

1 PURPOSE AND NEED

This Supplemental Environmental Impact Statement (SEIS) evaluates the potential environmental effects of employment of Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) sonar systems. The proposed action herein is the U.S. Navy employment of up to four SURTASS LFA sonar systems in the oceanic areas as presented in Figure 1-1 (SURTASS LFA Sonar Systems Potential Areas of Operations) of the Final Overseas Environmental Impact Statement/Environmental Impact Statement (FOEIS/EIS) for SURTASS LFA Sonar (DON, 2001). Based on current operational requirements, exercises using these sonar systems would occur in the Pacific, Atlantic, and Indian oceans, and the Mediterranean Sea. To reduce adverse effects on the marine environment, areas would be excluded as necessary to prevent 180-decibel (dB) sound pressure level (SPL) or greater within specific geographic range of land, in offshore biologically important areas during biologically important seasons, and in areas necessary to prevent greater than 145-dB SPL at known recreational and commercial dive sites.

SURTASS LFA sonar systems are long-range sonar systems that operate day or night in most weather conditions in the low frequency (LF) band (below 1,000 Hertz [Hz]) within the frequency range of 100 to 500 Hz. These systems have both active and passive components. The active component, LFA, is an augmentation to the passive towed array detection system (SURTASS), and is planned for use when passive system performance is inadequate. LFA is a set of acoustic transmitting source elements suspended by cable from underneath ocean surveillance ships, such as the Research Vessel (R/V) *Cory Chouest*, USNS IMPECCABLE (T-AGOS 23), and the VICTORIOUS Class (T-AGOS 19 Class). The active array transmits LF sound pulses that reflects off an object in the water, and the reflected pulses return in the form of echoes. The passive towed array receives the return echoes through listening devices (hydrophones).

The word “employment” as used in this document means the use of SURTASS LFA sonar systems during routine training and testing as well as the use of the system during military operations. This analysis does not apply to the use of the system in armed conflict or direct combat support operations, nor during periods of heightened threat conditions, as determined by the President and Secretary of Defense or their duly designated alternates or successors, as assisted by the Chairman of the Joint Chiefs of Staff (JCS).

The FOEIS/EIS for SURTASS LFA sonar was completed in January 2001 by the Department of the Navy (DON) with the National Marine Fisheries Service (NMFS) as a cooperating agency in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA)¹ and Presidential Executive Order (EO) 12114 (Environmental Effects Abroad of Major Federal

¹ The provisions of NEPA apply to major federal actions that occur or have effects in the United States, its territories, and possessions.

Actions)² (DON, 2001). The Deputy Assistant Secretary of the Navy for Environment (DASN(E)) signed the Record of Decision (ROD) on 16 July 2002 *Federal Register* (FR) (67 FR 48145), authorizing the operational employment of SURTASS LFA sonar systems contingent upon issuance by NMFS of letters of authorization (LOAs) under the Marine Mammal Protection Act (MMPA) and incidental take statements (ITs) under the Endangered Species Act (ESA) for each vessel.

The FOEIS/EIS augmented other environmental reviews associated with using SURTASS LFA sonar systems, including:

- Formal consultation under Section 7 of the Endangered Species Act;
- Issuance of authorizations to incidentally take marine mammals pursuant to regulations for implementing the Marine Mammal Protection Act; and
- Consistency determinations under provisions of the Coastal Zone Management Act.

In response to U.S. District Court ruling on the motion for preliminary injunction, the DASN(E) decided that the purposes of NEPA would be served by supplemental analysis of employing SURTASS LFA sonar systems. On 11 April 2003, the DASN(E) directed the Navy to prepare a supplemental EIS to address concerns identified by the Court to provide additional information regarding the environment that could potentially be affected by the SURTASS LFA sonar systems and additional information related to mitigation (See APPENDIX A).

1.1 Purpose and Need for Proposed Action

The original stated purpose for the SURTASS LFA sonar system from the FOEIS/EIS was:

“The purpose of the proposed action is to meet U.S. need for improved capability to detect quieter and harder-to-find foreign submarines at long range. This capability would provide U.S. forces with adequate time to react to, and defend against, potential submarine threats while remaining a safe distance beyond a submarine’s effective weapons range.” (DON, 2001)

This statement remains valid, and may be more compelling now than when it was presented in the FOEIS/EIS in January 2001. With the Cold War ending more than a decade ago, the Navy is faced with a smaller number of diesel-electric submarines with operations confined to smaller areas (Friedman, 2004). Maritime strategies rely heavily on quiet submarines to patrol the littorals, blockade strategic choke points, and stalk aircraft carrier battle groups (Goldstein and Murray, 2003).

To meet its long-range detection need, the Navy investigated the use of a broad spectrum of acoustic and non-acoustic technologies to enhance antisubmarine warfare (ASW) capabilities. Of those technologies evaluated, low frequency active sonar was the only system capable of

² The provisions of EO 12114 apply to major federal actions that occur or have effects outside of U.S. territories (the United States, its territories, and possessions).

providing long-range, detection during most weather conditions, day or night. (See SURTASS LFA Sonar FOEIS/EIS pages 1-8 to 1-12.) Low frequency active sonar is, therefore, the only available technology capable of meeting the U.S. need to improve detection of quieter and harder-to-find foreign submarines at long range. SURTASS LFA provides a quantifiable improvement in the Navy's capabilities against this threat and markedly improves the survivability of U.S. Naval forces in a hostile ASW scenario.

