

## 5 MITIGATION MEASURES

Mitigation, as defined by the Council on Environmental Quality (CEQ), includes measures to minimize impacts by limiting the degree or magnitude of a proposed action and its implementation. Four alternatives are presented in Chapter 2 and analyzed in Chapter 4 for the employment of SURTASS LFA sonar that will meet, to varying degrees, the Navy's purpose and need, and reduce potential impacts through the mitigation measures discussed in this chapter. The mitigation measures presented for the SURTASS LFA sonar are similar to those in the FOEIS/EIS and authorized in the Record of Decision (ROD) (67 FR 48145). The primary differences are coastal geographic restrictions of both 22 km (12 nm) and 46 km (25 nm), and consideration of additional offshore biologically important areas.

The objective of these mitigation measures is to avoid risk of injury to marine mammals, sea turtles, and human divers. This objective is met by:

- Ensuring that coastal waters within 22 km (12 nm) or 46 km (25 nm) of shore, depending on the determination made in the ROD, are not exposed to SURTASS LFA sonar signal levels  $\geq 180$  dB RL;
- Ensuring that no offshore biologically important areas are exposed to SURTASS LFA sonar signal levels  $\geq 180$  dB RL during critical seasons;
- Minimizing exposure of marine mammals and sea turtles to SURTASS LFA sonar signal levels below 180 dB RL by monitoring for their presence and suspending transmissions when one of these organisms enters this zone; and
- Ensuring that no known recreational or commercial dive sites are subjected to LF sound pressure levels greater than 145 dB RL.

Strict adherence to these measures should ensure that there will be no significant impact on marine mammal stocks, sea turtle stocks, and recreational or commercial divers.

## **5.1 Geographic Restrictions**

The following geographic restrictions apply to the employment of SURTASS LFA sonar:

- SURTASS LFA sonar-generated sound field would be below 180 dB RL within 22 km (12 nm) or 46 km (25 nm), depending on the determination made in the ROD, of any coastlines and in offshore areas outside this zone that have been determined by NMFS and the Navy to be biologically important;
- When in the vicinity of known recreational or commercial dive sites, SURTASS LFA sonar would be operated such that the sound fields at those sites would not exceed 145 dB RL; and
- SURTASS LFA sonar operators would estimate sound pressure levels (SPL) prior to and during operations to provide the information necessary to modify operations, including the delay or suspension of transmissions, in order not to exceed the 180-dB and 145-dB RL sound field criteria cited above.

### **5.1.1 Offshore Biologically Important Areas**

There are certain areas of the world's oceans that are biologically important to marine mammals and sea turtles as determined in the ROD. Because the majority of these areas exist within the coastal zone, SURTASS LFA sonar operations would be conducted such that the sound field is below 180 dB RL within 22 km (12 nm) (or 46 km [25 nm]) of any coastline and in any designated offshore biologically important areas that are outside these zones during the biologically important season for that particular area. The 22 km (12 nm) or 46 km (25 nm) restriction, depending on the determination made in the ROD, includes many marine-related critical habitats and sanctuaries (e.g., Hawaiian Islands Humpback Whale National Marine Sanctuary). The SURTASS LFA sonar sound field would be estimated in accordance with the guidelines in Subchapter 5.1.3 of the SEIS.

### **5.1.2 Recreational and Commercial Dive Sites**

SURTASS LFA sonar operations are constrained in the vicinity of known recreational and commercial dive sites to ensure that the sound field at such sites does not exceed 145 dB RL. Recreational dive sites are generally defined as coastal areas from the shoreline out to the 40-m (130-ft) depth contour, which are frequented by recreational divers; but it is recognized that there are other sites that may be outside this boundary. The SURTASS LFA sonar sound field is estimated in accordance with the guidelines in Subchapter 5.1.3 of the SEIS.

### **5.1.3 Sound Field Modeling**

SURTASS LFA sonar operators estimate SPLs prior to and during operations to provide the information necessary to modify operations, including the delay or suspension of transmissions, in order not to exceed the sound field criteria cited in Subchapter 5.1 of this SEIS.

Sound field limits are estimated using near-real-time environmental data and underwater acoustic performance prediction models. These models are an integral part of the SURTASS LFA sonar processing system. The acoustic models help determine the sound field by predicting the SPLs, or RLs, at various distances from the SURTASS LFA sonar source location. Acoustic model updates are nominally made every 12 hr, or more frequently when meteorological or oceanographic conditions change.

