DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XA628

Takes of Marine Mammals During Specified Activities; Confined Blasting Operations by the U.S. Army Corps of Engineers During the Port of Miami Construction Project in Miami, FL

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an Incidental Take Authorization (ITA).

SUMMARY: In accordance with the Marine Mammal Protection Act (MMPA) regulation, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to the U.S. Army Corps of Engineers (ACOE) take small numbers of marine mammals, by Level B harassment, incidental to confined blasting operations in the Port of Miami in Miami, Florida.

DATES: Effective March 15, 2013 through March 14, 2014.

ADDRESSES: A copy of the IHA and the application are available by writing to P. Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910 or by telephoning the contacts listed here.

An electronic copy of the IHA application containing a list of the references used in this document may be obtained by writing to the above address, telephoning the contact listed here (see **FOR FURTHER INFORMATION CONTACT**) or visiting the internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications.*

This project was previously evaluated by the ACOE under an Environmental Impact Statement (EIS) and a Record of Decision (ROD) for the project was signed on May 22, 2006, which is also available at the same internet address. Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address.

FOR FURTHER INFORMATION CONTACT: Howard Goldstein or Jolie Harrison, Office of Protected Resources, NMFS, 301–427–8401.

SUPPLEMENTARY INFORMATION:

Background

Section 101(a)(5)(D) of the MMPA (16 U.S.C. 1361 (a)(5)(D)) directs the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for the incidental taking of small numbers of marine mammals shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant). The authorization must set forth the permissible methods of taking, other means of effecting the least practicable adverse impact on the species or stock and its habitat, and requirements pertaining to the mitigation, monitoring and reporting of such takings. NMFS has defined ''negligible impact'' in 50 CFR 216.103 as ''* * * an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.''

Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. Section 101(a)(5)(D) of the MMPA establishes a 45-day time limit for NMFS' review of an application followed by a 30-day public notice and comment period on any proposed authorizations for the incidental harassment of small number of marine mammals. Within 45 days of the close of the public comment period, NMFS must either issue or deny the authorization.

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as:

> any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

16 U.S.C. 1362(18).

Summary of Request

On May 17, 2011, NMFS received a letter from the ACOE, requesting an IHA. The requested IHA would authorize the take, by Level B (behavioral) harassment, of small numbers of Atlantic bottlenose dolphins (*Tursiops truncatus*) incidental to confined blasting operations in the Miami Harbor, Port of Miami, in Miami-Dade County, Florida. The IHA application was considered adequate and complete on September 9, 2011. The ACOE plans to conduct four components as part of the project in Miami Harbor (see Figure 1 of the ACOE's IHA application for a map and more details). These components are:

(1) The widening of Cut 1 and deepening of Cut 1 and Cut 2;

(2) Adding a turn widener and deepening at the southern intersection of Cut 3 within Fisherman's Channel;

(3) Widening and deepening the Fisher Island Turning Basin; and

(4) Expanding the Federal Channel and Port of Miami berthing areas in Fisherman's Channel and the Lummus Island Turning Basin.

The construction will likely be completed using a combination of mechanical dredge (*i.e.,* a clamshell or backhoe), cutterhead dredge, and rock pre-treatment by confined blasting. The dredging will remove approximately 5,000,000 cubic yards (3,822,774.3 cubic meters [m^3]) of material from the harbor. Material removed from the dredging will be placed in Miami Harbor Ocean Dredged Material Disposal Site, or used to construct seagrass and reef mitigation projects.

The confined blasting is planned to take place beginning during the fall/winter of 2012 (November, 2012), and is expected to take up to 24 months in Miami, Florida. Additional information on the construction project is contained in the application, which is available upon request (see **ADDRESSES**). Confined blasting means that the shots would be ''confined'' in the rock with stemming that prevents the explosive energy from going upward from the hole into the water column, and forces it to go laterally into the surrounding rock. In confined blasting, each charge is placed in a hole drilled in the rock approximately 5 to 10 feet deep; depending on how much rock needs to be broken and the intended project depth. The hole is then capped with an inert material, such as crushed rock. A charge is the total weight of the explosives to be detonated during a blast. This can also be broken down into the weight of the individual delays. This process is referred to as ''stemming the

hole'' (see Figure 6 and 7 of the ACOE's application).

Description of the Specified Activities

The ACOE plans to deepen and widen the Federal channels at Miami Harbor, Port of Miami, in Miami-Dade County, Florida. The recommended plan (Alternative 2 of the Environmental Impact Statement [EIS]) includes four components:

(1) Widen the seaward portion of Cut 1 from 500 to 800 feet (ft) (152.4 to 243.8 meters [m]) and deepen Cut 1 and Cut 2 from a project depth of −44 to −52 ft (13.4 to 15.9 m);

(2) Add a turn widener at the southern intersection of Cut 3 within Fisherman's Channel and deepen to a project depth of −50 ft (−15.2 m);

(3) Increase the Fisher Island Turning Basin from 1,200 to 1,500 ft (365.8 to 457.2 m), truncate the northeast section of the turning basin to minimize seagrass impacts, and deepen from −42 ft (−12.8 m) to a project depth of −50 ft; and

(4) Expand the Federal Channel and Port of Miami berthing areas in Fisherman's Channel and in the eastern end of the Lummus Island Turning Basin (LITB) by 60 ft (18.3 m) to the south for a total of a 160 ft (48.8 m) wide berthing area and will be deepened from −42 ft to a project depth of −50 ft. The Federal Channel will be widened 40 ft (12.2 m) to the south, for a 100 ft (30.5 m) total width increase in Fisherman's Channel. This component (referred to as Component 5 in the ACOE's IHA application) will deepen Fisherman's Channel and the LITB from −42 ft to a project depth of −50 ft. See Figure 1 of ACOE's IHA application for a map of the project's components.

Disposal of the estimated five million cubic yards of dredged material would occur at up to three disposal sites (seagrass mitigation area, offshore artificial reef mitigation areas, and the Miami Offshore Dredged Material Disposal Site). This project was previously evaluated under an Environmental Impact Statement (EIS) titled ''Miami Harbor Miami-Dade County, Florida Navigation Study, Final General Reevaluation Report and Environmental Impact Statement,'' prepared under the National Environmental Policy Act, and a Record of Decision for the project was signed on May 22, 2006. The original proposed project included six components, two of which (components four and six) have been removed. The EIS provides a detailed explanation of project location as well as all aspects of project implementation. It is also available online for public review at: *http://www.saj.usace.army.mil/Divisions/Planning/Branches/Environmental/DOCS/OnLine/Dade/MiamiHarbor/NAV_STUDY_VOL-1_MIAMI.pdf.*

To achieve the deepening of the Miami Harbor from the existing depth of −45 ft (−13.7 m) to project depth of −52 ft, pretreatment of some of the rock areas may be required using confined underwater blasting, where standard construction methods are unsuccessful due to the hardness of the rock. The ACOE has used two criteria to determine which areas are most likely to need confined blasting for the Miami Harbor expansion: (1) Areas documented by core borings to contain hard and/or massive rock; and (2) areas previously blasted in the harbor during the 2005 confined blasting and dredging project.

The duration of the confined blasting is dependent upon a number of factors including hardness of rock, how close the drill holes are placed, and the type of dredging equipment that will be used to remove the pretreated rock. Without this information, an exact estimate of how many confined ''blast days'' will be required for the project cannot be determined. The harbor deepening project at Miami Harbor in 2005 to 2006 estimated between 200 to 250 days of confined blasting with one shot per day (a blast day) to pre-treat the rock associated with that project; however, the contractor completed the project in 38 days with 40 confined blasts. A shot, or blast, is an explosion made up of a group of blast holes set in a pattern referred to as a blast array that are detonated all at once or in a staggered manner with delays between them. A blast hole is the hole drilled into the bottom substrate that will be filled with explosives, capped with stemming, and detonated.

The upcoming expansion at Miami Harbor scheduled to begin in fall/winter of 2012 currently estimates a maximum of 600 blast days for the entire multi-year project footprint. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [no confined blasting is allowed on Sundays due to local ordinances]). A blast day is defined as one confined blast event/day. A blast event is made up of all the actions during a shot, this includes the Notice of Project Team and Local Authorities, which occurs two hours before the blast is detonated, through the end of the protected species watch, which last 30 minutes after the blast detonation. A typical blast timeline consists of: Notice to Project Team and Local Authorities (T minus 2 hours), protected species watch begins (T minus 1 hour), Notice to Mariners (channel closes, T minus 15 minutes), fish scare (T minus 1 minute), blast detonation, all clear signal (T plus 5 minutes), protected species watch ends (T plus 30 minutes), and delay capsule—if an animal is observed in either the danger or safety zones, the blast is delayed to monitor the animal until it leaves, on its own volition, from both the danger and safety zones (can occur between T minus 1 hour and detonation). There may be more than one confined blast event in a calendar day. While confined blasting events will occur only during daylight hours, typically six days a week. Other operations associated with the action (*i.e.,* dredging activities) will take place 24 hours a day, typically seven days a week. Confined blasting activities normally will not take place on Sundays due to local ordinances. The contractor may drill the blast array (*i.e.,* to physically drill the holes in the substrate to be removed in the pattern designed by the blasting engineer to remove the rock in the manner he/she needs to achieve the needed results) at night and then blast after at least two hours after sunrise (1 hour, plus one hour of monitoring). After detonation of the first explosive array, a second array may be drilled and detonated before the one-hour before sunset prohibition is triggered. An explosive array is the pattern of blast holes drilled into the bottom substrate that will be fractured by the blast detonation.

At this time, the ACOE has not selected a contractor and thus does not have a contractor-developed confined blasting plan from the contractor specifically identifying the number of holes that will be drilled, the amount of explosives that will be used for each hole, the number of confined blasts per day (usually no more than two per a day) or the number of days the construction is anticipated to take to complete. The ACOE is required to have all authorizations and permits completed (including the possession of an IHA) prior to the request for proposal and advertising the contract, per the Competition in Contracting Act, and the Federal Acquisition Regulations. While the ACOE does not have contract bids at this time, it is possible to make reasonable estimates of the bounds based on previous similar projects that have been conducted by the ACOE here and at other locations. NMFS supports the use of the worst-case scenarios to estimate confined blasting activities and associated potential impacts.

Drill holes are small in diameter (typically 2 to 4 in [5.1 to 10.2 cm] in diameter) and only 5 to 10 ft (1.5 to 3.1

m) deep, drilling activities take place for a short time duration, with no more than three holes being drilled at the same time (based on the current drill-rigs available in the industry that range from one to three drills). During the 2005 confined blasting event, dolphins were seen near the drill barge during drilling events and the ACOE did not observe avoidance behavior. No measurements associated with noise from drilling small blast holes have been recorded. The ACOE does not expect incidental harassment from drilling operations and is not requesting take associated with this activity.

Although the ACOE does not have a specific contractor-provided confined blasting plan, the ACOE developed plans and specifications for the project that direct the contractor to do certain things in certain ways and are basing these plans and specifications on the previous deepening project in Miami Harbor (construction was conducted in 2005 to 2006).

The previous ACOE project in Miami Harbor required a maximum weight of explosives used in each delay of 376 pounds (lb) (170.6 kilograms [kg]) and the contractors blasted once or twice daily from June 25 to August 25, 2005, for a total of 40 individual blasts in 38 days of confined blasting. The 2005 project, which utilized confined blasting, was limited to Fisherman's Channel and the Dodge-Lummus Island Turning Basin (see Figure 2 of ACOE's IHA application, which shows the confined blasting footprint for the 2005 project), whereas the project described in the ACOE's application includes Fisherman's Channel, Dodge-Lummus Island Turning Basin, Fisher Island Turning Basin, and Inner and Outer Entrance Channel. This larger area will result in more confined blasting for this project than was completed in 2005, as it includes areas not previously blasted in 2005.

A copy of the **Federal Register** notice of issuance for the IHA from 2003 (68 FR 32016, May 29, 2003), the IHA renewal from 2005 (70 FR 21174, April 25, 2005), and the final biological monitoring report from the ACOE's Miami Harbor Phase II project (completed in 2006) is attached to the ACOE's application and available on NMFS's Web site at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm#iha.* For the new construction at Miami Harbor, the ACOE expects the project may take multiple years, and the ACOE will seek subsequent renewals of this IHA after issuance, with sufficient time to prevent any delay to the project.

For the deepening at Miami Harbor, the ACOE has consulted with blasting industry experts and believes, based on the rock hardness and composition at Miami Harbor, a maximum charge weight per delay of 450 lbs (204.1 kg) should be expected. The minimum charge weight will be 10 lbs (4.5 kg). A delay is a period of time (in milliseconds) between small detonations that are part of the total charge weight of the entire detonation.

The focus of the confined blasting work at the Miami Harbor is to pre-treat the massive limestone formation that makes up the base of Miami Harbor prior to removal by a dredge utilizing confined blasting, meaning the explosive shots would be ''confined'' in the rock. Typically, each blast array is set up in a square or rectangle area divided into rows and columns (see Figures 3, 4, and 5 in the ACOE's IHA application). A typical blast array is 10 holes long by 4 holes wide with holes being spaced 40 ft (12.2 m) apart covering an area of 4,000 ft^2 (371.6 m^2). Blast arrays near bulkheads can be long-linear feature of one-hole wide by 8 or 10 holes long (see Figure 4 of the IHA application).

In confined blasting, each charge is placed in a hole drilled in the rock approximately 5 to 10 ft (1.5 to 3.0 m) deep; depending on how much rock needs to be broken and the intended project depth. The hole is then capped with an inert material, such as crushed rock. This process is referred to as ''stemming the hole'' (see Figure 6 and 7 of ACOE's IHA application; each bag as shown contains approximate volume of material used per discharge). The ACOE used this technique previously at the Miami Harbor Phase II project in 2005. NMFS issued an IHA for that operation on May 22, 2003 (68 FR 32016, May 29, 2003) and renewed the IHA on April 19, 2005 (70 FR 21174, April 25, 2005).

For the Port of Miami expansion project (Miami Harbor Phase II) that used confined blasting as a pre-treatment technique, the stemming material was angular crushed rock. (Stemming is the process of filling each borehole with crushed rock after the explosive charge has been placed. After the blasting charge has been set, then the chain of explosives within the rock is detonated. A chain of explosives refers to all of the detonations within the blast array, without regard to how many holes are in the array. They will detonate within milliseconds of each other. Stemming reduces the strength of the outward pressure wave produced by blasts.) The optimum size of stemming material is material that has an average diameter of approximately 0.05 times the diameter of the blast-hole. The selected material must be angular to perform properly (Konya, 2003). For the ACOE's project, specifications will be prepared by the geotechnical branch of the Jacksonville District.

The specifications for any construction utilizing the confined blasting for the deepening of Miami Harbor will have similar stemming requirements as those that were used for the Miami Harbor Phase II project in 2005 to 2006. The length of stemming material would vary based on the length of the hole drilled, however a minimum of two 2-ft (0.6 m) walls will be included in the project specific specifications. Studies have shown that stemmed blasts have up to a 60 to 90 percent decrease in the strength of the pressure wave released, compared to open water blasts of the same charge weight (Nedwell and Thandavamoorthy, 1992; Hempen *et al.,* 2005; Hempen *et al.,* 2007). However, unlike open water (unconfined) blasts (see Figure 8 of ACOE's IHA application), very little peer-reviewed research exists on the effects that confined blasting can have on marine animals near the blast (Keevin *et al.,* 1999). The visual evidence from a typical confined blast is shown in Figure 9 of ACOE's IHA application.

In confined blasting, the detonation is conveyed from the drill barge to the primer and the charge itself by Primacord and Detaline. These are used to safely fire the blast from a distance to ensure human safety from the blast. The Primacord and Detaline used on this project have a specific grain weight, and they burn like a fuse. They are not electronic. The time delay from activation to detonation of the charge is less than one second.

To estimate the maximum poundage of explosives that may be utilized for this project, the ACOE has reviewed previous confined blasting projects, including San Juan Harbor, Puerto Rico in 2000, and Miami Harbor, Florida in 2005. Additional data was also reviewed from the New York Harbor deepening project (ACOE, 2004 and Keevin *et al.,* 2005) and the Wilmington Harbor project (Settle *et al.,* 2002). The San Juan Harbor and 2005 Miami Harbor projects are most similar to the existing project in general environment, hardness/massiveness of rock, and species composition. The San Juan Harbor project's heaviest confined blast event using explosives was 375 lbs (170.1 kg) per delay and in Miami it was 376 lbs (170.6 kg) per delay. Based on discussion with the ACOE's geotechnical engineers, it is expected

that the maximum weight of delays for Miami Harbor will be larger since the rock is deeper, and expected to be harder and massive, in comparison to the previous two blasting projects.

Based upon industry standards and ACOE Safety & Health Regulations, the confined blasting program will follow these operating guidelines:

- The weight of explosives to be used in each confined blast will be limited to the lowest poundage of explosives that can adequately break the rock.
- Drill patterns (*i.e.,* holes in the array) are restricted to a minimum of 8 ft (2.4 m) separation from a loaded hole.
- Hours of confined blasting are restricted from two hours after sunrise to one hour before sunset to allow for adequate observation of the project area for marine mammals.
- Selection of explosive products and their practical application method must address vibration and air blast (overpressure) control for protection of existing structures and marine wildlife.
- Loaded blast holes will be individually delayed to reduce the maximum lbs per delay at point detonation, which in turn will reduce the mortality radius.
- The blast design will consider matching the energy in the ''work effort'' of the borehole to the rock mass or target for minimizing excess energy vented into the water column or hydraulic shock.
- Delay timing adjustments with a minimum of 8 milliseconds (ms) between delay detonations to stagger the blast pressures and prevent cumulative addition of pressures in the water.

Test Blast Program

Prior to implementing a construction blasting program, a test blast program will be completed. The test blast program will have all the same protective monitoring and mitigation measures in place for protected species as blasting operations for construction purposes. The purpose of the test blast program is to demonstrate and/or confirm the following:

- Drill boat capabilities and production rates;
- Ideal drill pattern for typical boreholes;
- Acceptable rock breakage for excavation;
- Tolerable vibration level emitted;
- Directional vibration; and
- Calibration of the environment.

The test blast program begins with a single range of individually delayed holes and progresses up to the maximum production blast intended for use. The test blast program will take place in the project area and will count toward the pre-treatment of material, since the blasts of the test blast program will be cracking rock. Each test blast is designed to establish limits of vibration and air blast overpressure, with acceptable rock breakage for excavation. The final test event simulates the maximum explosive detonation as to size, overlying water depth, charge configuration, charge separation, initiation methods, and loading conditions anticipated for the typical production blast.

The results of the test blast program will be formatted in a regression analysis with other pertinent information and conclusions reached. This will be the basis for developing a completely engineered procedure for the construction blasting plan.