**Excerpts from Statement of Admiral William J. Fallon, U.S. Navy
Vice Chief of Naval Operations
before the
Subcommittee on Readiness and Management Support
United States Senate Armed Services Committee
on Environmental Sustainment
March 13, 2003**

“.....New ultra-quiet diesel-electric submarines armed with deadly torpedoes and cruise missiles are proliferating widely. New technologies such as these could significantly threaten our fleet as we deploy around the world to assure access for joint forces, project power from the sea, and maintain open sea-lanes for trade. To successfully defend against such threats, our Sailors must train realistically with the latest technology, including next-generation passive and active sonars.”

“The Navy has immediate need for SURTASS LFA. The Chief of Naval Operations has stated that Anti-Submarine Warfare (ASW) is essential to sea control and maritime dominance. Many nations are capable of employing submarines to deny access or significantly delay execution of joint and coalition operations in support of our vital interests. The submarine threat today is real and in some ways has become more challenging than during the Cold War. Of the approximately 500 non-U.S. submarines in the world, almost half that number are operated by non-allied nations. Of greatest concern are the new ultra-quiet diesel-electric submarines armed with deadly torpedoes and cruise missiles being produced by the People's Republic of China, Iran, and North Korea.”

“These diesel submarines are very difficult to detect outside the range at which they can launch attacks against U.S. and allied ships using passive sonar systems. Active systems like SURTASS LFA, when used in conjunction with other anti-submarine sensor and weapons systems, are necessary to detect, locate and destroy or avoid hostile submarines before they close within range of our forces. To ensure our Sailors are properly prepared to counter this growing submarine threat, we must make certain they train with the best systems available.”

The Navy's primary mission is to maintain, train, equip, and operate combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas. The Secretary of the Navy and Chief of Naval Operations have continually validated that ASW is a critical part of that mission—a mission that requires unfettered access to both the high seas and the littorals. In order to be prepared for all potential threats, the Navy must not only continue to test and train in the open ocean, but also in littoral environments.

**Excerpts from Declaration of Vice Admiral John B. Nathman, U.S. Navy
Vice Chief of Naval Operations
To the United States District Court Northern District of California
September 25, 2002**

“ I am aware of the threat to naval forces posed by increasingly quiet submarines. SURTASS Low Frequency Active (LFA) is needed – and needed now – to counter this threat.”

“The threat from modern, quiet diesel-electric submarines to the U.S. Navy is acute and that threat will only increase in the future. I would rank the diesel submarine threat at the very top of those facing the U.S. Navy due to the difficulty in countering it, the potential that threat will proliferate, and its ability to affect naval operations in a number of our most crucial areas of operations.”

“This threat already presents a clear and present danger in crucial parts of the world including the Persian Gulf, along the Korean Peninsula, and in the Taiwan Strait, reflecting the known capabilities of Iran, North Korea and China. This threat increases daily. The U.S. Navy is conducting operations in areas that can be reached by diesel-electric submarines and our Navy’s operations in those areas must continue. Our national interests demand that the U.S. Navy operate naval forces safely and effectively in these areas. The costs of not being able to do so are incalculable.”

“Technologies currently in use, whether traditional mid-frequency active sonar or passive sonar, with recent enhancements, do not provide the capability to detect and engage the diesel-electric submarine threat at a sufficient stand-off distance. Without a low frequency, long-range, active sonar like SURTASS LFA, the diesel submarine threat poses an unacceptable risk to the Navy’s carrier battle groups and amphibious task forces and the men and women who are embarked with these forces. Our ability to conduct the full spectrum of operations from combat, to support for peacekeeping, to non-combat evacuation, to peacetime presence is jeopardized by our vulnerability to this threat.”

“No operational commander can employ a system, of any type, with confidence that it is effective in combat unless the personnel using the system have trained to use it and have used it, in a variety of realistic situations. Tactics must also be developed and honed.SURTASS LFA cannot simply be kept ‘on the shelf’ for use in time of armed conflict. The process of preparing to use it takes time. It is therefore critical that preparing to use this system not be delayed any further.”

“The Navy takes its responsibility to the marine environment seriously, and has committed a great deal of time and money to ensure that the proposed use of SURTASS is consistent with those responsibilities.”

1.1.1 The Immediate Submarine Threat

For a host of reasons, submarine forces are attractive to many nations. Because diesel submarines are relatively inexpensive, they are the most cost-effective platform for the delivery of several types of weapons, including torpedoes, long-range anti-ship cruise missiles, and a variety of anti-ship mines—as well as strategic nuclear weapons. With their stealth and ability to operate independent of escort vessels, submarines are very effective in attacking surface ships with torpedoes and missiles. Because submarines are inherently covert, they can conduct intrusive operations in sensitive areas, and can be inserted early with a minimal likelihood of being detected. The inability to detect a hostile submarine at long range before it can get close enough

to launch a missile is a critical shortfall in the Navy's ASW capability that is harmful to U.S. national security and puts naval vessels and U.S. sailors and marines at risk.

New-generation, ultra-quiet diesel and hybrid-powered submarines pose a major threat to U. S. Naval and allied forces and their coasts. World War II-designed diesel submarines were required to snorkel in order to recharge their batteries and could not move at speeds in excess of 20 knots without depleting their batteries within an hour or less. However, advanced, or hybrid, diesel propulsion systems that allow for long-term submergence with high-speed underwater maneuvering are a reality today. The Russian submarine builder, Rubin, now offers for sale a liquid oxygen and hydrogen fuel cell air-independent propulsion (AIP) option that permits diesel submarines to remain submerged for weeks without snorkeling (Goldstein and Murray, 2003). Submarines equipped with this type of propulsion will not be restricted to operations in shallow water nor to slow speeds.

