KEY WEST HARBOR DREDGING

MONITORING AND MITIGATION PLAN

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Key West Harbor Dredging Project Operational Control Turbidity Monitoring Work Plan

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TURBIDITY MONITORING PLAN

PROJECT OVERVIEW

This Operational Control Turbidity Monitoring (OCTM) Program is to be implemented in association with the Key West Harbor Dredging Project, which consists of maintenance dredging of portions of the Key West ship channel and Truman Harbor. This program has been designed to comply with Florida Department of Environmental Protection (FDEP) and U.S. Army Corps of Engineers (USACE) dredging permit requirements that were designed to protect area marine resources and water quality. The monitoring is to be conducted to the satisfaction of Florida Keys National Marine Sanctuary personnel who are responsible for protecting the corals, seagrasses, and other marine resources existing in the Outstanding Florida Waters that surround the channel and harbor where dredging will occur.

The FDEP and USACE permits limit the amount of turbidity increases relative to background levels that dredging operations can generate. Specific compliance points, i.e., distances down current from the dredge, are cited in the permits as locations where monitoring will occur.

The permits intend for monitoring data to be made available to the dredge operator every 2 hours so that dredging can be terminated in the event that an exceedance occurs. The monitoring approach is designed to increase the frequency of turbidity measurements to every 15 minutes if trends in collected data indicate proximity to unacceptable levels of turbidity. By informing the dredge operator of trends, it is anticipated that dredge operations can be modified without complete shutdown to reduce material releases that contribute to turbidity plumes.

Monitoring Approach

The turbidity monitoring approach primarily will use towed instrumentation to obtain data from background and compliance points on a continuous 24-hr per day basis. After recording turbidity data, the field survey team will evaluate the compliance point readings relative to background levels and then communicate to the dredge operator, in near real-time, the acceptability of those readings. The field survey team also will transmit collected data and field observations daily to the home office of PPB Environmental Labs, Inc. (PPB), the USACE's prime contractor for this monitoring program. After the data have been checked for correctness, they will be made available to regulatory agency personnel on a project website.

For this continuous monitoring project, two identically outfitted 30-ft survey vessels will be used. These vessels, described further below, will allow two two-man teams each to work 12-hour shifts from one of the vessels, allowing the non-active vessel the opportunity for maintenance and repairs as necessary. An aggressive maintenance program will be employed to assure vessel reliability and performance.

Each vessel will be fitted with a stern-mounted deployment boom. To collect turbidity data, a weighted hydrodynamic towfish with mounted turbidity, temperature, and depth sensors will be lowered from the deployment boom to the required depth. Water current data from a survey vessel-mounted acoustical Doppler current profiler (ADCP) will be used to determine the correct placement of background and compliance point stations relative to the dredge's position.

At each station, the survey team will determine the water depth using an echo-sounding depth finder, lower the sensor towfish to mid-depth, record one reading per second for 30 seconds to a

notebook computer, and then retrieve the towfish. To provide a more accurate representation of the turbidity and reduce the impact of variability of any one measurement, readings will be averaged over the 30-second recording period with the results entered into a database. Water current speed and direction, wind speed and direction, sea conditions, and dredge position also will be recorded for each sampling interval. The dredge operator will be contacted after each sampling period as to compliance status.

PROJECT STAFFING REQUIREMENTS

Field Survey Teams On Site

The collection of turbidity data will be completed by two alternating survey teams. Each two-man team will consist of a Field Team Leader and a Boat Operator/Navigator. A fifth person on shore will provide survey team support, oversight, and coordination functions. This fifth person will be either a Site Manager or a Lead Technician, on a rotating basis.

Field Team Leaders

The Field Team Leaders will be responsible for directing the monitoring efforts on the survey vessels. Each Field Team Leader will be responsible for all field data collection and the certification of instrumentation accuracy during his shift. The on-shift Field Team Leader will determine the positioning of the boat for data collection by calculating the locations of background and compliance points. He also will collect data from the turbidimeter on the required basis, document field conditions, download and record data from fixed mooring instruments, calibrate and perform routine maintenance on the sensors, communicate with the dredge operator in near real-time regarding survey results and compliance status, and assist the Boat Operator/Navigator with the safe operation of the vessel. At the end of each shift, he will transmit the shift's data to the Project Manager at PPB.

Boat Operators/Navigators

The Boat Operators/Navigators will be responsible for operating the survey vessels and all of their equipment. Each Boat Operator/Navigator will be responsible for his 30-ft survey vessel and its associated survey equipment. The on-shift Boat Operator/Navigator will position the vessel for monitoring as directed by the Field Team Leader. He also will be responsible for boating safety and ensuring the vessel and attached equipment and instrumentation are properly maintained and in good working condition. Each Boat Operator/Navigator will be an expert with the handling and operation of the 30-ft survey vessel. The Boat Operators/Navigators will be competent in navigation and seamanship and maneuvering the craft successfully in rough seas when less than small craft advisories are in effect. Because the Boat Operators/Navigators will be responsible for boat and crew safety, the Field Team Leaders will defer to the Boat Operators/Navigators when issues arise that might affect the safety of the craft and/or crew.

Site Manager

When serving as the fifth person on site, the Site Manager will be responsible for coordinating project activities (e.g., monitoring, scheduling, maintenance, corrective actions) in the Key West project area. He will obtain daily weather and tide data. He will report to the Project Manager on a regular basis. He will review all field data, observations, and maintenance logs on a daily basis and discuss any anomalies with the Project Manager as needed.

The Site Manager will be responsible for screening the turbidity, positioning, and current data from both shifts. The Site Manager will evaluate these data for anomalies, taking the appropriate corrective action when necessary.

In addition, the Site Manager will assist the survey teams when necessary. He will be cross-trained to function as a Field Team Leader and will fill that role should a Field Team Leader become sick or otherwise unable to serve his shift.

Lead Technician

When serving as the fifth person on site, the Lead Technician will be responsible for coordinating project activities (e.g., monitoring, scheduling, maintenance, and corrective actions) in the Key West project area. He will obtain daily weather and tide data. He will report to the Project Manager on a regular basis. He will review all field data, observations, and maintenance logs on a daily basis and discuss any anomalies with the Project Manager as needed.

The Lead Technician will be responsible for on-site maintenance and support of both survey vessels and their equipment. The Lead Technician will coordinate with both Boat Operators/Navigators to ensure equipment and support needs are met for both survey teams. He will coordinate vessel maintenance, schedule servicing of electronic instrumentation, and address any issues that could interfere with the monitoring effort.

In addition, the Lead Technician will assist the survey teams when necessary. He will be cross-trained to function as a Boat Operator/Navigator and will fill that role should a Boat Operator/Navigator become sick or otherwise unable to serve his shift.

OTHER TECHNICAL PROJECT STAFF MEMBERS

Project Director

The Project Director will be an employee of PPB, the USACE's prime contractor for this monitoring program, and have overall project responsibility including contract compliance and required communication with the client relating to possible contracting issues with the OCTM program. The Project Director will stay informed as to the overall aspects of the project and be continuously available should any issues develop requiring formal authorization by PPB. The Project Director may write, and is responsible for, the review of all documents required of PPB. The Project Director will make "on site" visits as required in the interest of the project or by the USACE. The Project Director also will be responsible for ensuring the Project Manager has the necessary resources to perform tasks required of the project.

Project Manager

The Project Manager will be responsible for selecting the project team, budget management, and managing directly, or through a liaison, the daily operations of the project. The Project Manager will interact directly with the USACE contracting officer's representatives as needed to accomplish the OCTM program objectives. In addition, the Project Manager will copy the Project Director on communications and keep him/her informed verbally regarding all activities associated with accomplishing the project objectives and data quality objectives.

Quality Assurance Officer (Field Audits)

The Quality Assurance Office will ensure that the data quality objectives of the project are being met. This will be accomplished by regular audits of the field team and procedures associated

with the Operational Turbidity Monitoring. The Quality Assurance Officer will ensure that the turbidity monitoring and procedures are properly understood, implemented, and evaluated. The Quality Assurance Officer will conduct field audits within an appropriate timeline to be decided by the Quality Assurance Officer and the Project Director.

Quality Control/Data Manager (Gainesville, Florida)

The Quality Control/Data Manager in Gainesville will be responsible for data review and validation before release of data from the PPB server.

Information Technology (IT) Staff

The IT person will be responsible for the maintenance and upkeep of the PPB data management/ website server. The server will be used to allow remote access to turbidity data. The IT person will be responsible for ensuring these data are available for access.

FIELD EQUIPMENT REQUIREMENTS

Various types of field equipment will be required to ensure the reliability of the flow of turbidity data regarding compliance status from the underwater sensor to communications with the dredge operator.

Survey Vessel Design and Specifications

Because this monitoring program is being designed to last for at least 1 year, two similar survey vessels will be equipped with redundant capacities to ensure uninterrupted, full-time monitoring. Given the length of this monitoring program, two vessels are necessary to avoid delays due to maintenance and repairs that could have an unacceptable impact on continuous dredge operations. The survey vessels will be equipped to rapidly deploy and retrieve turbidity sensors while measuring current in real-time from a vessel-mounted current meter.

Both fiberglass survey vessels will be "Island Hopper 30"s, which are 30 ft long and 12 feet wide. Their size (especially the wide beam) will ensure maximum cost-effective ability to continue operating in rough weather. They each will be equipped with a single inboard diesel engine. They will be capable of approximately 30 kn in acceptable weather conditions. Speed will be an issue when the survey team is working on a 15-minute schedule to complete a three-station monitoring circuit of over 2 miles. These vessels were selected specifically for their durability under extreme conditions. An air conditioned and heated cabin will provide a safe and reliable working environment in which to use electronic instrumentation that will be powered by a water-cooled generator with backup power supplies.

The work area of the deck will be approximately 8 ft by 10 ft and equipped with a small boom attached to the vessel at the stern in a position that will allow the turbidity sensor with a hydrodynamic weight to be lowered to and raised from mid-depth.

An RDI Workhorse ADCP current meter will be mounted in a sea chest in the interior of each survey vessel. With the ADCP mounted in such a manner, the survey team will be able to collect current data at slow speeds or transit between monitoring stations at high speeds without manipulating the ADCP transducer. The ADCP will be interfaced with the navigation system such that the raw current speed and direction readings, which are collected relative to the vessel's

hull, can be corrected based on vessel speed and direction to give real-world geodetic water current measurements. This survey team has used this technique very successfully in the past.

Each survey vessel will have an air-conditioned, environmentally controlled cabin to house the electronic instrumentation associated with navigation, data gathering, and data management. This instrumentation will include the following:

Navigation Instrumentation

The navigational system for the survey vessels will incorporate differentially corrected global positioning system (DGPS) receivers. This system will be integrated with a notebook computer with Hypack software to display vessel position relative to marine resources, navigational aids, the dredge, the channel, and other features of interest. Each vessel also will be equipped with a navigational radar to detect the presence/location of other vessels in foul weather and at night. A depth finder/fathometer will be used to measure water depth.

