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5 MITIGATION MEASURES

As part of the Navy's commitment to sustainable use of resources and environmental stewardship, the Navy incorporates measures that are protective of the environment into all of its activities. These include employment of best management practice, standard operating procedures (SOPs), adoption of conservation recommendations, and other measures that mitigate the impacts of Navy activities on the environment. Some of these measures are generally applicable and others are designed to apply to certain geographic areas during certain times of year, for specific types of Navy training. Mitigation measures covering habitats and species occurring in the Southern California (SOCAL) Range Complex have been developed through various environmental analyses conducted by the Navy for land and sea ranges and adjacent coastal waters.

The Navy has implemented a variety of marine mammal mitigation measures over the last two decades. This following discussion briefly describes the genesis and status of those mitigation measures.

Since the 1990s, the Navy has developed and implemented mitigation measures either as a result of environmental analysis or in consultation with regulatory agencies for research, development, test and evaluation activities (RDT&E) and training exercises. These measures included visual detection by trained lookouts, power down and shut down procedures, the use of passive sensors to detect marine mammals, and avoidance of marine mammals.

In December 2000, the Navy issued a memorandum entitled "Compliance with Environmental Requirements in the Conduct of Naval Exercises or Training at Sea" (Department of the Navy [DoN] 2000). This memorandum clarified Navy policy for continued compliance with certain environmental requirements including preparation of environmental planning documents, consultations pursuant to the Endangered Species Act (ESA), and applications for "take" authorizations under the Marine Mammal Protection Act (MMPA).

In 2003, the Navy issued the Protective Measures Assessment Protocol (PMAP) that implemented Navy-wide mitigation measures for various types of routine training events. Following the implementation of PMAP, the Navy agreed to additional mitigation measures as part of MMPA authorization and ESA consultation processes for specific training exercises from 2004-2007.

Finally, as authorized by the MMPA, the Secretary of Defense has approved two National Defense Exemptions (NDE) from the requirements of the MMPA for certain military readiness activities that employ mid-frequency active (MFA) sonar. The NDE includes mitigation measures that must be observed for use of MFA sonar during major Navy training exercises and on established Navy ranges and OPAREAs. These measures were designed to strike a reasoned balance between environmental protection, military readiness activities and, ultimately, the Navy's mission of National security. The NDE is in effect through January 2009.

In order to make the findings necessary to issue the MMPA authorization, it may be necessary for the National Marine Fisheries Service (NMFS) to require additional mitigation or monitoring measures beyond those addressed in this Environmental Impact Statement (EIS)/ Overseas Environmental Impact Statement (OEIS) (hereafter referred to as "EIS/OEIS"). These could include measures considered, but eliminated in this EIS/OEIS, or as yet undeveloped measures. In addition to commenting on this EIS/OEIS, the public will have an opportunity to provide information to NMFS through the MMPA process, both during the comment period following NMFS' Notice of Receipt of the application for a Letter of Authorization (LOA), and during the comment period following publication of the proposed rule. NMFS may propose additional mitigation or monitoring measures in the proposed rule. The suite of measures developed to

date as a result of those MMPA processes are included and analyzed as part of this section.

Additionally, the Navy is engaging in consultation processes under the ESA with regard to listed species that may be affected by the activities described in this EIS/OEIS. For the purposes of the ESA section 7 consultation, the mitigation measures proposed here may be considered by NMFS as beneficial actions taken by the Federal agency or applicant (50 CFR 402.14[g][8]). If required to satisfy requirements of the Endangered Species Act, NMFS may develop an additional set of measures contained in Reasonable and Prudent Alternatives, Reasonable and Prudent Measures, or Conservation Recommendations in any Biological Opinion issued for this Proposed Action.

The Navy also will consider public comments on proposed mitigation measures described in this EIS/OEIS.

This Section describes mitigation measures applicable to Navy activities in the SOCAL Range Complex.

5.1 GEOLOGY AND SOILS

Existing plans and policies are in place to limit the effects of construction and training on the environment at San Clemente Island (SCI) on an island-wide basis. Specific to earth resources, the Integrated Natural Resources Management Plan (INRMP) identifies erosion as a primary management issue and presents policies to reduce the impacts of erosion on the island. The INRMP notes that “erosion and sedimentation continue, arising from inadequately constructed or maintained roads, or from ongoing damage instigated by past overgrazing by feral goats, exterminated around 1991” (DoN 2002). Policies and SOPs relation to geology and soils include:

- Managing and limiting construction activities, including road construction, through an established site approval process.
- Limiting vehicle travel to existing roads: on SCI, off-road vehicle use is not permitted except in designated off-road areas or on established trails approved by the Navy’s regional Natural Resources Office (NRO).
- Prohibiting tracked vehicular maneuvering outside the boundaries of the Armored Vehicle Maneuver Corridor (AVMC). Additionally, tracked vehicle maneuvering and camping are prohibited inside marked environmentally sensitive areas.

Additionally, because SCI is managed as a federal property, island operations comply with the Federal Soil Conservation Act; thus the Navy is required to control and prevent erosion by conducting surveys and implementing conservation measures (Soil Conservation Act, 16 U.S.C. § 5901). In accordance with this mandate, the Navy is studying sedimentation and erosion associated with watersheds on SCI.

Protective measures proposed to minimize erosion effects on terrestrial biological resources are presented in Section 3.11.3. These include development and implementation of a program to monitor for erosion, dust generation, and deposition of dust in adjacent habitats. It is recommended that such a program include monitoring and provide a means for adaptive management of erosion associated with the existing roads and ranges. Specifically, an annual review of the erosion conditions of the Missile Impact Range (MIR), firebreak road, and camera locations would be conducted under coordination with the NRO. Examples of control measures to be considered include placing riprap in problem areas to provide energy dissipation of concentrated runoff from the MIR or the firebreak road or placement of water bars to prevent runoff from concentrating to the point where erosion could occur. A representative from NRO would be consulted to ensure that any proposed erosion control efforts would not adversely affect cultural resources.

5.2 AIR QUALITY

Emissions that may affect air quality are heavily regulated under the Clean Air Act and its implementing regulations, through a comprehensive Federal / State regulatory process (see Section 3.2). Consistent with these regulatory requirements and processes, the Navy has implemented comprehensive air quality management programs to ensure compliance.

5.3 HAZARDOUS MATERIALS AND WASTES

Releases or discharges of hazardous wastes or materials are heavily regulated through a comprehensive Federal / State regulatory process (see Section 3.3.2). Consistent with these regulatory requirements and process, the Navy has implemented comprehensive management programs to ensure compliance.

Shipboard and shore management of hazardous materials and waste is governed by Navy regulations (OPNAVINST 5090.1C). Environmental compliance policies and procedures applicable to operations ashore and afloat are defined in Navy instructions. These instructions reinforce regulatory prohibitions of the Clean Water Act against discharge of harmful quantities of hazardous substances into or upon U.S. waters out to 200 nm (371 km). These instructions include stringent hazardous waste discharge, storage, dumping, and pollution prevention requirements. Navy ships are required to conduct activities at sea in a manner that minimizes or eliminates any adverse impacts on the marine environment from hazardous materials or wastes.

The Navy has an active Pollution Prevention Program that applies to all aspects of its activities. It is Navy policy to conduct its facility management and acquisition programs so as to reduce to the maximum extent possible the quantity of toxic chemicals entering the environment. The Pollution Prevention Program is a comprehensive set of practices that reduce the volumes of wastes to be treated or transferred to the environment. The fundamental tenet of the Navy's Pollution Prevention Program is the reduction of hazardous materials and wastes at their source. This results in less hazardous waste for all waste streams. Pollution prevention practices include:

- Raw material substitution,
- Product reformulation,
- Process redesign or modification,
- Improved operation and maintenance, and
- Aggressive recycling programs.

5.4 WATER RESOURCES

Environmental compliance policies and procedures applicable to operations ashore are identified in Navy instructions that include directives regarding hazardous materials and waste management, pollution prevention, and recycling. Measures about management of hazardous materials and wastes at SCI, as discussed in Section 3.4.3.2.1 *et seq.*, provide protections for surface waters and ocean waters. In addition to preventive measures, implementation of the Installation Restoration Program at SCI also provides protection to these water resources from consequences of past practices. With regard to reducing or avoiding water quality degradation from the expenditure of training materials, management practices include activities to remove training debris including unexploded ordnance from land ranges. Certain features of the training materials themselves are designed to reduce pollution, as required by Navy and Department of Defense (DoD) regulations.

5.5 ACOUSTIC ENVIRONMENT (AIRBORNE SOUND)

Military personnel who might be exposed to airborne sound from military activities are required to take precautions, such as the wearing of protective equipment, to reduce or eliminate potential harmful effects of such exposure. With regard to potential exposure of non-military personnel in ocean areas (such as fishermen in the vicinity of SCI) precautions are taken pursuant to SOPs to prevent such exposure. These include advance notice of scheduled operations to the public and the commercial fishing community via the worldwide web, Notices to Mariners (NOTMARs), and Notices to Airmen (NOTAMs). In addition, range safety SOPs ensure that civilians are excluded from, and if necessary removed from areas of military operations, or that military activities do not occur when civilians are present. These procedures have proven effective at minimizing potential military / civilian interactions in the course of active training or other military activities.

The Navy has developed detailed SOPs regarding sound in the ocean environment, particularly with respect to sonar and explosive sources. These measures are discussed in detail below in Section 5.8 with regard to potential effects of sound on marine mammals and sea turtles.

5.6 MARINE PLANTS AND INVERTEBRATES

Marine plants and invertebrates benefit from the following measures in place to protect marine mammals and sea turtles (see Section 5.8). Lookouts are posted to visually survey for floating kelp, plants, or algal mats. In training using explosive ordnance, the intended impact area shall not be within 1000 yards (yd) (585 m) of known or observed kelp beds, floating plants, or algal mats. For training events using non-explosive ordnance, intended impact area shall not be within 200 yds (183 m) of known or observed kelp beds, floating plants, or algal mats. For air-to-surface missile exercises, the buffer zone is extended to 1,800 yds (1,646 m) around kelp forests, floating plants, and algal mats, for both explosive and non-explosive ordnance.

5.7 FISH

Mitigation measures for activities involving underwater detonations, implemented for marine mammals and sea turtles, also offer protections to habitats associated with fish communities. No additional mitigation measures are proposed or warranted because no substantial effects on fish or fish habitat were identified.

5.8 SEA TURTLES AND MARINE MAMMALS

As discussed in Section 3.8 and 3.9, the comprehensive suite of protective measures and SOPs implemented by the Navy to reduce impacts to marine mammals also serves to mitigate potential impacts on sea turtles. In particular, personnel and watchstander training, establishment of turtle-free exclusion zones for underwater detonations of explosives, and pre- and post-exercise surveys, all serve to reduce or eliminate potential impacts of Navy activities on sea turtles that may be present in the vicinity.

Effective training in the SOCAL Range Complex dictates that ship, submarine, and aircraft participants utilize their sensors and exercise weapons to their optimum capabilities as required by the mission. This section is a comprehensive list of mitigation measures that would be utilized for training activities analyzed in the SOCAL EIS/OEIS in order to minimize potential for impacts on marine mammals and sea turtles in the SOCAL Range Complex.