During the test blast program, the following data will be used to develop a regression analysis:

- Distance;
- Pounds per delay;
- Peak particles velocities (Threshold Limit Value [TVL]);
- Frequencies (TVL);
- Peak vector sum; and
- Air blast, overpressure.

As part of the development of the protected species monitoring and mitigation protocols, which will be incorporated into the plans and specification for the project, ACOE will continue to coordinate with the resource agencies and non-governmental organizations (NGOs) to address concerns and potential impacts associated with the use of blasting as a construction technique.

Additional details regarding the confined blasting and dredging project can be found in the ACOE's IHA application and EIS. The EIS can also be found online at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications.*

Description of the Dates, Duration, and Specified Geographic Region

At this time the ACOE has not yet awarded a contract or given a Notice to Proceed (NTP) with a specific date for the initiation of construction activities within the Port of Miami. However, the ACOE requested that the first IHA be issued by the end of July, 2012, with an effective date of March 15, 2013, to allow for the advertisement of the contract for construction in September, 2012; award the contract and provide the NTP to the selected in February, 2012 to the selected contractor, resulting in construction work beginning in March 15, 2013. After receiving NTP, the contractor will have 45 days to begin dredging activities, but blasting activities shall not begin until after March 15, 2013. The construction activities are expected to take up to 26 months and at this time, it is possible that confined blasting could take place at any time during construction. The ACOE also notes that multiple IHAs (up to three) will be needed and requested for this project due to the project duration.

The confined blasting activities will be limited to waters shallower than 60 ft. (18.3 m) and located entirely on the continental shelf and will not take place seaward of the outer reef. The specified geographic area of the construction will be within the boundaries of the Port of Miami, in Miami, Florida (see Figure 11 of the ACOE's IHA application). The Port of Miami is an island facility consisting of 518 upland acres and is located in the northern portion of Biscayne Bay in South Florida. The City of Miami is located on the west side of the Biscayne Bay; the City of Miami Beach is located on an island on the northeast side of Biscayne Bay, opposite of Miami. Both cities are located in Miami-Dade County, Florida, and are connected by several causeways crossing the bay. The Port of Miami is the southernmost major port on the Atlantic Coast. The Port of Miami's landside facilities are located on Dodge-Lummus Island, which has a GPS location 25°46′05″ North 80°09′40″ West. See Figure 11 of the ACOE's IHA application for more information on the location of the project area in the Port of Miami.

Comments and Responses

A notice of preliminary determinations and proposed IHA for the ACOE confined blasting operations was published in the **Federal Register** on November 18, 2011 (76 FR 71517). During the 30 day public comment period, NMFS received combined comments from the Sierra Club Miami Group, Biscayne Bay Waterkeeper, and Kent Harrison Robbins (Robbins *et al.*), as well as comments from the Marine Mammal Commission (Commission). The comments are posted online at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm.* Following are their substantive comments and NMFS' responses:

Comment 1: Robbins *et al.* states that the ACOE's request for an IHA does not comply with the regulatory and legal standards for issuance of an IHA because the project proposes 600 days of confined blasting with an average of one or two blasting periods per day. To authorize an IHA for a project longer than a one-year period undermines the purpose of the authorization because the cumulative and continued effects of the

confined blasts on the resident and transient bottlenose dolphin populations known to both the Biscayne Bay and Atlantic Shelf areas cannot be properly assessed by the limited scope of an IHA analysis, which can consider impact not to exceed one year.

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously.

50 CFR 216.107 states that IHAs will be valid for a period of time not to exceed one year but may be renewed for additional periods of time not to exceed one year for each reauthorization; therefore, the promulgation of regulations and the subsequent issuance of Letters of Authorization (LOAs) to the ACOE for the confined blasting operations in the Port of Miami is not necessary or required.

NMFS considered cumulative effects of the confined blasting on the resident and transient bottlenose dolphin populations (*i.e.,* Biscayne Bay and Western North Atlantic Central Florida Coastal stocks) in the action area as part of its NEPA analysis and prepared an ''Environmental Assessment for Issuance of an Incidental Harassment Authorization for U.S. Army Corps of Engineers Confined Blasting Operations During the Port of Miami Construction Project in Miami, Florida,'' which analyzes the project's purpose and need, alternatives, affected environment, and environmental effects for the action prior to making a determination on the issuance of the IHA. NMFS also considered these cumulative effects before making its negligible impact determination for issuance of the IHA to the ACOE. NMFS' EA and ACOE's FEIS adequately address the cumulative effects of relatively short-term confined blasting operations in relation to long-term noise and events from other past, present and reasonably foreseeable future anthropogenic sources, such as dredging, construction and demolition activities, shipping, commercial fishing, recreational fishing and boating, military readiness activities, and other human activities in the action area. These other activities are considered to be long-term and continuous.

Comment 2: Robbins *et al.* states that relative to the 2005/2006 Port of Miami safety zone calculations, the current application does not reflect the significant blasting area and duration of the project as well as the high maximum weight which will be employed in this project. In addition, the ACOE has not addressed how it will ensure that stemming the blast hole will be more effective in this round of blasting, especially when considering the specific nature of the blast area which is in a channel, which may carry sound and pressure farther and/or in a more concentrated route. Robbins *et al.* states that there should be improved methods for stemming blast holes. Studies such as Jordan (2007) and Hempen & Keevin (2007) have shown that the practice of confined blasting such as those done at the Port of Miami in 2005 significantly reduces the pressure wave released as compared to open water discharges of the same weight. However, if the protocol of stemming the holes to benefit the marine community is not properly executed, these mitigation methods are not creating the positive changes that are so critical to reducing the take number of fish, sea turtles, and manatees. The blast area is also in an extremely sensitive part of Biscayne Bay, sharing a boundary with a critical wildlife area frequented by bottlenose dolphin.

Response: The ACOE's IHA application clearly defines the Miami Harbor Deepening Project's action area and expected project duration. Protective zone (danger, exclusion, safety, and watch) calculations will be relatively applied in comparison to 2005/2006 Port of Miami safety zone calculations. The term ''relative'' means that the calculations utilized to determine the danger, exclusion, safety, and watch zones that are being used are based upon the actual charge weights that will be utilized for this effort—which may be as high as 450 lbs per delay (as compared to 376 lbs per delay in the 2005/2006 confined blasting in the Port of Miami), which consequently will result in larger protective zones. For instance, the calculated area of the danger zone for the largest blast conducted in 2005/2006 was 11,059,023.62 ft^2 (1,027,416.91 m^2), representing 0.09% of the total area of Biscayne Bay, and the calculated area of the danger zone for the largest confined blast proposed for this effort is 12,466,026.04 ft^2 (1,158,131.72 m^2), representing 0.10% of the total area of Biscayne Bay. This is a difference of 1,407,002.42 ft^2 (130,714.802 m^2), or an increase in the total impact area of 0.01% of the total area of Biscayne Bay, or 12% increase in impact area specific to the confined blast.

Regarding the effectiveness of the stemming, Section 3.5.5 of the ACOE's project confined blasting specification (02 10 00) state:

3.5.5 Stemming

All blast holes shall be stemmed. The Blaster or Blasting Specialist shall determine the thickness of stemming using blasting industry conventional stemming calculation. The minimum stemming shall be 2 ft (0.61 m) thick. Stemming shall be placed in the blast hole in a zone encompassed by competent rock. Measures shall be taken to prevent bridging of explosive materials and stemming within the hole. Stemming shall be clean, angular to subangular, hard stone chips without fines having an approximate diameter of ⅜ to ½ in (0.95 to 1.27 cm). A barrier shall be placed between the stemming and explosive product, if necessary, to prevent the stemming from settling into the explosive product. Anything contradicting the effectiveness of stemming shall not extend through the stemming.

The specifications clearly direct the contractor to utilize and employ blasting industry standards and specifically requires the contractor to place the blast hole in a zone encompassed by competent rock to minimize the potential rifling (when a hole is not well confined). The ACOE's Master Blaster reviews all proposed contractor blasting plans to ensure compliance with the project specifications.

NMFS uses the best scientific evidence available in its environmental analysis and the development of monitoring and mitigation measures required in the IHA issued to the ACOE. In the IHA, NMFS requires the ACOE to implement mitigation measures (*e.g.,* limiting the weight of explosives; capping explosives in loaded holes; minimum separation distance of loaded holes; staggering detonations; restricting hours when blasting can occur; calculating, establishing, and monitoring danger, exclusion, safety, and watch zones, etc.) during confined blasting operations that are expected to reduce the potential for incidental take and ensure the activity will have the least practicable impact on marine mammals and their habitat.

The ACOE has previously noted in the project environmental coordination documents (project FEIS and Biological Assessments) and continues to recognize that the project area is adjacent to the Bill Sadowski Critical Wildlife Area. NMFS' IHA requires the ACOE to implement monitoring and mitigation measures so that the confined

blasting operations will have the least practicable impact on bottlenose dolphins in the action area.

Comment 3: Robbins *et al.* states that as there is no evidence presented that drilling and dredging activities themselves do not increase harassment, these activities should be further tested. The only construction activity restricted to daylight hours is the blasting and all other work is permissible through the night when there will be no watch plan in place or possible, so it is unclear the amount of harm that these activities will cause. The extended nature of this project will also adversely impact the habitat of the bottlenose dolphin, sea turtles, and other marine mammals because the project is dredging approximately 415 acres of bay bottom, coral reef, and sea grass beds (and not including damage to outer shelf reef systems from barge anchoring chains) and FDEP is only requiring a total of 14 acres of seagrass mitigation and 9.78 of artificial reef mitigation.

Response: The ACOE has agreed to collect sound recordings of drilling operations during the confined blasting operations at Miami Harbor to help the ACOE and NMFS better characterize the noise associated with drilling activities at confined blasting projects throughout the U.S. The ACOE has conducted interviews with Protected Species Observers (PSOs) having more than 25 years of experience monitoring blasting activities. These individuals have stated that no avoidance behavior from any marine mammal species in many parts of the country, including bottlenose dolphins, has been observed in association with drilling activities associated with confined underwater blasting.

The ACOE conducts dredging operations 24 hours a day throughout the U.S. and, to date, utilizes the same types of dredging equipment planned to be used for the blasting and dredging operations as part of the Miami Harbor Deeping Project. The ACOE's Jacksonville District Local Master Guide Specification (Section 01 57 20) covers the requirements for environmental protection during construction activities, which includes monitoring and mitigation measures for dredging operations. This document can be found online at: *www.saj.usace.army.mil/Divisions/Engineering/DOCS/CADD/docsect/01_57_20.pdf*. Neither the ACOE, nor NMFS, has determined that dredging operations, in previously dredged and maintained navigation channels, has the potential to result in the incidental take of cetaceans.

Habitat loss associated with the project is limited primarily to an existing and maintained Federal channel that is 0.07% of the total area of Biscayne Bay, which is habitat area for the Biscayne Bay stock of bottlenose dolphins, and 0.0009% of the 20 m (65.6) isobar off the coast of Florida, which is habitat area for the Western North Atlantic Central Florida Coastal stock of bottlenose dolphin. The ACOE also conducted consultations with NMFS Southeast Regional Office (SERO) under the ESA and Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) regarding designated critical habitat of ESA-listed species and essential fish habitat (EFH).

The IHA issued to ACOE provides monitoring and mitigation requirements that will protect marine mammals from injury, serious injury, or mortality. The ACOE is required to comply with the IHA's requirements. Under the MMPA, IHAs must include means of effecting the least practicable impact on marine mammal species and their habitat (*i.e.,* impacts to seagrass, hardbottom or coral habitats). Monitoring and mitigation measures are designed to comply with this requirement.

Comment 4: Robbins *et al.* states that the ACOE is seeking, and NMFS has noticed, a legally-defective IHA by authorizing harassment of marine mammal species arising from activities expected to last for more than one year. NMFS cannot issue an IHA for the proposed blasting operations, as they are part of the overall Port of Miami blasting and dredging project, and the substantial number of takes that will occur over the period of many years involved in the project can only be authorized through LOA regulations under section 101(a)(5)(A)(i), 16 U.S.C. 1371(a)(5)(A)(i). For this reason, NMFS must deny the IHA application, and a comprehensive analysis and due process required under rulemaking, consistent with a request for a Letter of Authorization, should be required.

Response: NMFS disagrees with the commenter's statement. The ACOE requested an IHA in its adequate and complete application, and does not need to pursue the promulgation of regulations and subsequent LOAs by NMFS under section 101(a)(5)(A) of the MMPA for this specified activity. 50 CFR 216.107 states that except for activities that have the potential to result in serious injury or mortality, which must be authorized under § 216.105, IHAs may be issued, following a 30-day public review period, to allow activities that may result in only the incidental harassment of a small number of marine mammals. IHAs are valid for a period of time not to exceed one year but may be renewed for additional periods of time not to exceed one year for each reauthorization; therefore, the promulgation of regulations and the subsequent issuance of LOAs to the ACOE for the confined blasting operations in the Port of Miami is not necessary or required.

Comment 5: The proposed safety zone surrounding the blasting operations is [in]sufficient and detrimental to several marine mammals covered by the IHA.

Response: The safety zone is calculated to be twice the area of the danger zone, and pressure measurements collected during in situ pressure monitoring, have shown that blast pressures return to background at the outer edge of the danger zone. Additionally, both the safety and danger zones are based on unconfined, open water blasts (which is not the case here) and the safety zones were developed by the U.S. Navy to protect naval divers working with military ordinance during warfare to ensure that divers are not injured or killed. Also, the exclusion zone is larger than the area where the ACOE has determined that Level B harassment will occur, so if the monitoring and mitigation measures implemented are successful as expected, and no detonation occurs when an animal is inside the exclusion zone, no take by Level B harassment is likely to occur.

The ACOE's specified activity only authorizes the use of confined blasting, which results in a 60 to 90 percent reduction in the strength of the pressure wave released (Hempen *et al.,* 2007; Hempen *et al.,* 2005; Nedwell and Thandavamoorthy, 1992) when compared to an unconfined, open water blast like those seen in other military readiness activities using explosive ordinance. It is therefore unclear how these mitigation measures and protective zones are detrimental to bottlenose dolphins in the action area. The bottlenose dolphin is the only species of marine mammal managed under NMFS jurisdiction that is expected to occur in the action area. The commenter refers to ''marine mammal species'' to be included in the IHA, however, only the Biscayne Bay and Western North Atlantic Central Florida Coastal stocks of bottlenose dolphins are covered by the IHA. The West Indian (Florida) manatee, which may also be found in the action area, is managed under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

Comment 6: Robbins *et al.* states that the Biscayne Bay stock of bottlenose dolphins is apparently isolated within the Biscayne Bay community and from any other dolphin populations, thus,

Biscayne Bay is a distinct habitat for these bottlenose dolphins that are at risk.

Response: The available data do not support the commenter's belief that the Biscayne Bay stock of bottlenose dolphins is apparently isolated within Biscayne Bay and from any other dolphin populations. NMFS stock assessment report (2009) states that the range of the Biscayne Bay stock of bottlenose dolphins (*i.e.,* Haulover Inlet [north] and Card Sound bridge [south] boundaries) corresponds to the extent of confirmed home ranges of bottlenose dolphins observed residing in Biscayne Bay by a long-term photographic identification (photo-ID) study conducted by the NMFS SEFSC (Litz, 2007; SEFSC unpublished data), however, there have been few surveys outside of this range. These boundaries are subject to change upon further study of bottlenose dolphin home ranges within the Biscayne Bay estuarine system and comparison to an extant photo-ID catalog from Florida Bay to the south.

NMFS has to consider other information, not just the stock assessment reports, to provide a complete picture of marine mammals in the action area. There are at least five openings from the Atlantic Ocean into Biscayne Bay where bottlenose dolphins from the Biscayne Bay stock can exit the Biscayne Bay system. From the north they are: Haulover Inlet, Government Cut, Norris Cut, Bear Cut, and the Safety Valve. Additionally the Atlantic Intracoastal Waterway allows animals from Biscayne Bay to transit north into the Indian River Lagoon Estuarine System (IRLES) and South into Florida Bay. Contillo *et al.* (2011) documented that dolphins from Biscayne Bay have been observed in Florida Bay and dolphins from Florida Bay have been observed in Biscayne Bay on at least 20 occasions since 1999. Additionally, Biscayne Bay dolphins have been documented exiting the bay and been seen outside of Biscayne Bay in nearshore coastal waters off of Miami-Dade County, and animals documented as belonging to the coastal stock have been documented in Biscayne Bay on numerous occasions (Contillo, pers. comm., 2011). In the NMFS stock assessment report (2009), NMFS states that at least one dolphin was ''confirmed to be of the offshore morphotype by genetic testing and therefore not a Biscayne Bay resident.'' These data document that the Biscayne Bay stock of bottlenose dolphins (while likely are residents) are not isolated within Biscayne Bay, can and do exit Biscayne Bay, and that bottlenose dolphins from outside the stock enter Biscayne Bay and can mix with the Biscayne Bay stock.

Comment 7: Robbins *et al.* states that the northern portion of Biscayne Bay, which is geographically distinct from the southern portion of Biscayne Bay, is no longer polluted contrary to the allegations in the ACOE's IHA application and NMFS' notice of preliminary determinations and a proposed IHA. The corridor for the proposed 600 days of twice-a-day explosive blasting is located along the east-west Government Cut and Miami Harbor Channel bay corridor, which is the geographical divide between the northern and southern portions of Biscayne Bay. While there may have been a time decades ago when there were serious problems of industrial and municipal pollution of the northern portion of Biscayne Bay, that is not the current conditions of northern Biscayne Bay. Much of the municipal pollution and industrial effluent into Biscayne Bay and its tributaries has been eliminated over the prior decades due to strict code enforcement and the construction of deep well storage filtration systems as part of comprehensive plans adopted by the localities. It is a healthy estuarine habitat for dolphins and other sea mammals in the northern bay. Not noted in the ACOE IHA application and NMFS' notice of preliminary determinations and a proposed IHA is the enhancement of the northern Biscayne Bay estuary by the replanting of mangroves and the creation of Oleta River Florida Park. Thus, the suggestion that the northern portion of Biscayne Bay is unhealthy due to municipal and industrial pollution is not true. The northern portion of Biscayne Bay constitutes a significant wildlife habitat that supports marine mammals and other wildlife.

Response: The commenter is referring to the citation by NMFS in its stock assessment report (2009) for the Biscayne Bay stock of bottlenose dolphins that states ''the northern portion of Biscayne Bay is surrounded by the cities of Miami and Miami Beach and is therefore heavily influenced by industrial and municipal pollution sources (Bialczak *et al.,* 2001).'' Litz (2007) found that tissue samples collected for genetic and persistent organic pollutants (POP) analysis from dolphins in Biscayne Bay, male dolphins with home ranges in the northern portion of Biscayne Bay had polychlorinated biphenyl (PCB) levels five times higher than their counterparts with southern home ranges. This trend continued for dichlorodiphyltrichloroethane (DDT) (twice as high); chlordanes (four times higher); polybrominated diphenyl ethers (PBDE) (three times higher), and other pesticides (three times higher). The same trend was also observed in female dolphins when northern vs. southern animals' POP levels were compared. While it can be agreed that water quality in Biscayne Bay is better than it has been previously, high levels of POP, commonly associated with land-based pollution sources, remain higher in north Biscayne Bay then in the remainder of the Biscayne Bay system and continue to impact marine species inhabiting that part of Biscayne Bay.