Turbidity Measuring Instrumentation

Because turbidity is expected to be low (often less than 5 NTUs), it is important that the selected nephelometric sensor has a high level of accuracy and precision at low levels of turbidity. Accurate data are particularly important if each turbidity datum is to be considered accurate to ± 1 NTU. During storm events, turbidity values have been measured at 40 to 50 NTUs, and the natural variability is not known.

While the current plan calls for most monitoring to be performed from vessels, fixed position instruments are envisioned for use near the upland disposal facility. These instruments will be serviced every 2 days unless exceedances occur, and then at a frequency that has yet to be determined. Each recording turbidimeter will have electrical power supply sufficient to leave it unattended for a minimum of 1 week.

Because swift currents may be present, turbidity sensors will be small enough that drag from flowing water does not pose a problem. They also will be amenable to quick replacement should a sensor require more extensive servicing.

Fixed Position Monitoring Equipment

One fixed position monitoring station will be established to collect background data in the area where discharge from the upland disposal facility would occur. A turbidimeter with internal data storage is planned for this installation. This instrument may be placed on an existing structure, e.g., a navigational aid, or may be buoy-mounted, depending on the location selected. It will be serviced, calibrated, and data downloaded at regular intervals.

In the event that discharge appears likely to occur, a second turbidimeter will be used to collect permit compliance turbidity data. The instrument initially positioned for background data collection may need to be repositioned so that the two instruments will be able to alternate as background (up current) and compliance (down current) monitors. When and if these instruments are used to monitor for permit compliance, they will continue to store collected data internally, although the frequency of downloading may change. If the USACE desires radio transmission of compliance data from these stations, additional funding will be required to purchase, install, and maintain the necessary equipment and website.

Communication Equipment

The survey vessels will be able to communicate with the Coast Guard, private and commercial vessels, the dredge operator, Site Manager or Lead Technician, and the PPB Project Manager. Such communications will be necessary along the entire length of the project area where monitoring will occur. To ensure reliable communications, both marine-band radios and cellular phones will be used. Additionally, a VHF modem telemetry system will be used to directly receive dredge position data and transmit turbidity compliance data to and from a computer on the bridge of the dredge to avoid misunderstandings potentially associated with voice communication.

Storm Contingency Plan

If a hurricane develops, it may be necessary for the vessel crew to secure the vessel and other equipment. The vessel crew may need to evacuate the area due to safety considerations and return to their location of deployment (i.e., Jupiter or Gainesville) until severe weather subsides. The Project Manager/Project Director, in conjunction with the USACE, will make these decisions. There most likely will be weather conditions such as small craft advisories that will not necessitate securing vessels and equipment. Such decisions will be made on a case-by-case basis as indicated above, with the safety of the vessel crew being paramount.

Housing and Transportation Issues

Assuming that Navy housing is unavailable, survey team staff will be provided with lodging in a condominium in Key West. This dwelling, which will most likely be a three-bedroom condominium, will have the necessary facilities for computer access and adequate facilities for staff comfort. During overlap crew change nights, local per diem rates will be applied to the use of a local motel. If Navy housing is available and most cost-effective, then the crew will stay in housing provided by the Navy.

The staff will maintain two crew-cab pickup trucks on site for transportation to and from the dock. These trucks will have adequate capacity for transporting crew as well as field equipment.

MOBILIZATION/DEMOBILIZATION PLAN

After purchase, the two (currently-held-by-right-of-first-refusal-offer) survey vessels will be mobilized by truck from Clearwater, Florida and Key Largo, Florida to the Island Hopper International Boat Works in Ft. Pierce, Florida for modifications (i.e., purchasing and/or installing cabin enclosure, generator, air conditioner, digital compass, DGPS, sea chest for ADCP transducer, radar, VHF, fathometer, deck lights, transom walk-thru, dive platform, and all necessary safety, electrical, and tool kits). After vessel modifications, the vessels will be driven to the home office of PPB's field operations subcontractor, Continental Shelf Associates, Inc. (CSA) in Jupiter, Florida.

All survey equipment will be mobilized at CSA's shop facility in Jupiter. As equipment is received and checked, it will be installed on the vessels and then tested in the vicinity of the Jupiter Inlet. This equipment testing period also will be used for finalizing survey protocols and training of CSA and PPB personnel. The vessels and equipment then will be transferred to Key West by truck where they will be docked at Trumbo Point for the duration of the project.

Demobilization will occur at the end of operations where all equipment and vessels will be transported by truck to CSA. Personnel will secure the areas and return to CSA and PPB. All required agencies will be notified at the end of operations.

BASELINE MONITORING

This turbidity monitoring program is to be implemented in two phases: pre-dredging baseline monitoring and the during-dredging OCTM.

The pre-dredging baseline monitoring data will be collected in two separate phases: 1) under a previously issued task order and 2) as a 4-day pre-operational data collection program that will occur before operational monitoring begins. All vessels/equipment used for the operational turbidity monitoring will be used for the baseline monitoring as an additional system and protocol checkout period.

These vessels and equipment suites also may be used by CSA personnel under direct contract with the U.S. Navy to collect additional baseline turbidity data under a portion of the overall Monitoring and Mitigation Plan called the Net Environmental Effects Monitoring Plan. This element may provide as much as an additional 18 days of background turbidity data collection. The PPB OCTM team would coordinate closely with the CSA team under direction from the USACE as to how best to collect any additional background baseline data to best meet the needs for the OCTM component of the project.

COMMUNICATIONS PLAN

As noted above, the field survey team will contact the dredge operator after each sampling period as to compliance status by whatever manner is most effective for the dredge operation. It is currently planned to use a VHF modem data telemetry system to transfer dredge position and turbidity data back and forth between the survey vessel and the dredge's bridge with radio and cell phone verbal data transfer as backups. A USACE representative will be present on the bridge of the dredge as well. At the end of each shift, that shift's Field Team Leader will communicate shift data to PPB in Gainesville. These data will be communicated to the USACE and other regulatory agencies approved by the USACE via weekly reports. Yearly and end of project reports also will be communicated through the same mechanisms. These reports will be communicated by PPB.

DATA MANAGEMENT PLAN

Data will be collected from the turbidity sensors and other equipment (i.e., DGPS, ADCP) by the instrumentation on the vessel. These data will be collected and saved on a computer present on the survey vessel and then communicated at the end of each shift by e-mail or uploaded to PPB's database for archival and distribution as described in the communications plan. The Site Managers or Lead Technicians also will maintain on-site data archives that will serve as an off-site backup for raw data to the primary data server being maintained at PPB in Gainesville. These data will be available for viewing by those agencies/personnel authorized by the USACE. Data will be reviewed by the Site Manager or Lead Technician before they are sent to PPB and then reviewed and validated by PPB's quality assurance team before distribution to the authorized agencies.

A data repository will be set up on PPB's web-server for access by those persons authorized by the USACE. The data will be categorized in a hierarchical manner and easily accessible through any standard web browser. Access to the repository will be restricted by username and password authentication. If needed, 128-bit encrypted SSL also will be implemented in order to avoid electronic eavesdropping of the data transmission and prevent unauthorized access. All data will be stored on a journaled file system to guarantee data integrity, and nightly backups will be made.

REPORTING AND PUBLIC DISSEMINATION OF INFORMATION

The primary reporting of data will be the near real-time delivery of permit compliance turbidity levels to the dredger to enable proper operational control of the dredging operations. The documentation of these data will consist of three types of reports – a weekly report, a year-end turbidity report, and the final turbidity report. These reports will include turbidity values, locations, current water direction and speed, current wind direction and speed, and tidal state.

These data will be submitted to the appropriate regulatory agencies per instruction by the USACE. In addition, all data will be archived on the PPB server for access by those agencies authorized by the USACE.

SITE SPECIFIC SAFETY PLAN

All vessels will be equipped with all required Coast Guard-approved safety equipment. Emergency contacts and procedure lists will be laminated and posted in the cabins of both vessels. Personnel will be trained in first aid, cardiopulmonary resuscitation, man overboard, boat handling, and radio communications. All personnel will be familiarized with CSA's approved Safety Plan. If any questionable situations arise, the appropriate personnel will be notified. Operational schedule and/or changes will be communicated to the appropriate authorities. All vessels will monitor VHF channel 16.

MONITORING AND QUALITY ASSURANCE PLANS

Turbidity monitoring will occur in and around Key West Harbor before, during, and after dredging of the harbor. This monitoring will ensure that the conditions of the permits to dredge will be followed and that marine resources will be protected. Existing oversight by multiple regulatory agencies warrants a written monitoring plan as an important element for providing each agency with a complete and detailed description of the monitoring program. How and where the different elements of the monitoring program will be applied also will be addressed in the monitoring plan.

The concept of "adaptive management for resource protection" will be applied to the ongoing implementation of the monitoring program. If during the course of monitoring there is reason to believe that health of marine resources could be better protected by practical changes to the OCTM Program, such changes will be made.

Application of adaptive management will allow flexibility in the monitoring program. The monitoring plan will define the procedural approaches for identifying the need for change, defining program modifications to address the need, and the approval process.

An important aspect of the monitoring plan will be to identify naturally occurring conditions that may cause apparent permit violations so that understanding of these phenomena (e.g., water mass boundary movements, wind driven currents) can be used during interpretation of turbidity data. Similarly, normal harbor use (e.g., ship movements) will periodically impact turbidity; this will be accounted for during data interpretation.

It will be important to obtain multiple-agency consensus on the interpretation of data relative to non-dredging activities and phenomena before monitoring is implemented. Consequently, sufficient time, perhaps reduced by expedited interagency coordination, needs to be allowed for consensus to be reached on a draft plan.

In order for the OCTM Program to achieve its objectives, i.e., permit compliance for marine resource protection, a project-specific Quality Assurance Plan (QAP) will be developed. This QAP will state quality assurance objectives and describe the procedures used for data collection, evaluation, reduction, interpretation, and reporting. This plan will define limits of acceptability for turbidity measurement data, data set completeness, and timeliness for reporting data.

Managerial and Quality Assurance Site Visits

The Project Director will be on site for the appropriate phases of project initiation. In addition, he will be available to attend meetings or will travel to the project site when deemed necessary. Unless instructed otherwise by the USACE, the Project Director will monitor the project from Gainesville, Florida. The Project Director, in addition, will receive regular updates from the Project Manager as to the status and progress of the project.

The Quality Assurance Officer will conduct a field audit after the initiation of turbidity data collection while background data are still being collected before the dredging operation commences. The audit will occur after the operation has established a routine and initial set up and debugging is complete. A second field audit will be conducted 2 to 3 weeks after the dredging operation has commenced and operation is considered normal. If multiple dredges are used, a Quality Assurance Audit will be conducted on each operation once routine operation has begun. Assuming dredging operations continue for more than 6 months, quarterly field audits will be conducted. The Quality Assurance Officer also will ensure consistency of operation by overlapping audits between boat crews.