This section includes protective and mitigation measures that are followed for all types of exercises; those that are associated with a particular type of training event; and those that apply to a particular geographic region or season. For major exercises, the applicable mitigation measures are incorporated into a naval message which is disseminated to all of the units participating in the exercise or training event and applicable responsible commands. U.S. participants are required to

comply with these measures. Non-U.S. participants involved in events within the territorial seas of the U.S. (12 nm) are requested to comply with these measures to the extent these measures do not conflict with Status Of Forces agreements. Non-U.S. participants involved in events beyond the territorial seas (12 nm) are encouraged to comply with these mitigation measures to the extent the measures do not impair training, operations, or operational capabilities.

5.8.1 General Maritime Measures

5.8.1.1 Personnel Training – Watchstanders and Lookouts

The use of shipboard lookouts is a critical component of all Navy protective measures. Navy shipboard lookouts (also referred to as “watchstanders”) are highly qualified and experienced observers of the marine environment. Their duties require that they report all objects sighted in the water to the officer of the deck (OOD) (e.g., trash, a periscope, marine mammals, sea turtles) and all disturbances (e.g., surface disturbance, discoloration) that may be indicative of a threat to the vessel and its crew. There are personnel serving as lookouts on station at all times (day and night) when a ship or surfaced submarine is moving through the water.

All commanding officers (COs), executive officers (XOs), lookouts, OODs, junior OODs (JOODs), maritime patrol aircraft aircrews, and Anti-submarine Warfare (ASW)/Mine Warfare (MIW) helicopter crews will complete the NMFS-approved Marine Species Awareness Training (MSAT) by viewing the U.S. Navy MSAT digital versatile disk (DVD). MSAT may also be viewed on-line at <https://portal.navfac.navy.mil/go/msat>. All bridge watchstanders/lookouts will complete both parts one and two of the MSAT; part two is optional for other personnel. Part I of this training addresses the lookout’s role in environmental protection, laws governing the protection of marine species, Navy stewardship commitments and general observation information to aid in avoiding interactions with marine species. Part II focuses on identification of specific species.

- Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (Naval Education and Training Command [NAVEDTRA] 12968-D).
- Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, lookouts will complete the Personal Qualification Standard Program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). Personnel being trained as lookouts can be counted among those listed below as long as supervisors monitor their progress and performance.
- Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.

5.8.1.2 Operating Procedures & Collision Avoidance

- Prior to major exercises, a Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued to further disseminate the personnel training requirement and general marine species protective measures.
- COs will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.
- While underway, surface vessels will have at least two lookouts with binoculars; surfaced submarines will have at least one lookout with binoculars. Lookouts already posted for safety of navigation and man-overboard precautions may be used to fill this requirement.

As part of their regular duties, lookouts will watch for and report to the OOD the presence of marine mammals and sea turtles.

- On surface vessels equipped with a mid-frequency active sonar, pedestal mounted “Big Eye” (20x10) binoculars will be properly installed and in good working order to assist in the detection of marine mammals and sea turtles in the vicinity of the vessel.
- Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-D).
- After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook. (NAVEDTRA 12968-D)
- While in transit, naval vessels will be alert at all times, use extreme caution, and proceed at a “safe speed” so that the vessel can take proper and effective action to avoid a collision with any marine animal and can be stopped within a distance appropriate to the prevailing circumstances and conditions.
- When marine mammals have been sighted in the area, Navy vessels will increase vigilance and take reasonable and practicable actions to avoid collisions and activities that might result in close interaction of naval assets and marine mammals. Actions may include changing speed and/or direction and are dictated by environmental and other conditions (e.g., safety, weather).
- Naval vessels will maneuver to keep a safe distance from any observed marine mammal and avoid approaching them head-on. This requirement does not apply if a vessel’s safety is threatened, such as when change of course will create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in their ability to maneuver. Restricted maneuverability includes, but is not limited to, situations when vessels are engaged in dredging, submerged operations, launching and recovering aircraft or landing craft, minesweeping operations, replenishment while underway and towing operations that severely restrict a vessel’s ability to deviate course. Vessels will take reasonable steps to alert other vessels in the vicinity of the whale.
- Floating weeds and kelp, algal mats, clusters of seabirds, and jellyfish are good indicators of sea turtles and marine mammals. Therefore, increased vigilance in watching for sea turtles and marine mammals will be taken where these are present.
- Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.
- All vessels will maintain logs and records documenting training operations should they be required for event reconstruction purposes. Logs and records will be kept for a period of 30 days following completion of a major training exercise.

5.8.2 Measures for Specific Training Events

5.8.2.1 Mid-Frequency Active Sonar Operations

5.8.2.1.1 General Maritime Mitigation Measures: Personnel Training

- All lookouts onboard platforms involved in ASW training events will review the NMFS-approved Marine Species Awareness Training material prior to use of mid-frequency active sonar.
- All COs, XO's, and officers standing watch on the bridge will have reviewed the Marine Species Awareness Training material prior to a training event employing the use of mid-frequency active sonar.
- Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (Naval Educational Training [NAVEDTRA], 12968-D).
- Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, lookouts will complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not forbid personnel being trained as lookouts from being counted as those listed in previous measures so long as supervisors monitor their progress and performance.
- Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of mitigation measures if marine species are spotted.

5.8.2.1.2 General Maritime Mitigation Measures: Lookout and Watchstander Responsibilities

- On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.
- All surface ships participating in ASW training events will, in addition to the three personnel on watch noted previously, have at all times during the exercise at least two additional personnel on watch as lookouts.
- Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.
- On surface vessels equipped with mid-frequency active sonar, pedestal mounted "Big Eye" (20x110) binoculars will be present and in good working order to assist in the detection of marine mammals in the vicinity of the vessel.
- Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-D).
- After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook. Application of these techniques, which include the use of night vision goggles, allow lookouts to effectively monitor a 1,100-yd (1,000-m) safety zone at night.
- Personnel on lookout will be responsible for reporting all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

5.8.2.1.3 Operating Procedures

- A Letter of Instruction, Mitigation Measures Message, or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal mitigation measures.
- COs will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.
- All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.
- During mid-frequency active sonar operations, personnel will utilize all available sensor and optical systems (such as night vision goggles) to aid in the detection of marine mammals.
- Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.
- Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yds (183 m) of the sonobuoy.
- Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.
- Safety Zones—When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yds (914 m) of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 decibels (dB) below normal operating levels. (A 6 dB reduction equates to a 75 percent power reduction. The reason is that decibel levels are on a logarithmic scale, not a linear scale. Thus, a 6 dB reduction results in a power level only 25 percent of the original power.)
 - Ships and submarines will continue to limit maximum transmission levels by this 6-dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yds (1829 m) beyond the location of the last detection.
 - Should a marine mammal be detected within or closing to inside 500 yds (457 m) of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. (A 10 dB reduction equates to a 90 percent power reduction from normal operating levels.) Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yds (457 m) beyond the location of the last detection.
 - Should the marine mammal be detected within or closing to inside 200 yds (183 m) of the sonar dome, active sonar transmissions will cease. Sonar will not resume until the animal has been seen to leave the area, has not been detected for

30 minutes, or the vessel has transited more than 2,000 yds (457 m) beyond the location of the last detection.

- Special conditions applicable for dolphins and porpoises only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the OOD concludes that dolphins or porpoises are deliberately closing to ride the vessel's bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.
- If the need for power-down should arise as detailed in "Safety Zones" above, the Navy shall follow the requirements as though they were operating at 235 dB—the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 sonar was being operated).
- Prior to start up or restart of active sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.
- Active sonar levels (generally)—Navy will operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.
- Helicopters shall observe/survey the vicinity of an ASW training event for 10 minutes before the first deployment of active (dipping) sonar in the water.
- Helicopters shall not dip their sonar within 200 yds (183 m) of a marine mammal and shall cease pinging if a marine mammal closes within 200 yds (183 m) after pinging has begun.
- Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW training events involving active mid-frequency sonar.
- Increased vigilance will be practiced during ASW training events with tactical active sonar when critical conditions are present.

Based on lessons learned from strandings in Bahamas 2000, Madeiras 2000, Canaries 2002 and Spain 2006, beaked whales are of particular concern. The Navy should avoid planning Major ASW Training Exercises with mid-frequency active sonar in areas where they will encounter conditions which, in their aggregate, may contribute to a marine mammal stranding event.

The conditions to be considered during exercise planning include:

- Areas of at least 1,000-m depth near a shoreline where there is a rapid change in bathymetry on the order of 1,000-6,000 yds (914-5,486 m) occurring across a relatively short horizontal distance (e.g., 5 nautical miles [nm]).
- Cases for which multiple ships or submarines (≥ 3) operating mid-frequency active sonar in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10 nm apart).
- An area surrounded by land masses, separated by less than 35 nm and at least 10 nm in length, or an embayment, wherein operations involving multiple ships/subs (≥ 3) employing mid-frequency active sonar near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.

- Though not as dominant a condition as bathymetric features, the historical presence of a significant surface duct (i.e., a mixed layer of constant water temperature extending from the sea surface to 100 ft or more).

If the Major Range Event is to occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. The Navy will increase vigilance by undertaking the following additional mitigation measure:

- A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. Where practical, advance survey should occur within about 2 hours prior to mid-frequency active sonar use and periodic surveillance should continue for the duration of the exercise. Any unusual conditions (e.g., presence of marine mammals, groups of species milling out of habitat, and any stranded animals) shall be reported to the Office in Tactical Command, who should give consideration to delaying, suspending, or altering the exercise.
- All safety zone power down requirements described above will apply.
- The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with exact location and time/duration of the event, and noting results of surveys conducted.

5.8.2.2 Surface-to-Surface Gunnery (up to 5-inch explosive rounds)

- Lookouts will visually survey for floating weeds and kelp, and algal mats which may be inhabited by immature sea turtles in the target area. Intended impact shall not be within 600 yds (585 m) of known or observed floating weeds and kelp, and algal mats.
- A 600 yard radius buffer zone will be established around the intended target.
- From the intended firing position, lookouts will survey the buffer zone for marine mammals and sea turtles prior to commencement and during the exercise as long as practicable. Due to the distance between the firing position and the buffer zone, lookouts are only expected to visually detect breaching whales, whale blows, and large pods of dolphins and porpoises.
- When manned, target towing vessels will maintain a lookout. If a marine mammal or sea turtle is sighted in the vicinity of the exercise, the tow vessel will immediately notify the firing vessel in order to secure gunnery firing until the area is clear.
- The exercise will be conducted only when the buffer zone is visible and marine mammals and sea turtles are not detected within the target area and the buffer zone.

5.8.2.3 Surface-to-Surface Gunnery (non-explosive rounds)

- Lookouts will visually survey for floating weeds and kelp, and algal mats which may be inhabited by immature sea turtles in the target area. Intended impact will not be within 200 yds (183 m) of known or observed floating weeds and kelp, and algal mats.
- A 200-yd (183 m) radius buffer zone will be established around the intended target.
- From the intended firing position, lookouts will survey the buffer zone for marine mammals and sea turtles prior to commencement and during the exercise as long as practicable. Due to the distance between the firing position and the buffer zone, lookouts are only expected to visually detect breaching whales, whale blows, and large pods of dolphins and porpoises.