Additionally, the commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously.

Comment 8: Robbins *et al.* states that the proposed level of take analysis is faulty. While Level A harassment causing tympanic membrane (TM) rupture with correlated permanent hearing impairment is intended to be avoided, NMFS admits that it is ''unknown at this time'' as the farthest distance at which a dolphin would be exposed to an energy flux density (EFD) from an explosive which would cause Level A harassment (76 FR 71525). What this means is that the explosive detonations proposed may result in permanent hearing impairment and Level A harassment. Nonetheless, without this knowledge, the ACOE proposes allowing detonations. Without rational basis, the NMFS notice addresses Level B harassment without discussing why the dolphins should be permitted to be exposed to possible Level A harassment including permanent hearing loss.

NMFS also acknowledges that the Level B harassment definition also includes noise exposures below TTS that may result in behavioral modifications to resident animals. Without any scientific basis, the NMFS notice concludes that the behavioral modification criteria would not apply

''because there will be only two blasting events a day'' and each blast event will be multiple (440 in a matrix) within a few microseconds.

The ACOE's IHA application and NMFS' **Federal Register** notice do not correctly consider the impact of the blasting twice a day for 600 days on the behavior of the dolphins. Indeed, under the criteria for Level B harassment, ''behavioral disruption'' must be considered when TTS occurs. Under the harassment criteria for NMFS, Level B harassment includes behavioral disruption associated with TTS. As a result of a misconstruction of the dual criteria for harassment, the ACOE and NMFS do not consider the behavioral impact of the explosives and the proposed 600 days of twice-a-day blasting. Instead, it conclusively determines that twice a day blasting is not ''multiple detonations'' and, therefore, does not consider the third criteria of Level B harassment, sub-TTS impact with behavioral disruption, and utterly ignores the dual criteria of Level B harassment with TTS, which requires consideration of associated behavioral modification.

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, but they will not occur simultaneously.

NMFS disagrees with the commenter that the proposed level of take analysis is faulty in the ACOE's IHA application and NMFS's notice of preliminary determinations and proposed IHA (76 FR 71517, November 18, 2011). The IHA issued to the ACOE for the confined blasting operations in the Port of Miami only authorizes the incidental take of bottlenose dolphins by Level B harassment; no incidental takes by Level A harassment (injury), serious injury, or mortality are anticipated or authorized.

Because for ACOE's confined blasting activities all of the holes in the delay will explode within a few seconds at most (the blast array will be timed with a minimum eight milliseconds delay between detonations to stagger the blast pressures and prevent cumulative addition of pressures in the water), and a maximum of only two confined blasting events will occur in a day separated by a minimum of four to six hours (worst case scenario). NMFS applies the explosive TTS threshold which then allows us to estimate the number of animals that may incur TTS and account for any associated behavioral disruption.

The multiple detonations threshold was designed for specified activities like gunnery exercises where tens, to hundreds, to thousands of individual explosions continue over minutes to hours that would clearly have the potential to cause behavioral harassment associated at levels lower than those that result in TTS. The Level B harassment (behavioral) threshold criteria of 177 dB re 1 μPa^2 s would not apply to the ACOE's activity because there will only be a maximum of two blasting events a day (minimum four to six hours apart), and the multiple (staggered) detonations are within a few milliseconds of each other and do not last more than a few seconds in total duration per a blasting event.

Also, the exclusion zone is larger than the area where the ACOE has determined that Level B harassment will occur, so if the monitoring and mitigation measures are successful as expected, and no duration occurs when an animal is inside the exclusion zone, no take by Level B harassment is likely to occur.

The primary potential impact to the Atlantic bottlenose dolphins occurring in the Port of Miami action area from the detonations is Level B harassment (in the form of TTS and any associated behavioral disruption resulting) incidental to noise generated by confined explosives. In addition, NMFS believes that the monitoring and mitigation measures required by the IHA will further limit incidental take to Level B harassment and have the least practicable impact on marine mammal species or stocks in the action area.

Comment 9: Robbins *et al.* states that the blasting and resulting behavioral modification may sever the distinct Biscayne Bay bottlenose dolphin stock between the northern and southern parts of Biscayne Bay. The issue of behavioral modification is significant and, without any scientific analysis, is not considered by the ACOE's IHA application or NMFS' **Federal Register** notice. Biscayne Bay is a single identified habitat for a distinct genetic stock of bottlenose dolphins. It is transected by a corridor of about four miles (mi) (6.4 kilometers [km]). Half that corridor constitutes the blasting area. That corridor physically divides the northern and southern half of Biscayne Bay. The northern portion of Biscayne Bay, which is substantially a shallow grass covered environment where 69 of the 229 resident bottlenose dolphins have been found to reside, is unlike the southern portion of Biscayne Bay, which is a wide gulf of substantial width and breadth. Access to the narrow northern portion of Biscayne Bay is limited to passages below two bridges, one immediately adjacent to the blasting corridor. The only other means of egress from the northern portion of Biscayne Bay is below a bridge, at Bakers Haulover, cut approximately 9 mi (14.5 km) north, which provides access to the coastal waters adjacent to beaches without surrounding mangrove or other estuarine conditions in which the distinct Biscayne Bay dolphin community has been found to reside. The Biscayne Bay stock, which is genetically distinct from the coastal stock of dolphins, does not breed with the dolphins along the coast. Essentially, the blasting may create a significant acoustical barrier between the northern and southern portions of Biscayne Bay.

It has not been studied or determined whether the current bottlenose dolphins that reside in the northern portion of Biscayne Bay would be stressed by their isolation from the remainder of their resident community or would alternatively abandon their habitat in the northern portion of Biscayne Bay where 30% of the identified individuals currently reside. There is not consideration of data or presentation of scientific analysis that established the 600 days of blasting would not disrupt the behavioral patterns of the community of dolphins which reside in both the northern and southern areas of Biscayne Bay. Given the known intelligence of the dolphins, and their sensitive hearing, it is necessary for the applicant to establish with data and analysis that the blasting would not disrupt the natural behavioral patterns of the community of bottlenose dolphins in Biscayne Bay. No such analysis was presented in the ACOE's IHA application or in the NMFS **Federal Register** notice. How the blasting would disturb the Biscayne Bay stock by causing the disruption of their traversing across the blasting area as well as their breeding and feeding and related activities needs to be studied thoroughly before any incidental take from blasting is considered.

The ACOE and NMFS admit that they are ''unable to determine how the temporary modification of the action area by the proposed construction and blasting will impact the two stocks of

dolphins expected to be present in the Port of Miami'' (76 FR 71526, November 18, 2011). That statement suggests that the NMFS **Federal Register** notice does not recognize a significant distinction of the geographical location of the blasting that will impact the two different stocks (estuarine bay vs. coastal) in different ways. The impact to the coastal stock may very well be occasional because the blast area merely juts into the ocean coastal area, but the impact on the estuarine bay stock will be ongoing and will not be temporary. The disruption of the Biscayne Bay stock will be during the entire term of the 600 days of blasting and, if long term behavioral modification has occurred, for perhaps years thereafter. The NMFS' use of the word ''temporary'' is disingenuous given the 600 days of blasting and many more days of construction. The NMFS **Federal Register** notice acknowledges that the proposed construction and blasting'' may delay or detour their movements (76 FR 71526), but does not consider that as to traversing from north to south or vice-versa, an acoustical barrier will be created and dolphins, especially cows with nursing and young calves, may avoid the dangers of the area rather than place their young at risk. The effectual trapping of the dolphins in the northern portion of Biscayne Bay will not cause their slaughter, but may change their natural behavior.

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously.

NMFS believes that the confined blasting is unlikely to result in behavioral modifications that may sever the Biscayne Bay stock of bottlenose dolphins between the northern and southern parts of Biscayne Bay. A review of data collected by NMFS SEFSC before, during, and after the 2005 confined blasting event shows no difference in home range usage of bottlenose dolphins from the Biscayne Bay stock. The ACOE and NMFS expect this same response for the future confined blasting associated with the Miami Harbor Deepening Project. The project area is a commercial port environment, and the bottlenose dolphins residing in or transiting through the vicinity of the Port of Miami are likely habituated to the presence of, and noise from, numerous vessel movements ranging from large commercial vessels to small recreational craft, as well as sea planes and helicopters operating from the vicinity of Rickenbacker Causeway and overflying the Bill Sadowski Critical Wildlife Area. This ongoing commercial and recreational use of the Port of Miami's channels far exceeds the potential impact of the confined blast events associated with the deepening project that have a duration of less than 60 seconds each (from the first fish scare to the end of the actual confined blast), and with no more than two confined blast events (separated by at least four hours) occurring in one calendar day. Blasting events take from the time beginning one hour before the detonation through 30 minutes after the detonation, including any delays due to protected species. This means that the maximum duration of noise and pressure associated with confined blasts will be 120 seconds in a calendar day, which is 0.14% of all of the time in a calendar day, assuming a worst case of two confined blast events in a calendar day that last up to 60 seconds each in duration, with confined blasts occurring no more than six days a week. The ACOE took the most conservative calculation for each blast to protect natural resources. Furthermore, bottlenose dolphins residing in Biscayne Bay can transit through the Port of Miami area from north to south in two locations inside Biscayne Bay—at the Intracoastal Waterway, on the west side of the Port of Miami, which is completely outside the project area (including the safety zone) and where Fisherman's Channel meets the main channel in Government Cut, Fisher Island Turning Basin. These two corridors allow animals wishing to avoid the project area a mechanism to transit north and south. The issue of the isolation of the Biscayne Bay stock of bottlenose dolphins has already been addressed in the response to Comment 6 and is hereby incorporated by reference.

Comment 10: Robbins *et al.* states that the history of the ACOE's blasting operations at the Port of Miami indicates substantial impacts on dolphins. The lack of data and analysis is disturbing because during the prior blasting in 2005 at the Port of Miami, which lasted only 40 days, bottlenose dolphin in the exclusion zone were sighted 12 times involving a total of 30 individuals in the exclusion zone when those prior blasts were scheduled (76 FR 71532). In other words, in 30 percent of the dates in which blasting was scheduled, dolphins were sighted in the exclusion zone. Thus, given the radius, an even greater number would have been immediately adjacent and subject to sub-TTS impacts. Once the number of blasting events increases from 40 to 1,200, it is likely that a much greater number of dolphins will be adversely affected. The 30 multiple (from 40 to 1,200) of increased blasting events may likely result in 360 incidents of dolphin groups in the exclusion zone and many times that amount within the immediate area affected by sub-TTS noise. Using the same number of individuals per group as in 2005, results in a total of 900 individual dolphins traversing the exclusion zone during the 1,200 blasting events. Of course, these high numbers assume that the dolphins will not be avoiding the area after the repetitive blasting which is an assumption that the undersigned do not accept because behavioral modification may result in dolphins avoiding the area during the course of the blasting operations.

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously.

NMFS and the ACOE disagree with the comment that the history of the ACOE's confined blasting operations at the Port of Miami indicates substantial impacts on bottlenose dolphins in the action area. Utilizing the correct number of confined blast days/events and the specification requirement that when bottlenose dolphins are observed in either the danger or exclusion zone (as demonstrated in Figure 10 of the ACOE's IHA application), confined blasting operations are delayed until the animals leave the area of their own volition. The assumptions in the commenter's analysis indicating that bottlenose dolphins observed in the

exclusion zone (which includes the danger zone within its boundaries) are adversely affected by the planned confined blasting is flawed. The detonations are delayed until the dolphins leave the exclusion zone, where pressure monitoring has demonstrated that pressures at the edge of the danger zone return to background levels (Hempen *et al.,* 2007). By ensuring the animals have left the exclusion zone (an area larger than the danger zone) before the confined blast is detonated, the ACOE and NMFS believe that the project will have minimal impact on the stocks of bottlenose dolphins, since the animals outside the danger zone will not be subjected to pressures higher than the surrounding background environment. Also, the exclusion zone is larger than the area where the ACOE has determined that Level B harassment will occur, so if the monitoring and mitigation measures implemented are successful as expected, and no detonation occurs when an animal is inside the exclusion zone, no take by Level B harassment is likely to occur.

In contrast to the commenter's statement, the ACOE's 2005/2006 confined blasting and dredging project did not have any documented incidents of take by Level B harassment during the 40 confined blast days/events. One bottlenose dolphin was recorded as jumping after a confined blast detonation out of the 58 bottlenose dolphins observed in the project area during the blasting activities. However, this same dolphin was observed 30 minutes after the recorded jump, and behavior was documented as normal.

Comment 11: Robbins *et al.* states that the take estimates in the ACOE's IHA application are faulty. The applicant assumes no behavioral modification in which the bottlenose dolphin avoids the blast area. By the applicant's admission contained in Table 4 of NMFS' **Federal Register** notice (76 FR 71352), the estimated take of bottlenose dolphins stock could be 0.162 per blasting event, and applying the 1,200 blasting events (two per day for 600 days), a total of 194 takes of bottlenose dolphins of the Biscayne Bay stock will occur. That means that 194 bottlenose dolphins (assuming that a single dolphin is subject to a take only once), then 84% of the Biscayne Bay stock will be subject to harassment. The analysis of the number of takes is faulty at 76 FR 71354. Because the ACOE IHA application is for only one year and does not consider the entire course of 600 blasts, nor does it consider the worst case in its own charts, it minimizes the impact, claiming only 12 of the Biscayne Bay stock of bottlenose dolphins will be taken (see 76 FR 71534). It is a disingenuous analysis and the percentages impacted are intentionally misleading. The NMFS **Federal Register** notice claims that ''at worst [one year of blasting] may result, at worst in a temporary modification in behavior and/or low physiological effects (Level B harassment) of a small number of Atlantic bottlenose dolphins'' (76 FR 71534). This conclusion is false and without the data and analysis to support it. Then, in the next sentence the NMFS **Federal Register** notice acknowledges that there may be ''behavioral modifications'' (76 FR 71534), but then claims that it will be just ''temporary,'' vacating the area immediately after the blasting ''to avoid underwater acoustic disturbances,'' however, there are no data and analysis to show that after days, weeks, and months of blasting, an intelligent mammal like a dolphin will not learn to avoid the area in its entirety, resulting in the splitting of the Biscayne Bay stock between the northern and southern portions of Biscayne Bay. ''Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days'' (76 FR 71534). Does that not describe what is being proposed? Furthermore, the NMFS claims that the activities ''will result in the incidental take of small numbers of marine mammals by Level B harassment only, and that the total taking from the blasting activities will have a negligible impact on the affected species or stocks of marine mammals'' (76 FR 71534). This is utterly without support. As many as 84% of the Biscayne Bay stock of bottlenose dolphins would be impacted. Moreover, the functional severing of its habitat may affect behaviors from breeding to feeding to territorial behavior that have not been considered or analyzed.

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously. NMFS and the ACOE disagree with the comment that the take estimates in the IHA application are faulty. Although the ACOE has calculated a total potential take of 45 bottlenose dolphins from the Biscayne Bay stock and 42 bottlenose dolphins from the Western North Atlantic Central Florida Coastal stock, these estimated take (87 total) were calculated without considering the implementation of monitoring and mitigation measures to protect marine mammals. By adding the layers of protection—(1) Confined blasting that reduces the pressure by up to 90%; (2) zones of protection based on open water detonations that give no credit for the pressure reduction previously mentioned; and (3) PSOs and aerial overflights; the ACOE and NMFS feel that these monitoring and mitigation measures reduce the potential for incidental take, and as a result the ACOE limited the take request (*i.e.,* a total of 22 bottlenose dolphins [12 from the Biscayne Bay stock and 10 from the Western North Atlantic Central Florida Coastal]) to the amounts cited in the **Federal Register** notice (76 FR 71517, November 18, 2011). See ''Estimated Take by Incidental Harassment'' section later in this document for more information on how the estimates of incidental takes of the two stocks of bottlenose dolphins were calculated.

Additionally, as previously stated in the response to Comment 9, bottlenose dolphins residing in or transiting through the vicinity of the Port of Miami are likely habituated to the presence and noise from commercial and recreational vessels, sea planes, and helicopters frequently in the action area, and have two locations within Biscayne Bay to transit between the northern and southern portions of the Biscayne Bay to avoid the ACOE's confined blasting and dredging operations, if necessary. Also, dolphins in the action area will have short exposure to the ACOE's confined blasting activities and it is unlikely that any particular animals would be in the small danger zone near the explosives long enough to be subjected to repeated exposures.

Comment 12: Robbins *et al.* states that the ACOE's blasting area is immediately north and adjacent to the Bill Sadowski Critical Wildlife Area. The area adjacent to the Fisherman's Channel is a prime location to watch surfacing dolphins with their calves feeding during the hour before sunset. The proposed time of the blasts is one hour before sunset. The NMFS analysis of the incidental take does not consider the concentration

of marine mammals adjacent to and in the Bill Sadowski Critical Wildlife Area (76 FR 71532).

Response: The ACOE is aware that the project borders the Bill Sadowski Critical Wildlife Area, however, a review of the NMFS SEFSC sighting data from 1990 to 2004 does not support the commenter's statement that the area adjacent to Fisherman's Channel has been identified as a prime habitat area for observing mother/calf pairs or groups in the hour before sunset. The data show the highest concentrations of dolphin sightings to be north of the Port of Miami near Baker's Haulover Inlet and south of Rickenbacker Causeway, west of Key Biscayne, neither of these areas are within the boundaries of the Bill Sadowski Critical Wildlife Area. This may be because the part of Biscayne Bay west of Key Biscayne and south of Rickenbacker Causeway may be quieter then the area immediately south of the Port of Miami. The commenters have provided no additional data to support their claim. Additionally, the ACOE's project specifications and NMFS' monitoring and mitigation measures in the IHA require that confined blast detonations be complete at least one hour before sunset, the ACOE does not say that this is when detonations occur.

Comment 13: Robbins *et al.* states that the ACOE cannot obtain an IHA on the basis of its IHA application. The ACOE's project in the Port of Miami is expected to take up to 24 months and therefore requires development of regulations. The blasting and dredging project in the Port of Miami has been authorized in its entirety by the Federal and state governments (except for the MMPA incidental take authorization).