Key West Maintenance Dredging Project
Resource Health and Sedimentation Monitoring Plan

29 September 2003

1.0 INTRODUCTION

1.1 Objectives

The objective of the Resource Health and Sedimentation Monitoring (RHSM) Plan is to use coral and seagrass health and sedimentation measurements at selected locations adjacent to the project area as indicators of potential dredging impacts to benthic resources. Both resource health and net sediment accumulation then may be used as triggers for relocating the dredge to a different area if impacts are detected or threshold sediment accumulation levels are exceeded. This monitoring program was developed to respond to the following requirements from the U.S. Army Corps of Engineers (USACE) and Florida Department of Environmental Protection (FDEP) dredging permits:

1. Monitor coral health adjacent to dredging;
2. Monitor seagrass health adjacent to dredging;
3. Describe sediment characteristics in dredge footprint, pipeline corridor, and areas downstream of turbidity plume, adjacent to disposal site, and at monitoring stations;
4. Establish background sedimentation in and adjacent to dredging footprint and at monitoring stations;
5. Monitor during-dredging water quality for sedimentation from Key West harbor and approaches from outer coral reef tract;
6. Monitor sedimentation on nearby seagrass and coral communities; and
7. Monitor sediment traps weekly at pre-arranged stations.

1.2 Monitoring Plan Overview

The monitoring plan will consist of the following elements:

- Monitor coral health at sites adjacent to the project area and at reference sites by repetitive diver observations of selected coral colonies for signs of bleaching, excess mucous production, coral polyp extension, and disease;

- Monitor seagrass health within seagrass beds adjacent to the project area and at reference sites by diver observation of sediment buildup on blades and increased epiphytes or biofouling; and

- Monitor sedimentation adjacent to the dredging footprint within sensitive resources and at appropriate reference locations. The sedimentation monitoring will be conducted at permanent stations, and measurements will be made during dredging activities by using sediment accumulation blocks (weekly) and sediment traps (monthly).

The monitoring program will be flexible and adaptive, and the proposed procedures and protocols may be modified as necessary during the duration of the dredging project should conditions warrant.

2.0 METHODOLOGY

2.1 Monitoring Station Locations

Monitoring stations will be positioned as shown in **Figure 1** and distributed among the various resource types as follows:

Hard bottom areas:	11 project area + 3 reference stations
Hawk Channel patch reefs (crest):	5 project area + 3 reference stations
Hawk Channel patch reefs (base):	5 project area + 3 reference stations
Bank reefs:	5 project area + 3 reference stations
Deep seagrass areas:	3 project area + 3 reference stations
Shallow seagrass areas:	3 project area + 3 reference stations

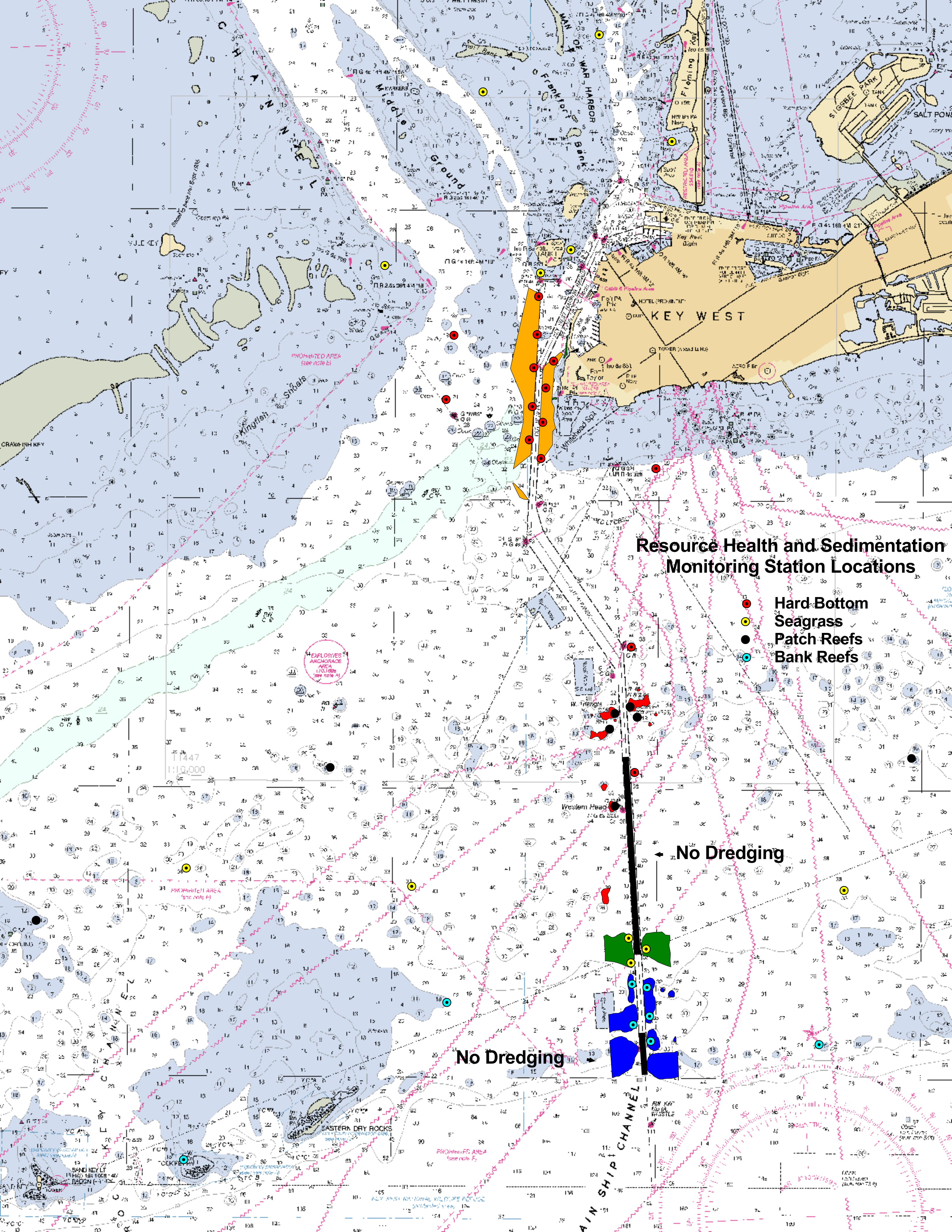
2.2 Resource Health

Either coral or seagrass health will be assessed at each station when the dredging operations are occurring or have occurred within 1,500 m of the station during the previous monitoring interval. Monitoring intervals will begin at 3 days and will increase to 7 days if no impacts are observed at monitoring stations within a specific dredging area over the first three monitoring intervals. Specific dredging areas may be delineated as Truman Harbor, the Cut C turning basin, Cut B, and Cut A/Main Ship Channel. The health monitoring also will be performed at reference sites appropriate for the dredging area stations being assessed.

2.2.1 Coral Health

At each of the coral health stations, a set of six stony coral colonies composed of at least four different species will be selected during the initial survey. Selected species may include *Agaricia agaricites, Colpophyllia natans, Dichocoenia stokesi, Diploria clivosa, Diploria strigosa, Montastrea annularis, Montastrea cavernosa, Porites astreoides, Siderastrea siderea, Solenastrea bournoni*, and *Stephanocoenia michelini*. Each colony will be healthy, greater than 15 cm in diameter, and marked with a numbered tag attached to a stainless steel pin drilled and epoxied into the bottom next to the colony. The position of each colony also will be mapped relative to the location of the net sediment accumulation block (distance and bearing) and recorded to allow relocation on subsequent surveys. At the Hawk Channel patch reef and associated reference sites, six coral colonies will be selected near the base and six colonies selected at the crest of each monitored reef due to the height of these features and the potential for different conditions at the base versus the crest.

The coral health assessment parameters will include bleaching, excess mucus production, polyp extension, and disease. Each selected coral colony will be assessed for each of the health parameters and assigned a health level of either “0” or “1” for each parameter. A score of “0” would indicate no observed bleaching, excess mucus production, polyp extension, or disease, while a “1” would be assigned for each parameter with a positive indication. The score for each parameter for each coral colony will be recorded,


Resource Health and Sedimentation
Monitoring Station Locations
Hard Bottom
Seagrass
Patch Reefs
Bank Reefs
No Dredging
No Dredging
KEY WEST
SIGSBEE PARK
SALT POND
Fleming Key
MAN OF WAR HARBOR
Frankfort Bank
Middle Ground
Kingfish Shoals
CRAWFISH KEY
EXPLOSIVES ANCHORAGE AREA
PROHIBITED AREA
EASTERN DRY ROCKS
SAND KEY LT
Western Head
MAIN SHIP CHANNEL
11447
1:10,000

and the coral health observations will be documented with approximately 15 sec of video per individual colony. A coral receiving a score of "1" for two or more parameters will be classified as declining in health. Each monitoring site will have a unique identification number that, along with date and time, will be recorded on videotape at the beginning of each site visit. Individual coral tag numbers also will be recorded on tape for each monitored colony at each site.

Information is being reviewed relative to the potential of utilizing pulse-amplitude modulated (PAM) fluorometry as an additional tool to assess coral health during dredging operations. The plan may be revised to include this method should it be deemed viable.

2.2.2 Seagrass Health

During each survey, the dive team will collect qualitative video of the seagrasses at the site with the camera positioned at an oblique angle to and approximately 0.5 to 1 m above the bottom. Approximately 3 min of video will be collected by divers swimming slowly in the area within 15 m of the net sediment accumulation block. Seagrass health parameters will include sediment buildup on blades and increased epiphytes or biofouling. These parameters are more subjective than those utilized for coral health and will require comparisons with observations from previous surveys and adjacent reference areas. The video data will be compared to video from the adjacent reference areas and to the data collected previously from each site to determine if differences exist. Information is being reviewed relative to the potential of utilizing PAM fluorometry as an additional tool to assess seagrass health during dredging operations. The plan may be revised to include this method should it be deemed viable.

2.3 Net Sediment Accumulation Data

A net sediment accumulation block will be placed at each of the monitoring stations. The block location coordinates will be recorded and serve as the center point of the monitoring station. The sediment accumulation blocks will provide sedimentation data more similar to the actual accumulation of sediments on corals and seagrasses when resuspension due to wave action and water flow is allowed to occur. These data also can be more directly compared with the available published data on impacts of specific quantities of sediment on coral health. The sediment accumulation block data will be utilized to determine if sedimentation at individual monitoring sites has exceeded threshold levels.

The net sediment accumulation block will consist of an 8" x 8" x 8" concrete block attached to the bottom with hydraulic cement. The block will have one side coated with anti-fouling paint, which will be oriented as the upper surface. The anti-fouling paint should help to minimize epibiotal growth on the upper surface of the block, which could interfere with sediment accumulation. The block will be cemented to the bottom with the upper surface level. At hard bottom or reef sites, the blocks will be attached only to exposed rock surfaces devoid of benthic fauna and no closer than 30 cm from any stony coral colony.

At the Hawk Channel patch reef and associated reference sites, sediment accumulation blocks will be placed in the vicinity of the monitored coral colonies at both the base and top of the reefs (two blocks per monitoring site). At seagrass stations, the block will be cemented to a 2" x 16" x 16" concrete tile that will be positioned level on the bottom within the seagrass bed. Observations made within seagrass beds during resource

delineation surveys indicate the sediment accumulation blocks can be positioned in grass-free areas within the monitored seagrass beds, resulting in no impact to living seagrass.

