Guidelines:
Risk Assessment and Risk Management Plan

I. Risk Assessment

A risk assessment is performed to address circumstances which may have contributed to an incidental take. It includes documenting the position and performance of the draghead deflectors during dredging. It includes incorporating sensor data from the dredge SI system along with the incidental take data to assess the dredging and environmental conditions when the incidental take occurred.

A risk assessment is normally perform by an individual(s) with specialty training and/background in dredging fundamentals, hydrographic survey, characteristics of dredged sediments, sea conditions, environmental constraints in permit conditions, Regional Biological Opinion (RBO) Terms and Conditions, RBO Management Protocol, and an understanding of hopper dredge operations and the Silent Inspector (SI) automated monitoring system.

II. Risk Assessment-Template

The following should be reviewed and addressed during performance of a risk assessment:

- review and document circumstances that may have contributed to the take- QA reports and TES Observers Reports and records;

- Verify/document that the USACE Sea Turtle Compliance Checklist was completed prior to project commencement. Verify that all corrective measures were made prior to commencing dredging;

- Document project construction stage and percent completion (i.e., start, middle, cleanup);

- Document dredged channel location where take occurred (i.e., mid-channel, side channel, toe of side slope, etc). Review channel location (i.e., mid-channel, bank, borrow site conditions) identify any dredging restrictions and/or constratints;

- Document physical conditions in the navigation channel /borrow site where take occurred that may have contributed to the take;

- Review sea turtle deflecting drag heads and operating conditions when take occurred;

- Review sea turtle deflecting dragheads, deflecting inflow overflow screens for operational compliance;

- Review available sea turtle observers' reports for possible patterns and/or trends in the channel and/or borrow site;

- Review available data indicating relative abundance-sea turtle presence in the area, as well as historical peak turtle abundance;

- Review available water temperature data as indicators of sea turtle presence, movement and/or abundance;

- Review available sea turtle relocation trawling data that may indicate presence and locations of sea turtles relative to channel/borrow area;

- Obtain and review the Silent Inspector (SI) time series plots information during the full load cycle when the take occurred. SI time series plots should include the following:

    1. dragarm depths-whether drag arms are on the bottom or in the water column;
    2. draghead angles;
    3. pump velocity (i.e., pumps on or off during lead when take occurred);
    4. Density of slurry in dredge pumps.

- Document coordination with the contractor, sea turtle observer, and Construction-Operations elements within the district, and the Division.

III. Risk Management Plan

A risk management plan is prepared after performing a Risk Assessment to address any recommended changes in the mode of the hopper dredge operation in order to minimize or reduce the likelihood of additional sea turtle takes and to ensure compliance with the terms and conditions of the GRBO future takes during the operation.

IV. Risk Management Plan-Template

- Identify possible causes for the incidental take based on risk assessment;

- Identify action (s) to correct condition(s) found in the risk assessment;

- Document discussion with hopper dredge crew and agreement on management reduction measures that can/will be taken to help minimize any future takes during the dredging operation.

- Corrective measures may include more intense monitoring of operational measures, relocating the dredge in the channel/borrow area, relocation trawling, etc.

- Document coordination with the contractor, construction or Quality Assurance (QA) representative for the project, and Construction-Operations elements with the district, and the Division.

V. Contractor's Operational Plan.

Within 20 calendar days after the date of Notice of Award, the contractor is required to submit an Environmental Protection Plan (EPP) for review and acceptance by the Contracting Officer. The Government may consider an interim plan for the first 30 days of operations. However, the Contractor will furnish an acceptable final plan no later than 30 calendar days after receipt of Notice to Proceed. Acceptance of the Contractor's plan does not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. Acceptance of the plan is conditional and predicated on satisfactory performance during construction.

The Government reserves the right to require the Contractor to make changes to the Environmental Protection Plan or operations if the Contracting Officer determines that environmental protection requirements are not being met. No physical work at the site should begin prior to acceptance of the Contractor's plan or an interim plan covering the work to be performed.

The dredging contractor should develop a written operation plan to minimize turtle takes. The operational plan should be submitted as part of the Environmental Protection Plan and should be discussed during the Pre-work inspection. The operation plan should be reviewed and approved during the hopper sea turtle compliance quality assurance inspection of the hopper dredge (see attachment 1).

VI. Sea Turtle Inspection Checklist for Hopper Dredges

The sea turtle inspection checklist (attachment 1) is used to perform a QC per-dredging inspection and QC start-up inspection as the hopper dredge it starts dredging operations. The QA checklist and its completion is the basis of the risk assessment and the risk management plan along with the contractor's EPP.