- When manned, target towing vessels will maintain a lookout. If a marine mammal or sea turtle is sighted in the vicinity of the exercise, the tow vessel will immediately notify the firing vessel in order to secure gunnery firing until the area is clear.
- The exercise will be conducted only when the buffer zone is visible and marine mammals and sea turtles are not detected within the target area and the buffer zone.

5.8.2.4 Surface-to-Air Gunnery (explosive and non-explosive rounds)

- Vessels will orient the geometry of gunnery exercises in order to prevent debris from falling in the area of sighted marine mammals, sea turtles, algal mats, and floating kelp.
- Vessels will expedite the recovery of any parachute deploying aerial targets to reduce the potential for entanglement of marine mammals and sea turtles.
- Target towing aircraft shall maintain a lookout. If a marine mammal or sea turtle is sighted in the vicinity of the exercise, the tow aircraft will immediately notify the firing vessel in order to secure gunnery firing until the area is clear.

5.8.2.5 Air-to-Surface Gunnery (explosive and non-explosive rounds)

- If surface vessels are involved, lookouts will visually survey for floating kelp, which may be inhabited by immature sea turtles, in the target area. Impact should not occur within 200 yds (183 m) of known or observed floating weeds and kelp or algal mats.
- A 200 yd (183 m) radius buffer zone will be established around the intended target.
- If surface vessels are involved, lookout(s) will visually survey the buffer zone for marine mammals and sea turtles prior to and during the exercise.
- Aerial surveillance of the buffer zone for marine mammals and sea turtles will be conducted prior to commencement of the exercise. Aerial surveillance altitude of 500 feet to 1,500 ft (152 - 456 m) is optimum. Aircraft crew/pilot will maintain visual watch during exercises. Release of ordnance through cloud cover is prohibited: aircraft must be able to actually see ordnance impact areas.
- The exercise will be conducted only if marine mammals and sea turtles are not visible within the buffer zone.

5.8.2.6 Small Arms Training - (grenades, explosive and non-explosive rounds)

- Lookouts will visually survey for floating weeds or kelp, algal mats, marine mammals, and sea turtles. Weapons will not be fired in the direction of known or observed floating weeds or kelp, algal mats, marine mammals, sea turtles.

5.8.2.7 Air-to-Surface At-Sea Bombing Exercises (explosive and non-explosive bombs and cluster munitions, rockets)

- If surface vessels are involved, lookouts will survey for floating kelp, which may be inhabited by immature sea turtles. Ordnance shall not be targeted to impact within 1,000 yds (914 m) of known or observed floating kelp, sea turtles, or marine mammals.
- A buffer zone of 1,000 yd (914 m) radius will be established around the intended target.
- Aircraft will visually survey the target and buffer zone for marine mammals and sea turtles prior to and during the exercise. The survey of the impact area will be made by flying at 1,500 feet or lower, if safe to do so, and at the slowest safe speed. Release of ordnance through cloud cover is prohibited: aircraft must be able to actually see

ordnance impact areas. Survey aircraft should employ most effective search tactics and capabilities.

- The exercises will be conducted only if marine mammals and sea turtles are not visible within the buffer zone.

5.8.2.8 Air-to-Surface Missile Exercises (explosive and non-explosive)

- Ordnance shall not be targeted to impact within 1,800 yds (1,646 m) of known or observed floating kelp, which may be inhabited by immature sea turtles.
- Aircraft will visually survey the target area for marine mammals and sea turtles. Visual inspection of the target area will be made by flying at 1,500 (457 m) feet or lower, if safe to do so, and at slowest safe speed. Firing or range clearance aircraft must be able to actually see ordnance impact areas. Explosive ordnance shall not be targeted to impact within 1,800 yds (1646 m) of sighted marine mammals and sea turtles.

5.8.2.9 Mine Countermeasures (Mine Sweeping)

- Establish a 250 yard buffer zone around the vessel and any towed sonar equipment.
- Do not conduct exercise if marine mammals or sea turtles are detected within the buffer zone.
- Use lookouts to survey for kelp beds before and during the exercise.
- Exercise shall not be conducted within 250 yards of known or observed kelp beds.

5.8.2.10 Underwater Detonations (up to 20-lb charges)

To ensure protection of marine mammals and sea turtles during underwater detonation training, the operating area must be determined to be clear of marine mammals and sea turtles prior to detonation. Implementation of the following mitigation measures continue to ensure that marine mammals would not be exposed to temporary threshold shift (TTS), permanent threshold shift (PTS), or injury from physical contact with training mine shapes during Major Exercises.

5.8.2.10.1 Exclusion Zones

All Mine Warfare and Mine Countermeasures Operations involving the use of explosive charges must include exclusion zones for marine mammals and sea turtles to prevent physical and/or acoustic effects to those species. These exclusion zones shall extend in a 700-yard arc radius around the detonation site.

5.8.2.10.2 Pre-Exercise Surveys

For Demolition and Ship Mine Countermeasures Operations, pre-exercise survey shall be conducted within 30 minutes prior to the commencement of the scheduled explosive event. The survey may be conducted from the surface, by divers, and/or from the air, and personnel shall be alert to the presence of any marine mammal or sea turtle. Should such an animal be present within the survey area, the exercise shall be paused until the animal voluntarily leaves the area. The Navy will suspend detonation exercises and ensure the area is clear for a full 30 minutes prior to detonation. Personnel will record any marine mammal and sea turtle observations during the exercise as well as measures taken if species are detected within the exclusion zone.

5.8.2.10.3 Post-Exercise Surveys and Reporting

Surveys within the same radius shall also be conducted within 30 minutes after the completion of the explosive event.

If there is evidence that a marine mammal or sea turtle may have been stranded, injured or killed by the action, Navy training activities will be immediately suspended and the situation

immediately reported by the participating unit to the Officer in Charge of the Exercise (OCE), who will follow Navy procedures for reporting the incident to the Commander, Pacific Fleet, Commander, Navy Region Southwest, Environmental Director, and the chain-of-command.

5.8.2.11 Very Shallow Water Underwater Detonations Mitigation Measures

- For each exercise, the safety-boat with an observer is launched 30 or more minutes prior to detonation and moves through the area around the detonation site. The task of the safety observer is to augment a shore observer's visual search of the mitigation zone for marine mammals and turtles. The safety-boat observer is in constant radio communication with the exercise coordinator and shore observer.
- At least 10 minutes prior to the planned initiation of the detonation event-sequence, the shore observer, on an elevated on-shore position, begins a continuous visual search with binoculars of the mitigation zone. At this time, the safety-boat observer informs the shore observer if any marine mammal or turtle has been seen in the zone and, together, both search the surface within and beyond the mitigation zone for marine mammals and turtles.
- The shore observer will indicate that the area is clear of animals after 10 or more minutes of continuous observation with no marine mammals or turtles having been seen in the mitigation zone or moving toward it.
- The observer will indicate that the area is not clear of animals any time a marine mammal or turtle is sighted in the mitigation zone or moving toward it and, subsequently, indicate that the area is clear of animals when the animal is out and moving away and no others have been sighted.
- Initiation of the detonation sequence will only begin on receipt of an indication from the shore observer that the area is clear of animals and will be postponed on receipt of an indication from that observer that the area is not clear of animals.
- Following the detonation, visual monitoring of the mitigation zone continues for 30 minutes for the appearance of any marine mammal or turtle in the zone. Any marine mammal or sea turtle appearing in the area will be observed for signs of possible injury. Possibly injured marine mammals or turtles are reported to the CNRSW Environmental Director and CPF San Diego Detachment office.

5.8.2.12 Mining Operations

Mining Operations involve aerial drops of inert training shapes on target points. Aircrews are scored for their ability to accurately hit the target points. This operation does not involve live ordnance. The probability of a marine species being in the exact spot in the ocean where an inert object is dropped is remote. However, as a conservative measure, initial target points will be briefly surveyed prior to inert ordnance release from an aircraft to ensure the intended drop area is clear of marine mammals and sea turtles.

5.8.2.13 Sinking Exercise

The selection of sites suitable for SINKEX involves a balance of operational suitability, requirements established under the Marine Protection, Research and Sanctuaries Act (MPRSA) permit granted to the Navy (40 Code of Federal Regulations § 229.2), and the identification of areas with a low likelihood of encountering marine mammals and sea turtles. To meet operational suitability criteria, locations must be within a reasonable distance of the target vessels' originating location. The locations should also be close to active military bases to allow participating assets access to shore facilities. For safety purposes, these locations should also be in areas that are not generally used by non-military air or watercraft. The MPRSA permit requires vessels to be sunk in waters which are at least 1,000 fathoms (3,000 yds / 2,742 m) deep and at least 50 nm from land.

In general, most marine mammals prefer areas with strong bathymetric gradients and oceanographic fronts for significant biological activity such as feeding and reproduction. Typical locations include the continental shelf and shelf-edge.

5.8.2.13.1 Sink Exercise Mitigation Plan

The Navy has developed range clearance procedures to maximize the probability of sighting any ships, marine mammals, or sea turtles in the vicinity of an exercise, which are as follows:

- All weapons firing would be conducted during the period 1 hour after official sunrise to 30 minutes before official sunset.
- Extensive range clearance operations would be conducted in the hours prior to commencement of the exercise, ensuring that no shipping is located within the hazard range of the longest-range weapon being fired for that event.
- An exclusion zone with a radius of 1.0 nm would be established around each target. This exclusion zone is based on calculations using a 990-pound (lb) H6 net explosive weight high explosive source detonated 5 ft below the surface of the water, which yields a distance of 0.85 nm (cold season) and 0.89 nm (warm season) beyond which the received level is below the 182 decibels (dB) re: 1 micropascal squared-seconds ($\mu\text{Pa}^2\text{-s}$) threshold established for the WINSTON S. CHURCHILL (DDG 81) shock trials (DoN 2001). An additional buffer of 0.5 nm would be added to account for errors, target drift, and animal movements. Additionally, a safety zone, which extends from the exclusion zone at 1.0 nm out an additional 0.5 nm, would be surveyed. Together, the zones extend out 2 nm from the target.
- A series of surveillance over-flights would be conducted within the exclusion and the safety zones, prior to and during the exercise, when feasible. Survey protocol would be as follows:
 - Overflights within the exclusion zone would be conducted in a manner that optimizes the surface area of the water observed. This may be accomplished through the use of the Navy's Search and Rescue Tactical Aid, which provides the best search altitude, ground speed, and track spacing for the discovery of small, possibly dark objects in the water based on the environmental conditions of the day. These environmental conditions include the angle of sun inclination, amount of daylight, cloud cover, visibility, and sea state.
 - All visual surveillance activities would be conducted by Navy personnel trained in visual surveillance. At least one member of the mitigation team would have completed the Navy's marine mammal training program for lookouts.
 - In addition to the overflights, the exclusion zone would be monitored by passive acoustic means, when assets are available. This passive acoustic monitoring would be maintained throughout the exercise. Potential assets include sonobuoys, which can be utilized to detect any vocalizing marine mammals (particularly sperm whales) in the vicinity of the exercise. The sonobuoys would be re-seeded as necessary throughout the exercise. Additionally, passive sonar onboard submarines may be utilized to detect any vocalizing marine mammals in the area. The OCE would be informed of any aural detection of marine mammals and would include this information in the determination of when it is safe to commence the exercise.
 - On each day of the exercise, aerial surveillance of the exclusion and safety zones would commence 2 hours prior to the first firing.