Following the re-occupation of each station during the subsequent monitoring surveys, sediment depth or accumulation on the block will be measured first to prevent the disturbance of the sediment layer by divers collecting other data. The accumulated sediment depth will be measured at five positions on the upper surface of the block. Measurements will be made in the center and at four points approximately 2.5" toward the center from each corner of the block. Sediment accumulation depth measurements will be recorded from these five positions, and the block will be swept clear of sediments as the last step before leaving the site. Any observations of fishes or invertebrates impacting the sediment layer on the block also will be recorded.

2.4 Sediment Traps

Arrays of three sediment traps will be placed at 15 of the monitoring sites to allow the comparison of net sediment accumulation block data with sediment trap data. These locations will include two hard bottom sites, two patch reef sites (base and crest of each), two seagrass sites, two bank reef sites, and a reference site from each. The sediment traps will be constructed of 1.5" inside diameter (ID) x 8" length polyvinyl chloride (PVC) pipe and a 500-ml nalgene collection jar, similar to the design being used in the Broward County Shore Preservation Project monitoring program. Both trap necks and jars will be coated with anti-fouling paint to minimize epibiotal growth. The PVC traps with the attached jar lids will be fastened to the steel sediment trap frame with hose clamps. The frame will be drilled and cemented into the bottom at hard bottom stations. At seagrass sites, the sediment trap frame will be embedded into a 16" square x 2"-3" thick reinforced poured cement base that will be placed in a grass-free location within the seagrass bed. Following completion of the monitoring program, all sediment traps, frames, and blocks will be removed.

The traps will be positioned with the mouth of the trap no more than 18" above the bottom. Sediment traps will be changed at 28-day intervals by unscrewing the nalgene trap jars from the PVC collars and capping the jars. New jars then will be attached to the trap collars for the next collection interval. Sediment samples will be transported to the laboratory where the water and sediment will be filtered through labeled pre-weighed filters. The filters and sediments will be rinsed with fresh water to remove salts, and the filters containing the sediments then will be dried in an oven and weighed.

2.5 Sampling Intervals

2.5.1 Resource Health and Net Sediment Accumulation

An initial survey will be conducted at all sites 1 week after completion of station setup to get a baseline assessment of resources after possible station setup impacts have subsided. Resource health assessment surveys then will be conducted at all sites at 28-day intervals until the initiation of dredging activities to collect information on natural variability in health within and among sites. Net sediment accumulation surveys to collect pre-dredging sedimentation data will occur at 1-week intervals at all stations until the initiation of dredging activities. Once dredging begins, the net sediment accumulation surveys will correspond with the time and locations of the resource health assessment surveys.

The first during-dredging resource health and net sediment accumulation survey will occur 3 days after initiation of dredging operations. Any monitoring site falling within 1,500 m of dredging activities during that first 3-day interval will be surveyed, in addition to all appropriate reference sites for each of the surveyed project area sites. Surveys will continue at 3-day intervals for 9 days, and if no effects have been observed the surveys then will be conducted at 7-day intervals. If subsequent monitoring indicates impacts are occurring on a regular basis or sediment accumulation levels are exceeding a threshold level relative to reference stations, the interval between surveys may be shortened. During each monitoring survey, only sites falling within 1,500 m of dredging activities during the preceding interval and corresponding reference sites will be surveyed.

During each survey, the appropriate reference sites will be sampled first to collect background data and observations for comparisons with the project area sites. By obtaining reference site data and observations first, any project area impacts should be more evident to the dive teams. This will allow an immediate response should impacts be detected.

2.5.2 Sediment Traps

Sediment trap arrays will be installed during the resource health monitoring station setup prior to initiation of dredging. Sediment traps and collection bottles will be installed on the trap arrays and changed out at 28-day intervals until the initiation of dredging activities. Traps will be changed out at all stations just before the start of dredging, and all traps will be changed out at 28-day intervals during dredging operations. Following the completion of dredging, all sediment traps will continue to be changed out at 28-day intervals for 12 months.

2.6 Personnel and Sampling Equipment

All sampling will be done utilizing scuba, requiring a four-person team of two divers, a dive tender, and a boat operator/navigator. A Master's degree level marine biologist will be the field team leader and responsible for field data collection and directing the monitoring efforts on the survey vessel. The boat operator/navigator will be responsible for operating the survey vessel and its associated survey equipment and will position the vessel for monitoring as directed by the field team leader. He also will be responsible for boating safety and ensuring the vessel and attached equipment and instrumentation are properly maintained and in good working condition.

Each dive team will include one Master's degree level marine biologist qualified to perform coral and seagrass health assessments. The second diver will use underwater video to document observations during the dive, including any significant impacts to corals, sediment accumulation on seagrasses, or qualitative video of sediment accumulation blocks. The video data will be digital format, and underwater lights will be utilized where necessary. A Sony DCR-TRV900 digital videocamera in an Amphibico underwater housing will be used in the progressive scan mode to record video data. All diving will be conducted following Continental Shelf Associates, Inc. standard safe diving practices. A Diving Safety Plan will be prepared, distributed to, and reviewed by all divers prior to the initiation of diving activities.

3.0 DATA REVIEW

3.1 Coral Health and Sedimentation Data

Coral health observations and sediment accumulation data will be reviewed following each RHSM survey day to determine if there have been any significant impacts to coral health or if project area site net sediment accumulation values have exceeded the average net sediment accumulation values of the reference sites by 1.5 mm/day (or another agreed-upon threshold level). Under the adaptive management approach, definitions of significant impacts to coral health and threshold levels of sedimentation may be subject to modification during the course of the project, based upon review and interpretation of monitoring data and discussions with FKNMS personnel.

Should the total number of declining corals at a project area site (those exhibiting scores of "1" in at least two of the health indices) exceed the average number of declining corals per reference site by a minimum of one coral, this shall constitute a soft trigger, which immediately will initiate a more detailed survey of coral colonies in the vicinity of the project area site (see **Table 1**). The initiation of the soft trigger will also require notification of the FKNMS project contact and the USACE representative on the dredge. This more detailed survey will consist of divers assessing the health of six additional randomly selected stony coral colonies in the vicinity of the project area site as soon as possible after the potential impact is realized. Results of the health assessment of this new group of six colonies then will be averaged with that of the original six colonies. If the average number of declining coral colonies at the two project area sites exceeds the average number of declining corals at the reference sites by at least one colony, the dredge may be required to move from that location until coral health has returned to normal levels. If dredge re-location is initiated, the dredge will move to a position no less than 150 m from the nearest impacted site. Once coral health appears to have recovered to normal levels and average daily sediment accumulation levels are less than 1.5 mm/day above reference site levels, the dredge may resume working in that area.

Net sediment accumulation levels (from the sediment accumulation blocks) at project area sites where corals show decline potentially associated with dredging will be utilized to adjust or ground truth the sedimentation rate of 1.5 mm/day above reference site accumulation currently proposed as a maximum for the project. This average daily sediment accumulation rate trigger level may be adjusted following initiation of the monitoring program if it is found that sedimentation rates of more than 1.5 mm/day above reference levels do not have an impact on coral health in the project area.

Should data from the net sediment accumulation blocks show an average sediment accumulation rate of greater than 1.5 mm/day above reference station levels at any station, this shall also constitute a soft trigger. The sedimentation results will be reviewed and compared with coral health observations, and the dredge may be required to move from that location. If the dredge is required to re-locate, it will be allowed to return to work at that location once average daily sedimentation rates return to less than 1.5 mm/day above reference station levels.

All coral health observation data will be tabulated by survey and utilized to aid in the detection of any trends in coral health at project area and reference area stations. Data from just-completed surveys will be compared to previous survey data to determine if there

are any visible downward trends in coral health not detected during individual survey data review.

3.2 Seagrass Health Observations

Seagrass health observations will be reviewed following each RHSM survey day to determine if there have been any significant impacts to seagrass health at project area stations. Should impacts to seagrass health be observed at the seagrass monitoring stations the dredge may be required to move from that location until seagrass health has returned to normal levels.

3.3 Reporting

Should impacts to monitored coral colonies or seagrass be detected or net sediment accumulation thresholds be exceeded, the field team leader will immediately contact the Florida Keys National Marine Sanctuary (FKNMS) representative as well as the USACE contact on the dredge to discuss the situation. This may result in moving the dredge to a different location. If impacts are deemed excessive by FKNMS biologists, an emergency response meeting may be initiated to discuss response or correction options.

Observations and results from the RHSM surveys will be compiled and presented in reports submitted monthly during the duration of the dredging activities. Net sediment accumulation data and sediment trap results from the preceding 4-week period will be presented in tabular form. Observations on coral and seagrass health will be reported if there are indications of declining health relative to reference stations. Any adjustments to the dredge location due to either decreases in resource health or excess sedimentation rates will be reported. Adjustments or modifications to coral health or sedimentation thresholds also will be documented and included in monthly reports.

Table 1. Examples for coral health assessment process flowchart.

EXAMPLE 1	Project Area Site A						Reference 1						Reference 2						Reference 3					
	Coral #						Coral #						Coral #						Coral #					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Bleaching	1	1	1	0	0	1	1	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	1
Excess mucus	0	1	0	0	1	0	0	0	1	0	0	1	1	1	1	0	1	0	0	0	0	0	1	0
Polyp extension	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	1	0	1	0
Disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Declining	√	√										√	√	√									√	
	2 declining corals/site						Average of 1.33 declining corals/reference site 0.67 more declining corals at project area site versus reference sites = No further action																	

EXAMPLE 2	Project Area Site D						Reference 4						Reference 5						Reference 6					
	Coral #						Coral #						Coral #						Coral #					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Bleaching	1	1	1	1	0	0	1	1	1	0	0	0	1	0	0	1	1	0	1	0	0	1	0	0
Excess mucus	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	0
Polyp extension	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	1
Disease	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Declining	√	√					√												√					
	2 declining corals/site						Average of 0.67 declining corals/reference site 1.3 more declining corals at project area site versus reference sites = Initiate more detailed survey																	

Key West Maintenance Dredging Project
Resource Impact Assessment Monitoring Plan

24 September 2003

1.0 INTRODUCTION

1.1 Objectives

The objectives of the Resource Impact Assessment Monitoring (RIAM) Plan are to 1) describe and quantify benthic marine communities within and adjacent to the dredging footprint and sediment placement site and 2) document dredging impacts to these benthic communities. These objectives will be accomplished through the collection of repetitive video data along fixed transects at specific project area and reference stations within the various community types. This monitoring program was developed to respond to the following requirements from the U.S. Army Corps of Engineers (USACE) and Florida Department of Environmental Protection (FDEP) dredging permits:

1. Document primary and secondary impacts to benthic communities within and adjacent to the dredging footprint, along the pipeline route, and at disposal sites with pre-, during-, and post-construction assessments;
2. Quantitatively assess benthic communities; and
3. Quantify impacts to Essential Fish Habitat (EFH) by habitat type.