Despite clear statutory language, the ACOE and NMFS appear to take the position that the incidental take of marine mammals during the lengthy blasting and dredging phase could be covered under successive one-year IHAs. To the contrary, the specified activity of the deepening project in the Port of Miami can be considered for MMPA purposes only under regulations and the issuance of subsequent LOAs, as section 101(a)(5)(D) of the MMPA specifies that an IHA can be issued for ''periods not more than one year.'' The legislative history of the MMPA, case law, and NMFS' own practice in issuing IHAs and LOAs all point to the need for the ACOE to apply for a rule in this context.

NMFS must administer the MMPA for the ''benefit of the protected species rather than for the benefit of commercial exploitation.'' *Committee for Human Legislation* v. *Richardson,* 540 F.2d 1141, 1148 (1976) (citing H.R. Rep. No. 92–707). And any decision ''must be consistent with the MMPA immediate goal'' of reducing take or serious injury to marine mammals to ''insignificant levels approaching zero mortality and serious injury rate.'' *Kokechik Fishermen's Ass'n* v. *Sec'y of Commerce,* 839 F.2d 795, 801 (1988) (citing 16 U.S.C. 1371(a)(2)). Congress' intent was to ''insist that the management of the animal populations be carried out with the interests of the animals as the prime consideration.'' H.R. Rep. No. 92–707, at 18. Therefore, the Secretary of Commerce must first look at the ''interest in maintaining healthy populations of marine mammals'' when balancing competing interests. Id. At 802; *Committee for Humane Legislation,* v. *Richardson,* 540 F.2d at 1151 n.39; see H.R. Rep. No.92–707, at 24 (1971) (The House Merchant Marine and Fisheries Committee intended to ''build such a conservative bias into the [MMPA]''); 118 Cong. Rec. S. 15680 (daily ed. October 4, 1971) (statement of Sen. Packwood) (''Scientists generally will state that our level of knowledge of marine mammals is very low * * * Barring better and more information, it would therefore appear to be wise to adopt a cautious attitude toward the exploitation of marine mammals.'').

When these principles are applied, NMFS must adopt an interpretation of its section 101(a)(5) incidental take authority that recognizes the one-year limitation applied to IHAs and apply regulations (and subsequent LOA) requirements. Any other approach will fail to give sufficient protection to the many marine mammals that will be subjected to take and harassment in favor of expediting the development of the Port of Miami blasting and dredging project. NMFS cannot allow for such a result and must deny the ACOE's IHA application.

The choice of incidental take authorization is very important because it has consequences for the protection provided to marine mammals and the level of public involvement. An IHA will consider only the takes that occur over the course of one year to determine whether the impacts of the ''specified activity'' on marine mammals are negligible. An activity like the Port of Miami blasting and dredging operations will occur continuously over several years and will have greater impacts when considered in its entirety than it will for just a component of the activity conducted during a single year. To determine if there is a ''negligible impact,'' it is therefore necessary to consider the entire activity, not just a subset of the activity defined by one-year increments.

Response: NMFS disagrees with the commenter's statement. The ACOE has requested an IHA in its adequate and complete application. 50 CFR 216.107 states that except for activities that have the potential to result in serious injury or mortality, which must be authorized under § 216.105, IHAs may be issued, following a 30-day public review period, to allowed activities that may result in only the incidental harassment of a small number of marine mammals. Each such IHA shall set forth permissible methods of taking by harassment; means of effecting the least practicable impact on the species, its habitat, and on the availability of the species for subsistence uses; and requirements for monitoring and reporting. IHAs will be valid for a period of time not to exceed one year but may be renewed for additional periods of time not to exceed one year for each reauthorization; therefore, the promulgation of regulations and the subsequent issuance of LOAs to the ACOE for the confined blasting operations in the Port of Miami is not necessary or required. NMFS has issued IHAs under section 101(a)(5)(D) of the MMPA for ''periods not more than one year'' and renewed IHAs, upon request for applicant's conducting specified activities that have the potential to result in the incidental harassment (Level A and/or Level B harassment) of small numbers of marine mammals. Specified activities that have the potential to result in serious injury or mortality of marine mammals must be authorized under 50 CFR 216.106. For additional information, please see the response to Comment 1.

Per requirements of 50 CFR 216.104, the ACOE included the necessary information for their activity in its submission to NMFS requesting an IHA. NMFS worked with the ACOE and requested additional information in its original IHA application to ensure and determine, based upon the best available scientific evidence, that it was adequate and complete. For the proposed IHA (76 FR 71517, November 18, 2011), NMFS invited information, suggestions, and comments from the public for a period not to exceed 30 days from the date of publication in the **Federal Register**. NMFS will involve the public on a proposed IHA, if or when the ACOE requests a renewal of the IHA for confined blasting operations as part of the Miami Harbor Deepening Project. The cumulative impacts of the ACOE's multiple year activities are considered and analyzed in the ACOE's FEIS and NMFS's EA.

Comment 14: Robbins *et al.* states that the mitigation efforts are insufficient and detrimental to the bottlenose dolphin. The issue of necessity for blasting and the amount of blasting involved in the blasting and dredging project in the Port of Miami does not appear to have been revisited. Technological advances in dredging equipment that would reduce the amount of blasting needed would greatly minimize the adverse effects on all marine life in and around the project footprint. As this project takes place within an Aquatic Preserve, classified as an Outstanding Florida Water, adjacent to a critical wildlife area, and is considered habitat for over 12 endangered or threatened species of marine life, it is imperative the most updated and least impactful best management practices be employed, including the most recent machinery, scientific studies and mitigation practices.

Response: As previously discussed in the response to Comment 5, it is unclear why the commenter believes that protective monitoring and mitigation measures proposed by the ACOE and required in the IHA issued by NMFS are detrimental to the bottlenose dolphins. NMFS has determined that the monitoring and mitigation measures required by the IHA will ensure the specified activity will have the least practicable impact on the stocks of bottlenose dolphins in the action area. The commenter contends that technological advances in dredging equipment would reduce the amount of blasting. During the feasibility and EIS process, ACOE reviewed all of the geotechnical data collected over the last 20 years. The ACOE's geotechnical engineers determined that the rock in Miami Harbor is both hard and massive, and will require pretreatment before removal with any dredging technology currently available.

The only methods available for pre-treatment of hard/massive rock are confined blasting and the use of a punch-barge or hydrohammer. As part of the feasibility and EIS process, the ACOE consulted with NMFS and the USFWS under section 7 of the ESA to determine the impacts of both methods on listed and protected species in the action area. NMFS and USFWS have both documented that the use of a punch-barge or hydrohammer, which would work during daylight hours, strikes the rock approximately once every 60 seconds for up to 720 hits in a 12 hour period. This would increase during periods of extended daylight. This constant pounding would serve to disrupt animal behavior in the area. Using the punch-barge would also extend the length of the project, thus increasing any potential impacts to all fish and wildlife resources in the action area. The ACOE believes that confined blasting to remove the rock in the Port of Miami has the least environmental impact of all available methods. Utilization of a punch-barge would result in pressure being released into the water like an unconfined blast, without a reduction in associated pressure wave, which can lead to impacts to marine mammals, and fish kill at levels much higher than confined underwater blasting. The ACOE removed punch-barging as a viable pre-treatment methodology, which leaves confined blasting as the only method to pre-treat rock prior to removal by conventional dredging methodologies.

NMFS' SERO issued a Biological Opinion (BiOp) on September 8, 2011, that analyzes the project's effects on staghorn coral (*Acropora cervicornis*). It is NMFS' biological opinion that the action, is likely to adversely affect staghorn coral, but is not likely to jeopardize its continued existence or destroy or adversely modify its designated critical habitat. Based upon NMFS SERO's analysis, NMFS no longer expects the project is likely to adversely affect Johnson's seagrass (*Halophila johnsonii*) or its designated critical habitat. NMFS has determined that the ESA-listed marine mammals (Blue, fin, sei, humpback, North Atlantic right, and sperm whales), smalltooth sawfish (*Pristis pectinata*), and leatherback sea turtles (*Dermochelys coriacea*) are not likely to be adversely affected by the action (NMFS, 2011). The USFWS concurred with the ACOE's determination that the construction activities related to the modification of Miami Harbor to accommodate the expansion of the Port of Miami may affect, but are not likely to adversely affect the West Indian manatee and the American crocodile since appropriate monitoring to minimize these effects will be incorporated into the project design. In addition, the effects of the action will not result in the adverse modification to designated critical habitat for the West Indian manatee if sufficient mitigation is provided for seagrass impacts (USFWS, 2003). See the Endangered Species Act section below for more information on endangered or threatened species.

Comment 16: Robbins *et al.* states that NMFS should require improvement for zones and the monitoring program. Zone calculations should use the latest studies and incorporate all findings from prior blasting events and account for bathymetric data and the nature of the blast area (*i.e.,* channels). A report entitled ''Blast emission criteria and detection methods for the safeguarding of marine mammals in a blast environment'' by R. A. Godson, published in 2010, states the following criteria:

> In order to provide an objective and quantitative assessment of the range and severity of any environmental effect from underwater blasting, it is necessary to be able to estimate the following parameters: The source level (*i.e.,* level of sound) generated by the explosives; the transmission loss, that is, the rate at which sound from the source is attenuated as it propagates underwater; the effect threshold, that is, the level of sound at which a particular effect, such as death, injury or avoidance of a species, occurs * * * (page 684).
>
> The Safety Zone is the zone beyond which peak pressure levels from blasting are predicted to be lower than the 83 kPa criterion, creating no adverse effects on marine mammals * * * This criterion was originally established for estimating the impacts of large unconfined explosions and was introduced in order to provide a more conservative range * * * when explosive or the marine animal approaches the sea surface (for which cases the explosive energy is reduced but the peak pressure is not) (page 686).
>
> The report further specifies the determination of the safety zone radius:
>
> The Safety Zone is the zone beyond which peak pressure levels from blasting are predicted to be lower than the 83 kPa criterion, creating no adverse effects * * * The propagation of the peak pressure is very much dependent on the hydrography specific to the site, the water depth and the sound propagation underwater (page 686).

The ACOE's IHA application frequently cites its 2005 blasting activities as a point of reference for the proposed blasting activities in 2012. These projects do not warrant the comparison, especially for the incidental take of dolphins as the ACOE contends. The project footprint is far larger in the present project than in 2005. The maximum weight of explosives has increased from 376 lbs (76 FR 71519) to 450 lbs with averages of two blasts per day for an estimated 600 days of blasting. Although, in its proposed calculations, ACOE has increased the danger zone for dolphins by 500 ft, this is insufficient accommodation relative to the large increase in blast pressure due to increased weight and frequency of blasting. Further, the safety zone calculation has not changed from the past blasting event in the current application. As detailed above, the safety zone is a critical component to ensure marine mammal safety.

Despite an incident during a 2005 blast reported in the ''Protected Marine

Species Watch Program Miami Harbor Deepening Project'' by ECOES Consulting, Inc. for the ACOE, the ACOE has not altered its mitigation program based on these findings. As stated in the report, two dolphins located in the channel west of the blasting, stationary at approximately 2,400 ft, ''were feeding and cavorting.'' The exclusion zone calculation was 1,600 ft for the lower weight of explosives used that day (the exact weight used is not recorded in this report). The report continues to describe the channel area (where much of the proposed blasting will also occur):

> The topography of the bottom of that area is very much shallow to the south, then an exceptionally steep drop off into the channel at 40+ ft ending at the bulkhead wall to the north. Westward, the channel continues and has a more gradual upward slope. At the time of the blast, one of the dolphins was at the surface in the shallows, which the other dolphin was underwater within the channel. The dolphin that was underwater showed a strong reaction to the blast. The animal jumped fully out of the water in a ''breaching'' fashion; behavior that had not been exhibited prior to the blast (ECOES, p. 18).

It is critical to note that based on the ACOE formula (which is proposed to remain the same in the current IHA application), the harassed dolphin was located 800 ft outside of the exclusion zone and still exhibited a strong adverse reaction to the blast described as ''lower weight.'' Considering the significant increase in weight maximum in the current project and the much increased frequency and duration of this project, it is clear that the mitigation and zone calculations are insufficient as proposed. In the ECOES report conclusion, the author also notes that the shallow channel and bathymetry of the project site, which remains the same (only expanded) in the current project has a great effect on the pressure and sound effect of the blasting agents: ''This observation may be important to consider when formulating blast/watch plans for marine mammals in the future. It may be prudent to extend or contract the exclusion zone based on the bathymetry of the project site'' (ECOES, p. 18).

Response: The commenter incorrectly states the project will have 600 days of blasting. The ACOE estimates a maximum number of 313 blast days for the duration of this IHA (*i.e.,* 365 days in a year minus 52 Sundays [normally no confined blasting is allowed on Sundays due to local ordinances]), with no more than one confined blast event at a time and no more than two confined blast events per a single day. A calendar day is 24 hours. A blast day/blast event (*i.e.,* approximately 1 hour 30 minutes in length) is the series of events beginning one hour before the detonation through 30 minutes after the detonation. There may be more than one blast day/blast event per calendar day, they will not occur simultaneously.

The commenter recommends that NMFS and the ACOE adopt the model proposed in Godson (2010) and believes that Godson's report entitled ''Blast emission criteria and detection methods for safeguarding of marine mammals in a blast environment'' presents the most recent data available (*i.e.,* the best scientific evidence) concerning underwater blasting. This is incorrect. Godson states that his model is based on a ''comprehensive review of different underwater blasting propagation models for a recent underwater blasting impacts assessment study'' found in Godson (2005). This means he did not review the most recent pressure studies and models developed from the data collected after the Kill van Kull blasting was completed in 2004, particularly the data collected in 2005 at Miami Harbor and published in Hempen *et al.* (2007).

The Godson model utilizes an unconfined blast as is demonstrated by its use of -1.13 exponential in the model equation. The -1.13 exponential utilized in the blasting literature is the attenuation, or reduction, of the maximum pressure through water. This is not an accurate representation of the effects from the proposed confined blasting at Miami Harbor. Based on the in situ pressure measurements collected in 2005, the ACOE's blasting experts developed a similar model to assess the benefit of confinement of the blast, however, even with the knowledge that confinement of the detonation in rock significantly reduces the pressure wave (Hempen *et al.,* 2007; Hempen *et al.,* 2005; Nedwell and Thandavamoorthy, 1992), the ACOE opted not to give any credit to the reduction in maximum pressure. By opting not to incorporate the reduction in maximum pressure into the protective zone equations, the ACOE is being conservative and protective of marine mammals in and near the action area.

Comment 15: The Commission recommends that NMFS issue the IHA, provided it requires the ACOE to conduct empirical sound propagation measurements during two detonation events per day using various delay weights and numbers of delays to verify that the danger and exclusion zones are sufficient to protect marine mammals from sound exposure levels, including the 182 and 177 dB re 1 Pa^2s thresholds. If the zones are found to be too small, then NMFS and ACOE should adjust them accordingly. In addition, NMFS and the ACOE should use the distances to the relevant thresholds from those empirical measurements to estimate the number of takes for subsequent IHAs.

Response: The ACOE is unable to collect data on empirical sound propagation measurements as recommended by the Commission because the area immediately south of Fisherman's Channel is bounded by shallow seagrass beds and encompassed by the Bill Sadowski Critical Wildlife Area. The shallow seagrass beds are found in waters so shallow that seagrasses are often exposed at low tides and motoring through the area would adversely impact the seagrass beds by dredging prop scars into the beds, resulting in previously unanticipated impacts. Additionally, Florida state law prohibits motorized vessels from entering this area.

To be able to collect the data requested by the Commission, the ACOE's contractor would have to lay out a network of hydrophones or pressure transducers before each blast, which requires entering the Bill Sadowski Critical Wildlife Area to lay the hydrophones or pressure transducers with a motorized vessel, and repeat the process to recover them after each blast, or it would require the ACOE to set up a network of vessels in the boundaries of the Bill Sadowski Critical Wildlife Area with a hydrophone or pressure transducer on each vessel. Hydrophone equipment systems have limitations gathering peak pressure data from blasting, and can be quickly overloaded if placed too close to the detonation; pressure transducers are better designed to measure blast pressures (Keevin, pers. comm.). Again, the vessels would have to enter the Bill Sadowski Critical Wildlife Area, which is in violation of the previously mentioned state law.

Comment 16: The Commission recommends that NMFS issue the IHA, provided it requires the ACOE to suspend all activities if the authorized number of takes is reached.

Response: NMFS concurs with the Commission's recommendation and has included a condition to this effect in the IHA. The taking by injury (Level A harassment), serious injury, or mortality of Atlantic bottlenose dolphins or any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of the IHA. If the ACOE exceeds the authorized number of takes, then the ACOE will notify NMFS and the IHA may be modified.

Description of Marine Mammals in the Area of the Specified Activity

Several cetacean species and a single species of sirenian are known to or could occur in the Miami Harbor action area and off the Southeast Atlantic coastline (see Table 1 below). Species listed as endangered under the U.S. Endangered Species Act (ESA), includes the humpback (*Megaptera novaeangliae*), sei (*Balaenoptera borealis*), fin (*Balaenoptera physalus*), blue (*Balaenoptera musculus*), North Atlantic right (*Eubalaena glacialis*), and sperm (*Physeter macrocephalus*) whale, and West Indian (Florida) manatee (*Trichechus manatus latirostris*). The marine mammals that occur in the Atlantic Ocean off the U.S. southeast coast belong to three taxonomic groups: mysticetes (baleen whales), odontocetes (toothed whales), and sirenians (the manatee). The West Indian manatee in Florida and U.S. waters is managed under the jurisdiction of the USFWS and therefore is not considered further in this analysis.

Table 1 below outlines the marine mammal species and their habitat in the region of the project area.