As we enter the 21st century, the global submarine threat is becoming increasingly more challenging. The Russian Federation and the People's Republic of China have publicly declared that the submarine is the single most potent ship in their fleets and the centerpiece of their respective navies. As China's economy grows, they are able to purchase the best available Russian submarines and weapons systems to support their political goal of controlling the approaches and seas around Taiwan, the Spratly Islands, and the South China Sea (Farrell, 2003). Published naval strategies of potential adversaries, including Iran and North Korea, have expressed similar strategic doctrine. As regional Asian economies recover from the 1997-98 financial crisis, established powers and smaller nations are planning to build or buy highly capable new submarines. The competition threatens to shift the power balance among some of the region's long-standing military rivals and poses a potential threat to key trade routes. China, Taiwan, India, Pakistan, Singapore, Malaysia, South Korea, Japan and Australia are taking delivery or have ordered advanced, stealthy submarines armed with state-of-the-art missiles and torpedoes capable of striking targets at sea or on land far from their home ports. China will take delivery by 2007 of up to eight more advanced Russian-built KILO-class diesel submarines which, combined with the four KILO-class units they already have, make up a formidable force that could allow China to blockade Taiwan's ports (Baker, 2003). From China's point of view, a top-class submarine fleet might make the United States think twice about sending major warships to the Taiwan Strait. Competition between China and India for maritime influence has keyed India's plan to boost its submarine force with 17 new acquisitions over the next decade. Singapore's inventory has recently reached four Swedish-built diesel submarines. Malaysia has ordered two French-built conventional submarines expected to be operational in 2007 and 2008. With Singapore and Malaysia in the submarine market, Thailand is now considering its underwater options. When all these submarines come into service, Asia's key waterways could again become as crowded—and as dangerous—below the surface as they were at the height of the Cold War when U.S. and Soviet submarines hunted each other on a regular basis.

Potential adversary nations are investing heavily in submarine technology, including designs for nuclear attack submarines, strategic ballistic missile submarines, and advanced diesel submarines. Over 40 countries have operational modern submarines, or are planning to add them to their naval forces. Table 1-1 provides a 2003 inventory of worldwide submarines. There are a total of 470 submarines owned by 40 countries—operational or being built. Of these, 257 are

diesel submarines—their combination of quiet operation and effective weapons gives them a substantial and multifaceted combat capability. World navy inventories of active combatant submarines fell to below 400 in 2003—less than half the total in the early 1990s—but important technological developments will result in more effective future submarines (Baker, 2004).

Submarine quieting technology is making submarines ever more difficult—in some cases, nearly impossible—to detect, even with the most capable passive sonar systems. A recent U.S.-Australian ASW exercise with the new Australian COLLINS-Class diesel submarine demonstrated that passive sonar had difficulty detecting this modern diesel submarine before ships were in range of its weapons.³ A single diesel submarine that is able to penetrate U.S. or multinational task force defenses could cause catastrophic damage to those forces, and weaken domestic or coalition political will for peacekeeping or counter-terrorism contingency operations. No navy seems to have viable countermeasures against a wake-homing torpedo, which can be bought to arm the KILO-submarine (Friedman, 2004). Even the threat of a quiet diesel submarine, in certain circumstances, would deny access to vital operational areas to U.S. or coalition naval forces.

1.1.2 SURTASS LFA Is Critical to Meet the Submarine Threat

Because of these threats, the Navy identified a need for long-range detection of hostile submarines before they could get close enough to use their weapons. The most effective and best available technology to reliably meet this long-range detection need is the SURTASS LFA sonar system. This capability is particularly significant in a concentration of friendly forces, such as the case occurring in the Arabian and Mediterranean Seas in support of operations in Afghanistan and Iraq, or during Operations Desert Shield and Desert Storm in 1990-1991. Aircraft carrier and amphibious task forces, their supporting ships and crews must operate in littoral zones and constricted waters. Choke points offer the perfect opportunity for quiet diesel submarines to stalk and ambush U.S. and allied ships. A pre-positioned diesel submarine, conducting a quiet patrol on battery power, is almost impossible to detect with passive sonar. The SURTASS LFA system, through long-range detection, can effectively counter this threat to the Navy and national security. Without this active augmentation (LFA) to passive and tactical systems, diesel submarines pose unacceptable risks to the U.S. Navy's carrier strike groups and expeditionary strike groups, and the sailors and marines that man them.

³ Statement of Vice Admiral Dennis V. McGinn, Deputy Chief of Naval Operations for Warfare Requirements and Programs before the Subcommittee on Fisheries Conservation, Wildlife, and Oceans of the House Committee on Resources on the Marine Mammal Protection Act and Surveillance Towed Array Sensor System Low Frequency Active Sonar, 11 October 2001.