1.2 Monitoring Plan Overview

The elements of the monitoring plan are as follows:

- Establish permanent transects within benthic marine resources along the project footprint and at suitable reference sites and collect quantitative video data along these transects to document percent cover, species composition, and changes in benthic communities;

- Collect quantitative-format images of individual stony coral colonies selected for health assessment during the Resource Health and Sedimentation Monitoring (RHSM) Program;

- Conduct the surveys prior to dredging and immediately following dredging; and

- Compare pre- and post-dredging data sets to document impacts.

2.0 METHODOLOGY

2.1 Monitoring Stations

The RIAM stations will be located at a subset of the RHSM stations (**Figure 1**). The stations will be distributed among the resource types as follows:

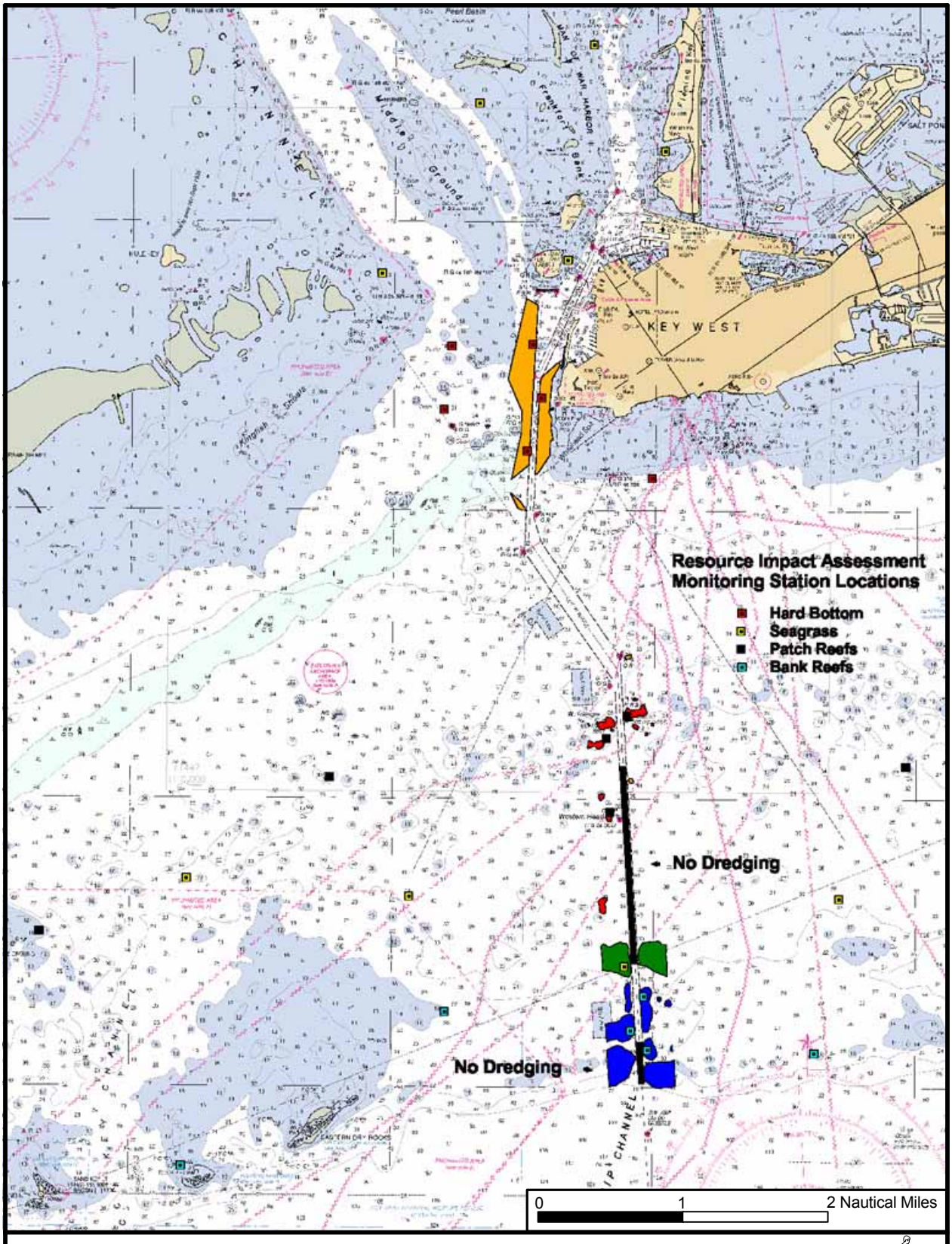


Figure 1. Resouce Impact Assessment Monitoring Program station locations.

Hard bottom areas:	5 project area + 3 reference stations
Hawk Channel patch reefs (crest):	3 project area + 3 reference stations
Hawk Channel patch reefs (base):	3 project area + 3 reference stations
Bank reefs:	3 project area + 3 reference stations
Deep seagrass areas:	1 project area + 3 reference stations
Shallow seagrass areas:	2 project area + 3 reference stations

2.1.1 Hard Bottom/Reef Stations

Three 20-m transects will be established at each hard bottom or reef monitoring station. Transects will be located within hard bottom/reef resources adjacent to the project area and within comparable reference areas. Transects will be randomly positioned within areas that include coral colonies and other attached fauna within each specific resource type. Stainless steel eyebolts will be drilled and epoxied into the bottom at 0, 10, and 20 m along each transect at the hard bottom and reef sites. A small closed-cell foam float coated with anti-fouling paint will be attached to each eyebolt with a short length of nylon braided line to aid in transect relocation. All transect marker eyebolts and buoys will be removed following completion of the monitoring program.

Vertical-format quantitative digital video data will be collected along each transect with the camera positioned 40 cm above and perpendicular to the substrate. This will yield an approximately 40-cm wide video field-of-view. The videocamera will be equipped with lights and with lasers set to converge at the 40-cm distance to the bottom. The diver will swim the camera along each transect at a speed of no greater than approximately 5 m per minute.

Quantitative video data also will be collected at each of the six stony coral colonies being monitored at each of the RIAM sites under the RHSM Program. An approximately 15-sec video segment will be collected with the camera positioned perpendicular to and at a set distance from the substrate. This will yield a plan-view of the coral. The coral will be oriented in the frame with the identification tag in the same relative location during each survey to give comparable views of the coral. A scale bar will be placed in the field-of-view of each image.

2.1.2 Seagrass Stations

Three transects will be established at each seagrass RIAM station. Each transect will be 20 m long and located within seagrass areas adjacent to the project area and within comparable reference areas. Steel reinforcement rods coated with anti-fouling paint and up to 3 ft in length will be driven into the bottom at the seagrass stations at 0, 10, and 20 m along each transect. As with the hard bottom and reef monitoring stations, quantitative-format digital video data will be collected along each of the seagrass transects with the camera positioned 40 cm above the substrate. Due to differences between the seagrass communities observed at the southern end of the main ship channel (primarily a deep water *Syringodium* community) and the shallower seagrass communities in the vicinity of Tank Island and to the north of the Truman Harbor turning basin (shallow water mixed seagrass species with macroalgae) and the possibility of each area being impacted differently, they will be treated as different resource types and each will have separate reference sites.

2.2 Personnel and Sampling Equipment

All sampling will be done utilizing scuba and will require a four-person team of two divers, a tender, and a boat operator. Each dive team will include one Master's degree level marine biologist qualified to perform coral and seagrass health assessments. The video data will be digital format, and underwater lights will be utilized. A Sony DCR-TRV900 digital videocamera in an Amphibico underwater housing will be used in the progressive scan mode to record video data. All diving will be conducted following Continental Shelf Associates, Inc. standard safe diving practices. A Diving Safety Plan will be prepared, distributed to, and reviewed by all divers prior to the initiation of diving activities.

2.3 Survey Schedule

The pre-dredging baseline survey will be conducted immediately following station installation. This survey will include the collection of video data along the fixed transects and the video images of the six stony corals being monitored at each of the RIAM sites. The post-dredging survey will be conducted immediately following the completion of dredging activities and will include all sites sampled during the pre-dredging survey.

A during-dredging RIAM survey will not be conducted under this program. Due to the volume of data collected during the RIAM surveys, data analysis will require several months to complete for each survey. The purpose of the during-dredging survey would be to document any impacts occurring prior to the completion of the project in order to adjust procedures to minimize or prevent these impacts. Given the timeframe for data analyses and interpretation, the dredging project would most likely be near completion before the during-dredging results were available. Due to its design, the weekly resource health and sedimentation monitoring should provide adequate early levels of detection of resource impacts. This will allow the Navy to make adjustments to the dredging program on a more timely basis, which will rectify problems and minimize and prevent further impacts.

3.0 DATA ANALYSES

3.1 Repetitive Transects

3.1.1 Hard Bottom and Reef Transects

Digital video data from each transect will be converted to still images with a still image capture card. Contiguous frames will be captured at maximum resolution using reference points at the top of each frame to ensure minimum overlap. Images from each station will be stored in a unique directory until being written to CD. Images will be analyzed using Point Count for Coral Reefs, developed during the Florida Keys National Marine Sanctuary Coral Reef Monitoring Program (CRMP). Specific analysis protocols will be similar to those utilized in the CRMP, which consist of placing random points over the image and identifying/counting each item (coral, sponge, algae, substrate type, etc.) falling under each point.

Video data will be analyzed for percent cover of stony corals (to species level), octocorals, sponges, macroalgae, zoanthids, seagrass, and substrate. Stony coral counts will be made along each transect, and information regarding coral condition

(bleaching, excess mucus, polyp extension, disease, sediment cover) also will be collected. Data will be entered into spreadsheets for each site and automatically saved. Statistical analyses of percent cover data will be conducted to reject or not reject the null hypothesis that there is no significant difference between project areas and reference areas before and after dredging.

3.1.2 Seagrass Transects

Video data from seagrass transects will be processed in the same manner as the hard bottom/reef transect data. Individual images will be analyzed using Point Count for Coral Reefs with seagrasses identified to species. The percent cover of each seagrass species within each image will be entered into spreadsheets for each site and saved. Statistical analyses will be conducted of percent cover data to reject or not reject the null hypothesis that there is no significant difference between project areas and reference areas before and after dredging.

3.2 Repetitive Coral Colonies

Video data of individual coral colonies will be converted to still images as described above. Pre- and post-dredging images of each coral will be compared following the completion of the post-construction survey. Individual stony coral images will be reviewed for the changes in coral health described in the RHSM Plan as well as for changes in the amount of living coral tissue and macroalgae or invertebrate overgrowth.

3.3 Reporting

Analyses of the monitoring survey video data will begin immediately following completion of the field data collection. A report will be prepared following the completion of the analyses of the video data sets and a review of the results. Any dredging-related impacts to benthic communities adjacent to the project area will be described with quantification of damages by habitat type.

Key West Maintenance Dredging Project
Net Environmental Effects Monitoring Plan

24 September 2003

1.0 INTRODUCTION

1.1 Objectives

The objectives of the Net Environmental Effects Monitoring Plan (NEEM) are to 1) show the effects of dredging Truman Harbor, the Truman Harbor turning basin, and the Key West ship channel on turbidity generated by ship traffic and 2) document sedimentation rates before and after dredging activities at stations along the Truman Harbor turning basin and Key West ship channel. This will be accomplished by the before and after monitoring of turbidity directly associated with ship activity and sedimentation rates throughout the project area.