- The results of all visual, aerial, and acoustic searches would be reported immediately to the OCE. No weapons launches or firing would commence until the OCE declares the safety and exclusion zones free of marine mammals and sea turtles.
- If a marine mammal or sea turtle is observed within the exclusion zone is diving, firing would be delayed until the animal is re-sighted outside the exclusion zone, or 30 minutes have elapsed. After 30 minutes, if the animal has not been re-sighted it would be assumed to have left the exclusion zone.
- During breaks in the exercise of 30 minutes or more, the exclusion zone would again be surveyed for any marine mammals or sea turtles. If any marine species are sighted within the exclusion zone, the OCE would be notified, and the procedure described above would be followed.
- Upon sinking of the vessel, a final surveillance of the exclusion zone would be monitored for 2 hours, or until sunset, to verify that no marine mammals were harmed.
- Aerial surveillance would be conducted using helicopters or other aircraft based on necessity and availability. The Navy has several types of aircraft capable of performing this task; however, not all types are available for every exercise. For each exercise, the available asset best suited for identifying objects on and near the surface of the ocean would be used. These aircraft would be capable of flying at the slow safe speeds necessary to enable viewing of marine vertebrates with unobstructed, or minimally obstructed, downward and outward visibility. The exclusion and safety zone surveys may be cancelled in the event that a mechanical problem, emergency search and rescue, or other similar and unexpected event preempts the use of one of the aircraft onsite for the exercise.
- Every attempt would be made to conduct the exercise in sea states that are ideal for marine mammal sighting, Beaufort Sea State 3 or less. In the event of a 4 or above, survey efforts would be increased within the zones. This would be accomplished through the use of an additional aircraft, if available, and conducting tight search patterns.
- The exercise would not be conducted unless the exclusion zone could be adequately monitored visually.
- In the event that any marine mammals or sea turtles are observed to be harmed in the area, a detailed description, including a description of the state of decomposition, if present, of the animal would be taken, the location noted, and if possible, photos taken. This information would be provided to NOAA Fisheries via the Navy's regional environmental coordinator for purposes of identification.
- An after action report detailing the exercise's time line, the time the surveys commenced and terminated, amount, and types of all ordnance expended, and the results of survey efforts for each event would be submitted to NOAA Fisheries.

5.8.2.14 Mitigation Measures Related to Explosive Source Sonobuoys (AN/SSQ-110A)

5.8.2.14.1 AN/SSQ-110A Pattern Deployment

- Crews will conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search should be conducted below 1500 ft at a slow speed when operationally feasible and weather conditions permit. In dual aircraft operations, crews may conduct coordinated area clearances.

- Crews shall conduct a minimum of 30 minutes of visual and aural monitoring of the search area prior to commanding the first post (source/receiver sonobuoy pair) detonation. This 30 minute observation period may include pattern deployment time.
- For any part of the briefed pattern where a post will be deployed within 1000 yds of observed marine mammal activity, crews will deploy the receiver ONLY and monitor while conducting a visual search. When marine mammals are no longer detected within 1000 yds of the intended post position, crews will collocate the AN/SSQ-110A sonobuoy (source) with the receiver.
- When operationally feasible, crews will conduct continuous visual and aural monitoring of marine mammal activity, including monitoring of their aircraft sensors from first sensor placement to checking off-station and out of RF range of the sensors.

5.8.2.14.2 AN/SSQ-110A Pattern Employment

- Aural Detection:
 - Aural detection of marine mammals cues the aircrew to increase the diligence of their visual surveillance.
 - If, following aural detection, no marine mammals are visually detected, then the crew may continue multi-static active search.
- Visual Detection:
 - If marine mammals are visually detected within 1000 yds of the AN/SSQ-110A sonobuoy intended for use, then that payload shall not be detonated. Aircrews may utilize this post once the marine mammals have not been re-sighted for 30 minutes or are observed to have moved outside the 1000 yd safety zone.
 - Aircrews may shift their multi-static active search to another post, where marine mammals are outside the 1000 yd safety zone.

5.8.2.14.3 AN/SSQ-110A Scuttling Sonobuoys

- Aircrews shall make every attempt to manually detonate the unexploded charges at each post in the pattern prior to departing the operations area by using the “Payload 1 Release” command followed by the “Payload 2 Release” command. Aircrews shall refrain from using the “Scuttle” command when two payloads remain at a given post. Aircrews will ensure a 1000 yd safety zone, visually clear of marine mammals, is maintained around each post as is done during active search operations.
- Aircrews shall only leave posts with unexploded charges in the event of a sonobuoy malfunction, an aircraft system malfunction, or when an aircraft must immediately depart the area due to issues such as fuel constraints, inclement weather, and in-flight emergencies. In these cases, the sonobuoy will self-scuttle using the secondary method or tertiary method.
- Aircrews ensure all payloads are accounted for. Sonobuoys that cannot be scuttled shall be reported as unexploded ordnance via voice communications while airborne and, upon landing, via Naval message.
- Mammal monitoring shall continue until out of their aircraft sensor range.

5.8.3 Conservation Measures

5.8.3.1 Proposed Monitoring Plan for the SOCAL Range Complex

The Navy has submitted a draft Monitoring Plan for the SOCAL Range Complex, which may be viewed at NMFS' Web site: <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>. NMFS and the Navy have worked together on the development of this plan in the months preceding the publication of this Final EIS/OEIS; however, Navy and NMFS are still refining the plan and anticipate that it will contain more details by the time it is finalized in advance of the issuance of the Record of Decision. Additionally, the plan may be modified or supplemented based on comments or new information received from the public. A summary of the primary components of the plan follows.

The draft Monitoring Plan for SOCAL has been designed as a collection of focused "studies" (described fully in the SOCAL draft Monitoring Plan) to gather data that will allow the Navy to address the following questions:

- Are marine mammals exposed to MFA sonar, especially at levels associated with adverse effects (i.e., based on NMFS' criteria for behavioral harassment, TTS, or PTS)? If so, at what levels are they exposed?
- If marine mammals are exposed to MFA sonar in the SOCAL Range Complex, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?
- If marine mammals are exposed to MFA sonar, what are their behavioral responses to various levels?
- Is the Navy's suite of mitigation measures for MFA sonar (e.g., measures agreed to by the Navy through permitting) effective at avoiding TTS, injury, and mortality of marine mammals?

Data gathered in these studies will be collected by qualified, professional marine mammal biologists that are experts in their field. They will use a combination of the following methods to collect data:

- Contracted vessel and aerial surveys.
- Passive acoustics.
- Marine mammal observers on Navy ships.

In the five proposed study designs (all of which cover multiple years), the above methods will be used separately or in combination to monitor marine mammals in different combinations before, during, and after training activities utilizing MFA sonar/HFA sonar.

This monitoring plan has been designed to gather data on all species of marine mammals that are observed in SOCAL. The Plan recognizes that deep-diving and cryptic species of marine mammals such as beaked whales have a low probability of detection (Barlow and Gisiner, 2006). Therefore, methods will be utilized to attempt to address this issue (e.g., passive acoustic monitoring).

In addition to the Monitoring Plan for SOCAL, by the end of 2009, the Navy will have completed an Integrated Comprehensive Monitoring Program (ICMP). The ICMP will provide the overarching structure and coordination that will, over time, compile data from both range specific monitoring plans (such as AFAST, the Hawaii Range Complex, and the SOCAL Range Complex) as well as Navy funded research and development (R&D) studies. The primary objectives of the ICMP are to:

- Monitor Navy training events, particularly those involving MFA sonar and underwater detonations, for compliance with the terms and conditions of ESA Section 7 consultations or MMPA authorizations;
- Collect data to support estimating the number of individuals exposed to sound levels above current regulatory thresholds;
- Assess the efficacy of the Navy's current marine species mitigation;
- Add to the knowledge base on potential behavioral and physiological effects to marine species from mid-frequency active sonar and underwater detonations; and,
- Assess the practicality and effectiveness of a number of mitigation tools and techniques (some not yet in use).

More information about the ICMP may be found in the draft Monitoring Plan for SOCAL.

5.8.3.2 Adaptive Management

Adaptive management principles consider appropriate adjustments to mitigation, monitoring, and reporting as the outcomes of the proposed actions and required mitigation are better understood. NMFS includes adaptive management principles in the regulations for the implementation of the proposed action, and any adaptive adjustments of mitigation and monitoring would be led by NMFS via the MMPA process and developed in coordination with the Navy. Continued opportunity for public input would be included via the MMPA process, as appropriate (i.e. via the "Letter of Authorization" process). The intent of adaptive management here is to ensure the continued proper implementation of the required mitigation measures, to conduct appropriate monitoring and evaluation efforts, and to recommend possible adjustments to the mitigation/monitoring/reporting to accomplish the established goals of the mitigation and monitoring which include:

Mitigation

- Avoidance or minimization of injury or death of marine mammals wherever possible (goals b, c, and d may contribute to this goal).
- A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of sound associated with the proposed active sonar activities,
- A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels,
- A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels
- A reduction in effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.
- For monitoring directly related to mitigation - an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation measures (shut-down zone, etc.).

Monitoring

- An increase in the probability of detecting marine mammals, both within the safety zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the effects analyses.
- An increase in our understanding of how many marine mammals are likely to be exposed to levels of MFA sonar/HFA sonar (or explosives or other stimuli) that we associate with specific adverse effects, such as behavioral harassment, TTS, or PTS.
- An increase in our understanding of how marine mammals respond to MFA sonar/HFA sonar (at specific received levels), explosives, or other stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival)
- An increased knowledge of the affected species
- An increase in our understanding of the effectiveness of certain mitigation and monitoring measures

Generally speaking, adaptive management supports the integration of NEPA's principles into the ongoing implementation and management of the Proposed Action, including a process for improving, where needed, the effectiveness of the identified mitigations. Note that any adjustment of mitigation and monitoring would be within the scope of the environmental analyses and considerations presented in this EIS/OEIS.

5.8.3.3 Research

The Navy provides a significant amount of funding and support to marine research. In the past five years the agency funded over \$100 million (\$26 million in FY08 alone) to universities, research institutions, federal laboratories, private companies, and independent researchers around the world to study marine mammals. The U.S. Navy sponsors seventy percent of all U.S. research concerning the effects of human-generated sound on marine mammals and 50 percent of such research conducted worldwide. Major topics of Navy-supported research include the following:

- Better understanding of marine species distribution and important habitat areas,
- Developing methods to detect and monitor marine species before and during training,
- Understanding the effects of sound on marine mammals, sea turtles, fish, and birds, and
- Developing tools to model and estimate potential effects of sound.