VII. Silent Inspector (SI) Automated Monitoring System

All hopper dredges shall be equipped with recording devices for each draghead that capture real time the following dredging parameters: drag head elevation, slurry density, Pump(s) slurry velocity measured at the output side, Pumps(s) vacuum, and Pump RPM. Sensors capture the data which are then made available in the form of SI Hopper Plots.

Prior to dredging, assurances should be made that these systems are running and that data is uploaded at minimum weekly intervals, and immediately when a take occurs.

Dredging data recorders available on hopper dredges that assist in measuring activities for turtle safe operation and monitoring include: draghead depth monitor, drag head flow velocity sensor, and the slurry density sensor. During the risk assessment, the Silent Inspector (SI) recording plots for the previously mentioned monitoring data should be reviewed to verify whether not the operational aspects of the dredge were in compliance with established requirements. (NOTE: An

SI draghead depth alarm system is being developed to document and record conditions when drag heads are off the bottom and pumps are running).

The Contractor should perform the necessary daily backup of SI data. The SI data files are to be identified by date and load numbers. In addition to daily uploads, archived SI data should be provided to the Contracting Officers Representative via CD (or alternate storage medium approved by the Contracting Officer' Representative) on a weekly basis as well as an end of project compilation of SI data. If a sea turtle take occurs, all SI data, including the full load cycle in which the take occurred, shall be sent immediately to the SI Customer Support Team http://si.wes.army.mil

SI data can graphically be plotted to show: velocity versus density versus draghead depth, for the loads when the takes occurred, to assess potential incompliance. SI Hopper Plots should be reviewed for the dredging cycle in which the sea turtle is taken in order to help determine where or not operational measures are being conducted in a manner that are in compliance with standard operational procedures and the reasonable and prudent measures found in the Regional biological Opinion.

Suction Pipe Density-Velocity: During the pre-inspection of the hopper dredge, prior to commencing dredging, operational procedures designed to balance the suction pipe densities and velocities in order to keep from taking sea turtles. The suction velocity on the dragheads when the take occurred should be reviewed. Ideally a suction velocity of less than 1 foot per second when the drag heads are off the bottom should not result in a take. High vacuum readings may be indicative of the drag heads being off of the bottom.
(NOTE: a training video will be available shortly that will assist in interpretation of SI monitoring data). Additional information on Silent Inspector can be found on the following website: http://si.wes.army.mil

VIII. Hopper Dredge Dragtender

The dragtender is the operator who actually handles the dragheads and controls the pumps. He/she is directly responsible for the proper operation of the equipment which could potentially take a turtle. Therefore, he/she is the key person during the dredging operations when it comes to sea turtles takes.

The hopper dredge dragtender is responsible for monitoring the lower dragarm approach angle while dredging. The drag tender should not allow the approach angle to be greater than the angle specified in the submittal during dredging operations. When the operating approach angle is greater than the submitted approach angle the deflector will NOT be plowing the required 6 inches (minimum depth) into the dredge material.). After all the permit conditions have been met and the above mentioned QC inspections have been performed, dredging operations can commence.

IX. Hopper Dredge Operational Requirements

The Contractor shall operate the hopper dredge to minimize the possibility of taking sea turtles and to comply with the requirements stated in the Incidental Take Statement provided by the National Marine Fisheries Service in their Biological Opinion.

The turtle deflector device and inflow screens shall be maintained in operational condition for the entire dredging operation.

Dredge pumps must not be operated when the dragheads are not firmly on the bottom, to prevent impingement or entrainment of sea turtles within the water column. Pumping water through the drag heads shall cease while maneuvering or during travel to/from the disposal area. (Information Only Note: Optimal suction pipe densities and velocities occur when the deflector is operated properly. If the required dredging section includes compacted fine sands or stiff clays, a properly configured arrangement of teeth may enhance dredge efficiency which reduces total dredging hours and "turtle takes." The operation of a draghead with teeth must be monitored for each dredged section to insure that excessive material is not forced into the suction line.

When excess high-density material enters the suction line, suction velocities drop to extremely low levels causing conditions for plugging of the suction pipe. Dredge operators should configure and operate their equipment to eliminate all low level suction velocities. Pipe plugging in the past was easily corrected, when low suction velocities occurred, by raising the drag head off the bottom until the suction velocities increased to an appropriate level. Pipe plugging cannot be corrected by raising the drag head off the bottom. Arrangements of teeth and/or the reconfiguration of teeth should be made during the dredging process to optimize the suction velocities).

Raising the draghead off the bottom to increase suction velocities is not acceptable. The primary adjustment for providing additional mixing water to the suction line should be through water ports. To insure that suction velocities do not drop below appropriate levels, the Contractor's personnel must monitor production meters throughout the job and adjust primarily the number and opening sizes of water ports. Water port openings on top of the draghead or on raised stand pipes above the drag head shall be screened before they are utilized on the dredging project. If a dredge section includes sandy shoals on one end of a tract line and mud sediments on the other end of the tract line, the Contractor should adjust the equipment to eliminate drag head pick-ups to clear the suction line.

