

Water quality monitoring of the compliance point (edge of mixing zone), an intermediate river site, and disposal site discharge will also be required during the dredging project, for the same parameters listed above, with special attention to those parameters that have shown preconstruction exceedances of surface water standards. The sampling program may vary based on the location of the dredging operation along the river, for example near tributary branches, or as work progresses toward the mouth. Based on results from previous monitoring, the sampling program may be modified during the project, by submitting a justification for the Department's approval. The Department may modify the monitoring plan requirements where reasonably warranted, for example in the case of a change in dredging and/or disposal operations by the selected contractor, or where review of monitoring data indicates inconsistencies or deficiencies in the plan.

If monitoring indicates exceedances of water quality standards occur or are imminent at the compliance point (edge of the mixing zone), the operation will be shut down immediately. In order to address such cases, a response plan shall be proposed to protect resources in Biscayne Bay. The dredging operation will remain shut down until modifications are made to reduce the level of contaminants entering the river. The operational modifications shall be approved by the Department prior to restart, and may include, but are not limited to the use of polymers/ flocculants, filters, increasing disposal site retention time, removal of spoil from the disposal area, etc. The Department's BBWR and SE District Office shall be notified verbally within 24 hours of any exceedance. A written description of the circumstances surrounding the exceedance shall be submitted with the modification plan.

Pursuant to 62-4.246 and 62-160 F.A.C., appropriate analytical methods shall be used, and shall provide a Method Detection Limit (MDL) below the appropriate standard or guidance level. If no method is available that can detect below the applicable standard or guidance level, then the method that provides the lowest MDL shall be used. Use of a method with a MDL above the standard or guidance level shall require prior approval from DEP BBWR.

All sampling, monitoring and analyses required in this permit shall be performed in accordance with Chapter 62-160, Florida Administrative Code (F.A.C.), Quality Assurance. Please be advised that significant changes are being promulgated for the Department's Quality Assurance procedures and rules pursuant to Chapter 62-160 F.A.C. All parties involved in sampling and analysis should keep appraised of these changes. Information about this rule may be obtained

through the Departments web site at:
http://www8.myflorida.com/environment/learn/science/laboratories/dqa/qaprog/workshop.html

13. Biological Resources Monitoring
A Biological Resources Monitoring Plan, designed cooperatively by the Department, the USACE, FWCC, Miami-Dade County DERM, NMFS, and USFWS, shall be developed prior to the issuance of an Individual ERP for this project. The plan will be included in the Individual ERP.

Depending on the selected design for dredging and disposal activities, the Biological Resources Monitoring Plan may include the following items, or other items reasonably necessary to provide adequate protection of the biological community. When the actual project design is selected, the monitoring will be designed to address specific concerns.

The plan for the monitoring of the natural resources, e.g. benthic organisms and seagrass, waterward of the edge of the mixing zone shall be designed with the goal of detecting stress on the biological community that may not be detected by chemical/physical monitoring, e.g. chronic low level exposure to multiple contaminants, sporadic and transient acute contaminant exposure, physical effects of siltation, light attenuation, etc. This monitoring shall include observations relating to the health and function of the biological system.

14. Flow Monitoring
A Flow Monitoring Plan, designed cooperatively by the Department, the USACE, FWCC, Miami-Dade County DERM, NMFS, and USFWS, shall be developed prior to the issuance of an Individual ERP for this project. The plan will be included in the Individual ERP.

Depending on the selected design for dredging and disposal activities, the Flow Monitoring Plan may include the following items, or other items reasonably necessary to provide adequate and appropriate flow data. When the actual project design is selected, the monitoring will be designed to address specific concerns.

The goal of the monitoring will be to acquire data necessary for the development of a mixing model. The mixing model will be used to assist in developing procedures and operations that minimize contaminant concentrations within the mixing zone.

15. Dewatered Spoil Monitoring
A Dewatered Spoil Monitoring Plan, designed cooperatively by the Department, the USACE, FWCC, Miami-Dade County DERM, NMFS, and USFWS, shall be developed prior to the issuance of an Individual ERP for this project. The plan will be included in the Individual ERP.

Depending on the selected design for dredging and disposal activities, the Dewatered Spoil Monitoring Plan may include the following items, or other items reasonably necessary to define the quality of the material. When the actual project design is selected, the monitoring will be designed to address specific concerns.

The goal of the plan will be to determine the appropriate final disposition method for the dredge material. Analysis of the bulk material, and leachate prepared from the bulk material may be necessary in order to make this determination.

16. Groundwater Monitoring
A Groundwater Monitoring Plan, designed cooperatively by the Department, the USACE, FWCC, Miami-Dade County DERM, NMFS, and USFWS, shall be developed prior to the issuance of an Individual ERP for this project. The plan will be included in the Individual ERP.