TABLE 1—THE HABITAT AND CONSERVATION STATUS OF MARINE MAMMALS INHABITING THE PROJECT AREA IN THE ATLANTIC OCEAN OFF THE U.S. SOUTHEAST COAST

Species	Habitat	ESA [1]	MMPA [2]
Mysticetes:			
North Atlantic right whale (*Eubalaena glacialis*)	Coastal and shelf ..	EN	D
Humpback whale (*Megaptera novaeangliae*)	Pelagic, nearshore waters, and banks.	EN	D
Bryde's whale (*Balaenoptera brydei*)	Pelagic and coastal	NL	NC
Minke whale (*Balaenoptera acutorostrata*)	Shelf, coastal, and pelagic.	NL	NC
Blue whale (*Balaenoptera musculus*)	Pelagic and coastal	EN	D
Sei whale (*Balaenoptera borealis*)	Primarily offshore, pelagic.	EN	D
Fin whale (*Balaenoptera physalus*)	Slope, mostly pelagic.	EN	D
Odontocetes:			
Sperm whale (*Physeter macrocephalus*)	Pelagic, deep seas	EN	D
Cuvier's beaked whale (*Ziphius cavirostris*)	Pelagic	NL	NC
Gervais' beaked whale (*Mesoplodon europaeus*)	Pelagic	NL	NC
True's beaked whale (*Mesoplodon mirus*)	Pelagic	NL	NC
Blainville's beaked whale (*Mesoplodon densirostris*)	Pelagic	NL	NC
Dwarf sperm whale (*Kogia sima*)	Offshore, pelagic ...	NL	NC
Pygmy sperm whale (*Kogia breviceps*)	Offshore, pelagic ...	NL	NC
Killer whale (*Orcinus orca*)	Widely distributed	NL EN (Southern Resident).	NC D (Southern Resident, AT1 Transient)
Short-finned pilot whale (*Globicephala macrorhynchus*)	Inshore and offshore.	NL	NC
False killer whale (*Pseudorca crassidens*)	Pelagic	NL	NC
Mellon-headed whale (*Peponocephala electra*)	Pelagic	NL	NC
Pygmy killer whale (*Feresa attenuata*)	Pelagic	NL	NC
Risso's dolphin (*Grampus griseus*)	Pelagic, shelf	NL	NC
Bottlenose dolphin (*Tursiops truncatus*)	Offshore, Inshore, coastal, and estuaries.	NL	NC S (Biscayne Bay and Central Florida Coastal stocks) D (Western North Atlantic Coastal)
Rough-toothed dolphins (*Steno bredanensis*)	Pelagic	NL	NC
Fraser's dolphin (*Lagenodelphis hosei*)	Pelagic	NL	NC
Striped dolphin (*Stenella coeruleoalba*)	Pelagic	NL	NC
Pantropical spotted dolphin (*Stenella attenuata*)	Pelagic	NL	NC D (Northeastern Offshore)
Atlantic spotted dolphin (*Stenella frontalis*)	Coastal to pelagic	NL	NC
Spinner dolphin (*Stenella longirostris*)	Mostly pelagic	NL	NC D (Eastern)
Clymene dolphin (*Stenella clymene*)	Pelagic	NL	NC
Sirenians:			
West Indian (Florida) manatee (*Trichechus manatus latirostris*)	Coastal, rivers, and estuaries.	EN	D

[1] U.S. Endangered Species Act: EN = Endangered, T = Threatened, NL = Not listed.
[2] U.S. Marine Mammal Protection Act: D = Depleted, S = Strategic, NC = Not classified.

The one species of marine mammal under NMFS jurisdiction known to commonly occur in close proximity to the blasting area of the Port of Miami is the Atlantic bottlenose dolphin, specifically the stocks living near the Port of Miami within Biscayne Bay (the Biscayne Bay stock) or transiting the outer entrance channel (Western North Atlantic Central Florida Coastal stock).

Atlantic Bottlenose Dolphin

Atlantic bottlenose dolphins are distributed worldwide in tropical and temperate waters, and in U.S. waters occur in multiple complex stocks along

the U.S. Atlantic coast. The coastal morphotype of bottlenose dolphins is continuously distributed along the Atlantic coast south of Long Island, New York, to the Florida peninsula, including inshore waters of the bays, sounds, and estuaries. Except for animals residing within the Southern North Carolina and Northern North Carolina Estuarine Systems (*e.g.,* Waring *et al.,* 2009), estuarine dolphins along the U.S. east coast have not been previously included in stock assessment reports. Several lines of evidence support a distinction between dolphins inhabiting coastal waters near the shore and those present in the inshore waters of the bays, sounds, and estuaries. Photo-ID and genetic studies support the existence of resident estuarine animals in several inshore areas of the southeastern United States (Caldwell, 2001; Gubbins, 2002; Zolman, 2002; Mazzoil *et al.,* 2005; Litz, 2007), and similar patterns have been observed in bays and estuaries along the Gulf of Mexico coast (Well *et al.,* 1987; Balmer *et al.,* 2008). Recent genetic analyses using both mitochondrial DNA and nuclear microsatellite markers found significant differentiation between animals biopsied along the coast and those biopsied within the estuarine systems at the same latitude (NMFS, unpublished data). Similar results have been found off the west coast of Florida (Sellas *et al.,* 2005).

Biscayne Bay Stock

Biscayne Bay is a shallow estuarine system located along the southeast coast of Florida in Miami-Dade County. The Bay is generally shallow (depths less than 5 m [16.4 ft]) and includes a diverse range of benthic communities including seagrass beds, soft coral and sponge communities, and mud flats. The northern portion of Biscayne Bay is surrounded by the cities of Miami and Miami Beach and is therefore heavily influenced by industrial and municipal pollution sources. The water flow in this portion of Biscayne Bay is very restricted due to the construction of dredged islands (Bialczak *et al.,* 2001). In contrast, the central and southern portions of Biscayne Bay are less influenced by development and are better flushed. Water exchange with the Atlantic Ocean occurs through a broad area of grass flats and tidal channels termed the Safety Valve. Biscayne Bay extends south through Card Sound and Barnes Sound, and connects through smaller inlets to Florida Bay.

The Biscayne Bay stock of bottlenose dolphins is bounded by Haulover Inlet to the north and Card Sound Bridge to the south. This range corresponds to the extent of confirmed home ranges of bottlenose dolphins observed residing in Biscayne Bay by a long-term photo-ID study conducted by the Southeast Fisheries Science Center (Litz, 2007; SEFSC unpublished data). It is likely that the range of Biscayne Bay dolphins extends past these boundaries; however, there have been few surveys outside of this range. These boundaries are subject to change upon further study of dolphin home ranges within the Biscayne Bay estuarine system and comparison to an extant photo-ID catalog from Florida Bay to the south.

Dolphins residing within estuaries north of this stock along the southeastern coast of Florida are currently not included in a stock assessment report. There are insufficient data to determine whether animals in this region exhibit affiliation to the Biscayne Bay stock, the estuarine stock further to the north in the IRLES, or are simply transient animals associated with coastal stocks. There is relatively limited estuarine habitat along this coastline; however, the Intracoastal Waterway extends north along the coast to the IRLES. It should be noted that during 2003 to 2007, there were three stranded bottlenose dolphins in this region in enclosed waters. One of these had signs of human interaction from a boat strike and another was identified as an offshore morphotype of bottlenose dolphin.

Bottlenose dolphins have been documented in Biscayne Bay since the 1950's (Moore, 1953). Live capture fisheries for bottlenose dolphins are known to have occurred throughout the southeastern U.S. and within Biscayne Bay during the 1950's and 1960's; however, it is unknown how many individuals may have been removed from the population during this period (Odell, 1979; Wells and Scott, 1999).

The Biscayne Bay bottlenose dolphin stock has been the subject of an ongoing photo-ID study conducted by the NMFS SEFSC since 1990. From 1990 to 1991, preliminary information was collected focusing on the central portion of Biscayne Bay. The survey was re-initiated in 1994, and it was expanded to include the northern portion of Biscayne Bay and south to the Card Sound Bridge in 1995 (SEFSC unpublished data; Litz, 2007). Through 2007, the photo-ID catalog included 229 unique individuals. Approximately 80% of these individuals may be long-term residents with multiple sightings over the 17 years of the study (SEFSC, unpublished data). Analyses of the sighting histories and associations of individuals from the Biscayne Bay segregated along a north/south gradient (Litz, 2007).

Remote biopsy samples of Biscayne Bay animals were collected between 2002 and 2004 for analyses of population genetic structure and persistent organic pollutant concentrations in blubber. Genetic structure was investigated using both mitochondrial DNA and nuclear (microsatellite) markers, and the data from Biscayne Bay were compared to data from Florida Bay dolphins to the south (Litz, 2007). Within Biscayne Bay, dolphins sighted primarily in the northern half of Biscayne Bay were significantly differentiated from those sighted primarily in the southern half at the microsatellite loci but not at the mitochondrial locus. There was not sufficient genetic information between these groups to indicate true population subdivision (Litz, 2007). However, genetic differentiation was found between the Biscayne Bay and Florida Bay dolphins in both markers (Litz, 2007). The observed genetic differences between resident animals in Biscayne Bay and those in an adjacent estuary combined with the high levels of sight fidelity observed, demonstrate that the resident Biscayne Bay bottlenose dolphins are a demographically distinct population stock.

The total number of bottlenose dolphins in the Biscayne Bay stock is unknown. During small boat surveys between 2003 and 2007, 157 unique individuals were identified using standard methods, however, this catalog size does not represent a valid estimate of population size because the residency patterns of dolphins in Biscayne Bay is not fully understood. Litz (2007) determined that 69 animals in Biscayne Bay have a northern home range. Based on Waring *et al.* (2010), the maximum population of animals that may be in the project area is equal to the total number of uniquely identified animals for the entire photo-ID study of Biscayne Bay—229 individuals. Present data are insufficient to calculate a minimum population estimate, and to determine the population trends, for the Biscayne Bay stock of bottlenose dolphins. The total human-caused mortality and serious injury for this stock is unknown and there is insufficient information available to determine whether the total fishery-related mortality and serious injury for this stock is insignificant and approaching zero mortality and serious injury rate. Documented human-caused mortalities in recreational fishing gear entanglement and ingestion of gear reinforce concern for this stock. Because the stock size is currently unknown, but likely small and relatively few

mortalities and serious injuries would exceed potential biological removal, NMFS considers this stock to be a strategic stock.

Western North Atlantic Central Florida Coastal Stock

On the Atlantic coast, Scott *et al.* (1988) hypothesized a single coastal migratory stock ranging seasonally from as far north as Long Island, to as far south as central Florida, citing stranding patterns during a high mortality event in 1987 to 1988 and observed density patterns. More recent studies demonstrate that the single coastal migratory stock hypothesis is incorrect, and there is instead a complex mosaic of stocks (McLellan *et al.,* 2003; Rosel *et al.,* 2009).

The coastal morphotype is morphologically and genetically distinct from the larger, more robust morphotype primarily occupying habitats further offshore (Hoelzel *et al.,* 1998; Mead and Potter, 1995; Rosel *et al.,* 2009). Aerial surveys conducted between 1978 and 1982 (CETAP, 1982) north of Cape Hatteras, North Carolina, identified two concentrations of bottlenose dolphins, one inshore of the 82 ft (25 m) isobath and the other offshore of the 164 ft (50 m) isobath. The lowest density of bottlenose dolphins was observed over the continental shelf, with higher densities along the coast and near the continental shelf edge. It was suggested, therefore, that north of Cape Hatteras, North Carolina, the coastal morphotype is restricted to waters less than 82 ft deep (Kenney, 1990). Similar patterns were observed during summer months in more recent aerial surveys (Garrison and Yeung, 2001; Garrison *et al.,* 2003). However, south of Cape Hatteras during both winter and summer months, there was no clear longitudinal discontinuity in bottlenose dolphin sightings (Garrison and Yeung 2001; Garrison *et al.,* 2003). To address the question of distribution of coastal and offshore morphotypes in waters south of Cape Hatteras, tissue samples were collected from large vessel surveys during the summers of 1998 and 1999, from systematic biopsy sampling efforts in nearshore waters from New Jersey to central Florida conducted in the summers of 2001 and 2002, and from winter biopsy collection effort in 2002 and 2003 in nearshore continental shelf waters of North Carolina and Georgia. Additional biopsy samples were collected in deeper continental shelf waters south of Cape Hatteras during the winter of 2002. Genetic analyses using mitochondrial DNA sequences of these biopsies identified individual animals to the coastal or offshore morphotype. Using the genetic results from all surveys combined, a logistic regression was used to model the probability that a particular bottlenose dolphin group was of the coastal morphotype as a function of environmental variables including depth, sea surface temperature, and distance from shore. These models were used to partition the bottlenose dolphin groups observed during aerial surveys between the two morphotypes (Garrison *et al.,* 2003).

The genetic results and spatial patterns observed in aerial surveys indicate both regional and seasonal differences in the longitudinal distribution of the two morphotypes in coastal Atlantic waters. Generally, from biopsy samples collected, the coastal morphotype is found in nearshore waters, the offshore morphotype in deeper waters and a spatial overlap between the two morphotypes in intermediate waters. More information on the seasonal differences and genetic studies off of the Carolina's, Georgia, and Florida, differentiating morphotypes of bottlenose dolphins can be found online in the NMFS stock assessment reports.

In summary, the primary habitat of the coastal morphotype of bottlenose dolphin extends from Florida to New Jersey during summer months and in waters less than 65.6 ft (20 m) deep, including estuarine and inshore waters.

In addition to inhabiting coastal nearshore waters, the coastal morphotype of bottlenose dolphin also inhabits inshore estuarine waters along the U.S. east coast and Gulf of Mexico (Wells *et al.,* 1987; Wells *et al.,* 1996; Scott *et al.,* 1990; Weller, 1998; Zolman, 2002; Speakman *et al.,* 2006; Stolen *et al.,* 2007; Balmer *et al.,* 2008; Mazzoil *et al.,* 2008). There are multiple lines of evidence supporting demographic separation between bottlenose dolphins residing within estuaries along the Atlantic coast. In Biscayne Bay, Florida, there is a similar community of bottlenose dolphins with evidence of year-round residents that are genetically distinct from animals residing in a nearby estuary in Florida Bay (Litz, 2007). A few published studies demonstrate that there are significant genetic distinctions and differences between animals in nearshore coastal waters and estuarine waters (Caldwell, 2001; Rosel *et al.,* 2009). Despite evidence for genetic differentiation between estuarine and nearshore populations, the degree of spatial overlap between these populations remains unclear. Photo-ID studies within estuaries demonstrate seasonal immigration and emigration and the presence of transient animals (*e.g.,* Speakman *et al.,* 2006). In addition, the degree of movement of resident estuarine animals into coastal waters on seasonal or shorter time scales is poorly understood. However, for the purposes of this analysis, bottlenose dolphins inhabiting primarily estuarine habitats are considered distinct from those inhabiting coastal habitats. Initially, a single stock of coastal morphotype bottlenose dolphins was thought to migrate seasonally between New Jersey (summer months) and central Florida based on seasonal patterns in strandings during a large scale mortality event occurring during 1987 to 1988 (Scott *et al.,* 1988). However, re-analysis of stranding data (McLellan *et al.,* 2003) and extensive analysis of genetic (Rosel *et al.,* 2009), photo-ID (Zolman, 2002) and satellite telemetry (NMFS, unpublished data) data demonstrate a complex mosaic of coastal bottlenose dolphin stocks. Integrated analysis of these multiple lines of evidence suggests that there are five coastal stocks of bottlenose dolphins: the Northern Migratory and Southern Migratory stocks, a South Carolina/Georgia Coastal stock, a Northern Florida Coastal stock, and a Central Florida Coastal stock.

The spatial extent of these stocks, their potential seasonal movements, and their relationships with estuarine stocks are poorly understood. More information on the migratory movements and genetic analyses of bottlenose dolphins can be found online in the NMFS stock assessment reports.

The NMFS stock assessment report addresses the Central Florida Coastal stock, which is present in coastal Atlantic waters from 29.4° North south to the western end of Vaca Key (approximately 24.69° North to 81.11° West) where the stock boundary for the Florida Keys stock begins (see Figure 1 of the NMFS Stock Assessment Report). There has been little study of bottlenose dolphin stock structure in coastal waters of southern Florida; therefore the southern boundary of the Central Florida stock is uncertain. There is no obvious boundary defining the offshore extent of this stock. The combined genetic and logistic regression analysis (Garrison *et al.,* 2003) indicated that in waters less than 32.8 ft (10 m) depth, 70% of the bottlenose dolphins were of the coastal morphotype. Between 32.8 ft and 65.6 ft depth, the percentage of animals of the coastal morphotype dropped precipitously, and at depths greater than 131.2 ft (40 m) nearly all (greater than 90%) animals were of the offshore morphotype. These spatial patterns may not apply in the Central Florida Coastal stock, as there is a

significant change in the bathymetric slope and a close approach of the Gulf Stream to the shoreline south of Cape Canaveral.

Aerial surveys to estimate the abundance of coastal bottlenose dolphins in the Atlantic were conducted during winter (January to February) and summer (July to August) of 2002. Abundance estimates for bottlenose dolphins in each stock were calculated using line-transect methods and distance analysis (Buckland *et al.,* 2001). More information on the survey tracklines, design, effort, animals sighted, and methods for calculating estimated abundance can be found online in the NMFS stock assessment reports.

The estimated best and minimum population for the Central Florida Coastal Stock is 6,318 and 5,094 animals, respectively. There are insufficient data to determine the population trends for this stock. From 1995 to 2001, NMFS recognized only a single migratory stock of coastal bottlenose dolphins in the western North Atlantic, and the entire stock was listed as depleted. This stock structure was revised in 2002 to recognize both multiple stocks and seasonal management units and again in 2008 and 2010 to recognize resident estuarine stocks and migratory and resident coastal stocks. The total U.S. fishery-related mortality and serious injury for the Central Florida Coastal stock likely is less than 10% of the calculated PBR, and thus can be considered to be insignificant and approaching zero mortality and serious injury rate. However, there are commercial fisheries overlapping with this stock that have no observer coverage. This stock retains the depleted designation as a result of its origins from the originally delineated depleted coastal migratory stock. The species is not listed as threatened or endangered under the ESA, but this is a strategic stock due to the depleted listing under the MMPA.

Further information on the biology and local distribution of these species and others in the region can be found in ACOE's IHA application, which is available upon request (see **ADDRESSES**), and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: *http://www.nmfs.noaa.gov/pr/species/*.

Potential Effects on Marine Mammals

In general, potential impacts to marine mammals from explosive detonations could include mortality, serious injury, as well as Level A harassment (injury) and Level B harassment. In the absence of mitigation, marine mammals could be killed or injured as a result of an explosive detonation due to the response of air cavities in the body, such as the lungs and bubbles in the intestines. Effects would be likely to be most severe in near surface waters where the reflected shock wave creates a region of negative pressure called ''cavitation.''

A second potential possible cause of mortality (in the absence of mitigation) is the onset of extensive lung hemorrhage. Extensive lung hemorrhage is considered debilitating and potentially fatal. Suffocation caused by lung hemorrhage is likely to be the major cause of marine mammal death from underwater shock waves. The estimated range for the onset of extensive lung hemorrhage to marine mammals varies depending upon the animal's weight, with the smallest mammals having the greatest potential hazard range.

NMFS' criteria for determining potential for non-lethal injury (Level A harassment) from explosives are the peak pressure that will result in: (1) The onset of slight lung hemorrhage, or (2) a 50 percent probability level for a rupture of the tympanic membrane (TM). These are injuries from which animals would be expected to recover on their own.

NMFS has established dual criteria for what constitutes Level B harassment: (1) An energy based temporary threshold shift (TTS) in hearing at received sound levels of 182 dB re 1 μPa^2-s cumulative energy flux in any ⅓ octave band above 100 Hz for odontocetes (derived from experiments with bottlenose dolphins (Ridgway *et al.,* 1997; Schlundt *et al.,* 2000); and (2) 12 psi peak pressure cited by Ketten (1995) as associated with a safe outer limit for minimal, recoverable auditory trauma (*i.e.,* TTS). The threshold for sub-TTS behavioral harassment is 177 dB re 1 μPa^2 s. The Level B harassment zone is the distance from the mortality, serious injury, injury (Level A harassment) zone to the radius where neither of these criterion is exceeded.