Table 1-1. World Submarine Inventory

Country	Total Nuclear Powered	Total Nuclear Building	Total Conventional & Non-Nuc AIP	Total Conventional Building
Atlantic/Baltic/Mediterranean/Black				
Algeria			2	
Canada			3	1
Denmark			2	
Egypt			4	
Germany			12	4
Greece			8	4
Israel			3	
Italy			6	2
Netherlands			4	
Norway			6	
Poland			4	1
Portugal			2	2
Spain			6	
Sweden			5	2
Turkey			12	4
Ukraine			1	
South America				
Argentina			3	
Brazil			4	1
Chile			2	2
Columbia			2	
Ecuador			1	
Peru			6	
Venezuela			2	
Western Pacific/Indian Ocean				
Australia			6	
Peoples Republic of China	4	2	58	12
India		3	16	2
Indonesia				2
Iran			3	
Japan			16	5
Malaysia				2
North Korea			26	
Pakistan			9	1
Singapore			4	
South Africa				3
South Korea			9	3
Taiwan			2	
US/UK/France/Russia				
US	69	7		1
UK	14	3		
France	10	4		
Russia	38	3	8	2
Total Nuclear Powered	135			
Total Nuclear Building		22		
Total Conventional/Non-Nuclear AIP			257	
Total Conventional/Non-Nuclear AIP Building/Conversions				56
World Submarine Population (40 countries)				470

Note: World Submarine Population does not include min-subs (midget and swimmer delivery vehicles)
Reference: Saunders (2003); Scherr (2003)

1.1.3 Littorals

The U.S. military anticipates that future naval conflicts are most likely to occur within littoral or coastal areas. This is a distinct change from the Cold War, where such conflicts were most likely to occur in mid-ocean areas. These littoral areas have highly variable and frequently high underwater background noise, largely as a result of commercial shipping, and difficult underwater acoustic propagation conditions, such as multi-path propagation, that make for shorter detection ranges. Passive sonar is significantly degraded in such complex littoral environments. SURTASS LFA provides the U.S. Navy with the most effective and best available means to monitor submarines in the littoral areas at distances sufficient to allow them to be detected, tracked and, if necessary, attacked, before they pose threats to U.S. or allied naval/land forces, or civilian coastal targets.

Littoral Environment
<p>The term “littoral” is one of the most misunderstood terms used in naval warfare. Based on the dictionary, the adjective “littoral” pertains to, or existing on a shore. In the noun form, the word means a shore or coastal region.</p> <p>The Navy’s meaning differs because it is based on a tactical, not geographic, perspective relating to overall coastal operations including all assets supporting a particular operation regardless of how close, or far, from the shore it may be operating. The Navy defines littoral as the region that horizontally encompasses the land/watermass interface from fifty (50) statute miles (80 kilometers [km]) ashore to two hundred (200) nautical miles (370 km) at sea; extends vertically from the bottom of the ocean to the top of the atmosphere and from the land surface to the top of the atmosphere (Naval Oceanographic Office, 1999).</p>

A prime example of the importance of littoral areas is in the waters of Eastern Asia, including the shallow waters of the South China Sea, East China Sea, Sea of Japan, and Philippine Sea. Many of the world’s busiest sea-lanes pass through these waters, an area the Chinese want very much to control and where billions of dollars in American investments will almost guarantee U.S. involvement (Farrell, 2003).

In June 2002, the United States General Accounting Office (GAO) provided a report to the U.S. House of Representatives concerning questions raised as to whether SURTASS LFA will increase the Navy’s undersea detection capabilities and whether the Navy has an alternative for the system (GAO, 2002). In response to the Congressional request, the GAO examined the extent that SURTASS LFA sonar will enhance the Navy’s ASW capabilities to detect submarines and whether there are other existing or planned systems that can provide the same long-range detection capabilities as those of SURTASS LFA. The GAO report concluded that SURTASS LFA will increase the Navy’s capability to detect submarines in the open ocean, but there has been limited demonstration of the system’s capabilities in littoral waters where the threat is increasing.

Excerpts from GAO report (GAO-02-692)—Defense Acquisitions: Testing Needed to Prove SURTASS/LFA Effectiveness in Littoral Waters

The single recommendation from the GAO report related to the lack of testing in littoral areas. The report stated:

“Without testing in littoral areas, the Navy will not know whether the system is suitable and effective where the enemy threat is of increasing concern and detection is more challenging.”

1.2 Background

Consistent with responsible stewardship of the environment, the United States is firmly committed to the protection of marine mammals and is mindful of the potential effects that man-made sound may have upon marine life. The Navy has conducted extensive research on this issue, including testing the effects of certain active sonar systems on some marine species. Research concerning active sonar’s potential effects has demonstrated that, under certain circumstances and conditions, use of active sonar has an effect upon particular marine species. The U.S. recognizes that active sonar testing and training to defend against this threat (i.e., the global proliferation of extremely quiet submarines posing a critical threat to the maritime interests of the U.S. and its allies) must be accomplished in an environmentally sound manner that is science-based and protective of marine life.

Compliance with numerous environmental laws and regulations is mandatory. This process of balancing national security with environmental stewardship of the oceans is complex, costly, and lengthy. For the acquisition of any emergent system (regardless of classification) to be successful, environmental compliance must be taken into account early in the planning process (Johnson et al., 2002). Recent strandings of beaked whales, coincident with naval maneuvers in which active mid-frequency sonars were in use, have put naval sonars in the spotlight.

LFA Operations Without Incidents

Many citizens, scientists and environmental groups opposed the Navy’s development and use of LFA technology. Based on the evidence available at the time, these concerns that LFA posed potential threats to marine life over large distances were considered by the Navy. Operational testing of LFA was halted in 1997 until the completion of an extensive environmental analysis under the National Environmental Policy Act and compliance to numerous other environmental regulations to include the Marine Mammal Protection Act and the Endangered Species Act. Except for the Low Frequency Sound Scientific Research Project in 1997-98, LFA operations did not commence again until January 2003 when the R/V *Cory Chouest* began reintroduction into the Pacific Fleet. Over a year later, the USNS IMPECCABLE commenced operations in April of 2004.