1.2 Monitoring Plan Overview

- Sample turbidity plumes associated with ship traffic using turbidimeters deployed from a small vessel following ships and record turbidity concentrations behind the vessels along the length of the ship channel;

- Place a remote drogue with attached turbidimeters in ship turbidity plumes and record data within the plumes as they dissipate; and

- Collect sedimentation data before and after dredging from selected net sediment accumulation monitoring sites and sediment traps established as a component of the Resource Health and Sedimentation Monitoring (RHSM) Program.

2.0 METHODOLOGY

2.1 Large Vessel Turbidity Monitoring

Levels of turbidity associated with large vessel traffic within the Truman Harbor turning basin and ship channel will be monitored before the initiation of dredging and after the completion of the dredging project. Measurements of turbidity will be made at near-surface and mid-water depths behind large vessels as they transit within the ship channel and turning basin. Ships will include military vessels, cruise ships, and large commercial freighters or tankers.

The survey vessel will follow the ships at a fixed distance (approximately 200 to 300 m) and record near-surface and mid-depth turbidity using two towed turbidimeters. Information recorded during each sampling will include vessel name and type, date, time interval, distance of turbidimeters from vessel, depth of instruments, continuous survey vessel position and speed, and turbidity levels. Either before or after each monitored vessel's passage down the channel, background turbidity readings will be collected along the channel for comparisons. Measurements will be made of ship passages during two separate 3-day periods prior to dredging and two 3-day periods after the

completion of dredging. Turbidity data will be stratified by specific segments of the channel and vessel type and size to assess the net environmental effect of the dredging on ship-generated turbidity levels within various sections of the project area.

2.2 Plume Dissipation Measurements

Plumes created during ship movements at specific locations within the ship channel and turning basin will be measured and tracked by deploying a drogue with attached turbidimeters to drift with the turbid water mass. The drogue surface-float will have a position-recording device to continuously record drogue location as it follows the plume. Turbidimeters will record both near-surface and mid-depth turbidity levels as the plume dissipates. Vessel name and type, date, time, estimated wind speed and direction, and tidal direction will be recorded during each deployment.

2.3 Sedimentation Data

As part of the RHSM Plan, sediment traps and sediment accumulation blocks will be placed at specific locations adjacent to resources within the project area. These will be monitored prior to dredging and following the completion of the dredging project to collect information on sedimentation rates for the NEEM Program. Sediment measurements will be made at project area and reference site net sediment accumulation blocks at 1-week intervals, and sediment traps will be changed out at 28-day intervals.

At the net sediment accumulation blocks, divers will measure and record sediment depths at five locations on each block, and then clear the blocks of sediment. Sediment traps will be changed out by divers, who will remove and cap the trap jars and replace them with new jars. Each sediment trap sample will be dried and weighed to determine the total dry weight of material falling into traps. Pre- and post-dredging net sediment accumulation measurements and sediment trap data then will be evaluated to assess the net environmental effect of dredging on sedimentation in the project area. Sediment trap data collected during dredging activities also will be available for comparison.

3.0 RESULTS

3.1 Data Analyses

A linear model approach will be used to analyze the turbidity data collected in the ship channel. The null hypothesis of the analysis will be that there is no difference in large vessel-generated turbidity before and after dredging. This will be evaluated against the alternative hypothesis that large vessel-generated turbidity is less after dredging compared to before dredging. The response variable will be the average turbidity measured for a specific vessel passage within individual spatial strata in the channel.

Data will be stratified by time (before versus after dredging at a minimum), space (location in the ship channel), and vessel or vessel type. Other sources of variability that will be included in the model are wind speed, tidal stage, and water depth. Net sediment accumulation data and sediment trap data will be statistically analyzed similarly with a linear model approach.

Draft Mitigation Plan for Key West Maintenance Dredging Project
25 September 2003

1.0 INTRODUCTION

1.1 Objectives

The objectives of the Mitigation Plan are to 1) describe types of mitigation incorporated into the design of the Key West Maintenance Dredging Project, which include avoiding and minimizing impacts, conducting resource assessment surveys to document resources, and developing monitoring programs and 2) outline response actions and potential compensatory mitigation activities to be instituted should impacts detrimental to the resources occur. These activities would include rapid response to notify appropriate agencies, rectify impacts by repairing or restoring the affected resources and immediately correcting the impact-causing event, and compensate for impacts by replacing or providing acceptable substitute resources or services. This plan was developed to respond to the following requirements from the U.S. Army Corps of Engineers (USACE) and Florida Department of Environmental Protection (FDEP) dredging permits:

1. The mitigation plan will include actions to offset the effects of sedimentation/turbidity and specifically detail how the response to events will be conducted including responsibilities.
2. The mitigation plan shall include success criteria for evaluating the effectiveness of the proposed mitigation.
3. The permittee shall immediately alert the Florida Keys National Marine Sanctuary (FKNMS) staff of any impacts or accidents that may occur. The permittee shall initiate within 24 hours of any incident, the recovery and restoration of any damage to living coral in the event of unforeseen accidents, such as anchor damage, anchor cable scouring, or disposal pipeline failure.
4. In coordination with the FKNMS, the permittee shall complete at least 24 hours prior to work obviously impacting coral resources, all activities necessary to temporarily or permanently relocate these resources so that dredging activities may proceed.
5. The permittee shall avoid injury to all federally protected species and marine communities such as corals, patch reefs, seagrasses and hard bottom habitat. Unavoidable impact shall require in-kind restoration and mitigation. Mitigation ratios shall be determined based on a Habitat Equivalency Analysis.
6. Plans and specifications for the mitigation plan as agreed upon by the resource agencies involved in the project (FKNMS, FDEP, USACE, Navy) to include methodology and standards, timeline and schedules, mitigation goals and success criteria, employed technologies, critical elements and tasks, assignment of responsibilities and shared resources involved.

1.2 Definition of Mitigation

Under Regulations for Implementing NEPA from CEQ (Section 1508.20), “mitigation” is defined as including the following:

1. Avoiding the impact altogether by not taking a certain action or parts of an action.
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
5. Compensating for the impact by replacing or providing substitute resources or environments.

This description is hierarchical with avoidance being the most preferred mitigation and compensation the least desired.

1.3 Mitigation Plan Overview

- The Key West Maintenance Dredging Project was designed and modified to avoid and minimize impacts to resources, with a goal of no net loss of resources due to the project.
- Extensive planning and resource surveys were conducted and monitoring plans are being developed to prevent or minimize dredging impacts and assess effects of the project on resources.
- Rapid response protocols will be instituted to repair and restore resources damaged by operational accidents.
- Monitoring of repairs and restoration activities will be conducted with approved success criteria implemented.
- Compensatory mitigation will be undertaken for impacts to resources that cannot be directly repaired or restored. The compensatory mitigation will also take into account beneficial impacts from the dredging project as determined during net environmental effects monitoring.
- Compensatory mitigation may include restoration of “orphan” grounding sites on reefs or seagrass beds, coral transplantation requested by FKNMS staff, deployment of mooring buoys at FKNMS-approved locations, or restoration/enhancement of other mutually agreed-upon marine habitat.

2.0 MITIGATION PLAN

2.1 Mitigation Incorporated Within Existing Project

2.1.1 Avoidance and Minimization of Impacts

The Navy has sought to avoid and minimize impacts to marine resources within the project area throughout the design and permitting process. Examples of direct avoidance of resources include the demarcation of no-anchor/no-activity zones within areas of sensitive resources adjacent to the project area, establishment of buffer zones along hard bottom walls in the turning basin, proposed routing of pipelines to avoid direct contact with resources, and creation and implementation of marine mammal and sea turtle avoidance plans. Impacts have been minimized by decreasing the project depth and the volume of sediment to be removed from the project area, agreeing to more stringent operational turbidity monitoring protocols that will protect resources by

minimizing turbidity associated with the dredging, and incorporating resource health and sedimentation monitoring standards that will further protect resources.

2.1.2 Rectifying Impacts

The Navy will have an Impact Response Team available for the duration of the project. This team will include marine biologists and divers experienced in marine resource damage assessment and repairs. The team will be capable of initiating recovery and restoration activities for any damages to living coral in the event of unforeseen accidents, such as anchor damage, anchor cable scouring, vessel groundings, disposal pipeline failure, or any other direct impacts to resources. The team will be able to initiate these activities within 24 hrs of the reporting of any incident and will work with FKNMS staff to complete restoration. The Navy also will immediately determine the cause of an incident and correct operations to prevent future occurrences.

2.1.3 Compensation for Impacts

It is the Navy's contention that there will be minimal impacts to resources resulting from this project during normal operations due both to the extensive avoidance and minimization efforts initiated to date and to monitoring programs that will be conducted in association with dredging activities. Monitoring to be conducted by the USACE or Navy in conjunction with the dredging activities will include the following: 1) operational control turbidity monitoring around the dredging platform; 2) resource health and sedimentation monitoring in the vicinity of the dredge during the project; 3) resource impact assessment monitoring before and after dredging; and 4) net environmental effects monitoring before and after dredging.

2.2 General Emergency Response Protocols

2.2.1 Notifications

Should a significant resource impact occur during the dredging project, the event will be immediately reported to several agencies, including the FKNMS, the U.S. Navy, the USACE, the U.S. Coast Guard (if there is a vessel involved in the impact), and the dredging contractor. A list of appropriate contacts with names and telephone numbers will be prepared and distributed prior to the initiation of dredging activities. This list will be prioritized such that the most key personnel/agencies are notified first. In many instances a resource impact may be relatively minor and not require a multi-agency response. For example, impacts involving vessel groundings or oil spills will require a different response than those consisting of excessive sediment deposition on resources or anchor damage. Should the impact be significant and require multiple agencys' participation, a temporary "command center" will be established for coordination of response and restoration activities. The Navy and the dredging contractor will work with the regulatory and resource protection agencies to ensure a cooperative and rapid resolution to any resource impact events.

2.2.2 Initial Assessment

An Impact Response Team will be available to respond within 24 hrs of any incident. This team will be composed of several of the personnel conducting the resource health and sedimentation monitoring and will be on site and able to respond

immediately during a significant portion of the dredging schedule. The team will be trained in damage assessment and early response techniques, including initial stabilization of resources. Following reporting of a resource impact, the Impact Response Team will coordinate with FKNMS field scientists and other agencies with jurisdiction over the event to discuss response options and perform an initial assessment of damages. They will have a 30-ft survey vessel on site that will be adequate for an immediate response. Should a large-scale impact occur requiring a substantial level of effort, larger vessels in the 100-ft range could be utilized as on-site work platforms.

The initial site visit will be to determine if the area is safe to inspect and what the next specific steps should include. In the event of a ship or barge grounding, the U.S. Coast Guard will be working with the responsible party to ensure the safety of the vessel and prevent further resource impacts. Once the area is deemed safe, an initial site survey will be performed to assess the severity and size of the resource impact. This could include the collection of video and still photographs and preliminary in situ diver measurements using tape measures or a differential global positioning system (DGPS) plotting from a small vessel. The initial observations will be summarized and provided to the other agencies involved in the process and will include a description of the type of impact, size of the area directly impacted, potential for additional damages, and initial early responses that could be undertaken to minimize damages.