If the sound field criteria listed in Subchapter 5.1 were exceeded, the sonar operator would notify the Officer in Charge (OIC), who would order the delay or suspension of transmissions. If it were predicted that the SPLs would exceed the criteria within the next 12 hr, the OIC would also be notified in order to take the necessary action to ensure that the sound field criteria would not be exceeded.

## **5.2 Monitoring to Prevent Injury to Marine Animals**

The following monitoring to prevent injury to marine animals is required when employing SURTASS LFA sonar:

- **Visual monitoring** for marine mammals and sea turtles from the vessel during daylight hours by personnel trained to detect and identify marine mammals and sea turtles;
- **Passive acoustic monitoring** using the passive (low frequency) SURTASS array to listen for sounds generated by marine mammals as an indicator of their presence; and
- **Active acoustic monitoring** using the High Frequency Marine Mammal Monitoring (HF/M3) sonar, which is a Navy-developed, enhanced HF commercial sonar, to detect, locate, and track marine mammals and, to some extent, sea turtles, that may pass close enough to the SURTASS LFA sonar's transmit array to enter the LFA mitigation zone.

### **5.2.1 Visual Monitoring**

Visual monitoring includes daytime observations for marine mammals and sea turtles from the vessel. Daytime is defined as 30 min before sunrise until 30 min after sunset. Visual monitoring begins 30 min before sunrise or 30 min before the SURTASS LFA sonar is deployed. Monitoring continues until 30 min after sunset or until the SURTASS LFA sonar is recovered. Observations are made by personnel trained in detecting and identifying marine mammals and sea turtles. Marine mammal biologists qualified in conducting at-sea marine mammal visual monitoring from surface vessels train and qualify designated ship personnel to conduct at-sea visual monitoring. The objective of these observations is to maintain a track of marine mammals and/or sea turtles observed and to ensure that none approach the source close enough to enter the LFA mitigation zone.

These personnel maintain a topside watch and marine mammal/sea turtle observation log during operations that employ SURTASS LFA sonar in the active mode. The numbers and identification of marine mammals/sea turtles sighted, as well as any unusual behavior, is entered into the log. A designated ship's officer monitors the conduct of the visual watches and periodically reviews the log entries. There are two potential visual monitoring scenarios.

First, if a potentially affected marine mammal or sea turtle is sighted outside of the LFA mitigation zone, the observer notifies the OIC. The OIC then notifies the HF/M3 sonar operator to determine the range and projected track of the animal. If it is determined that the animal will pass within the LFA mitigation zone, the OIC orders the delay or suspension of SURTASS LFA sonar transmissions when the animal enters the LFA mitigation zone. If the animal is visually observed within 2 km (1.1 nm) and 45 degrees either side of the bow, the OIC orders the immediate delay or suspension of SURTASS LFA sonar transmissions. The observer continues visual monitoring/recording until the animal is no longer seen.

Second, if the potentially affected animal is sighted anywhere within the LFA mitigation zone, the observer notifies the OIC who orders the immediate delay or suspension of SURTASS LFA sonar transmissions.

All sightings are recorded in the log and provided as part of the Long Term Monitoring (LTM) Program as discussed in FOEIS/EIS Subchapter 2.4.2 to monitor for potential long-term environmental effects.

### **5.2.2 Passive Acoustic Monitoring**

Passive acoustic monitoring is conducted when SURTASS is deployed, using the SURTASS towed horizontal line array (HLA) to listen for vocalizing marine mammals as an indicator of their presence. If the sound is estimated to be from a marine mammal that may be potentially affected by SURTASS LFA sonar, the technician notifies the OIC who alerts the HF/M3 sonar operator and visual observers. If prior to or during transmissions, the OIC then orders the delay or suspension of SURTASS LFA sonar transmissions when the animal enters the LFA mitigation zone.

All contacts are recorded in the log and provided as part of the LTM Program to monitor for potential long-term environmental effects.