Depending on the selected design for dredging and disposal activities, the Groundwater Monitoring Plan may include the following items, or other items reasonably necessary to provide adequate protection of groundwater quality. When the actual project design is selected, the monitoring will be designed to address specific concerns.

Groundwater concerns mainly are associated with contaminants that may leach from the sediments at the interim and final disposal site(s).

17. Depending on the intended final method of disposal and the test results for the dewatered spoil material, the Department's Waste Management requirements may be incorporated into the Individual ERP. In addition, there may be significant amounts of solid waste items removed from the river, which require disposal in a solid waste facility.

18. Removal of contaminated sediment from the Miami River potentially provides net improvement of water quality within the river. The removal of sediments thus serves as mitigation for temporary elevations of contaminants in the river, within the mixing zone, during the project.

However, given the fact that existing water quality and habitat conditions are significantly better outside the mouth of the Miami River than they are within the river, every effort shall be made to avoid release of contaminants beyond the mouth. Furthermore, pursuant to 373.414(1)b, F.S., water quality mitigation would be necessary to offset any unavoidable water quality degradation, below existing background levels, waterward of the mouth of the Miami River. In addition, pursuant to 62-4.242, F.A.C., the project must be clearly in the public interest. If the pre-project monitoring, the mixing model, and/or other relevant information do not provide assurance that further degradation of water quality outside of the mixing zone shall be prevented, then the local

sponsor will be responsible for providing water quality mitigation. Potential mitigation options include obtaining Clean Marina or Facility status, stormwater projects, or pollution prevention projects. The mitigation will be documented through a binding agreement between the local sponsor and the Department, prior to issuance of the Individual ERP.

19. Corrections to the attached drawings include:

On the overall project aerial, "Sheet 1", the area marked "Mile -0.25 thru 4.19", should read "Mile -0.25 thru 2.93">

On the cross-section drawings, "Sheet 19", the project depth is shown as -15' MLW in all project areas. The cross-sections for areas with channel widths of 125' and 90', should show a depth of -12.5' MLW.

20. Protected Species Conditions

The standard manatee construction conditions, and the additional conditions described below, shall be followed for all in-water construction.

Turbidity curtains or barriers will need to be monitored regularly to prevent manatee entanglement or entrapment. How frequently the barriers need to be monitored will be determined once turbidity containment is addressed by the applicant. This condition will then be modified to be more specific to the project proposal.

A manatee observer plan will be developed for the project and must be approved by the FWCC prior to issuance of the final permit. This plan must address the number of observers needed, where they will be located, and the observer's names and qualifications. The observer plan may require multiple observers that have experience in manatee observation, and are equipped with polarized sunglasses and binoculars to aid in observation. The manatee observers must be on site during all in-water construction activities and will advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity. Movement of a work barge, other associated vessels, and any in-water work shall be minimized to the extent possible after sunset, when the possibility of spotting manatees is negligible.

The permittee shall ensure that the contractor maintains a log detailing sightings, collisions, or injuries to manatees should they occur during the contract period. Manatee sighting information shall include the number of manatees seen per sighting, time of day observed, indicate if work was stopped due to manatee proximity, and when in-water work resumed once manatees left the area. Copies of the logs should be provided monthly to the FWCC. Following project completion, a report summarizing incidents and sightings shall be submitted to the Florida Fish

and Wildlife Conservation Commission, 620 South Meridian Street, OES-BPS, Tallahassee, Florida 32399-1600.

To reduce the risk of crushing a manatee between a vessel and the wharf or between two vessels that are moored together, the permittee shall install wharf fenders with appropriate materials to provide sufficient standoff space of at least 4 feet under compression. Fenders or buoys providing a minimum standoff space of at least 4 feet under compression shall be used for all vessels associated with the dredging project, including dredges and barges. Fenders will also be required at the disposal site where the barge will off-load the dredged material.

Blasting shall be prohibited.

When construction details are available, more detailed conditions may be added for the final permit. If impacts to native habitat resources, such as submerged aquatic vegetation, are anticipated the FWCC will reevaluate the project in light of the additional information concerning the loss of habitat.

21. All work shall be within the area described in BOTIITF Deed # 18939.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Michael Sole, Chief
Bureau of Beaches and Wetland Resources

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this permit and authorization to use sovereign submerged lands, including all copies, were mailed before the close of business on May 17, 2002, to the above listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to 120.52(7),
Florida Statutes, with the designated Department Clerk,
receipt of which is hereby acknowledged.

Monica R. House 06/17/02
Clerk Date

Attachments:
Drawings 20 pages
62-4.242 F.A.C.
62-4.244 F.A.C.