This research is directly applicable to Fleet training activities, particularly with respect to the investigations of the potential effects of underwater noise sources on marine mammals and other protected species. Proposed training activities employ active sonar and underwater explosives, which introduce sound into the marine environment.

The Marine Life Sciences Division of the Office of Naval Research currently coordinates six programs that examine the marine environment and are devoted solely to studying the effects of noise and/or the implementation of technology tools that will assist the Navy in studying and tracking marine mammals. The six programs are as follows:

- Environmental Consequences of Underwater Sound,
- Non-Auditory Biological Effects of Sound on Marine Mammals,
- Effects of Sound on the Marine Environment,

- Sensors and Models for Marine Environmental Monitoring,
- Effects of Sound on Hearing of Marine Animals, and
- Passive Acoustic Detection, Classification, and Tracking of Marine Mammals.

The Navy has also developed the technical reports referenced within this document, including the Marine Resource Assessment. Furthermore, research cruises by the National Marine Fisheries Service (NMFS) and by academic institutions have received funding from the U.S. Navy.

The Navy has sponsored several workshops to evaluate the current state of knowledge and potential for future acoustic monitoring of marine mammals. The workshops brought together acoustic experts and marine biologists from the Navy and other research organizations to present data and information on current acoustic monitoring research efforts and to evaluate the potential for incorporating similar technology and methods on instrumented ranges. However, acoustic detection, identification, localization, and tracking of individual animals still requires a significant amount of research effort to be considered a reliable method for marine mammal monitoring. The Navy supports research efforts on acoustic monitoring and will continue to investigate the feasibility of passive acoustics as a potential mitigation and monitoring tool.

Overall, the Navy will continue to fund ongoing marine mammal research, and is planning to coordinate long term monitoring/studies of marine mammals on various established ranges and operating areas. The Navy will continue to research and contribute to university/ external research to improve the state of the science regarding marine species biology and acoustic effects. These efforts include mitigation and monitoring programs; data sharing with NMFS and via the literature for research and development efforts; and future research as described previously.

5.8.3.4 Stranding Response Plan for Major Navy Training Exercises in the SOCAL Range Complex

NMFS and the Navy have developed a draft Stranding Response Plan for Major Exercises in the SOCAL Range Complex (available at: [http:// www.nmfs.noaa.gov/pr/permits/incidental.htm](http://www.nmfs.noaa.gov/pr/permits/incidental.htm)). Pursuant to 50 CFR Section 216.105, the plan will be included as part of (attached to) the Navy's MMPA Letter of Authorization (LOA), which contains the conditions under which the Navy is authorized to take marine mammals pursuant to training activities involving MFA sonar/HFA sonar or explosives in the SOCAL Range Complex. The Stranding Response plan is specifically intended to outline the applicable requirements the authorization is conditioned upon in the event that a marine mammal stranding is reported in the SOCAL Range Complex during a major training exercise. As mentioned above, NMFS considers all plausible causes within the course of a stranding investigation and this plan in no way presumes that any strandings that could occur in the SOCAL Range Complex are related to, or caused by, Navy training activities, absent a determination made in a Phase 2 Investigation as outlined in the plan, indicating that MFA sonar or explosive detonation in the SOCAL Range Complex were a cause of the stranding. This plan is designed to address the following three issues:

- Mitigation—When marine mammals are in a situation that can be defined as a stranding, they are experiencing physiological stress. When animals are stranded, and alive, NMFS believes that exposing these compromised animals to additional known stressors would likely exacerbate the animal's distress and could potentially cause its death. Regardless of the factor(s) that may have initially contributed to the stranding, it is NMFS' goal to avoid exposing these animals to further stressors. Therefore, when live stranded cetaceans are in the water and engaged in what is classified as an Uncommon Stranding Event (USE), the shutdown component of this plan is intended to minimize the exposure of those animals to MFA sonar and explosive detonations, regardless of whether or not these activities may have initially played a role in the event.

- **Monitoring**—This plan will enhance the understanding of how MFA sonar/HFA sonar or underwater detonations (as well as other environmental conditions) may, or may not, be associated with marine mammal injury or strandings. Additionally, information gained from the investigations associated with this plan may be used in the adaptive management of mitigation or monitoring measures in subsequent LOAs, if appropriate.
- **Compliance**—The information gathered pursuant to this protocol will inform NMFS' decisions regarding compliance with Sections 101(a)(5)(B and C) of the MMPA.

The Stranding Response Plan has several components:

Shutdown Procedures—When an uncommon stranding event occurs during a major exercise in the SOCAL Range Complex, and a live cetacean(s) is in the water exhibiting indicators of distress, NMFS will advise the Navy that they should cease MFA sonar/HFA sonar operation and explosive detonations within 14 nm (26 km) of the live animal involved in the USE (NMFS and Navy will maintain a dialogue, as needed, regarding the identification of the USE and the potential need to implement shutdown procedures). This distance is the approximate distance at which sound from the active sonar sources is anticipated to attenuate to 145 dB (SPL). The risk function predicts that less than 1 percent of the animals exposed to active sonar at this level (mysticete or odontocete) would respond in a manner that NMFS considers Level B Harassment.

Memorandum of Agreement (MOA)—The Navy and NMFS will develop a MOA, or other mechanism consistent with federal fiscal law requirements (and all other applicable laws), that allows the Navy to assist NMFS with the Phase 1 and 2 Investigations of USEs through the provision of in-kind services, such as (but not limited to) the use of plane/boat/truck for transport of stranding responders or animals, use of Navy property for necropsies or burial, or assistance with aerial surveys to discern the extent of a USE. The Navy may assist NMFS with the Investigations by providing one or more of the in-kind services outlined in the MOA, when available and logistically feasible and when the provision does not negatively affect Fleet operational commitments.

Communication Protocol—Effective communication is critical to the successful implementation of this Stranding Response Plan. Very specific protocols for communication, including identification of the Navy personnel authorized to implement a shutdown and the NMFS personnel authorized to advise the Navy of the need to implement shutdown procedures (NMFS Protected Resources HQ—senior administrators) and the associated phone trees, etc. are currently in development and will be refined and finalized for the Stranding Response Plan prior to the issuance of a final rule (and updated yearly).

Stranding Investigation—The Stranding Response Plan also outlines the way that NMFS plans to investigate any strandings (providing staff and resources are available) that occur during major training exercises in the SOCAL Range Complex.

5.8.4 Alternative Mitigation Measures Considered but Eliminated

As described in Chapter 3, Section 3.9, the vast majority of estimated sound exposures of marine mammals during proposed active sonar activities would not cause injury. Potential acoustic effects on marine mammals would be further reduced by the mitigation measures described above. Therefore, the Navy concludes the proposed action and mitigation measures would achieve the least practical adverse impact on species or stocks of marine mammals.

A determination of “least practicable adverse impacts” includes consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity. Therefore, the following additional mitigation measures were analyzed and eliminated from further consideration:

Augmenting Navy lookouts on Navy vessels providing surveillance of ASW or other training events with non-Navy personnel:

Augmenting Navy lookouts on Navy vessels providing surveillance of ASW or other training events with non-Navy personnel: The protection of marine mammals is provided by a lookout sighting the mammal and prompting immediate action. The premise that Navy personnel cannot or will not do this is unsupported. Navy lookouts are extensively trained in spotting items at or near the water surface and relaying the information to their superiors who initiate action. Navy lookouts utilize their skills more frequently than many third-party trained non-Navy marine mammal observers. Use of Navy lookouts is the most effective means to ensure quick and efficient communication within the command structure, thus ensuring timely implementation of any relevant mitigation measures. A critical skill set of effective Navy training is communication via the chain of command. Navy lookouts are trained to report swiftly and decisively using precise terminology to ensure that critical information is passed to the appropriate supervisory personnel. Furthermore, as analyzed in the Final EIS/OEIS, available berthing space, integration of non-Navy personnel into the command structure, and security issues would present added challenges.

Employing non-Navy observers on non-military aircraft or vessels:

The Final EIS/OEIS concluded that measures in this category do not result in increased protection to marine mammals because the size of the areas, the time it takes to survey, and the movement of marine mammals preclude real-time mitigation. Recognizing that ASW training events could occur throughout the entire SOCAL Range Complex OPAREA (consisting of approximately 113,000 nm² [387,500 km²]), contiguous ASW events may cover many hundreds of square miles in a few hours. Event participants are usually not visible to each other (separated by many tens of miles) and are constantly in motion. The number of civilian ships and/or aircraft required to monitor the area around these events would be considerable. In addition to practical concerns, surveillance of an exercise area during an event raises safety issues. Multiple, land-based, slow civilian aircraft operating in the same airspace as military aircraft will limit both the time available for civilian aircraft to be in the training area and present a concern should such aircraft experience mechanical problems. Scheduling of civilian vessel or aircraft surveillance also presents concerns, as exercise event timetables cannot be precisely fixed but develop freely from the flow of the tactical situation, thus mimicking real combat action. Waiting for civilian aircraft or vessels to complete surveys, refuel, or be on station would interrupt the necessary spontaneity of the exercise and would negatively impact the effectiveness of the military readiness activity. The Navy is committed to maintaining its marine mammal surveillance capability using both Navy surface and, to the extent that aviation assets are participants in the training activity, aerial monitoring.

Avoiding habitats and complex/steep bathymetry, including seamounts, and employing seasonal restrictions:

Seamounts are used by submarines to hide or mask their presence, requiring the need to train in this complex ocean environment. This is precisely the type of area needed by the Navy to train with MFA sonar. Exercise locations are carefully chosen by planners based on training requirements and the ability of ships, aircraft, and submarines to operate safely. However, the full habitat requirements for most marine mammals in the SOCAL Range Complex are unknown. Accordingly, there is insufficient information available regarding possible alternative exercise locations or environmental factors that would be less important to marine mammals in SOCAL. When available, it must be factored with other considerations including safety and access to land ranges and facilities.

Avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Limiting training activities to fewer than 12 months of the year would not only concentrate all annual training and testing activities into a shorter time period, but would also not meet the readiness requirements of the Navy's mandate to deploy trained forces as might be required by unscheduled real world events.

Avoiding seamounts without exception fails to define scientific parameters for seamounts critical to marine mammals, such as a critical depth from the surface, and it is impossible to establish scientifically what would constitute a buffer that would avoid these areas. In addition, without a scientifically derived definition, there is no means to implement any proposed mitigation measure based on avoidance of seamounts.

Avoidance of steep or complex bathymetry in the SOCAL ignores the fact that there are numerous and a variety of complex bathymetry in the SOCAL. Many of these areas of complex bathymetry and seamounts are in the very locations where Navy trains, and are valuable to Navy training. The purported need for this suggested mitigation measure is based on findings from other areas of the world that do not have direct application to the unique environment present in SOCAL (e.g., the circumstances surrounding the 2000 Bahamas mass-stranding event). Ultimately, the Navy needs to train in representative environments, including near seamounts and in areas of steep or complex bathymetry, as submarines use these environments to avoid detection. Not being allowed to conduct exercises in these areas would have an unacceptable impact on training effectiveness.