2.2.3 Emergency Stabilization of Resources

In the event of damages to hard bottom or reef resources, it is important to stabilize the impacted site as soon as possible to prevent further damages and minimize existing impacts. This includes righting any large overturned coral heads to their original orientation, collecting smaller corals and other detached fauna that appear healthy and could be successfully reattached, and removing sediments that may have accumulated on adjacent living coral colonies. Following the initial stabilization and resource salvage effort, coral colonies will be re-attached at appropriate locations to prevent further damage. This could be accomplished while the detailed damage assessment survey is still occurring, to minimize additional impacts caused by delaying initial restoration.

2.2.4 Detailed Damage Assessment

Following initial emergency stabilization of damaged resources at the impacted site a detailed damage assessment survey will be conducted. This effort will be undertaken by both the Impact Response Team and FKNMS Damage Response personnel. The survey will document all damages from the impact and may include structural framework damage assessment in hard bottom or reef areas, depth of craters, trenches, or blowholes in grassbed areas, areal extent of the impact in m^2, numbers of corals impacted, area of seagrasses damaged, and estimates of other fauna damaged during the event. The field effort may include the establishment of baselines and tagging of various features to aid in re-location at a later time. Extensive video and photographic documentation of the damages will also be conducted.

The results of the detailed damage assessment survey will be reviewed and presented in a report that will be submitted to all involved agencies. Data from the report will be used to aid in the determination of mitigation ratios and in developing a restoration plan for the impacted site.

2.2.5 Development of Restoration Plan

- Discussions / meetings with NOAA DARP regarding restoration options
- Incorporate levels of damage into HEA model
- Define mitigation ratio
- Develop success criteria for the restoration

2.2.6 Restoration Implementation

- Conduct the restoration
- FKNMS oversight

2.2.7 Monitoring of Restoration Project

- Establish monitoring program for restored areas
- Conduct monitoring over a fixed period of time
- Evaluate effectiveness and success of mitigation

2.3 Coral Relocation Protocols

Stony coral colonies positioned within the footprint of the project area may require relocation during the course of the dredging activities. Specific instances would be corals that have colonized the northern tip of the Mole Pier, which is scheduled for demolition, and corals along the upper edges of the seawall on the interior of Truman Harbor, which may be exposed to very high levels of turbidity during harbor dredging. These corals will be removed and transplanted to adjacent areas designated by FKNMS staff.

Stony coral colonies in areas to be impacted will be removed by dive teams and re-attached in designated locations. Colonies will be detached using hammers and chisels to separate them from the vertical walls. Removal should be relatively easy due to the smooth surface of the concrete and steel bulkheads on the Mole Pier and Truman Harbor sea wall. Because of the flat, low profile shapes of many of the colonies, some breakage will be expected. All colonies and fragments will be carried to the surface and placed in tubs of seawater aboard the survey vessel. The corals will then be placed back in the water at the reattachment site and positioned upright on the bottom until they are reattached. It will be important to ensure water conditions at the relocation site are as similar to those of the detachment site as possible, with equivalent water depths, light regimes, current, and coral orientation.

Coral colonies will be reattached in suitable locations using standard techniques approved by the FKNMS. A specific location will be selected that is relatively free of attached fauna and has a rough surface texture, increasing the likelihood of successful attachment by the cement mixture. The substrate will then be cleared of algae and encrusting growth using a wire brush. Each colony or fragment will be attached to the bottom using a Type II Portland cement mixture with molding plaster added to decrease the set time of the cement. Following the completion of the reattachment process a subset of the relocated coral colonies will be selected and tagged for monitoring purposes. The colonies will be monitored for health and growth to determine coral relocation success rates.

2.4 Compensatory Mitigation Plan

Should unexpected adverse impacts to resources occur over the course of the dredging project, compensatory mitigation approved by the resource agencies will be undertaken. This mitigation would be implemented if the resource impact assessment monitoring indicated a negative impact to resources most likely due to dredging activities. These impacts could include decreases in corals or other attached hard bottom or reef fauna at project area monitoring sites versus reference sites, declines in seagrass density at project area monitoring sites versus reference sites, or other detrimental impacts to FKNMS resources attributable to the dredging project. A typical compensatory mitigation plan would include five major elements: 1) an ecological description of the habitat; 2) goals, objectives, and performance standards for the mitigation; 3) attributes of the mitigation including type, location, and mitigation ratio; 4) monitoring program; and 5) performance evaluation.

2.4.1 Description of Habitat

As a component of the planning and permitting phase of this project, resource characterization and mapping surveys were conducted within and adjacent to the project area. These surveys included the collection of sediment samples for grain size and chemical analyses for organics and metals pollutants, bathymetry data, side-scan sonar data to delineate seafloor features and resource habitat zones, and towed video and diver video and observations to provide a more detailed description of resources. The diver video data also yielded a preliminary quantification of benthic communities adjacent to the project footprint. Further collection of qualitative and quantitative data within defined resource areas will be made during the Resource Impact Assessment Monitoring Program to be conducted before and after dredging activities.

2.4.2 Goals, Objectives, and Performance Standards

The goals and objectives of compensatory mitigation in this project will be to replace or restore communities adversely impacted by project activities. This may be difficult, depending on the type of impact detected. For example, should levels of increased turbidity or sedimentation cause a decline in coral communities adjacent to the project area, the restoration of the area to its former condition could be very difficult. In this instance, some form of off-site mitigation, such as restoration of orphan grounding sites, may be more appropriate. Should the impact consist of dredge anchor, cable, cutterhead, or other acute reef or hard bottom framework damage, then repairs and restoration of the site may be more practicable. Due to the uncertainty over the specific types of impacts that may occur during the project, the Navy does not believe the development of a specific compensatory monitoring plan for each potential impact is appropriate at this time. The Navy will consult with the resource agencies to develop compensatory mitigation options, which could then be further developed as the project progresses. Once these options are delineated, performance standards would be defined that would include the specific objective, the level or condition defining success, and the period over which this success must be sustained.

2.4.3 Attributes of the Mitigation

As with the goals, objectives, and performance standards, the attributes of the mitigation are dependent on the type, extent, and location of the impacts. These cannot be specifically defined until the impacts are determined. The Navy will attempt to mitigate “in kind” and in the vicinity of the impact, where appropriate. Mitigation ratios could be dependent on the type of impact, the value of the resource, the probability of success of the mitigation, and expected length of time of interim loss of habitat. Any net environmental benefits associated with the project, such as documented decreases in vessel-generated turbidity following the completion of dredging, also would be considered when determining mitigation ratios.

2.4.4 Monitoring Program

Monitoring of the mitigation project is utilized to evaluate the performance and success of the effort over time. The monitoring is used to determine if the mitigation is meeting the stated goals, objectives, and performance standards, and if remediation is needed. The monitoring program should include the rationale for the types of data to be collected and how the data will be utilized. As with the attributes of the mitigation, monitoring cannot be defined until the specific mitigation is agreed upon.

2.4.5 Performance Evaluation

Performance evaluation will use information from the monitoring program to evaluate the status of the mitigation effort relative to the performance standards. The purpose of the evaluation is to ensure the success of the mitigation effort and to determine which course of action should be taken if performance standards are not being met.

Key West Maintenance Dredging Project
Public Awareness, Data Management, and Regulatory Reporting Program

I. MISSION STATEMENT

The purpose of the Public Awareness and Outreach (PA) Program plan is to identify strategies necessary to implement an effective PA program during the Key West Harbor.

Update the status of the project between the Navy and their contractors to various agencies, organizations, special interest groups, and concerned individuals before, during, and after construction.

Communicate with identified key players, key dates, and potential media, government officials, and special interest groups.

Prepare PA presentations, newsletters, and web sites to disseminate information and solicit comments.

II. OVERVIEW

The Navy has completed evaluations of proposed dredging at Key West and received environmental permits for construction. The dredge contractor selection and contracting is in process by the Department of the Army. The Florida Department of Environmental Protection and U.S. Army Corps of Engineers Permit Condition(s) require the Navy to conduct public awareness activities to include pre-construction and project activity meetings with maritime interests; consultation forums with local government, industry, and interest groups; and monthly project specific news releases/newsletter. The data to be conveyed through this program include:

Construction mobilization schedules, sequencing, locations, and multi-tasking needs

Regulatory approvals and availability of documents

Compliance and monitoring activities summaries

The objective of the effort is to provide a proactive public awareness program designed to support the Navy's mission and to assist in the Florida Keys National Marine Sanctuary ongoing public information program. The Navy program will be implemented by the following tasks to be performed during the pre-construction during-construction, and post-construction phases.

Presentations

- **Pre-Construction**

The Public Affairs Officer(s) (PAO) group will review Public Awareness and Outreach Program elements to agree on level of effort and modifications as required throughout the project. Agreed upon productions will be assembled and provided by CZR for presentation by the CO, NASKW. CZR will assist, as requested.

One (1) pre-construction presentation will be conducted prior to the initiation of dredging construction. Individual presentations will be made to the City Council, County Commission, Chamber(s) of Commerce, Propeller Club, Navy League, Professional Fishing Guide Association, Charter Boat Association, League of Women Voters, and other service organizations. Individual presentations will be made no later than two (2) weeks prior to start of construction. One each presentation will be made by the CO, NASKW, with CZR support, in conjunction with the FKNMS, to the Sanctuary's Advisory Council and the Large Vessel Working Group.

Media Days

During the week immediately prior to start of construction, a “media day” event (two days) will be conducted. The process will focus on getting elected officials, media, and interested individuals more thoroughly acquainted with the dredging by touring the dredge after viewing the planned work via interpretive display at Truman Harbor. Organization, materials prep, logistic planning and interpretive displays will be provided by CZR; dredge tours and transport to and from the various plants will be provided by the dredge contractor. Interpretive displays will be located at Truman Harbor near the dredge tour boarding point, and supported by CZR personnel to provide discussion and answer questions.

Two (2) media day events will be conducted during construction. One (two day) event will be held post construction.

- **During Construction**

One (1) community meeting series is scheduled for the mid-construction. The NASKW CO will make all or most of the presentations with updates, including photography, video, and other data as derived, prepared for the CO by CZR. CZR will participate in one (1) presentation.

- **Post Construction**

One post construction presentation will be made within two months of construction completion to present a summary of activities and environmental compliance monitoring over the two (2) year construction period. Organizations visited by the CO will be the same as pre-construction and during construction. As in pre-construction and during construction events, the NASKW CO will make the presentation, with CZR support, from a material package assembled and provided by CZR.

The presentations will be held in public spaces chosen by Navy and FKNMS. They will, when feasible, coincide with scheduled outreach programs under the Large Vessel Working Group and/or Sanctuary Advisory Council Working Group events.