TABLE 2—NMFS' THRESHOLD CRITERIA AND METRICS UTILIZED FOR IMPACT ANALYSES FROM THE USE OF EXPLOSIVES

Mortality	Level A Harassment (Non-lethal injury)		Level B Harassment (Non-injurious; TTS and associated behavioral disruption [dual criteria])	Level B Harassment (Non-injurious behavioral, Sub-TTS)
31 psi-msec (onset of severe lung injury [mass of dolphin calf]).	205 dB re 1 μPa^2·s EFD (50 percent of animals would experience TM rupture).	13 psi-msec positive pressure (onset of slight lung injury).	182 dB re 1 μPa^2·s EFD*; 23 psi peak pressure (< 2,000 lb) 12 psi peak pressure (> 2,000 lb).	177 dB re 1 μPa sEFD* (for multiple detonations only).

* **Note:** In greatest 1/3-octave band above 10 Hz or 100 Hz.

The primary potential impact to the Atlantic bottlenose dolphins occurring in the Port of Miami action area from the detonations is Level B harassment incidental to noise generated by explosives. In the absence of any monitoring or mitigation measures, there is a very small chance that a marine mammal could be injured, seriously injured, or killed when exposed to the energy generated from an explosive force on the sea floor. However, the ACOE and NMFS believe that the monitoring and mitigation measures will preclude this possibility in the case of this particular specified activity.

Non-lethal injurious impacts (Level A harassment) are defined in this IHA as TM rupture and the onset of slight lung injury. The threshold for Level A harassment corresponds to a 50 percent rate of TM rupture, which can be stated in terms of an energy flux density (EFD) value of 205 dB re 1 μPa^2 s. TM rupture is well-correlated with permanent hearing impairment (Ketten, 1998) indicates a 30 percent incidence of permanent threshold shift (PTS) at the same threshold. The farthest distance from the source at which an animal is exposed to the EFD level for the Level A harassment threshold is unknown at this time.

Level B (non-injurious) harassment includes temporary (auditory) threshold

shift (TTS), a slight, recoverable loss of hearing sensitivity. One criterion used for TTS is 182 dB re 1 μPa² s maximum EFD level in any 1/3-octave band above 100 Hz for toothed whales (*e.g.,* dolphins). A second criterion, 23 psi, has been established by NMFS to provide a more conservative range of TTS when the explosive or animals approaches the sea surface, in which case explosive energy is reduced, but the peak pressure is not. For the project in Miami Harbor, the distance from the blast array at which the 23 psi threshold could be met for various charge detonation weights can be, and has been calculated.

The threshold for sub-TTS behavioral harassment is 177 dB re 1 μPa² s. However, as described previously, this criterion would not apply to the ACOE's activity because there will only be a maximum of two blasting events a day (minimum four to six hours apart), and the multiple (staggered) detonations are within a few milliseconds of each other and do not last more than a few seconds in total duration per a blasting event.

For a fully confined blast, the pressure at the edge of the danger zone is expected to be 6 psi. Utilizing the pressure data collected the Miami Harbor Phase II project in 2005, for a maximum charge weight of 450 lbs in a fully confined blast, the pressure is expected to be 22 psi approximately 700 ft (213.4 m) from the blast, which is below the threshold for Level B harassment (*i.e.,* 23 psi criteria for explosives less than 2,000 lb). However to ensure the protection of marine mammals, and in case of an incident where a detonation is not fully confined, the ACOE assumes that any animal within the boundaries of a designated ''danger zone'' at the time of detonation would be taken by Level B harassment.

The ACOE is planning to implement, and NMFS has required, a series of monitoring and mitigation measures to protect marine mammals from the potential impacts of the confined blasting activities. The ACOE has designated a ''danger zone'' as the area within which the potential for Level B harassment occurs, and the ''exclusion zone'' as the area within which if an animal crosses and enters that zone then the confined blast will be delayed until the animal leaves the zone of its own volition. The exclusion zone is larger than the area where the ACOE has determined that Level B harassment will occur, so if the monitoring and mitigation measures implemented are successful as expected, and no detonation occurs when an animal is inside of the exclusion zone, no take by Level B harassment is likely to occur. However, to be conservative, the ACOE has calculated the potential exists for Level B harassment and is pursuing an IHA from NMFS. More information on how the danger and exclusion zones are determined is included in the ''Mitigation'' section of this document (see below).

In a previous monitoring report for ACOE's Miami Harbor Phase II project in 2005, it was noted that a bottlenose dolphin outside the exclusion zone, in the deeper water channel, exhibited a startle response immediately following a confined blast. Details of that event from the monitoring report are included below:

> Any animals near the exclusion zone were watched carefully during the blast for any changes in behavior or noticeable reaction to the blast. The only observation that showed signs of a possible reaction to the blast was on July 27, when two dolphins were in the channel west of the blast. The dolphins were stationary at approximately 2,400 ft (731.5 m) from the blast array, feeding and generally cavorting. Due to the proximity of the dolphins, the drill barge was contacted prior to the blast to confirm that the exclusion zone calculation was 1,600 ft (487.7 m) for the lower weight of explosives used that day. The topography of the bottom in that area is very shallow (approximately 3.3 ft [1 m]) to the south, then an exceptionally steep drop off into the channel at 40 plus ft ending at the bulkhead wall to the north. Westward, the channel continues and has a more gradual upward slope. At the time of the blast, one of the dolphins was at the surface in the shallows, while the other dolphin was underwater within the channel. The dolphin that was underwater showed a strong reaction to the blast. The animal jumped fully out of the water in a 'breaching' fashion; behavior that had not been exhibited prior to the blast. The animal was observed jumping out of the water immediately before the observers heard the blast suggesting that the animal reacted to the blast and not some other stimulus. It is probable that, because this animal was located in the channel, the sound and pressure of the blast traveled either farther or was more focused through the channeling and the reflection from the bulkhead, thus causing the animal to react even though it was well outside the safety radius. These two dolphins were tracked for the entire 30 min post blast period and no obvious signs of distress or behavior changes were observed. Other animals observed near the safety radius during the blast were all to the south of the blasting array, well up on the seagrass beds or in the pipe channel that runs through the seagrass beds. None of these animals showed any reaction to the blast.

Individual dolphins from other stocks and within the Biscayne Bay and Western North Atlantic Central Florida Coastal stocks potentially move both inshore and offshore of Biscayne Bay due to the openness of this bay system and closeness of the outer continental shelf. These movements are not fully understood and the possibility exists that these other stocks may be affected in the same manner as the Biscayne Bay and Western North Atlantic Central Florida Coastal stocks.

Based on the data from the Miami Harbor project in 2005 and the implementation of the monitoring and mitigation measures, the ACOE and NMFS expects limited potential effects of the construction and confined blasting activities on marine mammals in the Port of Miami action area.

Potential Effects on Marine Mammal Habitat

No information is currently available that indicates resident bottlenose dolphins in the action area specifically utilize the inner and outer channels, walls, and substrate of the Port of Miami as habitat for feeding, resting, mating, or other biologically significant functions. The bottom of the channel has been previously blasted, and the rock and sand dredged. The walls of the channels are composed of vertical rock. The ACOE acknowledges that while the port may not be suitable foraging habitat for bottlenose dolphins in Biscayne Bay, it is likely that dolphins may use the area to traverse to and from North Biscayne Bay or offshore via the main channel (*i.e.,* Government Cut).

The temporary modification of the action area by the construction and confined blasting activities may potentially impact the two stocks of bottlenose dolphins expected to be present in the Port of Miami, however, these impacts are not expected to be adverse. If animals are using the Port of Miami project area to travel from south to north Biscayne Bay or vice-versa and/or exiting the Biscayne Bay via the main shipping channel, the construction and confined blasting activities may delay or detour their movements.

Confined blasting within the boundaries of the Port of Miami will be limited both spatially and temporally. The explosives utilized in the confined blasting operations are water soluble and non-toxic. If an explosive charge is unable to be fired and must be left in the drill hole, it is designed to break down. Also, each drill hole has a booster with detonator and detonation cord. Most of the detonation cord is recovered onto the drill barge by pulling it back onboard the drill barge after the confined blasting event. Small amounts of detonation cord may remain in the water after the confined blasting event has taken place, and will be recovered by small vessels with scoop nets. Any material left in the drill hole after the confined blast event will be recovered

through the dredging process, when the cutterhead dredge excavates the fractured rock material.

With regard to prey species (mainly fish), a very small number of fish are expected to be impacted by the Miami Harbor project, based on the results of the 2005 blasting project in Miami Harbor. That project consisted of 40 confined blast events over a 38 day time frame. Of these 40 confined blast events, 23 were monitored (57.5% of the total) by the State, and injured and dead fish were collected after the all clear was given (the ''all-clear'' is normally at least two to three min after the shot is fired, since seagulls and frigate birds quickly learned to approach the confined blast site and swoop in to eat some of the stunned, injured, and dead fish floating on the surface of the water). State biologists and volunteers collected the carcasses of the floating fish (note that not all dead fish float after a blasting event, and due to safety concerns, there are no plans to put divers on the bottom of the channel in the blast zone to collect non-floating fish carcasses. The fish were described to the lowest taxonomic level possible (usually species) and the injury types were categorized. The data forms are available from the FWC and ACOE upon request.

A summary of those data shows that 24 different genera were collected during the previous Miami Harbor blasting project. The species with the highest abundance were white grunts (*Haemulon plumier,* N = 51), scrawled cowfish (*Lactophrys quadricornis,* N = 43), and pygmy filefish (*Monocanthus setifer,* N = 30). The total fish collected during the 23 confined blasts was 288 or an average of 12.5 fish per blast (range 3 to 38). In observation of the three confined blasts with the greatest number of fish killed (see Table 4 of ACOE's application) and reviewing the maximum charge weight per delay for the Miami Harbor project, it appears that there is no direct correlation between the charge weight and fish killed that can be determined from such a small sample. Reviewing the 23 blasting events where dead and injured fish were collected after the ''all-clear'' signal was given, no discernable pattern exists. Factors that affect fish mortality include, but are not limited to fish size, body shape (fusiform, etc.), proximity of the blast to a vertical structure like a bulkhead (*e.g.,* see the August 10, 2005 blast event, a much smaller charge weight resulted in a higher fish kill due to the closeness of a bulkhead).

TABLE 3—CONFINED BLAST MAXIMUM CHARGE WEIGHT AND NUMBER OF FISH KILLED DURING MIAMI HARBOR 2005 PROJECT

Date	Max charge weight/delay (lb)	Fish killed
July 25, 2005	112	35
July 26, 2005	85	38
August 10, 2005	17	28

In the past, to reduce the potential for fish to be injured or killed by the confined blasting, the resource agencies have requested, and ACOE has allowed, that confined blasting contractors utilize a small, unconfined explosive charge, usually a 1 lb (0.5 kg) booster, detonated about 30 seconds before the main confined blast, to drive fish away from the confined blasting zone. It is assumed that noise or pressure generated by the small charge will drive fish from the immediate area, thereby reducing impacts from the larger and potentially more-damaging confined blast. Blasting companies use this method as a ''good faith effort'' to reduce the potential impacts to aquatic natural resources. The explosives industry recommends firing a ''warning shot'' to frighten fish out of the area before seismic exploration work is begun (Anonymous, 1978 in Keevin *et al.,* 1997).

There are limited data available on the effectiveness of fish scare charges at actually reducing the magnitude of fish kills, and the effectiveness may be based on the fish's life history. Keevin *et al.* (1997) conducted a study to test if fish scare charges are effective in moving fishes away from blast zones. They used three freshwater species (*i.e.,* largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), and flathead catfish (*Pylodictis olivaris*), equipping each fish with an internal radio tag to allow the fishes movements to be tracked before and after the scare charge. Fish movement was compared with a predicted lethal dose (LD) 0% mortality distance for an open water shot (no confinement) for a variety of charge weights. Largemouth bass showed little response to repelling charges and none would have moved from the kill zone calculated for any explosive size. Only one of the flathead catfish and two of the channel catfish would have moved to a safe distance for any blast. This means that only 11% of the fish used in the study would have survived the blast events.

These results call into question the effectiveness of this minimization methodology; however, some assert that based on the monetary value of fish (American Fishery Society, 1992 in Keevin *et al.,* 1997), including the high value commercial or recreational species like snook (*Centropomus undecimalis*) and tarpon (*Megalops atlanticus*) found in southeast Florida inlets like Port Everglades, the low cost associated with repelling charge use would be offset if only a few fish moved from the kill zone (Keevin *et al.,* 1997).

To calculate the potential loss of prey species from the project area as an impact of the confined blasting events, the ACOE used a 12.5 fish kill per blasting event estimate based on the Miami Harbor 2005 project, and multiplied it by the 40 shots, reaching a total estimate of 500 floating fish. As stated previously, not all carcasses float to the surface and there is no way to estimate how many carcasses did not float. Using an estimate of 12.5 fish kill per blasting event, and the maximum 600 detonations for the entire multi-year project, the minimum number of fish expected to be killed by the project is approximately 7,500 fish across the entire 28,500 ft (8,686.8 m) long channel footprint, assuming the worst case scenario and the entire channel needs to be blasted.

NMFS anticipates that the action will result in no significant impacts to marine mammal habitat beyond rendering the areas immediately around the Port of Miami less desirable shortly after each confined blasting event and during dredging operations and potentially eliminating a relatively small amount of locally available prey. The impacts will be localized and instantaneous. Impacts to marine mammal habitat, as well as invertebrate

and fish species are not expected to be significantly detrimental.

Mitigation

In order to issue an ITA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses.

Over the last 10 years, the ACOE's Jacksonville District has been collecting data concerning the effects of confined blasting projects on marine mammals. This effort began in the early 1990's when the ACOE contracted with Dr. Calvin Koyna, Precision Blasting Services, to review previous ACOE blasting projects. The ACOE also received recommendations from the Florida Fish and Wildlife Conservation Commission (FWC, then known as the Florida Department of Natural Resources) and the USFWS to prepare for a harbor deepening project at Port Everglades, Florida, which was conducted in the mid-1980s. The recommendations prepared for the project were specifically aimed at protecting endangered manatees and endangered and threatened sea turtles.

The ACOE will develop and implement four zones as protective measures that are based on the use of an unconfined blast. The use of unconfined blast in development of these protective zones for a confined blast will increase the conservation measures afforded marine mammals in the action area. These four zones are referred to as the danger zone (*i.e.,* inner most zone, located closest to the blast), the exclusion zone (*i.e.,* the danger zone plus 500 ft (152.4 m) to add an additional layer of conservatism for marine mammals), the safety zone (*i.e.,* the third zone), and the watch zone (*i.e.,* the outer most zone). All of these zones are noted in Figure 11 of ACOE's IHA application and described in further detail in this section of the document (see below). Of these four zones, only the danger zone is associated with an MMPA threshold. The danger zone has been determined to be larger than or equal to the threshold for Level B harassment, as defined by the MMPA. Injury (Level A harassment), serious injury, or mortality are expected to occur at closer distances to the blasting array within the danger zone.

These four zone calculations will be included as part of the specifications package that the contractors will bid on before the project is awarded.

As part of the ACOE's Miami Harbor Phase II project, the ACOE monitored the confined blasting project and collected data on the pressures associated with confined blasts, while employing a formula to calculate buffer and exclusion zones that would protect marine mammals. Results from the pressure monitoring at Miami Harbor Phase II demonstrate that stemming each drill hole reduces the blast pressure entering the water (Nedwell and Thandavamoorthy, 1992; Hemen *et al.,* 2005; Hempen *et al.,* 2007).

The following standard conditions have been incorporated into the project specifications to reduce the risk to marine mammals in the project area. While this application is specific to bottlenose dolphins, these specifications are written for all protected species that may be in the project area.

If confined blasting is planned during the period of November 1 through March 31, significant operational delays should be expected due to the increased likelihood of manatees being present within the project area. If possible, avoid scheduling confined blasting during the period from November 1 through March 31. In the area where confined blasting could occur or any area where confined blasting is required to obtain channel design depth, the following marine mammal protective measures shall be employed, before, during, and after each confined blast:

(A) The USFWS and NMFS must review the contractor's approved Blasting Plan prior to any confined blasting activities. (Copies of this blasting plan shall be provided to FDEP and FWC as a matter of comity.) This confined blasting proposal must include information concerning a watch program and details of the confined blasting events. This information must be submitted at least 30 days prior to the date of the confined blast(s) to the following addresses:

(1) FWC–ISM, 620 South Meridian Street, Mail Stop 6A, Tallahassee, FL 32399–1600 or *ImperiledSpecies@myfwc.com.*

(2) NMFS Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910.

(3) USFWS, 1339 20th Street, Vero Beach, Florida 32960–3559 or 6620 Southpoint Drive South, Suite 310, Jacksonville, FL 32216–0912 (project location dependent).

(4) NMFS Southeast Regional Office, Protected Species Management Branch, 263 13th Avenue South, St. Petersburg, FL 33701.

In addition to plan review, Dr. Allen Foley shall be notified at the initiation and completion of all in-water blasting (*allen.foley@myfwc.com*).

(B) The contractor's blasting plan shall include at least the following information, as required by the project's specifications:

(1) A list of PSOs, their qualifications, and positions for the watch, including a map depicting the locations for boat or land-based PSOs. Qualified PSOs must have prior on-the-job experience observing for protected species during previous in-water blasting events where the blasting activities were similar in nature to this project.

(2) The amount of explosive charge, the explosive charge's equivalency in TNT, how it will be executed (depth of drilling, stemming, in-water, etc.), a drawing depicting the placement of the charges, size of the exclusion zone, and how it will be marked (also depicted on a map), tide tables for the blasting event(s), and estimates of times and days for blasting events (with an understanding this is an estimate, and may change due to weather, equipment, etc.).

(C) For each explosive charge placed, four zones will be calculated, denoted on monitoring reports and provided to PSOs before each blast for incorporation in the watch plan for each planned detonation. All of the zones will be noted by buoys for each of the blasts. These zones are:

(1) Danger Zone: The danger zone radius is equal to 260 (79.25 m) times the cube root of the weight of the explosive charge in lbs per delay (equivalent weight of tetryl or TNT). The radius of the danger zone has been determined to be equal to or larger than the distance from the charge to a location where a marine mammal would experience Level B harassment.

Danger zone (ft) = 260 (lbs/delay)$^{1/3}$

Danger Zone Development: The radius of the danger zone will be calculated to determine the maximum distance from the confined blast at which mortality to marine mammals is likely to occur. The danger zone was determined by the amount of explosives used within each delay (which can contain multiple boreholes). (The original basis of this calculation was to protect human U.S. Navy Seal divers from underwater detonations of underwater mines [Goertner, 1982]). Goertner's calculations were based on impacts to terrestrial animals in water when exposed to a detonation suspended in the water column (unconfined blast) as researched by the U.S. Navy in the 1970's (Yelverton *et al.,* 1973; Richmond *et al.,* 1973).