Avoiding MFA and HFA sonar use within 12 nm from shore or, in the alternative, 15.5 miles (25 kilometers) from the 200-meter isobath:

During a recent major exercise in Hawaii (RIMPAC 2006), this mitigation measure precluded ASW training in the littoral region, which had a significant impact on realism and training effectiveness. There is no scientific evidence that any set distance from the coast is more protective of marine mammals than any other distance. The Navy has also determined that limiting MFA sonar use to outside 12 nm from the coast prevented crew members from gaining critical experience in training in shallow waters, and training in littoral waters. Sound propagates differently in shallower water. In real world events, it is highly likely crew members would be working in these types of areas, and these are the types of areas where diesel-electric submarines would be operating. Without the critical training near shore that ASW exercises provide, crews will not have the experience needed to successfully operate sonar in these types of waters, impacting vital military readiness.

Using MFA and HFA sonar with output levels as low as possible consistent with mission requirements or using active sonar only when necessary:

Operators of sonar equipment are trained to be aware of the environmental variables affecting sound propagation. In this regard, the sonar equipment power levels are always set consistent with mission requirements. Active sonar is only used when required by the mission since it has the potential to alert opposing forces to the sonar platform's presence. The Navy remains committed to using passive sonar and all other available sensors in concert with active sonar to the maximum extent practicable consistent with mission requirements.

Suspending training at night, periods of low visibility and in high sea-states when marine mammals are not readily visible:

It is imperative that the Navy train to be able to operate at night, in periods of low visibility, and in high sea-states using the full potential of MFA or HFA sonar as a sensor. Anti-submarine

warfare requires many hours and days for the situation to develop, to be identified and for the forces to respond. It would be extremely impracticable and unrealistic for the Navy's forces at sea to train only in daylight hours or to wait for weather to clear. Naval forces must train during all conditions to ensure they understand how constantly changing environmental conditions (including changes between day and night) affect sonar's capabilities and their ability to detect and maintain contact with submerged objects. The naval forces must constantly identify those changing conditions and adapt to them.

Maneuvering a vessel at night and during restricted visibility is not a simple activity. Navy vessels use radar and night vision devices to detect any object, whether a marine mammal, a periscope of an adversary submarine, trash, debris, or another surface vessel. Under the International Navigation Rules of the Road, periods of fog, mist, falling snow, heavy rainstorm, sandstorms, or any similar events are referred to as "restricted visibility." In restricted visibility, all mariners, including Navy vessel crews, are required to maintain proper look-out by sight and hearing as well as "by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision." Therefore, Navy vessels are required to use all means available in restricted visibility, including sonar and positioning of additional lookouts for heightened vigilance to avoid collision. Navy vessels use radar and night vision goggles to avoid any object, whether a marine mammal, a periscope of an adversary submarine, trash, debris, or another surface vessel. Prohibiting or limiting vessels from using MFA sonar during periods of restricted visibility therefore violates international navigational rules, increases navigational risk, and jeopardizes the safety of the ship and crew.

Reducing power in significant surface ducting conditions:

Surface ducting occurs when water conditions (e.g., temperature layers, lack of wave action) result in sound energy emitted at or near the surface to be refracted back up to the surface, then reflected from the surface only to be refracted back up to the surface so that relatively little sound energy penetrates to the depths that otherwise would be expected. This increases active detection ranges in a narrow layer near the surface, but decreases active sonar detection below the thermocline, a phenomenon that submarines have long exploited. Significant surface ducts are conditions under which ASW training must occur to ensure Sailors learn to identify these conditions, how they alter the abilities of MFA sonar systems, and how to deal with the resulting effects on MFA sonar capabilities. To be effective, the complexity of ASW requires the most realistic training possible. Reducing power in significant surface ducting conditions undermines training realism because the unit would be operating differently than it would during actual warfare.

Additionally, and significantly, the necessary information regarding water conditions in the exercise areas is not uniform and can change over a period of a few hours as the effects of environmental conditions such as wind, sunlight, cloud cover, and tide changes alter surface duct conditions. Across a typical SOCAL exercise area, the determination of "significant surfacing ducting" is continually changing, and this mitigation measure could not be accurately implemented.

Furthermore, surface ducting alone does not increase the risk of MFA sonar impacts to marine mammals. While surface ducting causes sound to travel farther before losing intensity, simple spherical and cylindrical spreading losses result in a received level of no more than 175 dB at 1,000 meters, even in significant surface ducting conditions. There is no scientific evidence that this mitigation measure is effective or that it provides additional protection for marine mammals beyond that afforded by an appropriate safety zone.

Reduction of MFA sonar power levels by 6 dB to 10 dB results in a 50- to 80-percent reduction of detection of submarines in the area due to a decrease in power of 75 to 90 percent. This means

reduction of sonar power levels results in an inability to detect submarines at greater distances which reflect real world situations. As submarines are capable of striking ships at distances greater than a powered-down sonar would be able to detect, effective training is compromised.

The requirement under the current MMPA national defense exemption to consider significant surface ducting as part of an aggregate of conditions in planning major exercises does not apply in the SOCAL Range Complex because those conditions do not exist in the aggregate. Normal safety zone requirements always apply.

Scaling down training to meet core aims:

As with each Navy range complex, the primary mission of the SOCAL Range Complex is to provide a realistic training environment for naval forces to ensure that they have the capabilities and high state of readiness required to accomplish assigned missions. Modern war and security operations are complex. Modern weaponry has brought both unprecedented opportunity and innumerable challenges to the Navy. Smart weapons, used properly, are very accurate and actually allow the military Services to accomplish their missions with greater precision and far less destruction than in past conflicts. But these modern smart weapons are very complex to use. U.S. military personnel must train regularly with them to understand their capabilities, limitations, and operation. Modern military actions require teamwork between hundreds or thousands of people, and their various equipment, vehicles, ships, and aircraft, all working individually and as a coordinated unit to achieve success. These teams must be prepared to conduct activities in multiple warfare areas simultaneously in an integrated and effective manner. Navy training addresses all aspects of the team, from the individual to joint and coalition teamwork. Training events are identified and planned because they are necessary to develop and maintain critical skills and proficiency in many warfare areas. Exercise planners and Commanding Officers are obligated to ensure they maximize the use of time, personnel and equipment during training. The level of training expressed in the proposed action and alternatives is essential to achieving the primary mission of the SOCAL Range Complex.

Limiting the active sonar event locations:

Areas where events are scheduled to occur are carefully chosen to provide for the safety of events and to allow for the realistic development of the training scenario including the ability of the exercise participants to develop, maintain, and demonstrate proficiency in all areas of warfare simultaneously. Limiting the training event to a few areas would have an adverse impact the effectiveness of the training by limiting the ability to conduct other critical warfare areas including, but not limited to, the ability of the Strike Group to defend itself from threats on the surface and in the air while carrying out air strikes and/or amphibious assaults. Limiting the exercise areas would concentrate all active sonar use, resulting in unnecessarily prolonged and intensive sound levels rather than the more transient exposures predicted by the current planning that makes use of multiple exercise areas. Furthermore, major exercises using integrated warfare components require large areas of the littorals and open ocean for realistic and safe training.

Passive acoustic detection and location of marine mammals:

As noted above, the Navy uses its passive detection capabilities to the maximum extent practicable consistent with the mission requirements to alert training participants to the presence of marine mammals in an event location.

Using “ramp-up” of MFA sonar to clear an area prior to the conduct of ASW training events:

Ramp-up procedures involve slowly increasing the sound in the water to levels that would clear an area of marine mammals prior to training at nominal source levels. Ramp-up procedures are not a viable alternative for MFA sonar training events as the ramp-up would alert opponents to the participants' presence, thus undermining training realism and effectiveness of the military readiness activity. When a Strike Group ship turns its sonar on, area submarines are alerted to its presence. A submarine can hear an active sonar transmission farther away than the surface ship can hear the echo of its sonar off the submarine. Ideally, the surface ship will detect the submarine in time to attack the submarine before the submarine can attack one of the ships of the Strike Group. If the MFA sonar ship starts out at a low power and gradually ramps up, it will give time for the submarine to take evasive action, hide, or close in for an attack before the MFA sonar is at a high enough power level to detect the submarine.

Ramp-up procedures purportedly provide marine mammals the opportunity to leave the area. There is no evidence that ramp-up procedures achieve the desired effect of causing the marine mammal to leave the area. Instead, it is well proven that dolphins ride the bow-waves of all vessels, including those employing MFA sonar, which indicates that some species of marine mammals do not flee.

Implementing vessel speed reduction:

Vessels engaged in training use extreme caution and operate at a slow, safe speed consistent with mission and safety. Ships and submarines need to be able to react to changing tactical situations in training as they would in actual combat. Placing arbitrary speed restrictions would not allow them to properly react to these situations. Training differently than that which would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities.

Using new technology (e.g., unmanned reconnaissance aircraft, underwater gliders, and instrumented ranges) to detect and avoid marine animals:

Although the Navy works with many new technologies, they presently remain unproven and limited in availability. The Navy has been collecting data using the hydrophones at underwater instrumented ranges to collect passive acoustic data on marine mammals. The Navy is working to develop the capability to detect and localize vocalizing marine mammals using these sensors, but based on the current status of acoustic monitoring science, it is not yet possible to use installed systems as mitigation tools. Similarly, research involving a variety of other methodologies (e.g., underwater gliders, radar, and lasers) is not yet developed to the point where they are effective or could be used as an actual mitigation tool.

Using larger shut-down zones:

The current power down and shut down zones are based on scientific investigations specific to MFA sonar for a representative group of marine mammals. They are based on the source level, frequency, and sound propagation characteristics of MFA sonar. The zones are designed to preclude direct physiological effect from exposure to MFA sonar. Specifically, the current power-downs at 500 yards and 1,000 yards, as well as the 200 yard shut-down, were developed to minimize exposing marine mammals to sound levels that could cause TTS and PTS. These safety zone distances were based on experiments involving distances at which the onset of TTS and PTS were identified. They are also supported by the scientific community. The safety zone the Navy has developed is also based on a lookout's ability to realistically maintain situational awareness over a large area of the ocean, including the ability to detect marine mammals at that distance during most conditions at sea. Requirements to implement procedures when marine mammals are

present well beyond 1,000 yards dictate that lookouts sight marine mammals at distances that, in reality, are not always practicable. These increased distances also significantly expand the area that must be monitored to implement these procedures. For instance, if a power down zone increases from 1,000 to 4,000 yards, the area that must be monitored increases sixteen-fold. Increases in safety zones are not based in science, do not provide any appreciable benefit to marine mammals and severely impact realistic ASW training. For example, increasing the shutdown zone for example from 200 yards to 2,187 yards contains 121 times the area of the Navy's current 200-yard shutdown zone. This restriction could increase the number of times that a ship would have to shut down active sonar, impacting realistic training and depriving ships of valuable submarine contact time. Commanders responsible for locating, tracking, and attacking a hostile submarine could lose awareness of the tactical situation through the constant stopping and starting of MFA sonar leading to significant exercise event disruption. Increased shutdowns could allow a submarine to take advantage of the lapses of active sonar, and position itself for an attack.