CC:
Tim Rach, DEP, SE District
Betsy Hewitt, DEP, Office of General Counsel
David Mayer, DEP, CAMA
Inger Hansen, DEP, SE District
Mary Murphy, DEP, SE District
Geetha Selvendran, DEP, SE District
Paul Wierzbicki, DEP, SE District
Greg Graves, DEP, SE District
Mark Thompson, DEP, SE District
Doug Strom, DEP, SE District
Steve Wolfe, DEP, Div. of Resource Assess. and Mgmt.
Bob Hall, DEP, OIP
Richard Tedder, DEP, Div. Waste Mgmt.
Gail Sloane, DEP, Div. Water Resource Mgmt.
Brad Hartman, FWCC, BPSM

Carol Knox, FWCC, BPSM
SFWMD, Regulation Dept.
Brad Riech, USFWS
Jim Boggs, USFWS
Mike Johnson, NMFS
Susan Markley, Miami-Dade Co. DERM
Lee Heedy, Miami-Dade Co. DERM
David Miller, Miami River Commission
Suzanne Tarr, Save the Manatee Club
Nancy Case O'Bourke, Case O'Bourke Eng.
Nancy Lee
Cynthia Guerra, Tropical Audubon Society
Ken Jones, PBSJ
Stacey Roberts, PBSJ
DEP, BBWR Permit Information Center
DEP, BBWR File

STANDARD
MANATEE PROTECTION CONSTRUCTION CONDITIONS
FOR AQUATIC-RELATED ACTIVITIES

The permittee/grantee/lessee shall ensure that:

1. The contractor instructs all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel are responsible for observing water-related activities for the presence of manatee(s), and shall implement appropriate precautions to ensure protection of the manatee(s).

2. All construction personnel are advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, and the Florida Manatee Sanctuary Act. The permittee and/or contractor may be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

3. Prior to commencement of construction, the prime contractor involved in the construction activities shall construct and display at least two temporary signs (placards) concerning manatees. For all vessels, a temporary sign (at least 8 1/2" by 11") reading "Manatee Habitat/Idle Speed In Construction Area" will be placed in a prominent location visible to employees operating the vessels. In the absence of a vessel, a temporary sign (at least 2' by 2') reading "Warning: Manatee Habitat" will be posted in a location prominently visible to land based, water-related construction crews.

A second temporary sign (at least 8 1/2" by 11") reading "Warning, Manatee Habitat: Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Any collision with and/or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission at 1-888-404-FWCC" will be located prominently adjacent to the displayed issued construction permit. Temporary notices are to be removed by the permittee upon completion of construction.

4. Siltation barriers are to be properly secured so that manatees cannot become entangled, and are to be monitored daily to avoid manatee entrapment. Barriers must not block manatee entry to or exit from the essential habitat.

5. All vessels associated with the project will operate at "no wake/idle" speeds at all times while in the water where the draft of the vessel provides less than four feet of clearance from the bottom and; the vessels will follow routes of deep water whenever possible.

6. If manatees are seen within 100 yards of the active daily construction/dredging operation, all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment.

7. Any collisions with and/or injury to a manatee shall be reported immediately to the Florida Fish and Wildlife Conservation Commission (FWC)(1-888-404-FWCC) and to the FWC Bureau of Protected Species Management at (904) 922-4330.

8. The contractor will maintain a log detailing sightings, collisions, or injuries to manatees, should they occur during the contract period. A report summarizing incidents and sightings shall be submitted to the following agencies:

Florida Fish and Wildlife Conservation Commission
Bureau of Protected Species Management
Mail Station OES-BPS
620 South Meridian St.
Tallahassee, Florida 32399

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

This report must be submitted annually or following the completion of the project if the contract period is less than a year.

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF
Planning Division
Environmental Branch

MAR 25 2002

Mr. James J. Slack
U. S. Fish and Wildlife Service
1339 20th Street
Vero Beach, Florida 32960-3559

Dear Mr. Slack:

Thank you for the Draft Fish and Wildlife Coordination Act Report (CAR) of February 4, 2002, for the maintenance dredging of Miami River in Dade County, Florida. A detailed reply to the 13 recommendations in the CAR is enclosed. We intend to comply with some of the recommendations in the draft CAR (3, 9, 11, 12, and 13).

In recommendation number 1 you ask to review the bid responses. Federal Acquisition Regulations (FAR) require confidentiality in the distribution of contract proposals. However, a U.S. Fish and Wildlife Service (FWS) employee can become a part of the Source Selection Team (SST) as either a voting member or an advisor. An advisor is not required to participate in all of the discussions and evaluations of contract proposals (which is labor intensive and would require travel to Jacksonville for several days to a week at a time).