No evidence has come forth of any injury or stranding of marine mammals either during the brief periods of the SURTASS LFA research projects in the late 1990s (which were conducted close to land, with extensive monitoring, and during periods of high marine mammal densities—areas where LFA will not operate) or since LFA operations were resumed in 2003.

SURTASS LFA sonar was the first Navy program for an operational system to have completed the NEPA process, a process that began on 18 July 1996, when the Navy published its Notice of Intent (NOI) in the *Federal Register* (67 FR 37452) to prepare an environmental impact statement (EIS) for SURTASS LFA Sonar under NEPA and Presidential EO 12114. It culminated with the signing of the ROD on 16 July 2002 (67 FR 48145). The Navy's ESA Section 7 consultation with the NMFS and permitting requirements under the MMPA concluded with NMFS's issuance of the Biological Opinion and Incidental Take Statement (NMFS, 2002a; 2002b) and the issuance of a Letter of Authorization (LOA) (67 FR 55818) under the MMPA Final Rule (50 CFR Part 216 Subpart Q) (67 FR 46785) for the operation of SURTASS LFA Sonar on R/V *Cory Chouest*.

A chronology of key regulatory events are provided in Table 1-2.

1.2.1 Court Opinion and Order

On 7 August 2002, the National Resources Defense Council, the U.S. Humane Society and four other plaintiffs filed suit against the Navy and NMFS over SURTASS LFA sonar use and permitting. Key litigation events included:

- 7 August 02—Plaintiffs filed suit in United States District Court for the District of Northern California to halt deployment of SURTASS LFA.
- 31 October 02—Court issued Opinion and Order Granting Plaintiffs' Motion for a Preliminary Injunction.
- 14 November 02— Mediation with Court-appointed mediator regarding scope of preliminary injunction.
- 15 November 02—Court issued Stipulation and Order re: Tailored Preliminary Injunction for operations of LFA in a stipulated area in northwest Pacific/Philippine Sea, south and east of Japan.
- September 02 to June 03—The parties filed cross motions for summary judgment.
- 30 June 03—Oral arguments on cross-motions for summary judgment.
- 26 August 03—Court issued Opinion and Order on Cross-Motions for Summary Judgment.
- 25 September 03—Mediation with Court-appointed mediator regarding scope of permanent injunction.
- 14 October 03—Court issued Stipulation Regarding Permanent Injunction for operations of LFA in stipulated areas in northwest Pacific/Philippine Sea, Sea of Japan, East China Sea, and South China Sea.
- 2 December 04—Court vacated and dismissed the MMPA small numbers and specific geographic regions claims.
- 7 July 05—Court issued amendment to the Stipulation Regarding Permanent Injunction for expansion of operating areas in northwestern Pacific Ocean.

Table 1-2. Chronology of Key SURTASS LFA Regulatory Events

Year	Key SURTASS LFA Regulatory Events
1996	<ul style="list-style-type: none"> • Notice of Intent (NOI) to prepare an EIS published in the <i>Federal Register</i>. • Public scoping meetings held in Norfolk, San Diego and Honolulu. • Written comments received on scoping for the Draft EIS.
1997	<ul style="list-style-type: none"> • Public outreach meetings held (4). • Scientific Working Group meetings held (2). • LF Sound Scientific Research Program (LFS SRP) Phase I: So. California Bight. • Naval Submarine Medical Research Lab (NSMRL) study on bioeffects of LF sound on divers.
1998	<ul style="list-style-type: none"> • Public outreach meeting held (1). • Scientific Working Group meeting held (1). • LFS SRP Phase II: central California coast; and Phase III: Big Island, Hawaii. • NSMRL study on bioeffects of LF sound on divers (cont'd.). • NMFS agreed to be a cooperating agency in the preparation of the EIS.
1999	<ul style="list-style-type: none"> • NSMRL issued interim guidance for LF sound in presence of divers. • Draft EIS published with 90-day public comment period. • Public hearings held on Draft EIS in Norfolk, San Diego and Honolulu. • Navy submitted application to NMFS for authorization to incidentally take marine mammals under the MMPA. • Navy initiated formal Section 7 consultation with NMFS under the ESA with submittal of the Biological Assessment. • NMFS published Advance Notice of Proposed Rulemaking (ANPR) on Navy's application for incidental taking of marine mammals in <i>Federal Register</i>. • SURTASS LFA Open Houses held for public info dissemination: Seattle, Boston, Miami, Los Angeles and Honolulu.
2000	<ul style="list-style-type: none"> • Completed successful testing of high frequency (HF) marine mammal monitoring (HF/M3) sonar. • Navy drafted responses to 1,070 comments and 11 petitions received during the Draft EIS 90-day comment period.
2001	<ul style="list-style-type: none"> • Final EIS published and availability announced in the <i>Federal Register</i>. • NMFS published Proposed Rule in the <i>Federal Register</i>. • Public hearings held on NMFS's Proposed Rule: Los Angeles, Honolulu, and Silver Spring.
2002	<ul style="list-style-type: none"> • DASN (E) signed the Record of Decision (ROD), published in <i>Federal Register</i>. • NMFS published Final Rule in the <i>Federal Register</i>. • NMFS issued Letter of Authorization (LOA) under MMPA for SURTASS LFA employment on R/V <i>Cory Chouest</i>; published notice of issuance in the <i>Federal Register</i>. • NMFS issued Biological Opinion under ESA. • NMFS issued Incidental Take Statement (ITS) under ESA.
2003	<ul style="list-style-type: none"> • 25 January 2003 R/V <i>Cory Chouest</i>, having met all environmental compliance requirements, commenced testing and training in the Western Pacific Ocean. • Navy submitted application to NMFS for authorization to incidentally take marine mammals for second year operations under MMPA for SURTASS LFA employment on R/V <i>Cory Chouest</i> and USNS IMPECCABLE. • NMFS issued LOAs for second year operations; published notice of issuance in the <i>Federal Register</i>. • NMFS issued Biological Opinion and ITS under ESA.
2004	<ul style="list-style-type: none"> • Navy submitted application to NMFS for authorization to incidentally take marine mammals for third year operations. • NMFS issued LOAs and Biological Opinion/ITS for third year operations.
2005	<ul style="list-style-type: none"> • Navy submitted application to NMFS for authorization to incidentally take marine mammals for fourth year operations. • NMFS issued LOAs and Biological Opinion/ITS for fourth year operations.