### **5.2.3 Active Acoustic Monitoring**

HF active acoustic monitoring uses the HF/M3 sonar to detect, locate, and track marine mammals (and possibly sea turtles) that could pass close enough to the SURTASS LFA sonar array to enter the LFA mitigation zone. HF acoustic monitoring begins 30 min before the first SURTASS LFA sonar transmission of a given mission is scheduled to commence and continues until transmissions are terminated. Prior to full-power operations, the HF/M3 sonar power level is ramped up over a period of 5 min from 180 dB SL in 10-dB increments until full power (if required) is attained to ensure that there are no inadvertent exposures of local animals to RLs  $\geq$

180 dB from the HF/M3 sonar. There are two potential scenarios for mitigation via active acoustic monitoring.

First, if a contact is detected outside the LFA mitigation zone, the HF/M3 sonar operator determines the range and projected track of the animal. If it is determined that the animal will pass within the LFA mitigation zone, the sonar operator notifies the OIC. The OIC then orders the delay or suspension of transmissions when the animal is predicted to enter the LFA mitigation zone.

Second, if a contact is detected by the HF/M3 sonar within the LFA mitigation zone, the observer notifies the OIC who orders the immediate delay or suspension of transmissions.

All contacts are recorded in the log and provided as part of the LTM Program.

#### **5.2.4 Resumption of SURTASS LFA Sonar Transmissions**

SURTASS LFA sonar transmissions can commence/resume 15 min after there is no further detection by the HF/M3 sonar and there is no further visual observation of the animal within the LFA mitigation zone.

### 5.3 Summary of Mitigation

Table 5-1 is a summary of the proposed mitigation, the criteria for each, and the actions required.

Table 5-1. Summary of Mitigation

Mitigation	Criteria	Actions
<b>Geographic Restrictions</b>		
22 km (12 nm) or 46 km (25 nm), depending on the determination made in the Record of Decision, from coastline and offshore biologically important areas during biologically important seasons outside of 22 km (12 nm) or 46 km (25 nm)	Sound field below 180 dB RL, based on SPL modeling.	Delay/suspend SURTASS LFA sonar operations.
Recreational and commercial dive sites <sup>1</sup>	Sound field not to exceed 145 dB RL, based on SPL modeling.	Delay/suspend SURTASS LFA sonar operations.
<b>Monitoring to Prevent Injury to Marine Mammals and Sea Turtles</b>		
Visual Monitoring	Potentially affected species near the vessel but outside of the LFA mitigation zone.	Notify OIC.
	Potentially affected species sighted within 2 km (1.1 nm) and 45 degrees either side of the bow or inside of the LFA mitigation zone.	Delay/suspend SURTASS LFA sonar operations.
Passive Acoustic Monitoring	Potentially affected species detected.	Notify OIC.
Active Acoustic Monitoring	Contact detected and determined to have a track that would pass within the LFA mitigation zone.	Notify OIC.
	Potentially affected species detected inside of the LFA mitigation zone.	Delay/suspend SURTASS LFA sonar operations.
Notes:		
1. Recreational dive sites are generally defined as coastal areas from the shoreline out to the 40-m (130-ft) depth contour.		

## 5.4 Evaluation of the Use of Small Boats and Aircraft for Pre-operational Surveys

In its Opinion and Order of 26 August 2003, the Court found that the defendants failed to assess the use of aerial surveys or observation vessels for LFA sonar missions operated close to shore. The Court did not define the term “close to shore,” and did not include this requirement in the tailored Permanent Injunction issued on 14 October 2003, which incorporated a stand-off distance of 30 nm (55.6 km). As discussed in Subchapter 1.2.2 of this SEIS, the National Defense Authorization Act for Fiscal Year 2004 (NDAA, 2004) was passed by Congress as HR 1588 and signed into law on 24 November 2003. Several of the provisions of NDAA 2004 concerned revisions to the Marine Mammal Protection Act as they relate to military readiness activities. These revisions to the MMPA did not eliminate the requirement for mitigation and monitoring, but emphasized that mitigation and monitoring decisions should take into account safety, practicality of implementation, and impact on effectiveness of the military readiness activity.