Restricting the use of MFA sonar during ASW training events while conducting transits between islands (i.e., choke-points):

This restriction is not applicable to transit in the SOCAL Range Complex. A chokepoint is a strategic strait or canal. Although there are over 200 major straits around the world, only a handful are considered to be strategic "chokepoints," such as the Strait of Gibraltar, Panama Canal, Strait of Magellan, Strait of Malacca, Bosphorus and Dardanelles, Strait of Hormuz, Suez Canal, and Bab el Mandeb. While chokepoints are relatively few in number, significant quantities of international commerce and naval shipping move through these chokepoints, making them strategically important to the United States because a single quiet diesel submarine can position itself in the chokepoint and effectively block access beyond that point. The primary similarity of these chokepoints is lengthy shorelines that restrict maneuverability. The longer and more narrow the passage, the more likely the chokepoint creates an area of restricted egress for marine mammals. The conditions of the channels used in SOCAL differ from other channels around the world, including the Northwest Providence channel in the Bahamas. The Bahamas marine mammal stranding event in 2000 involved a critical confluence of conditions. The Northwest Providence channel is 100 nm long and between 25-30 nm wide. In contrast, the channels between the Channel Islands are formed by adjacent islands rather than long, adjacent land mass boundaries. Therefore, these channels do not constrict movement of marine mammals between two long land masses for many miles, as may have been the case in the Bahamas in 2000. Conducting ASW training events while transiting in the SOCAL Range Complex does not present the same conditions as those that resulted in the Bahamas mass stranding event (see Section 1.1.3.1 of Appendix F). Most importantly, there is no limited egress for marine mammals for events that occur in SOCAL.

Adopting mitigation measures of foreign nation navies:

The Navy typically operates in a Strike Group configuration where the group focuses its efforts on conducting air strikes and/or amphibious operations ashore. This requires that the Navy train to what it calls "integrated warfare" meaning that Strike Groups must conduct many different warfare areas simultaneously. These include the ability to defend itself from attacks from submarines, mines, ships, aircraft and missiles. Other nations do not possess the same integrated warfare capabilities as the United States. As a result, many foreign nations' measures are focused solely on reducing what they perceive to be impacts involving ASW. They are not required to locate training areas and position naval forces for the simultaneous and integrated warfare elements that the Navy conducts. As a result, many nations are willing to move training to areas where they believe marine mammals may not exist and do not train in the same bathymetric and littoral environments as the Navy.

5.9 SEA BIRDS

Avoidance of seabirds and their nesting and roosting habitats provides the greatest degree of protective measure from potential impacts within the SOCAL Range Complex. Currently, the majority of aircraft operations that might affect seabirds are concentrated at the Naval Auxiliary Landing Field (NALF) on SCI, and the potential for bird aircraft strikes exists. Pursuant to Navy instruction, measures to evaluate and reduce or eliminate this hazard to aircraft, aircrews, and birds are implemented. Additionally, guidance involving land or water detonations contains instructions to personnel to observe the surrounding area within 600 yds (585 m) for 30 minutes prior to detonation. If birds (or marine mammals or sea turtles) are seen, the operation must be relocated to an unoccupied area or postponed until animals leave the area. Monitoring of seabird populations and colonies by conservation groups and researchers is conducted intermittently within coastal areas and offshore islands with limited support from various military commands.

5.10 TERRESTRIAL BIOLOGICAL RESOURCES

As noted in section 3.11.1.3, the Navy implements measures to avoid, minimize, or compensate for its effects on biological resources including listed species on SCI. Key management and monitoring activities include completion and implementation of the SCI Wildland Fire Management Plan; continued monitoring and management activities for all endangered species but with particular attention to San Clemente loggerhead shrike, San Clemente sage sparrow, island fox, and six federally-listed plant species; invasive species monitoring and control efforts; continued operation of the on-island nursery and restoration efforts being conducted by nursery staff; vegetation condition and trend assessment; and continued implementation of the SCI Integrated Natural Resources Management Plan (INRMP). The Navy proposes to continue these measures. Further, as noted in section 3.11.4, the Navy proposes to implement additional measures to mitigate the environmental effects of its activities. The following is a comprehensive list of current and proposed mitigation measures intended to reduce effects of military activities on biological resources of SCI:

5.10.1 General Measures

- **G-M-1.** Continue to control invasive exotic plant species on an island-wide scale, with an emphasis on the AVMC, the IOA, TARs, and other operations insertion areas such as West Cove, Wilson Cove and the airfield. A pretreatment survey to identify areas needing treatment, one treatment cycle, and a retreatment cycle (when necessary) will be planned each year to minimize the distribution of invasive species. The focus of the invasive exotic plant control program will continue to be the control of highly invasive exotic plants that have the potential to adversely impact habitat for federally listed species in known locations, and the early detection and eradication of new occurrences of such species. Where feasible, include future construction sites in a treatment and retreatment cycle prior to construction.
- **G-M-2.** Continue feral cat and rat control efforts and monitoring level of feral cat and rat population (would benefit all endangered and threatened wildlife on SCI as well as the island fox) as long as they are demonstrated to support listed species recovery and population maintenance. To reduce human-induced increases in the feral cat and rat populations, the Navy will ensure that personnel do not feed cats and that all trash, food waste, and training refuse are disposed of properly in animal proof containers.
- **G-M-3.** Continue implementation of INRMP, with review and revision per Navy directives addressing management of natural resources. Identification of conservation measures that provide additional benefits to the protected resources affected by the

proposed action will be given priority consideration for incorporation into the SCI INRMP during reviews, updates and revisions.

- **G-M-4.** Continue to review and coordinate the dissemination of environmental conservation measures to island users. Conservation measures will be distributed to island military and civilian staff in accordance with commander's guidelines, and with Fleet operations.
- **G-M-5.** Conduct any necessary Explosive Ordnance Disposal (EOD) ordnance detonations in or near endangered or threatened species habitat in a manner that minimizes the potential for wildfire without compromising personnel safety.
- **G-M-6.** Coordinate range access to achieve optimal flexibility between training operations and natural resource management activities, according to range use instructions and with priority given to military training.
- **G-M-7.** Locate SHOBA heavy ordnance targets with regard to proximity to sensitive resources, including San Clemente loggerhead shrike, sensitive plants (e.g., away from Horse Beach Canyon), and coastal salt marsh, to the extent feasible while meeting operational needs.
- **G-M-8.** Conduct monitoring and control activities for non-native predators outside the impact area boundaries. Monitoring and control activities would include China Point Road between Impact Areas I and II. Monitoring and control activities may be intensified as needed to prevent elevated predation on listed species outside the Impact Area boundaries attributable to predator populations within the Impact Area boundaries. Access to conduct control efforts would not be limited within SHOBA outside the Impact Area I and II boundaries. (See also related measure **G-M-2**).
- **G-M-9.** Conduct monitoring and control activities for invasive non-native plant species outside of the impact area boundaries. Monitoring and control activities would include China Point Road and the portion of Horse Beach Canyon Road between Impact Areas I and II. Monitoring and control activities may be intensified as needed to prevent spread of invasive species and effects on listed species outside the Impact Area boundaries attributable to invasive species populations within the Impact Area boundaries. Access to conduct control efforts would not be limited within SHOBA outside the Impact Area I and II boundaries. (See also related measure **G-M-1**).

5.10.2 Assault Vehicle Maneuver Corridor, Assault Vehicle Maneuver Road, Assault Vehicle Maneuver Area, Artillery Firing Points, Artillery Maneuver Points, Infantry Operations Area, and Amphibious Landing Sites

- **AVMC-M-1.** Survey for Federally listed and sensitive plant species within the AVMC (including AVMAAs, AFP-1, AFP-6, AMPs) and IOA.
- **AVMC-M-2.** Conduct periodic monitoring of the AVMC (AVMAAs, AMPs, AFPs, AVMR) and IOA as part of vegetation/habitat and sensitive species survey updates for the INRMP.
- **AVMC-M-3.** Develop an erosion control plan and finalize AVMA, AMP, and AFP areas based on field review with soil erosion experts and military personnel, such that operational areas minimize inclusion of steep slopes and drainage heads. Develop, apply and maintain BMPs for erosion/sedimentation where appropriate, and provide

for regular monitoring and control of invasive species. The goals of the plan would be as follows:

- to minimize soil erosion within each of these operational areas and minimize offside impacts;
- to prevent soil erosion from adversely affecting federally listed or proposed species or their habitats;
- to prevent soil erosion from significantly impacting other sensitive resources, including sensitive plant and wildlife species and their habitats, jurisdictional wetlands and non-wetland waters, the area of Special biological Significance (ASBS) surrounding the island, and cultural resources

The plan would lay out the Navy's approach in assessing and reducing soil erosion in the AVMAAs, AMPs, AFPs, and the IOAs, as well as routes used to access these areas. The plan would consider the variety of available erosion control measures and determine the most appropriate measure(s) to control erosion in the area. The plan would include an adaptive management approach and contain the following essential elements:

- Site-specific BMPs to minimize soil erosion on site and minimize offsite impacts, which could include:
 - Establishing setbacks or buffers from steep slopes, drainages, and sensitive resources
 - Construction of site specific engineered or bio-engineered structures that would reduce soil erosion and transport of sediment off site
 - Revegetation
 - Maps defining boundaries of operational areas that provide appropriate setbacks
 - A BMP maintenance schedule
- A plan to monitor soil erosion and review the effectiveness of BMPs
- A mechanism for determining and implementing appropriate remedial measures and refining BMPs should the need arise
- **AVMC-M-4.** Military units will be briefed on maneuver area boundaries prior to conducting operations in these areas.
- **AVMC-M-5.** Assault vehicle travel or maneuvering will not be conducted outside the boundaries of the AVMC (including AFPs, AMPs, AVMAAs, AVMR).
- **AVMC-M-6.** Develop and implement a project to monitor for erosion, dust generation, and deposition of dust in adjacent habitats.
- **AVMC-M-7.** Prior to coming to SCI, military and non-military personnel will be asked to conduct a brief check for visible plant material, dirt, or mud on equipment and shoes. Any visible plant material, dirt or mud should be removed before leaving for SCI. Tactical ground vehicles will be washed of visible plant material, dirt and mud prior to embarkation for SCI. Additional washing is not required for amphibious vehicles after 15 minutes of self-propelled travel through salt water prior to coming ashore on SCI.

- **AVMC-M-8.** Continue to enforce the existing 35 mph speed limit on Ridge Road for shore all traffic. The Navy will post signs, continue public awareness programs; mow roadside vegetation; and monitor roadways for kills of protected or conservation agreement species including San Clemente loggerhead shrike, San Clemente sage sparrow, and island fox.
- **AVMC-M-9.** Tracked and wheeled vehicles will continue to use the existing route for ingress and egress to/from the beach at West Cove.
- **AVMC-M-10.** For Horse Beach Cove Amphibious Landing and Embarkation Area at TAR 21, vehicles will use an ingress/egress route that avoids impact on wetlands and minimizes impacts on coastal dune scrub. This involves driving amphibious vehicles westward on the unvegetated beach and egressing from beach west of the mouth of Horse Beach Canyon.