On 25 January 2003, the R/V *Cory Chouest*, having met all environmental compliance requirements, commenced testing and training in the northwestern Pacific Ocean under the tailored Preliminary Injunction issued by the Court on 15 November 2002. Since then the R/V *Cory Chouest* has successfully completed numerous training operations. These operations were conducted within the stipulated areas and under the mitigation requirements of the Final Rule and LOA issued by NMFS. The culmination of this complex process took six years of dedicated effort by both Navy and NMFS personnel.

The Court issued its Opinion and Order on the parties' motions for summary judgment in the SURTASS LFA litigation on 26 August 2003. The Court found that deficiencies in the Navy and NMFS compliance with the MMPA, ESA, and NEPA warranted issuing a tailored permanent injunction; however, a complete ban on the use of SURTASS LFA was not warranted. Specifically, the Court found that a total ban on the employment of SURTASS LFA would interfere with the Navy's ability to ensure military readiness and to protect those serving in the military against the threat posed by hostile submarines. The Court directed the parties to meet and confer on the scope of a tailored permanent injunction, which would allow for continued operation of the system with additional mitigation measures. This mediation session occurred on 25 September 2003 in San Francisco. On 14 October 2003, the Court issued a Stipulation Regarding Permanent Injunction for the operations of SURTASS LFA from both R/V *Cory Chouest* and USNS IMPECCABLE (T-AGOS 23) in stipulated portions of the Northwest Pacific/Philippine Sea, Sea of Japan, East China Sea, and South China Sea with certain year-round and seasonal restrictions. On 7 July 2005, the Court amended the injunction to expand the potential areas of operation based on real world contingencies, as shown in Figure 1-1.

1.2.2 Military Readiness and Environmental Compliance

As detailed above, the Navy faces an increasing threat from quiet diesel submarines operated by several non-allied nations, including Iran, North Korea, and China. To combat this threat the Navy must continue employment and advanced research and development of ASW weapons systems. The employment of these systems during routine training, testing and military operations inevitably involves interaction with marine mammals and, therefore, application of the MMPA. In meeting its obligation under current environmental laws, the Navy undertook a comprehensive and exhaustive environmental planning and associated research efforts to support the deployment of SURTASS LFA. Working in cooperation with NMFS, the Navy completed an EIS, developed measures to protect marine species, and obtained all required permits pursuant to the MMPA and ESA. The scientific research and EIS involved extensive participation by independent scientists from a large number of laboratories and academic organizations, with wide-ranging public participation in the EIS process. Based on this, NMFS concluded that the planned SURTASS LFA operations would have negligible impacts on marine mammals.

The term "military readiness activity" is defined in Public Law 107-314 (16 U.S.C. § 703 note) to include all training and operations of the Armed Forces that relate to combat; and the adequate and realistic testing of military equipment, vehicles, weapons and sensors for proper operation and suitability for combat use. NMFS and the Navy have determined that the Navy's SURTASS LFA sonar testing and training operations that are the subject of NMFS's July 16, 2002, Final Rule constitute a military readiness activity because those activities constitute "training and