Additionally, observations of sea turtle injury and mortality associated with unconfined blasts for the cutting of oil rig structures in the Gulf of Mexico (Young, 1991; Young and O'Keefe, 1994) were also incorporated in this radius beyond its use by the Navy.

The U.S. Navy Dive Manual and the FWC Guidelines (2005) set the danger zone formula for an unconfined blast suspended in the water column, which is as follows:

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

Where:

R = radius of the danger zone in ft
W = weight of the explosive charge in lbs (tetryl or TNT)

This formula is conservative for the confined blasting being done by the ACOE in the Port of Miami since the blast will be confined with the rock and not suspended in the water column. The reduction of impact by confining the shots more than compensates for the presumed higher sensitivity of marine mammals. The ACOE and NMFS believes that the radius of the danger zone, coupled with a strong marine mammal monitoring and protection plan is a conservative approach to the protection of marine mammals in the action area.

(2) Exclusion Zone: The exclusion zone radius is equal to the danger zone plus a buffer of 500 ft. Detonation will not occur if a marine mammal is known to be (or based on previous sightings, may be) within the exclusion zone.

Exclusion zone (ft) = danger zone + 500 ft

Exclusion Zone Development: The exclusion zone is not associated with any threshold of take under the MMPA. The exclusion zone was developed during consultations with the FWC during the 2005 to 2006 Phase II dredging and confined blasting project in Miami Harbor. FWC requested a larger ''no blast'' radius due to the high number of manatees documented in the vicinity of the Port of Miami, particularly utilizing the Bill Sadowski Critical Wildlife Area directly south of the port and north of Virginia Key. The ACOE concurred with this request and added a second zone with an additional 500 ft radius above the calculated radius of the danger zone. To be consistent with the previous blasting activities at Miami Harbor, and since the confined blasting will take place in the same area, with the same concerns about the proximity of manatees to the blasting sites along Fisherman's Channel, the ACOE plans to maintain the exclusion zone.

(3) Safety Zone: The safety zone is equal to 520 (158.50 m) times the cube root of the weight of the explosive charge in lbs per delay (equivalent weight of tetryl or TNT).

Safety zone (ft; two times the size of the danger zone) = 520 $(lbs/delay)^{1/3}$

Safety Zone Development: The safety zone is not associated with any threshold of take. The safety zone was developed to be an area of ''heightened awareness'' of protected species (*e.g.* dolphins, manatees, and sea turtles) entering the blast area, without triggering a shut-down. This area triggers individual specific monitoring of each individual or group of animals as they transit in, out, or through the designated zones.

(4) Watch Zone: The watch zone is three times the radius of the danger zone to ensure that animals entering or traveling close to the exclusion zone are sighted and appropriate actions can be implemented before or as the animal enters the any impact areas (*i.e.,* a delay in blasting activities).

Watch zone (ft; three times the size of the Danger Zone) = 3 [260 $(lbs/delay)^{1/3}$]

Watch Zone Development: The watch zone is not associated to any threshold of take. The watch zone is the area that can be typically covered by a small helicopter based on the blasting site, flight speed, flight height, and available fuel to ensure effective mitigation-monitoring of the project area.

(D) The watch program shall begin at least one hour prior to the scheduled start of blasting to identify the possible presence of marine mammals. The watch program shall continue for at least 30 minutes (min) after detonations are complete.

(E) The watch program shall consist of a minimum of six PSOs. Each PSO shall be equipped with a two-way radio that shall be dedicated exclusively to the watch. Extra radios should be available in case of failures. All of the PSOs shall be in close communication with the blasting sub-contractor in order to halt the blast event if the need arises. If all PSOs do not have working radios and cannot contact the primary PSO and the blasting sub-contractor during the pre-blast watch, the blast shall be postponed until all PSOs are in radio contact. PSOs will also be equipped with polarized sunglasses, binoculars, a red flag for back-up visual communication, and a sighting log with a map to record sightings. All confined blasting events will be weather dependent. Climatic conditions must be suitable for optimal viewing conditions, to be determined by the PSOs.

(F) The watch program shall include a continuous aerial survey to be conducted by aircraft, as approved by the Federal Aviation Administration (FAA). The confined blasting event shall be halted if an animal(s) is sighted within the exclusion zone, within the five min before the explosives are scheduled to be detonated. An ''all clear'' signal must be obtained from the aerial PSO before the detonation can occur. The confined blasting event shall be halted immediately upon request of any of the PSOs. If animals are sighted, the blast event shall not take place until the animal(s) moves out of the exclusion zone under its own volition. Animals shall not be herded away or intentionally harassed into leaving. Specifically, the animals must not be intentionally approached by project watercraft or aircraft. If the animal(s) is not sighted a second time, the event may resume 30 min after the last sighting.

(G) An actual delay in blasting shall occur when a marine mammal is detected within the exclusion zone at the point where the blast countdown reaches the T-minus five min. At that time, if an animal is in or near the safety zone, the countdown is put on hold until the zone is completely clear of marine mammals and all 30 min sighting holds have expired. Animal movements into the safety zone prior to that point are monitored closely, but do not necessarily stop the countdown. The exception to this would be stationary animals that do not appear to be moving out of the area or animals that begin moving into the safety zone late in the countdown. For these cases, holds on the T-minus 15 minutes may be called to keep the shipping channel open and minimize the impact on the Port of Miami operations.

(H) The PSOs and contractors shall evaluate any problems encountered during blasting events and logistical solutions shall be presented during blasting events and logistical solutions shall be presented to the Contracting Officer. Corrections to the watch shall be made prior to the next blasting event. If any one of the aforementioned conditions is not met prior to or during the blasting, the watch PSOs shall have the authority to terminate the blasting event, until resolution can be reached with the Contracting Officer. The Contracting Officer will contact FWC, USFWS, and NMFS.

(I) If an injured or dead marine mammal is sighted after the confined blast event, the PSOs on watch shall contact the ACOE and the ACOE will then contact the proper Federal and/or state natural resource agencies.

The PSOs shall maintain contact with the injured or dead marine mammal

until authorities have arrived. Blasting shall be postponed until consultations are reinitiated and completed, and determinations can be made of the cause of injury or mortality. If blasting injuries are documented, all demolition activities shall cease. The ACOE will then submit a revised blasting plan to USFWS and NMFS for review with copies provided to FWC and FLDEP as a matter of comity.

(J) Within 30 days after completion of all blasting events, the primary PSO shall submit a report the ACOE, who will provide it to the USFWS, NMFS, FWC, and FLDEP providing a description of the event, number and location of animals seen and what actions were taken when animals were seen. Any problems associated with the event and suggestions for improvements shall also be documented in the report.

Monitoring for Mitigation

The ACOE will rely upon the same monitoring protocol developed for the Port of Miami project in 2005 (Barkaszi, 2005) and published in Jordan *et al.* (2007), which can be found online at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm*. The monitoring protocol is summarized here:

A watch plan will be formulated based on the required monitoring radii and optimal observation locations. The watch plan will consist of at least five PSOs including at least one aerial PSO, two boat-based PSOs, and two PSOs stationed on the drill barge (see Figures 13, 14, 15, and 16 of the ACOE's IHA application). This watch plan will be consistent with the program that was utilized successfully at Miami Harbor in 2005. The sixth PSO will be placed in the most optimal observation location (boat, barge, or aircraft) on a day-by-day basis depending on the location of the blast and the placement of dredging equipment. This process will ensure complete coverage of the four zones as well as any critical areas. The watch will begin at least one hour prior to each blast and continue for one half hour after each blast (Jordan *et al.,* 2007).

The aerial PSO will fly in a turbine engine helicopter (bell jet ranger) with the doors removed. This provided maximum visibility of the watch and safety zones as well as exceptional maneuverability and the needed flexibility for continual surveillance without fuel stops or down time, minimization of delays due to weather or visibility and the ability to deliver post-blast assistance. Additionally, at least six commercial helicopter, small Cessna, and ultra-light companies operate on Key Biscayne, immediately south of the Port of Miami and offer ''flight-seeing'' operations over downtown Miami, Bayfront, and the Port of Miami. Recreational use of ultra-lights launching from Key Biscayne is also common in the area, as are overflights of commercial seaplanes, jet aircraft, and helicopters. The action area being monitored is a high traffic area, surrounded by an urban environment where animals are potentially exposed to multiple overflights daily. ACOE conferred with Mary Jo Barkaszi, owner and chief PSO of ECOES, Inc., a protected species monitoring company with 25 years experience, and has worked on the last five blasting events involving marine mammal concerns for the ACOE throughout the country. All of these blasting events had bottlenose dolphins commonly occur in the project area. Ms. Barkaszi states that in her experience, she has not observed bottlenose dolphins diving or fleeing the area because a helicopter is hovering nearby at 500 ft (pers. comm., September 12, 2011). During monitoring events, the helicopter hovers at 500 ft above the watch zone and only drops below that level when helping to confirm identification of something small in the water, like a sea turtle. The ACOE and NMFS do not expect the incidental take of bottlenose dolphins, by Level B harassment, from helicopter-based monitoring of the blasting operations and the ACOE is not requesting take.

Boat-based PSOs are placed on one of two vessels, both of which have attached platforms that place the PSOs eyes at least 10 ft (3 m) above the water surface enabling optimal visibility of the water from the vessels. The boat-based PSOs cover the safety zone where waters are deep enough to safely operate the boats without any impacts to seagrass resources. The shallow seagrass beds south of the project site relegate the PSO boats mainly to the channel east and west of the blast zone. At no time are any of the PSO boats allowed in shallow areas where propellers could potentially impact the fragile seagrass.

At times, turbidity in the water may be high and visibility through the water column may be reduced so that animals are not seen below the surface as they should be under normal conditions. This may be more common on an ebb tide or with a sustained south wind. However, animals surfacing in these conditions are still routinely sighted from the air and from the boats, thus the overall PSO program is not compromised, only the degree to which animals were tracked below the surface. Adjustments to the program are made accordingly so that all protected species are confirmed out of the safety zone prior to the T-minus five min, just as they are under normal visual conditions. The waters within the project area are exceptional for observation so that the decreased visibility below the surface during turbid conditions make the waters more typical of other port facilities where PSO programs are also effective throughout the U.S., for example New York and Boston harbors, where this monitoring method has also been employed.

All PSOs are equipped with marine-band VHF radios, maps of the blast zone, polarized sunglasses, and appropriate data sheets. Communications among PSOs and with the blaster is of critical importance to the success of the watch plan. The aerial-based PSO is in contact with vessel and drill barge-based PSOs and the drill barge with regular 15 min radio checks throughout the watch period. Constant tracking of animals spotted by any PSO is possible due to the amount and type of PSO coverage and the excellent communications plan. Watch hours are restricted to between two hours after sunrise and one hour before sunset. The watch begins at least one hour prior to the scheduled blast and is continuous throughout the blast. Watch continues for at least 30 min post blast at which time any animals that were seen prior to the blast are visually re-located whenever possible and all PSOs in boats and in the aircraft assisted in cleaning up any blast debris.

If any marine mammals are spotted during the watch, the PSO notifies the aerial-based PSO and/or the other PSOs via radio. The animals is located by the aerial-based PSO to determine its range and bearing from the blast array. Initial locations and all subsequent re-acquisitions are plotted on maps. Animals within or approaching the safety zone are tracked by the aerial and boat-based PSOs until they exited the safety zone. Anytime animals are sighted near the safety zone, the drill barge is alerted as to the animal's proximity and some indication of any potential delays it might cause.

If any animal(s) is sighted inside the safety zone and not re-acquired, no blasting is authorized until at least 30 minutes has elapsed since the last sighting of that animal(s). The PSOs on watch will continue the countdown up until the T-minus five minute point. At this time, the aerial-based PSO confirms that all animals are outside the safety zone and that all holds have expired prior to clearing the drill barge for the T-minus five min notice. A fish scare charge will be fired at T-minus five min and T-minus one min to minimize

effects of the blast on fish that may be in the same area of the blast array by scaring them from the blast area.

Monitoring and Reporting

In order to issue an ITA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking.'' NMFS implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area.

The ACOE will be conducting a study on fish kill associated with confined underwater blasting that will provide information on the effects of confined underwater blasting on prey species for dolphins in the project area. This study will determine the minimum distance from the blast array, based on charge weight, at which fish will not be killed, or injured (the ''lethal dose of zero'' distance) by confined underwater blasting. Similar studies have been completed for open water (unconfined) blasts as cited by Hempen and Keevin (1995), Keevin *et al.* (1995a, 1995b, and 1997), and Keevin (1998), but no such studies have been conducted for confined underwater blasting. This data will be useful for future confined blasting projects where pisciverous marine mammals are found, since it will allow resource managers to assess the impacts of the blasting activities on marine mammal prey, where species composition and density data have been collected for that project.

Additionally, ACOE will provide sighting data for each blast to researchers at NMFS Southeast Fisheries Science Center's marine mammal program and any other researchers working on dolphins in the project area to add to their database of animal usage of the project area. The ACOE will rely upon the same monitoring protocol developed for the Port of Miami project in 2005 (Barkaszi, 2005) and published in Jordan *et al.* (2007).

The ACOE plans to coordinate monitoring with the appropriate Federal and state resource agencies, and will provide copies of all relevant monitoring reports prepared by their contractors. After completion of all detonation and dredging events, the ACOE will submit a summary report to regulatory agencies.

Within 30 days after completion of all blasting events, the lead PSO shall submit a report to the ACOE, who will provide it to NMFS. The report will contain the PSO's logs (including names and positions during the blasting events), provide a description of the events, environmental conditions, number and location of animals sighted, the behavioral observations of the marine mammals, and what actions were taken when animals were sighted in the action area of the project. Any problems associated with the event and suggestions for improvements shall also be documented in the report. A draft final report must be submitted to NMFS within 90 days after the conclusion of the blasting activities. The report would include a summary of the information gathered pursuant to the monitoring requirements set forth in the IHA, including dates and times of detonations as well as pre- and post-blasting monitoring observations. A final report must be submitted to NMFS within 30 days after receiving comments from NMFS on the draft final report. If no comments are received from NMFS, the draft final report will be considered to be the final report.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury, serious injury or mortality, ACOE will immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation, Office of Protected Resources, NMFS at 301–427–8401 and/or by email to *Jolie.Harrison@noaa.gov* and *Howard.Goldstein@noaa.gov,* and the NMFS Southeast Region Marine Mammal Stranding Network at 877–433–8299 (*Blair.Mase@noaa.gov* and *Erin.Fougeres@noaa.gov*) (Florida Marine Mammal Stranding Hotline at 888–404–3922). The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Status of all noise-generating source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with ACOE to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. ACOE may not resume their activities until notified by NMFS via letter or email, or telephone.

In the event that ACOE discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in the next paragraph), ACOE will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301–427–8401, and/or by email to *Jolie.Harrison@noaa.gov* and *Howard.Goldstein@noaa.gov,* and the NMFS Southeast Region Marine Mammal Stranding Network (877–433–8299) and/or by email to the Southeast Regional Stranding Coordinator (*Blair.Mase@noaa.gov*) and Southeast Regional Stranding Program Administrator (*Erin.Fougeres@noaa.gov*). The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with ACOE to determine whether modifications in the activities are appropriate.

In the event that ACOE discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ACOE will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, at 301–427–8401, and/or by email to *Jolie.Harrison@noaa.gov* and Howard.Goldstein@noaa.gov, and the NMFS Southeast Region Marine Mammal Stranding Network (877–433–8299), and/or by email to the Southeast Regional Stranding Coordinator (*Blair.Mase@noaa.gov*) and Southeast Regional Stranding Program Administrator (*Erin.Fougeres@noaa.gov*), within 24 hours of discovery. ACOE will provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as:

> Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].

The ACOE is requesting the take of Atlantic bottlenose dolphins, by Level B harassment only, incidental to blasting activities at Miami Harbor. The ACOE notes that multiple IHAs (up to three) will likely be needed and requested for the project due to the duration of the planned blasting activities. See Table 2 (above) for NMFS' threshold criteria and metrics utilized for impact analyses from the use of explosives.

Biscayne Bay Stock

The Biscayne Bay stock of Atlantic bottlenose dolphins is bounded by Haulover Inlet to the north and Card Sound Bridge to the south. Biscayne Bay is 428 square mi (mi^2) (1,108.5 square km [km^2]) in area. The Port of Miami channel, within the boundaries of Biscayne Bay, is approximately 7,200 ft (2,194.6 m) long by 500 ft (152.4 m) wide, with the 3,425 ft (1,044 m) long by 1,400 ft (426.7 m) wide Dodge-Lummus Island turning basin (total area 0.3 mi^2 [0.8 km^2]) at the western terminus of Fisherman's Channel. The Port of Miami's channels consist of approximately 0.1% of the entire area of Biscayne Bay.

To determine the maximum area of Biscayne Bay in which bottlenose dolphins may experience pressure levels greater than or equal to the 23 psi threshold for explosives less than 2,000 lb (907.2 kg), which has the potential to result in Level B harassment due to temporary threshold shift (TTS) and associated behavioral disruption, the ACOE may utilize a maximum charge weight of 450 lb (204.1 kg) with a calculated danger zone of 1,995 ft (608.1 m). Using this radius, the total area of this zone is approximately 0.1% of Biscayne Bay (12,503,617 ft^2 [1,161,624 m^2]).

Utilizing the pressure data collected the Miami Harbor Phase II project in 2005, for a maximum charge weight of 450 lbs in a fully confined blast, the pressure is expected to be 22 psi approximately 700 ft (213.4 m) from the blast, which is below the threshold for Level B harassment (*i.e.,* 23 psi criteria for explosives less than 2,000 lb). However to ensure the protection of marine mammals, and in case of an incident where a detonation is not fully confined, the ACOE assumes that any animal within the boundaries of the danger zone would be taken by Level B harassment.

Litz (2007) identified 69 individuals of the Biscayne Bay stock that she classified as the ''northern dolphins'' meaning animals with a mean sighting history from 1994 to 2004 north of 25.61° North. The photo-ID study that Litz's data is based on encompassed an area of approximately 200 mi^2 (518 km^2), approximately 50% of Biscayne Bay. The estimated maximum population of animals that may be in the project area is equal to the total number of uniquely identified animals for the entire photo-ID study of Biscayne Bay is 229 individuals (Waring *et al.,* 2010). The best population estimate for Biscayne Bay is 157 individuals, which is based on SEFSC's most consistent survey effort conducted during the 2003 to 2007 photo-ID survey seasons (Waring *et al.,* 2010).