Members of the SST must sign a confidentiality statement. Generally, they cannot share information to anyone outside of the SST. Since the proposals cannot leave the building or the direct control of the contracting officer, the members of the SST must come here to view the proposals in a secure room under the control of the Contracting Officer. Members of the SST are also involved much earlier in the process with the development of the Source Selection Plan and Source Selection Criteria.

I believe having FWS on a SST throughout the source selection process would benefit both our agencies and do much to alleviate FWS concerns over the Request for Proposal (RFP) process. The RFP process allows more flexibility on the part of contractors to propose innovative approaches that may be more efficient, more cost effective, or less impactive to the environment. The RFP process is being used more and more as an increasing range of innovative approaches are brought to our attention.

I look forward to your response to the invitation to participate in the Source Selection Team for this project. If you have any questions, please contact Kenneth Dugger at 904 232-1686.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

Recommendations in CAR
Miami River Maintenance Dredging
Detailed Reply

1. Submit RFP bid responses to FWS for review and incorporation into (or supplementation of) the Final CAR.

The nature and timing of such review must follow the requirements of the Federal Acquisition Regulations (FAR). We have offered this to FWS for several projects on several occasions (see body of this letter).

2. Recommends pneumatic dredging to minimize bottom agitation or other hydraulic method or a sealed precision closed-bucket clamshell.

There is a large amount of debris in Miami River. Clam Shell dredging is probably the only practical means of dredging. The closed-bucket clamshell might be somewhat effective if the debris does not "break the seal". We do not believe the nature of the sediments warrants closed-bucket. These sediments are largely subject to prop wash with everyday vessel traffic in this congested river/canal. Closed-bucket is not practical for a large amount of sediments and we feel not necessary for this project.

3. Comply with Special Conditions 6 through 20 of FL DEP Draft Conceptual permit of December 5, 2001. Give FWS opportunity for input for water quality monitoring.

We will comply with the requirements of the Water Quality Certification.

4. Supplement the Miami River Tracer Study with hydrodynamics data and evaluation within the Miami River.

In a recent meeting in Vero Beach with FWS, WES presented the results of a simulation of a hydrodynamic circulation model of Biscayne Bay to simulate a dye tracer near the mouth of the Miami River into Biscayne Bay. This simulation shows where much of the water and associated sediments/contaminants go once they leave the river. While additional modeling is possible, it would be very expensive and take months (if not years) to develop and verify. It is doubtful that any amount of modeling, time, and money would satisfy a zero risk standard. While models are useful tools in understanding the dynamics of the system, they still rely on real observation for verification and development and should be carefully used as a complement, rather than as a substitute for extensive local knowledge and experience of the river and the bay.

5. Devise a monitoring and contingency plan to temporarily stop work if sediment is transported to the bay.

The Water Quality Certification typically contains a turbidity requirement outside the mixing zone. We will cease dredging if turbidity limits are met in accordance with the Water Quality Certification (WQC).

6. Submit a plan/determination on whether dredging should be suspended at certain locations of the river.

The whole river needs to be dredged. Again, there is a turbidity requirement in the WQC.

7. Submit a plan on actions/safeguards needed for the eastern-most project cut, just outside the mouth of the river.

The mixing zone is 150 meters (see previous 2 items above).

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

It would be extremely difficult to erect turbidity containment devices in the river. The size of the river, flow, and vessel traffic make this very difficult and we feel unnecessary. Erosion and surface water management are standard requirements for upland activities.

9. Abide by Standard Manatee Protection Conditions and additional protection measures as contained in Special Condition 20 of DEP permit of December 5, 2001 (required for agreement with a "not adversely impact" manatee determination pursuant to Section 7 of the Endangered Species Act).

Manatee specs are part of contract language. We will comply with the requirements of the ESA and the Water Quality Certification.

10. Provide a current seagrass survey including at least a quarter mile radius from the mouth of the river prior to dredging. Incorporate seagrass monitoring to capture any project-related impacts.

Since the river is highly turbid and stirred-up with daily vessel traffic, it would not be possible to attribute any change in sea grass to dredging activity. Sea grass does not occur at the mouth of the river for this reason. Dredging is unlikely to add significantly to the sediment load leaving the river already on a daily basis.

11. Provide FWS with details of the final off-site spoil-disposal.

We will provide such details once the contract is awarded. If we consider awarding an activity that falls beyond the range of impacts considered in the CAR and the EIS, we will examine the need to supplement the NEPA document and the CAR. We would only award for disposal that meets legal requirements and the specifications in the RFP.

12. Notify FWS 30 days prior to the commencement of dredging. This is doable.

13. Provide monitoring data [on environmental resources] as it is produced during and post construction. This is doable.