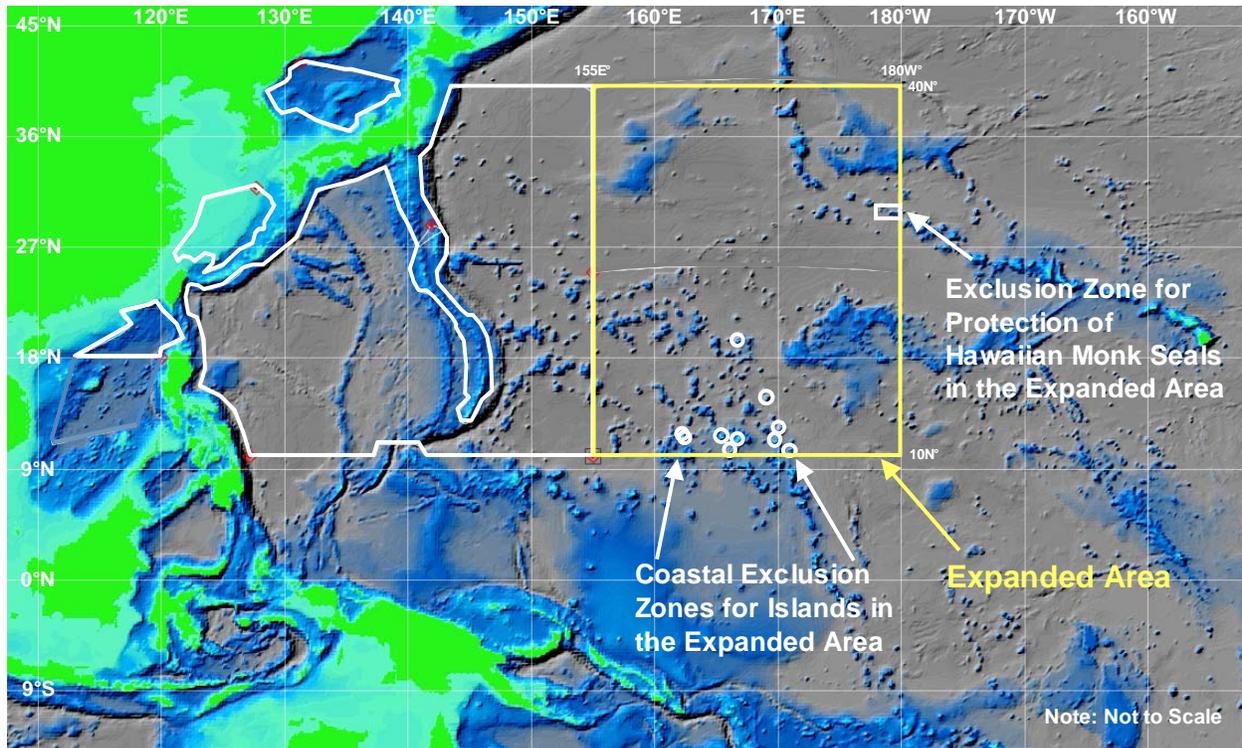


Figure 1-1. SURTASS LFA Sonar Operations Areas Permitted under Stipulation Regarding Permanent Injunction as Amended

operations of the Armed Forces that relate to combat” and constitute “adequate and realistic testing of military equipment, vehicles, weapons and sensors for proper operation and suitability for combat use.”

In order to improve readiness, the Department of Defense (DoD) asked Congress to clarify several provisions of environmental laws as they applied to military training and testing activities. This legislative clarification was provided by Congress as part of HR 1588, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2004 (NDAA FY04), and was signed into law on 24 November 2003. The provisions of this act that specifically relate to SURTASS LFA concern revisions to the MMPA, as summarized below:

- Overall – Changed the MMPA definition of “harassment,” adjusted the permitting system to better accommodate military readiness activities, and added a national defense exemption.
- Amended definition of “harassment” as it applies to military readiness activities and scientific activities conducted on behalf of the Federal government.
- Level A “harassment” defined as any act that injures or has the *significant* potential to injure a marine mammal.
- Level B “harassment” defined as any act that disturbs or is *likely to disturb* a marine mammal by causing disruption of natural behavioral patterns *to a point where the*

patterns are abandoned or significantly altered. Behaviors include migration, surfacing, nursing, breeding, feeding, and sheltering.

- Secretary of Defense may invoke a national security exemption not to exceed two years for any action after conferring with the Secretary of Commerce and the Secretary of Interior, as appropriate.
- NMFS's determination of "least practicable adverse impact on species or stock" must include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.
- Eliminated the "small numbers" and "specified geographic region" requirements from the incidental take permitting process for military readiness activities.

The amended definition of "harassment" focuses authorization of military readiness and scientific research activities on biologically significant impacts to marine mammals, a science-based approach.

These revisions to the MMPA do not eliminate the requirement for mitigation and monitoring. The Navy still must operate under the Final Rule and is required to obtain annual LOAs from NMFS for each vessel. Congress also commended DoD and the Navy for their extensive marine mammal research, but directed an annual report be provided to Congress on research conducted and accompanying funding to ensure a continued level of effort of at least \$7 million per year.

1.2.3 System Upgrades

SURTASS LFA is part of the Integrated Undersea Surveillance System (IUSS). IUSS is designed to detect, classify and track diesel and nuclear submarines operating in both shallow and deep regions of littoral waters and deep ocean areas. The majority of IUSS operational sensors were developed based on deep-water, open ocean threat scenarios. However, to meet current and future surveillance requirements, IUSS sensors must be adapted or developed to operate in littoral or regional ocean areas where conflicts are most likely to occur. To meet this requirement, IUSS active sensors must be able to be operated in these challenging environments. Additionally, IUSS active sensors must possess the ability to work independently or cooperatively with other IUSS, Navy, and allied nations' assets. Three different modes of operation must be considered: 1) mono-static or independent operations, 2) bi-static operations where one system functions as the active source and other assets function as the active receivers, and 3) multi-static operations where multiple active sources are employed cooperatively with multiple receivers.

To meet these emergent requirements, the Navy has initiated a program to upgrade individual undersea surveillance systems. This will include SURTASS LFA system upgrades and modifications necessary to install and operate LFA from the smaller VICTORIOUS Class (T-AGOS 19 Class) ocean surveillance ships as shown in Figure 1-2.



Figure 1-2. VICTORIOUS Class (T-AGOS 19 Class) Ocean Surveillance Ship.