Table 4 (below) presents the estimated incidental take, by Level B harassment, for varying charge weight delays likely to be used during the blasting activities and the estimated impacts based on the population estimates used in this analysis. In all cases, less than one bottlenose dolphin is expected to be taken incidental to each blasting event (0.049 minimum to 0.162 maximum). This assumes that the distribution of bottlenose dolphins is equal throughout all of Biscayne Bay.

TABLE 4—THE ESTIMATED INCIDENTAL TAKE OF BOTTLENOSE DOLPHINS FROM THE BISCAYNE BAY STOCK, PER EACH BLASTING EVENT, BASED ON THE MAXIMUM CHARGE WEIGHT/DELAY AND POPULATION DENSITY

Maximum (lbs/delay)	Danger zone (ft)	Estimated take based on minimum population estimate (69 animals)	Estimated take based on best population estimate (157 animals)	Estimated take based on maximum population estimate (229 animals)
450	1,992	0.072	0.164	0.239
200	1,518	0.042	0.095	0.139
119	1,277	0.030	0.067	0.098
50	957	0.017	0.038	0.055
17	668	0.008	0.018	0.027

The ACOE accessed the NMFS SEFSC photo-ID survey data from 1990 to 2004 in Biscayne Bay via the OBIS–Seamap database (*http://seamap.env.duke.edu/*) and downloaded the Google Earth overlay of the data. Figure 12 of the ACOE's IHA application shows the general area of the Port of Miami and hot spots of bottlenose dolphin sightings both north and south of Miami Harbor. The data were used to see if sightings across all parts of the Biscayne Bay were equal. This sighting frequency data was not used to calculate the potential take numbers of marine mammals incidental to the blasting activities.

Reviewing the data from the Miami Harbor Phase II project in 2005, the ACOE noted that for the 40 detonations, 28% of all animals sighted within the action area (Fisherman's Channel) were bottlenose dolphins (the other animals sighted were manatees and sea turtles). Bottlenose dolphins were sighted inside the exclusion zone 12 times with a total of 30 individuals, with an average of 2.5 animals per sighting out of the total 58 bottlenose dolphins recorded during the project; therefore, groups of dolphins entered the exclusion zone multiple times. Also, dolphins entered the exclusion zone during 30% of the blasting events. Not all of the incidents where dolphins entered the exclusion zone resulted in a project delay, it is dependent upon when during the countdown the animals cross the line demarcating the exclusion zone, and how long they stay in the exclusion zone.

During the Miami Harbor Phase II project in 2005, bottlenose dolphins in

the exclusion zone triggered delays on four occasions during the 13 blasting events (31%). If the maximum 313 (365 calendar days/year minus 52 Sundays/year [no confined blasting will occur on Sundays]) potential detonations for the duration of the one year IHA have an equal percentage of delays as the 2005 project (assuming construction starts in June with blasting June, 2012 to June, 2013 timeframe, with no blasting on Sundays), 94 of the detonations would be delayed for some period of time due to the presence of protected species and 29 of those delays would specifically be for bottlenose dolphins.

As a worst case, using the area of the danger zone, and recognizing that the Port of Miami is within the boundaries of the northern area described in Litz (2007), and that the danger zone of any blasting event using equal to or less than 450 lbs/delay will be approximately 0.1% of Biscayne Bay, the ACOE assumes that because animals are not evenly distributed throughout Biscayne Bay, that they travel as single individuals or in groups (as documented in the OBIS–Seamap data and the monitoring data from the Miami Harbor Phase II project in 2005), and that without any monitoring and mitigation measures to minimize potential impacts, up to three bottlenose dolphins from the Biscayne Bay stock may be taken, by Level B harassment, incidental to each blasting event.

Assuming that the delays will be spread equally across the action area and using the calculation of 29 delays and that three bottlenose dolphins would be inside the danger zone, 15 of the delayed blasting events would take place in Biscayne Bay since it compromises 52% of the action area. Three bottlenose dolphins times 15 detonations is equal to 45 bottlenose dolphins potentially exposed to an underwater sound and pressure over a 1-year period for an IHA incidental to the blasting activities at the Port of Miami.

Western North Atlantic Central Florida Coastal Stock

The Western North Atlantic Central Florida Coastal stock of bottlenose dolphins is present in the coastal Atlantic waters shallower than 65.6 ft (20 m) in depth between latitude 29.4° North to the western end of Vaca Key (approximately 29.69° North to 81.11° West) where the stock boundary for the Florida Key stock begins, with an area of 3,007 mi^2 (7,789 km^2). The outer entrance channel of the Port of Miami is approximately 15,500 ft long (4,724.4 m) by 500 ft wide, which is approximately 0.28 mi^2 (0.73 km^2). The Port of Miami's channels consist of approximately 0.009% of the stocks boundaries.

The same calculations for assessing the potential impacts to bottlenose dolphins from the blasting activities that were used for the Biscayne Bay stock were also applied to this stock. To determine the maximum area of the coastal Atlantic in which bottlenose dolphins may experience pressure levels greater than or equal to the 23 psi threshold for explosives less than 2,000 lb (907.2 kg), which has the potential to result in Level B harassment due to TTS and associated behavioral disruption, the ACOE may utilize a maximum charge weight of 450 lb (204.1 kg) with a calculated danger zone of 1,995 ft (608.1 m). Using this radius, the total area of this zone is approximately 0.015% of coastal Atlantic where this stock is expected to occur).

For an open-water, unconfined blast, the pressure edge of the danger zone is expected to be 23 psi. For a fully confined blast, the pressure at the edge of the danger zone is expected to be 6 psi. Utilizing the pressure data collected the Miami Harbor Phase II project in 2005, for a maximum charge weight of 450 lbs in a fully confined blast, the pressure is expected to be 22 psi approximately 700 ft (213.4 m) from the blast, which is below the threshold for Level B harassment (*i.e.,* 23 psi criteria for explosives less than 2,000 lb). However to ensure the protection of marine mammals, and in case of an incident where a detonation is not fully confined, the ACOE assumes that any animal within the boundaries of the danger zone would be taken by Level B harassment.

Waring *et al.* (2010) estimates the minimum population for the Western North Atlantic Central Florida stock to be 5,094 animals, and estimates the best population to be 6,318 animals.

Table 5 (below) presents the estimated incidental take, by Level B harassment, for varying charge weight delays likely to be used during the blasting activities and the estimated impacts based on the population estimates used in this analysis. In all cases, less than one bottlenose dolphin is expected to be taken incidental to each blasting event (0.102 minimum to 0.948 maximum). This assumes that the distribution of bottlenose dolphins is equal throughout all of the stock's range.

TABLE 5—THE ESTIMATED INCIDENTAL TAKE OF BOTTLENOSE DOLPHINS FROM THE WESTERN NORTH ATLANTIC CENTRAL FLORIDA COASTAL STOCK, PER EACH BLASTING EVENT, BASED ON THE MAXIMUM CHARGE WEIGHT/DELAY AND POPULATION DENSITY

Maximum (lbs/delay)	Danger zone (ft)	Estimated take based on minimum population estimate (5,094)	Estimated take based on best population estimate (6,318)
450	1,992	0.758	0.940
200	1,520	0.441	0.547
119	1,279	0.312	0.387
50	958	0.175	0.217
17	668	0.085	0.106

Other than the aerial surveys conducted by NMFS used to develop the stock assessment report, the ACOE has not been able to locate any additional photo-ID or habitat usage analysis. As a result, the ACOE is unable to determine if animals are evenly distributed throughout the stock's range, particularly in the southernmost portion of the stock's range where the action area is located.

To be conservative, the ACOE will use the same assumptions for the Western North Atlantic Central Florida Coastal stock as was used for the Biscayne Bay stock. Reviewing the data from the Miami Harbor Phase II project in 2005, the ACOE noted that for the 40 detonations, 28% of all animals sighted within the action area (Fisherman's Channel) were bottlenose dolphins (the

other animals sighted were manatees and sea turtles). Bottlenose dolphins were sighted inside the exclusion zone 12 times with a total of 30 individuals, with an average of 2.5 animals per sighting out of the total 58 bottlenose dolphins recorded during the project; therefore, groups of dolphins entered the exclusion zone multiple times. Also, dolphins entered the exclusion zone during 30% of the blasting events. Not all of the incidents where dolphins entered the exclusion zone resulted in a project delay, it is dependent upon when during the countdown the animals cross the line demarcating the exclusion zone, and how long they stay in the exclusion zone.

During the Miami Harbor Phase II project in 2005, bottlenose dolphins in the exclusion zone triggered delays on four occasions during the 13 blasting events (31%). If the maximum 313 planned detonations for the duration of the one year IHA (equal to 365 calendar days/year minus 52 Sundays/year [no confined blasting will occur on Sundays) have an equal percentage of delays as the 2005 project (assuming construction starts in June with blasting June, 2012 to June, 2013 timeframe, with no blasting on Sundays), 94 of the detonations would be delayed for some period of time due to the presence of protected species and 29 of those delays would specifically be for bottlenose dolphins.

As a worst case, using the area of the danger zone, and that the danger zone of any blasting event using equal to or less than 450 lbs/delay will be approximately 0.009% of the stock's range. The ACOE assumes that because animals are not evenly distributed throughout the stock's range, that they travel as single individuals or in groups (as documented in the monitoring data from the Miami Harbor Phase II project in 2005), and that without any monitoring and mitigation measures to minimize potential impacts, up to three bottlenose dolphins from the Western North Atlantic Central Florida Coastal stock may be taken, by Level B harassment, incidental to each blasting event.

Assuming that delays will be spread equally across the action area and using the calculation of 29 delays and that three bottlenose dolphins would be inside the danger zone, 14 of the delayed blasting events would take place in Biscayne Bay since it compromises 48% of the action area. Three bottlenose dolphins times 14 detonations is equal to 42 bottlenose dolphins potentially exposed to underwater sound and pressure over a one year period for an IHA incidental to the blasting activities at the Port of Miami.

Summary of Requested Estimated Take

Without the implementation of the monitoring and mitigation measures, the ACOE has calculated up to 87 bottlenose dolphins (45 from the Biscayne Bay stock, 42 of the Western North Atlantic Central Florida stock) may be potentially taken, by Level B harassment, incidental to the blasting operations over the course of the one year IHA. Due to the protective measures of confined blasts, the implementation of the monitoring and mitigation measures (*i.e.,* danger, exclusion, safety, and watch zones, use of the confined blasting techniques, as well as PSOs), the ACOE is requesting the take, by Level B harassment only, of a total of 22 bottlenose dolphins (12 bottlenose dolphins from the Biscayne Bay stock and 10 bottlenose dolphins from the Western North Atlantic Central Florida Coastal stock). The ACOE believes that the implementation of the protective measures of confined blasts reduces the potential for take to approximately 25% of the calculated take without any monitoring and mitigation measures. Based on the previous project by the ACOE at Miami Harbor, with 40 blast events and no documented take, this estimated take is likely high.

Encouraging and Coordination Research

The ACOE will coordinate monitoring with the appropriate Federal and state resource agencies, including NMFS Office of Protected Resources and NMFS SERO Protected Resources Division, and will provide copies of any monitoring reports prepared by the contractors.

Negligible Impact and Small Numbers Analysis and Determination

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as ''* * * an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.'' In making a negligible impact determination, NMFS evaluated factors such as:

(1) The number of anticipated injuries, serious injuries, or mortalities;

(2) The number, nature, and intensity, and duration of Level B harassment (all relatively limited);

(3) The context in which the takes occur (*i.e.,* impacts to areas of significance, impacts to local populations, and cumulative impacts when taking into account successive/ contemporaneous actions when added to the baseline data);

(4) The status of stock or species of marine mammals (*i.e.,* depleted, not depleted, decreasing, increasing, stable, and impact relative to the size of the population);

(5) Impacts on habitat affecting rates of recruitment or survival; and

(6) The effectiveness of monitoring and mitigation measures (*i.e.,* the manner and degree in which the measure is likely to reduce adverse impacts to marine mammals, the likely effectiveness of the measures, and the practicability of implementation).

Tables 1, 4, and 5 in this document discloses the habitat, regional abundance, conservation status, density, and the number of individuals potentially exposed to sounds and pressure levels considered the threshold for Level B harassment. There are no known important reproductive or feeding areas in the action area.

For reasons stated previously in this document, and in the notice of the proposed IHA (76 FR 71517), the specified activities associated with the ACOE's blasting operations are not likely to cause PTS, or other non-auditory injury, serious injury, or death to affected marine mammals. As a result, no take by injury, serious injury, or death is anticipated or authorized, and the potential for temporary or permanent hearing impairment is very low and will be minimized through the incorporation of the monitoring and mitigation measures.

No injuries or mortalities are anticipated to occur as a result of the ACOE's blasting operations, and none are to be authorized by NMFS. Approximately 22 Atlantic bottlenose dolphins (12 from the Biscayne Bay stock, 10 from the Western North Atlantic Central Florida Coastal stock) are anticipated to incur short-term, minor, hearing impairment (TTS) and associated behavioral disruption due to the instantaneous duration of the blasting events. While some other species of marine mammals may occur in the project area, only Atlantic bottlenose dolphins are anticipated to be potentially impacted by the ACOE's blasting operations.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hr cycle). Behavioral reactions to noise exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Consequently, a behavioral response lasting less than

one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). The ACOE's action at Miami Harbor includes up to two planned blasting events per day over multiple days, however, they are very short in duration, and are only expected to potentially result in momentary reactions by marine mammals in the action area, which would not be expected to accumulate in a manner that would impact reproduction or survival.

Atlantic bottlenose dolphins are the only species of marine mammals under NMFS jurisdiction that are likely to occur in the action area, they are not listed as threatened or endangered under the ESA, however both stocks are listed as depleted and considered strategic under the MMPA. To protect these marine mammals (and other protected species in the action area), the ACOE must delay operations if animals enter designated zones. Due to the nature, degree, and context of the Level B harassment anticipated and described in this notice (see Potential Effects on Marine Mammals section above), the activity is not expected to impact rates of recruitment or survival for any affected species or stock. Also, the confined blasting activities are very short in duration and there are no known important areas in the ACOE's action area.

As mentioned previously, NMFS estimates that one species of marine mammals under its jurisdiction could be potentially affected by Level B harassment over the course of the IHA. For each species, these numbers are estimated to be small (*i.e.,* 22 Atlantic bottlenose dolphins, 12 from the Biscayne Bay stock [17% of the estimated minimum population, 7.6% of the estimated best population, and 5.2% of the estimated maximum population], and 10 from the Western North Atlantic Central Florida Coastal stock [0.19% of the estimated minimum population and 0.15% of the estimated best population] and has been mitigated to the lowest level practicable through the incorporation of the monitoring and mitigation measures mentioned previously in this document.

NMFS has determined, provided that the aforementioned monitoring and mitigation measures are implemented, that the impact of conducting the blasting activities in the Port of Miami from June, 2012 through May, 2012, may result, at worst in a temporary modification in behavior and/or low level physiological effects (Level B harassment) of small numbers of Atlantic bottlenose dolphins.

While behavioral modifications, including temporarily vacating the area immediately after blasting operations, may be made by these species to avoid the resultant underwater acoustic disturbance, the availability of alternate areas within these area and the instantaneous and sporadic duration of the blasting activities, have led NMFS to determine that this action will have a negligible impact on the specified geographic region.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS has determined that the ACOE's planned blasting activities will result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking from the blasting activities will have a negligible impact on the affected species or stocks of marine mammals; and the impacts to affected species or stocks of marine mammals have been mitigated to the lowest level practicable.

Impact on Availability of Affected Species for Taking for Subsistence Uses

Section 101(a)(5)(D) also requires NMFS to determine that the authorization will not have an unmitigable adverse effect on the availability of marine mammal species or stocks for subsistence use. There is no subsistence hunting for marine mammals in the action area (waters off of the coast of southeast Florida) that implicates MMPA section 101(a)(5)(D).

Endangered Species Act

Under section 7 of the ESA, the ACOE requested formal consultation with the NMFS SERO, on the project to improve the Port of Miami on September 5, 2002, and reinitiated consultation on January 6, 2011. NMFS determined that the action is likely to adversely affect one ESA-listed species and prepared a Biological Opinion (BiOp) issued on September 8, 2011, that analyzes the project's effects on staghorn coral (*Acropora cervicornis*). It is NMFS' biological opinion that the action, is likely to adversely affect staghorn coral, but is not likely to jeopardize its continued existence or destroy or adversely modify its designated critical habitat. Based upon NMFS SERO's updated analysis, NMFS no longer expects the project is likely to adversely affect Johnson's seagrass (*Halophila johnsonii*) or its designated critical habitat. NMFS SERO has determined that the ESA-listed marine mammals (blue, fin, sei, humpback, North Atlantic right, and sperm whales), smalltooth sawfish (*Pristis pectinata*), and leatherback sea turtles (*Dermochelys coriacea*) are not likely to be adversely affected by the action. Previous NMFS BiOps have determined that hopper dredges may affect hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempii*), green (*Chelonia mydas*), and loggerhead (*Caretta caretta*) sea turtles through entrainment by the draghead. Any incidental take of loggerhead, green, Kemp's ridley, or hawksbill sea turtles due to hopper dredging has been previously authorized in NMFS' 1997 South Atlantic Regional BiOp on hopper dredging along the South Atlantic coast. The ACOE is currently in re-initiation of consultation with NMFS on the South Atlantic Regional BiOp. When a new BiOp is issued by NMFS, the Terms and Conditions of that South Atlantic Regional BiOp will be incorporated into the project.

National Environmental Policy Act

The ACOE has prepared a ''Final General Reevaluation Report and Environmental Impact Statement on the Navigation Study for Miami Harbor, Miami-Dade County, Florida,'' and a ''Record of Decision on the Navigation Study for Miami Harbor, Miami-Dade County, Florida'' for the project was signed on May 22, 2006; however, this document does not analyze NMFS' action, the issuance of the IHA for the ACOE's activity. NMFS, after independently reviewing and evaluating the document for sufficiency and compliance with the Council of Environmental Quality (CEQ) regulations and NOAA Administrative Order (NAO) 216–6 § 5.09(d), has conducted a separate National Environmental Policy Act (NEPA) analysis and prepared a ''Environmental Assessment for Issuance of an Incidental Harassment Authorization for U.S. Army Corps of Engineers Confined Blasting Operations During the Port of Miami Construction Project in Miami, Florida,'' which analyzes the project's purpose and need, alternatives, affected environment, and environmental effects for the action prior to making a determination on the issuance of the IHA. Based on the analysis in the EA and the underlying information in the record, including the application, proposed IHA, public comments, and formal ESA section 7 consultation, NMFS has prepared and issued a Finding of No Significant Impact determining that preparation of an

Environmental Impact Statement is not required.

Authorization

NMFS has issued an IHA to the ACOE for conducting blasting operations at the Port of Miami, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: July 31, 2012.

Helen M. Golde,

Acting Director, Office of Protected Resources, National Marine Fisheries Service.

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