Each presentation will explain the planning, pre-construction, construction, and post construction activities. The progress of the project will be detailed through each phase. The results and benefits of the project will be presented. Public interaction will be encouraged by receiving comments and questions and providing oral responses. Additional follow-up responses will be provided by the Navy or FKNMS as appropriate.

Presentation materials will be prepared in Microsoft Powerpoint for use by Navy personnel.

News Releases

News releases in newsletter format will be prepared for distribution monthly during pre-construction and construction phases. The text will be reviewed for approval by the Navy. The news releases will be distributed to local newspapers, FKNMS, Harbor Master, and U.S. Coast Guard for inclusion into their publications. Two (2) pre-construction, fifteen (15) during construction, and five (5) post construction (including 2 months demobilization) news releases will be made.

Data Management

REMOVED

Web Site

A project Web Site will be developed and maintained for public access as well as data management, reporting, and communication. The web site will include the information above, construction schedules, photographs, permits, and environmental reports. On-going modifications and monitoring reports will be provided as a password-protected "bulletin board forum" to allow agency review and retrieval of comments.

The web page(s) available to the public will include project descriptions, photographs of equipment, operation, and habitat, as well as a "frequently asked questions" section designed to address those dredge related elements and issues that can be anticipated. The FAQ page(s) also will be updated as the work progresses.

Web sections available to the regulatory agencies will require password entry and will include:

- Data summaries
- Required daily tables / graphic plots
- Required weekly reports
- Operating updates
- Construction schedules
- Other elements as approved for release by Navy

Web sections available only to Navy and Navy contractors will require secure password entry and will include:

- Raw data
- Calibration record
- Operations record, including operational modification as may be required to satisfy permit conditions

Client Progress Meetings

CZR will participate in scheduled progress meetings to review formal public presentations and other perceptions of the community/public reactions to the construction and monitoring process. A verbal report of agencies contacted will be provided with a summary of issues to be resolved. Five progress meetings are anticipated during all phases. Two meetings shall be held in Norfolk and three in Key West.

Navy / Contractors / Agency Coordination

Partnering team coordination will be maintained throughout the construction period, to include pre-construction planning activities. Close coordination will be maintained with the dredge contractor(s), particularly as operations change from one type to another relative to both excavation and dredged material placement. Navy/regulatory agency coordination will be near-continuous to assure regulatory agency confidence in all dredging activities, including monitoring, and especially avoidance mitigation.

Product Flow

All materials as described herein will be collected and processed by CZR for Navy review and approval. The web site will be managed for Navy by CZR. All process and product elements will be Navy property. Presentations will be led by or made entirely by the NASKW CO; CZR will participate in presentations as above indicated and will be prepared to make additional presentations as requested.

III. PROJECT STATUS PRESENTATIONS

A. Pre-Construction Project Introduction Meetings

1. Status of Project
   a. Photographs or graphic displays of project activities
   b. Construction status
      Update of contractors progress, location, construction methods, equipment status, scheduling, sequencing, and proposed activities.
   c. Resource impact assessment plan update
      Net Environmental Effect Monitoring
      Resource Health and Sediment Monitoring
      Operational Compliance Monitoring

2. Discussion / Comments

B. Pre-Construction Project Community Meeting

1. Status of Project
   a. Photographs or graphic displays of project activities
   b. Construction status
      Update of contractors progress, location, construction methods, equipment status, scheduling, sequencing, and proposed activities.
   c. Resource impact assessment plan update
      Net Environmental Effect Monitoring
      Resource Health and Sediment Monitoring
      Operational Compliance Monitoring

2. Discussion / Comments

C. During Construction Project Update Meetings

1. Status of Project
   a. Photographs or graphic displays of project activities
   b. Construction status
      Update of contractors progress, location, construction methods, equipment status, scheduling, sequencing, and proposed activities.
   c. Resource impact assessment plan update
      Net Environmental Effect Monitoring
      Resource Health and Sediment Monitoring
      Operational Compliance Monitoring

2. Discussion / Comments

D. Post Construction Project Summary Meetings

Status of mission accomplished and objectives met
Summarize results of data collection and monitoring events
Schedule of future monitoring, regulatory assurances, and permit condition requirements and compliance
Photographs and graphic displays
Discussion / Comments

IV. KEY PLAYERS

Navy

NASKW CO – CAPT Jim Scholl
NASKW PAO – Kelly Hinchey
NASKW Business Manager – Ron Demes

NASKW Harbor Master – Senior Chief Mike Palmer
CLF Environmental Project Coordinator – Dave Daly
CLF PM – CAPT Mark Anthony
CLF PAO – Ted Brown
CNRSE Environmental Project Coordinator – Brock Durig
CNRSE PAO – Bob Nelson
SOUTHDIV EIC/PM – Jeffrey Guss
SOUTHDIV PAO – Jim Beltz

Contractors

ACOE Contracting Officer – George Cooper
ACOE PM – Jackie Hand
ACOE PAO – Cindy Foley
Dredging Contractor -- ???
Continental Shelf Associates, Inc. – Fred Ayer
CZR Incorporated – Jim Hudgens
PPB – Ward Dickins

Regulatory

ACOE PM – Paul Kruger
FDEP PM – Marty Seeling
FDEP PAO – Lisa Douglass
FKNMS PM – Lauri MacLaughlin
FKNMS PAO – Cheva Heck
NOAA PM – Audra Livergood

V. KEY DATES

A. PRE-CONSTRUCTION

22 August 03	Bid Opening
15 September 03	Contractor Certification
	Notice of Award
15 September 03	Notice to Proceed
01 October 03	Project Introductory Community Meeting
05 November 03	Pre-Construction Conference (Navy/Corps/Contractor[s])
13 November 03	Pre-Construction Community Meeting
08-14 November 03	Media Week
08 November 03	AM Public Officials/Media Tour Dredge
	PM Public Dredge Tour
09 November 03	AM Public Officials/Media Tour Dredge
	PM Public Dredge Tour
10 November 03	AM Public Dredge Tour
11 November 03	AM Public Dredge Tour
12 November 03	AM Public Dredge Tour

B. CONSTRUCTION

15 December 03*	Project Status/Update Community Contacts
15 March 04	Project Status/Update Community Contacts
15 June 04	Project Status/Update Community Contacts
15 September 04	Project Status/Update Community Contacts
15 December 04	Project Status/Update Community Contacts
15 March 05	Project Status/Update Community Contacts
15 June 05	Project Status/Update Community Contacts

15 September 05 Project Status/Update Community Contacts

* All are multiple contacts by CO, e.g., Chamber, County Commission, City Council, Propeller Club, et. al.

C. POST PROJECT

01 January 06	Project Completion Community Contacts
01 February 06	Preliminary Summary of Monitoring Results
01 March 06	Present Preliminary Monitoring Summary/Community Meeting
01 January 07	Complete Year 1 Post Project Monitoring
01 March 07	Present Year 1 Post Project Monitoring Summary/Community Meeting
01 March 08	Final Monitoring Report to FDEP and ACOE

VI. POTENTIAL MEDIA, GOVERNMENT OFFICIALS AND SPECIAL INTEREST GROUPS/POC

A. Print Media

1. Produce Newsletter
   a. Disseminated by local press, U. S. Coast Guard Notice to Mariners and other media to advise public of project status
2. Additional Media for News Articles
   a. Notice to Mariners
   b. Chamber Chowder (KW Chamber of Commerce Newsletter)
      POC: Editors-Virginia Panico and Donna Brown
   c. Celebrate POC: E-Mail editor@celebratekeywest.com
   d. Keynoter
      POC: E-Mail ikahn@keynoter.com
      Wmarkham@keynoter.com
   e. Key West Citizen
      POC: Reporters Emily Roach
   f. Miami Herald POC: E-Mail jbabson@herald.com
   g. Solares Hill POC: E-Mail nhansen@keysnews.com
   h. Navy / Marine Corps News
   i. Navy News Times

B. Radio Stations

1. Clear Channel Radio Key 93.5, WEOW 92.7, and WHALE 99.5
   POC: Leigh Fox 305-296-7511
2. Conch 98/US 1 Radio
3. US1 News Show Bill Becker 305-872-9100 (us1radionews@aol.com)
4. WFKZ 103
5. WKIZ RADIO (SPANISH RADIO)
6. WLLS Island 107
7. WPIK/PIK'N 102.5
8. NASKW Radio

C. Television

1. WFOR-TV CH-4 (CBS South Florida Affiliate)
   POC: Reporter Ted Scouten (C) 305-903-3663
   scoutet@wfor.cbs.com or cbs4ted@aol.com
2. WSVN CH-7 (FOX Affiliate)
   POC: Reporter Juan Carlos Fanjul (C) 305-495-6159
3. WTVJ CH-6 (NBC Affiliate) Liz Roldan 954-622-6110
   Sandy Antonio

4. WPLG CH-10 (ABC Affiliate)
   Nadia Gedeon 305-325-2364

D. Government Officials [Requires Verification]

1. Monroe County

a. James L. Roberts (County Administrator)
b. Mayor Dixie Spehar (Chairman of Monroe County Board of Commissioners)
c. District 1 Commissioner: Dixie Spehar (R)
d. District 2 Commissioner: George Neugent (R)
e. District 3 Commissioner: Charles McCoy (R)
f. District 4 Commissioner: David Rice (R)
g. District 5 Commissioner: Murray Nelson (R)

2. City of Key West

a. Julio Avael (Manager)
b. Mayor Jimmy Weekley (Chairman of Key West City Board of Commissioners)
c. Tom Oosterhoudt (Commissioner DISTRICT I)
   Merili McCoy (Commissioner DISTRICT II)
   Edwin A. Scales, III (Commissioner DISTRICT III)
   Harry Bethel (Commissioner DISTRICT IV)
   Vacant (Commissioner DISTRICT V)
   Carmen Turner (Commissioner DISTRICT VI)
d. Military Affairs Committee
   Chairman: Roger Braun
   Secretary: Kerry Baker 305-294-2587/88
e. Navy League
   Joe Mathers, President
   Ron Demes, Vice President

3. State of Florida

a. Governor Jeb Bush
b. Senator Bob Graham (FL-D)
c. Senator Bill Nelson (FL-D)

E. Interest Groups

1. Reef Relief
2. Propeller Club
3. Harbor Pilots Association
4. Chamber(s) of Commerce
5. Large Vessel Working Group
6. FKNMS Advisory Council
7. Charter Captains Association
8. Professional Fishing Guide Asociation
9. Fill in as appropriate

VII. Web Site

1. Objective
   a. provide easy and open access to project status and related operations.
2. Multilayered
   a. Layer 1
      i. Unlimited access for public on project status and overview
      ii. Construction mobilization, schedules, sequencing, locations and multitasking
      iii. Regulatory approvals and documents
      iv. Compliance and monitoring summaries
      v. Photographs and graphic displays
      vi. Links to related web sites
   b. Layer 2

i. Navy / multi agency access by password for internal operations
ii. Data comprising the compliance and monitoring summaries
iii. Navy / ACOE / Contractor / Regulatory Agency communiques

c. Layer 3
   i. Navy / ACOE access only for real time monitoring data
   ii. Navy / ACOE comminiques
d. Additional secure layers available for use