In the evaluation of the feasibility of conducting pre-operational aerial and small craft surveys, the following assumptions were made:

- Surveys would be for areas outside of the 2-km (1.08 nm) mitigation and buffer zones.
- Survey objectives would be to identify unexpected areas of high marine mammal density—primary survey effort would be between ship and shore, where highest densities of marine mammals would be expected.
- Surveys would not be conducted during LFA operations and there would be no post-operational surveys.
- Surveys would occur only during daylight hours, weather permitting.
- Aircraft would only fly under visual flight rules (VFR) conditions (i.e., in good visibility, as opposed to instrument flight rules (IFR) wherein the pilot is allowed to fly in poor visibility by using his instruments to navigate.
- Aircraft would fly a maximum of 100 nm from its home airfield.
- Small boat would only be used in Beaufort Sea State (SS) 3 or less (Beaufort SS3 = 7-10 knots sustained wind; maximum wave height 0.6 m, 2.0 ft). This limitation is primarily because the survey small boat would be launched from the SURTASS LFA vessel, all of which have very high freeboard (distance between waterline and main deck).
- Small boat would remain in visual range of the SURTASS LFA vessel.
- Surveys would be conducted by a single aircraft or single small boat.
- Aircraft would be of the standard type used for visual surveys (not military aircraft), but would stage from U.S. military airfields when SURTASS LFA operations are off a foreign coast. LFA vessels generally do not operate with other fleet assets, so naval aircraft would normally not be available.

### *Small Craft*

The following factors were considered in the evaluation of the use of a small craft for pre-operational marine mammal surveys:

- **Safety:** Because of the configuration of all SURTASS LFA vessels (very high freeboard), it is difficult to launch a small boat at sea. It is considered that it would be unsafe to launch and operate a small boat from a SURTASS LFA ship at sea in seas greater than Beaufort SS3.
- **Impacts to Marine Mammals:** In order to survey an area for marine mammals, the small boat would have to traverse the area frequently, at relatively high speed, which may subject any marine mammals in the area to additional anthropogenic noise.
- **Scientific Research Program (SRP):** The surveys utilized in the SRP cannot be compared to the type of surveys believed to be envisioned by the Court. These surveys were effective because they were conducted either from shore stations or very close to shore (in some cases 1 to 2 nm, 1.85 to 3.70 km) and in areas of known concentrations of marine mammals. These surveys were permitted under NMFS permit #875-1401.
- **Ineffectiveness:** Large-area survey from a small boat will not be effective because:
  - There is limited horizontal, visual range from craft at water level.
  - High-speed small craft will cause animals to avoid the survey vessel by swimming away or diving and thus may not be seen (Au and Green, 2000).

### *Aerial Surveys*

The following factors were considered in the evaluation of the use of an aircraft for pre-operational marine mammal survey:

- **Safety:** Aerial surveys can be hazardous, particularly since they are often conducted at low altitudes and over open water. In 2002, four people died when their aerial observation plane crashed off the coast of Florida. They were conducting visual surveys for northern right whales for the New England Aquarium. Subsequently, all visual survey aircraft were grounded until the investigation into the mishap was concluded. New regulations require a co-pilot on all aerial survey flights; this and other new requirements have increased the costs markedly.
- **The above loss of life, and the growing evidence that passive acoustics yields more and better data on vocalizing marine mammals, has convinced NOAA to invest more heavily in passive acoustic data collection, particularly for those marine mammals that spend little time on the surface.**
- **Equipment and personnel:** The appropriate civilian aircraft would need to be leased in advance, and include pilot and co-pilot and two aircraft-qualified visual observers. The formation of this “team” would also require that they be able to communicate with the SURTASS LFA vessel and provide a written post-flight report.
- **Airfield proximity:** The distances from the closest U.S. military airfield to a SURTASS LFA operating area off a foreign coast could be significant. This factor would make these kinds of surveys more expensive, logistically difficult and probably more dangerous (particularly if there is no divert field near the operating area).

- Logical option: Given the time, effort and expense to carry this out, it would be more meaningful and logical to carry out a scientifically-based research survey effort under the Long Term Monitoring/Research Program. This would be for an area where LFA operations are expected to occur and there is a paucity of marine mammal distribution and density data available.
- SURTASS LFA vessels' aircraft capabilities: None of the SURTASS LFA vessels are designed to support aircraft (helicopter) operations.
- Effectiveness of aerial surveys is diminished by high sea states, low visibility, and diving habits of the specific animal.
- Impacts of aerial surveys: Marine mammals may be harassed by low-flying aircraft.

### *Summary*

As demonstrated above, small boat and pre-operational aerial surveys for SURTASS LFA operations are not feasible because they are not practicable, not effective, may increase the harassment of marine mammals, and are not safe to the human performers. Therefore, under the revisions to the MMPA by the NDAA FY04, pre-operational surveys are not considered as a viable mitigation option.

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