Draghead pumps should be lower or turned off when the pumps are off of the bottom. Constant or increased RPMS while starboard or Port drag heads are off of the bottom is higher probability periods of getting a take. This is especially important if the dredge is operating near side slopes where turtles may rest.

The Contractor must keep the draghead buried a minimum of 6 inches in the sediment at all times. Although the over depth prism is not the required dredging prism, the Contractor shall achieve the required prism by removing the material from the allowable over depth prism.

During turning operations the pumps must either be shut off or reduced in speed to the point where no suction velocity or vacuum exists. Unexpected increases in the draghead pump RPMs could be indicative of strain due to plugging by a turtle or from dredged material or both.

These operational procedures are intended to stress the importance of balancing the suction pipe densities and velocities in order to keep from taking sea turtles. The Contractor shall develop a written operational plan to minimize turtle takes and submit it as part of the Environmental Protection Plan.

The Contractor must comply with all requirements of this specification and the Contractor's accepted Environmental Protection Plan. The contents of this specification and the Contractor's Environmental Protection Plan shall be shared with all applicable crew members of the hopper dredge.

Hopper dredge dragheads shall be equipped with rigid sea turtle deflectors which are rigidly attached. No dredging shall be performed by a hopper dredge without an installed turtle deflector device.

The leading edge of the deflector shall be designed to have a plowing effect of at least 6" depth when the drag head is being operated. Instrumentation or indicator should be monitored by the dragtender and kept in proper calibration to insure the critical "approach angle" is maintained during dredging operations.

The design "approach angle" or the angle of lower draghead pipe relative to the average sediment plane is very important to the proper operation of a deflector. If the lower drag head pipe angle in actual dredging conditions varies tremendously from the design angle of approach used in the development of the deflector, the 6" plowing effect does not occur. Therefore, every effort shall be made by the dragtender to insure this design "approach angle" is maintained.

The draghead can be on the bottom but if the approach angle is greater that the submitted approach angle turtles can go under the deflector even if the draghead is on the bottom. Monitoring the approach angle in SI is critical to assure the deflector is plowing into the bottom.

Over penetration of the deflector will reduce production and increase fuel consumption of the dredge. SI data plots should be reviewed to determine whether or not the dragheads are being properly positioned on the bottom during each dredging cycle. Verification should be made that the drag head angles are properly set so that the drag head the deflectors are plowing 6 inches in to the dredged material.

XI. Channel -Borrow Area Bathymetry

The potential for increase incidental takes may occur due to channel locations or the bathymetry and configuration of the borrow areas. In preparing a risk assessment, wind and current conditions in the navigation channel area or borrow area should be reviewed as possible

contributors to the hopper dredge operation and the incidental. High current conditions and winds may affect a draghead operation on the bottom.

In some cases, dragheads may "crab" or move under or onto side slopes as a result of bottom conditions, bottom currents or location of the dredge in or near the side of the channel. Crabbing may result in dragheads not being maintained on the bottom or dropping into existing dredged areas. Crabbing increases the likely hood of turtle takes since the dragheads may not be properly located on the bottom or may be rising over bottom areas where turtles may hide or hibernate. Verification of whether or not the dredge was "crabbing" and the reason(s) for possible crabbing during the dredging operation should be documented.

For borrow areas in particular, the District Navigation Section or the Dredging Function should be consulted to ensure that the project can be executed as designed using a hoper dredge or a hopper dredge with sea turtle deflecting dragheads. The navigation expert should evaluate project conditions to ensure that there are no technical reasons that preclude the use of hopper dredges.

Channel Side-Slopes and Banks. Trawling effectiveness and draghead plowing efficiency decreases significantly when working along the toe of a channel or along steep banks. Dragheads may not be able to get close to the side slopes, bumps, humps may not allow dragheads to remain on the bottom, and Trawlers may not be able to trawl close enough to the side slopes to sweep the area.

Quality-Type of Dredged Material. The material being dredged (i.e., compacted sand and/or stiff clays) affects the location of the drag heads as well as whether or not drag head angles are correct and is plowing in into the bottom (material). Suction velocities readings may drop to low levels when excess high-density material enters the suction line. This may leads to conditions associated with plugging of the dredge pipes.

Food Sources within Channel/Borrow Area. In considering the relative abundance of sea turtles, possible food sources in the channel and/borrow areas should be considered as possible reasons for turtles being in the area. Turtles follow food source instincts. When the food source moves in they move in.