5.10.3 Training Areas and Ranges

- **TAR-M-1.** Develop and implement a five-year monitoring plan with annual surveys for Threatened and Endangered plant species when they are known to occur within or adjacent to TARs outside of Impact Areas I and II.

5.10.4 Basic Training Sites (BTSS)

- **BTS-M-1.** Construction of structures will not involve grading and will be conducted outside the sage sparrow breeding season. The footprint of the construction areas will be marked to avoid habitat areas in coordination with the SCI natural resources program. Anti-perch devices will be installed on the structures.

5.10.5 Additional Species-Specific Measures

San Clemente sage sparrow

- **SCSS-M-1.** Continue surveys and population analysis for the San Clemente sage sparrow. Develop additional surveys to assess sage sparrow juvenile survivorship and habitat use. Surveys will be developed and scheduled such that access to training areas are not restricted when training is needed/requested.
- **SCSS-M-2.** Manage the San Clemente sage sparrow population for long-term persistence in accordance with recommendations in the SCSS Management Plan, and in a manner that is compatible with military training requirements. Identification of conservation measures that provide additional benefits to sage sparrows will be given priority consideration for incorporation into the SCI INRMP and the SCSS Management Plan during reviews, updates and revisions. Conservation benefits provided to San Clemente Sage Sparrows will also benefit the Island Night Lizard, as they co-occur in highest densities in the same prime habitat.
- **SCSS-M-3.** Develop and implement a monitoring plan to assess the incidental take of SCSS within and adjacent to TARs 10 and 17. Incorporate findings into recommendations for minimizing or avoiding incidental take, to the extent practicable, into the SCSS Management Plan.

San Clemente Loggerhead Shrike

- **SCLS-M-1.** Continue the currently successful program of habitat restoration, predator management, monitoring, captive breeding, and re-introduction to benefit

the San Clemente loggerhead shrike until such time that recovery objectives are identified and achieved.

- **SCLS-M-2.** Evaluate nest success data for SCLS in sites nearest AFP-6, including those in Eagle and Cave Canyons, and compare it to other sites in and out of SHOBA with the objective of determining whether or not success rates are typical for the species.
- **SCLS-M-3.** The shrike monitoring team will provide schedulers the location of shrike nests within operational boundaries and prior to the installation of fuel/fire beak lines.
- **SCLS-M-4.** Range schedulers would provide the GPS coordinates of up to four (4) shrike nests at any one time to operators and advise that sensitive resources occur within a 10 m radius of these points. GPS coordinates would only be provided for nests that appear in the IOA in areas wider than 1000 feet, and not in any AVMA, AVMR, AFP, AMP, or TAR.

Island Night Lizard

- **INL-M-1.** Continue population monitoring at 3-year intervals and annual habitat evaluations while the delisting petition is being evaluated by USFWS.

California brown pelican

- **CBP-M-1.** Ensure that California brown pelicans are not in proximity to over-blast pressure prior to underwater demolition activities. Sequential underwater detonations would be conducted either less than 10 seconds apart or greater than 30 minutes apart to avoid impacts to birds attracted by fish kill.

Western Snowy Plover

- **WSP-M-1.** Continue annual breeding and non-breeding season surveys for the western snowy plover at West Cove and Northwest Harbor.

Island Fox

- **IF-M-1.** Continue educational work with on-Island civilian and military personnel to prevent feeding, handling of foxes.
- **IF-M-2.** Continue feral cat control and education and enforcement of prohibitions concerning on-Island civilian and military personnel feeding, keeping, or otherwise encouraging the persistence of cats on SCI.
- **IF-M-3.** Continue posting signs, mowing road verges, and education to help minimize the potential for vehicular collisions with foxes.

Santa Cruz Island Rock-Cress

- **RC-M-1.** Investigate feasibility of establishing additional colonies in suitable habitat farther away from the IOA and AFP--1 using the on-island nursery to propagate from local seed.
- **RC-M-2.** To the extent practicable and as appropriate based on potential impacts, areas surrounding Santa Cruz Island rockcress occurrences will be prioritized as primary targets for weed eradication.

5.11 CULTURAL RESOURCES

Section 3.12.1 details protective measures implemented with regard to cultural resources on SCI. (submerged cultural resources in ocean areas are unaffected by Navy activities.) As noted, the Navy has developed a draft Programmatic Agreement (PA) pursuant to 36 (C.F.R.) § 800.14 (the regulation implementing the National Historic Preservation Act). NHPA Section 106 compliance on SCI will be governed by a PA. The Draft PA stipulates qualifications of personnel, development of an Integrated Cultural Resources Management Plan (ICRMP), determination of an Area of Potential Effects, evaluation of resources to ensure that authorizations for ground-disturbing activities include appropriate measures to protect archaeological resources, emergency procedures, and annual reporting.

The PA identifies Impact Areas I and II in the southern portion of SCI as areas exempt from compliance with Section 106 due to their degree of disturbance and the safety risk to personnel that would be required to survey these areas. The PA defines dispersed pedestrian troop movements as having no potential for affecting cultural resources.

To ensure that cultural resources are managed in a planned and coordinated manner, the Navy is preparing an ICRMP for SCI. There are 18 elements of the ICRMP, as noted in Section 3.12.1.2. Several of these elements already have been addressed in the current Cultural Resources Management Plan for SCI, and some are being addressed in this EIS/ OEIS. All required elements will be addressed in the ICRMP, which will provide for overall management of cultural resources.

Avoidance of adverse effect is the preferred treatment for cultural resources. There are several existing cultural resource measures for site avoidance in place as standard operating procedures at SCI. These measures include:

- All proposed actions except those on existing ranges are reviewed by the NRO for potential effects on cultural resources;
- Ongoing mitigation focuses on treating adverse effects;
- Vehicles are required to stay on established roads or within the AVMC;
- Unauthorized collection of archaeological material is not allowed;
- No digging is permitted;
- Archaeological sites in areas of high use are posted with archaeological site protection signs; and

The Navy uses environmental planning, and project design and redesign to avoid or minimize impacts on resources. When avoidance is not feasible, however, eligible resources must receive appropriate mitigation. For archaeological sites considered important for their potential to provide information, this usually involves data recovery. Mitigating impacts on built resources typically involves Historic American Building Survey/Historic American Engineering Record documentation. The character of treatment is determined through consultation with the California State Historic Preservation Office (SHPO) and Advisory Council on Historic Preservation on adverse effect under 36 C.F.R. § 800.

5.12 TRAFFIC

The Navy strives to ensure that it retains access to ocean training areas and special use airspace (SUA) as necessary to accomplish its mission, while facilitating joint military-civilian use of such areas to the extent practicable and consistent with safety. These goals of military access, joint use, and safety are promoted through various coordination and outreach measures, including:

- Publication of NOTAM advising of the status and nature of activities being conducted in W-291 and other components of SUA in the EIS Study Area.
- Return of SUA to civilian Federal Aviation Administration (FAA) control when not in use for military activities. To accommodate the joint use of SUA, a Letter of Agreement is in place between Los Angeles Air Traffic Control Center (ARTCC) and Fleet Area Control and Surveillance Facility (FACSFAC) San Diego (Navy). The LOA defines the conditions and procedures to ensure safe and efficient joint use of waning areas.
- Publication of NOTMAR and other outreach. The Navy provides information about potentially hazardous activities planned for the SOCAL OPAREA, for publication by the U.S. Coast Guard in NOTMAR. Most such activities occur in the vicinity of SCI. To ensure the broadest dissemination of information about hazards to commercial and recreational vessels, the Navy provides detailed schedules of its activities planned near SCI on a dedicated website.

5.13 SOCIOECONOMICS

Given the nature and location of Navy activities addressed in this EIS/OEIS, mitigation and protective measures are unnecessary with respect to socioeconomic considerations.

5.14 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Given the nature and location of Navy activities addressed in this EIS/OEIS, mitigation and protective measures are unnecessary with respect to socioeconomic considerations.

5.15 PUBLIC SAFETY

Navy activities in the SOCAL Range Complex comply with numerous established safety procedures to ensure the safety of participants and the public. FACSFAC and Navy range managers have published safety procedures for activities on the offshore and nearshore areas. These guidelines are directive for range users. They provide, among other measures, that:

- Commanders are responsible for ensuring that impact areas and targets are clear prior to commencing activities that are hazardous.
- Aircraft or vessels expending ordnance shall not commence firing without permission of the scheduling authority for their specific range area.
- Firing units and targets must remain in their assigned areas, and units must fire in accordance with current safety instructions.
- Except for SCI, ships are authorized to fire their weapons only in offshore areas and at specific distances from land, depending on the caliber and range of the weapons fired. The larger the caliber, the farther offshore that the firing must take place.
- The use of pyrotechnic or illumination devices and marine markers such as smoke or dye markers will be allowed only in the assigned areas, to avoid the launch of Search and Rescue forces when not required. Aircraft carrying ordnance to or from ranges shall avoid populated areas to the maximum extent possible.
- Aircrews operating in W-291 are aware that non-participating aircraft are not precluded from entering the area and may not comply with a NOTAM or radio warning that hazardous activities are scheduled or occurring. Aircrews are required to maintain a continuous lookout for non-participating aircraft while operating under visual flight rules in W-291.

In addition to the FACSFAC and SCORE procedures, the Navy has instituted the following SOPs for use of the SOCAL Range Complex:

5.15.1.1 Aviation Safety

Aircraft in W-291 fly under visual flight rules (VFR) and under visual meteorological conditions. This means that the commanders of military aircraft are responsible for the safe conduct of their flight. Prior to releasing any weapons or ordnance, the impact area must be clear of non-participating vessels, people, or aircraft. The OCE is ultimately responsible for the safe conduct of range training. A qualified Safety Officer is assigned to each training event or exercises and can terminate activities if unsafe conditions exist. Aircraft entering the SCI Air Traffic Area are required to be in radio contact with military air traffic control.

5.15.1.2 Submarine Safety

Vertical separation of at least 100 ft (30.5 m) is required between the top of a submarine's sail and the depth of a surface ship's keel. If a submarine (or submarine simulated target, the MK-30) is at periscope depth, at least a 1,500-yard (yd) (1,372-m) horizontal separation from other vessels must be maintained.

5.15.1.3 Surface Ship Safety

During training events, surface ships maintain radio contact with range control. Prior to launching a weapon, ships are required to obtain a "Green Range," which indicates that all safety criteria have been satisfied, and that the weapons and target recovery conditions and recovery helicopters and boats are ready to be employed.

5.15.1.4 Missile Exercise Safety

Safety is the top priority and paramount concern during missile exercises. These exercises can be surface-to-surface, subsurface-to-surface, surface-to-air, or air-to-air. A Missile Exercise (MISSILEX) Letter of Instruction is prepared prior to any missile firing exercise. This instruction establishes precise ground rules for the safe and successful execution of the exercise. Any MISSILEX participant who observes an unsafe situation can communicate a "Red Range" order over any voice communication systems. Range control is in radio contact with participants at all times during a MISSILEX.

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