1.3 Environmental Impact Analysis Process

The purpose of this SEIS is to:

- Address deficiencies in NEPA, ESA, and MMPA⁴ compliance found by the U.S. District Court for the Northern District of California in its 26 August 2003 Opinion and Order;
- Provide information necessary to apply for a new five-year Rule that would provide for incidental takes under the MMPA when the current rule expires in 2007, taking into account legislative changes to the MMPA and the need to employ two additional SURTASS LFA sonar systems;
- Analyze potential impacts for LFA system upgrades; and
- Provide additional information and analyses pertinent to the proposed action.

This SEIS focuses on:

- DASN(E) direction to:
 - Provide additional information regarding the environment that could potentially be affected by employment of SURTASS LFA;

⁴ On 2 December 2004, the Court vacated and dismissed the MMPA claims based on the NDAA FY04 amendments to the MMPA.

- Provide additional information related to mitigation of the potential impacts of the system;
- Addressing pertinent deficiencies raised by the Court including:
 - Additional mitigation and monitoring;
 - Additional area alternatives analysis;
 - Analysis of the potential impacts of LF sound on fish;
- Providing the information necessary to apply for a new five-year rule that would provide for the incidental takes under the MMPA, taking into account the NDAA FY04 amendments to the MMPA for military readiness.

Additional SEIS analyses include:

- Updating literature reviews and determination of data gaps, especially for fish, sea turtles, and marine mammals;
- Marine animal LF sound thresholds/impacts based on Fish Controlled Exposure Experiments (CEE) and updated literature reviews;
- LF sound impact analysis to include:
 - Geographic areas;
 - Marine mammal impacts under NDAA FY04 definition of “harassment;”
 - Fish impacts;
 - Other listed species’ impacts, as required (e.g., sea turtles);
- Mitigation (need for mitigation will be determined by impact analysis based on new legislation); and
- Cumulative impact analysis.

The Navy is the lead agency in the development of the SEIS with NMFS of the Department of Commerce’s (DOC) National Oceanic and Atmospheric Administration (NOAA) as a cooperating agency (See APPENDIX A).

1.4 Analytical Context

There have been no substantial changes to the framework for the development of the analytical context since the FOEIS/EIS. This information in the FOEIS/EIS remains valid. Except as noted below, the contents of the Subchapter 1.4 of the FOEIS/EIS are incorporated by reference. The specific scientific information for marine animals was updated to ensure that the best available data was utilized in this analysis.

1.4.1 Adequacy of Scientific Information on Human Divers

There have been no significant changes to the knowledge or understanding for the potential effects of LF sound on humans in water. The information in Subchapter 1.4.1 of the FOEIS/EIS remains valid, and the contents are incorporated by reference.

1.4.2 Adequacy of Scientific Information on Marine Animals

The information in the FOEIS/EIS remains valid for the analysis of the potential effects of LF sound on marine animals. The contents of Subchapter 1.4.2 of the FOEIS/EIS are incorporated by reference. Additional information on the potential effects on marine mammals and fish are included in this SEIS and are addressed in Subchapters 1.4.2.1, 1.4.2.4, and 1.4.2.5 below.

1.4.2.1 Estimating the Potential for Injury to Marine Mammals

There have been no significant changes to the knowledge or understanding of the potential for LF sound to injure marine mammals. The information in Subchapter 1.4.2.1 of the FOEIS/EIS remains valid, and the contents are incorporated by reference. However, since the FOEIS/EIS, concerns have been raised about direct impacts on tissue, indirect impacts on tissues surrounding a structure, and acoustically mediated bubble growth within tissues from supersaturated dissolved nitrogen gas. These issues are discussed in this SEIS.

1.4.2.2 Estimating the Potential for Behavioral Effects

There have been no significant changes to the knowledge or understanding of the potential for LF sound to modify significant biologically important behavior in marine mammals. The information in Subchapter 1.4.2.2 of the FOEIS/EIS remains valid, and the contents are incorporated by reference.

1.4.2.3 Masking

There have been no significant changes to the knowledge or understanding of the potential for LF sound to mask biologically important sounds. The information in Subchapter 1.4.2.3 of the FOEIS/EIS remains valid, and the contents are incorporated by reference.

1.4.2.4 Estimating the Potential for Injury to Fish Stocks

Due to the lack of scientific data relating to the potential for LF sound to affect fish stocks, an independent scientific research program was funded to examine whether exposure to high-intensity, low frequency sonar, such as SURTASS LFA, would affect fish. The Fish Controlled Exposure Experiment (CEE) is an ongoing study being conducted by the University of Maryland designed to examine the effects of LFA on hearing, the structure of the ear, and selected non-auditory systems in a *salmonid* (rainbow trout) and channel catfish.

1.4.2.5 Marine Mammal Strandings

There have been no significant changes to the data available on beaked whale strandings presented in Subchapter 3.2.5.1 of the FOEIS/EIS and its contents are incorporated by reference. Additional information on marine mammal strandings is presented in Subchapter 4.4.4 of this SEIS.

1.4.3 Analytical Approach

There have been no significant changes to the analytical approach and the associated conservative assumptions. The information in Subchapter 1.4.3 of the FOEIS/EIS remains valid, and the contents are incorporated by reference.

1.4.4 NEPA Disclosure

There have been no significant changes to the NEPA disclosure statement. The information in Subchapter 1.4.4 of the FOEIS/EIS remains valid, and the contents are incorporated by reference.