



**FINAL
SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT
FOR
SURVEILLANCE TOWED ARRAY SENSOR SYSTEM
LOW FREQUENCY ACTIVE
(SURTASS LFA) SONAR
Volume 2 of 2**



**Department of the Navy
Chief of Naval Operations
April 2007**

Prepared for
Department of the Navy

in accordance with
Chief of Naval Operations Instruction 5090.1B

pursuant to
Executive Order 12114
and
National Environmental
Policy Act Section 102(2)(C)



Final Supplemental Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar Volume 2 of 2

April 2007

Abstract

This Supplemental Environmental Impact Statement (SEIS) evaluates the potential environmental impacts of employing the Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) sonar. It has been prepared by the Department of the Navy in accordance with the requirements of Presidential Executive Order (EO) 12114 (Environmental Effects Abroad of Major Federal Actions) and the National Environmental Policy Act of 1969 (NEPA). The Navy currently plans to operate up to four SURTASS LFA sonar systems. At present the Research Vessel (R/V) *Cory Chouest* and the USNS IMPECCABLE (T-AGOS 23) are the only vessels equipped with SURTASS LFA sonar. The additional SURTASS LFA sonar systems would be installed on the USNS VICTORIOUS (T-AGOS 19) Class ocean surveillance vessels. In addition to the No Action Alternative, the SEIS analyzed four additional alternatives. The analysis of these five alternatives is intended to address NEPA deficiencies identified in the Ninth District Court's 26 August 2003 opinion, as well as to fulfill the Navy's responsibilities under NEPA with regard to providing additional information related to the proposed action. The SEIS considers mitigation measures, including coastal standoff restrictions of 22 and 46 km (12 and 25 nm) and the designation of additional offshore biologically important areas.

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APPENDIX B

COMMENTS

Appendix B

Comments

This appendix contains the comments received on the SURTASS LFA Sonar Draft SEIS during the 90-day comment period, which ended on 10 February 2006. Comments on the Draft SEIS were received in the following forms: letters, written statements received via the public hearing, oral statements made at the public hearings, and e-mail correspondence. Transcripts from the public hearings are presented in Appendix C.

B. 1 Receipt of Comments

Less than 100 comments were received from congress; federal and state agencies; groups and associations; and private individuals. Comments postmarked by 10 February 2005, or e-mail on, or before, 10 February 2005, were reviewed and are considered in this Final SEIS. Table B-1 presents a summary of the comments received.

Table B-1 Summary of Comments

Commentor Classification	Number of Comments
Congresspersons	1
Federal Agencies and Officials	6
State Agencies and Officials	2
Organizations and Associations	15
Individuals	74
Total	98

B. 2 Identification of Comments

Each submission received was assigned one of the following characteristic codes:

- G Federal and state agencies and officials;
- C Congresspersons
- O Organizations
- I Individuals

These labels were assigned for the convenience of readers and to assist in the organization of this document, priority or special treatment was neither intended nor given in the responses to comments. Within each of the categories, each submission was then assigned a number, in the order it was received and processed, such as C-001, I-001, and so on.

Because of the number of comments received and the fact that many comments concerned similar issues, the responses to comments were prepared on a summary basis in accordance with 15 CFR 1503.4.

All comments were reviewed/analyzed and categorized into broad issues (see Chapter 10 of the Final SEIS, Volume I). These issues were further subdivided into more specific comments. Responses to these comments were then drafted and reviewed for scientific and technical accuracy and completeness. When a comment generated a revision to the Draft SEIS, the location of this revision was identified by the chapter, subchapter, or appendix in the Final SEIS. Where the existing text of the Final SEIS was deemed to adequately respond to a comment, the appropriate chapter, subchapter, and/or appendix were also identified.

Copies of all substantive comments have been included at the end of this appendix. The alphanumeric code associated with each written submission is marked at the top of each page of each of these comments.

B.3 Form Letters

33 of 98 of the comments received were in the form of one of three standard letters. Each type of these “form” letters, contained the same or very similar comments. All of the form letters have been reproduced in Appendix B.

B.4 Location of Responses to Comments

Tables B-2 to B-B provide alphabetic summaries of all comments received by congressperson and federal/state agencies; organizations and associations; and individuals, respectively. Each commentor can locate their specific comment by checking the “Location” column in the appropriate table. Substantive comments are reproduced at the end of this appendix in alphanumeric sequence.

As stated above, specific comments were grouped according to issues. These issues were further subdivided into more specific comments and assigned a “comment number,” such as 1.1.1. Specific comments with their responses are found in numeric order in Chapter 10 of the Final EIS. In each comment, comment number(s) are found in the right-hand margin indicating the location of the response to the particular paragraph or sentence of the comment. Each commentor can thus locate the response(s) to their particular comment(s) in Chapter 10 of the Final EIS, Volume I.

Table B-2. Congresspersons and Federal/State/Local Agencies

<u>Organization</u>	<u>Commenter Number</u>
Fisheries and Oceans Canada	G-005
Marine Mammal Commission	G-002
Marine Mammal Commission	G-008
National Oceanic and Atmospheric Administration	G-003
State of California - California Coastal Commission	G-001
State of Maine - Maine State Planning Office	G-006
US Congress - Rep. Michael Michaud	C-001
US Department of Interior	G-007
US Environmental Protection Agency	G-004

Table B-3. Organizations and Associations

<u>Organization</u>	<u>Commenter Number</u>
Animal Welfare Institute	O-004
Animal Welfare Institute	O-013
Citizens Opposing Active Sonar Threats	O-008
Earth Island Institute	O-005
Earth Island Institute	O-006
Earth Island Institute	O-011
Friends of Santa Clara River	O-007
Green Party of Hawai'i	O-002
Kingdom of Hawaii	O-003
NRDC	O-001
New York Whale and Dolphin Action League (Taffy Lee Williams)	O-015
NRDR (with CD attachment of works cited)	O-014
Ocean Mammal Institute/International Ocean Noise Coalition	O-010
Seattle Aquarium Society	O-009
Sierra Club	O-012

Table B-4. Individual Commenters

<u>Commenter Name</u>	<u>Commenter Number</u>
Aaron (Manor School class)	I-050
Aila, Pansy	I-007
April (Manor School class)	I-035
Ari (Manor School class)	I-041
Botwin, Wendy	I-060
Boyle, Karen (RN)	I-003
Boyle, Karen (RN)	I-005
Browe, Courtney	I-070
Charlotte (Manor School class)	I-042
Christian (Manor School class)	I-046
Crabill, Robert E.	I-074
Cronin, Marc	I-015
Dashu, Max	I-056
Diana (Manor School class)	I-047
Dziak, John	I-030
Eagle, Kathleen	I-066
Eagle, Wesley	I-063
Ellenby, John	I-022
Ellis, Dulanie	I-019
Emma (Manor School class)	I-040
Friedman, Debbie and Paul Kelby	I-016
Gibbs, Ashley Eagle	I-062
Gibbs, Thomas	I-067
Goodman, Janet	I-069
Gray, Sylvia Ruth	I-024
Grunther, Doug	I-059

Guzman, Piedad	I-012
Honda, Laura Dax (Manor School class)	I-033
Hubacker, Peggy Kala	I-010
Hurley, Gail	I-065
Husband, Arianna	I-052
Jack (Manor School class)	I-051
Jasper, Marilyn	I-025
Julia (Manor School class)	I-036
Klein, Wendy	I-053
Leonard, Gordana	I-028
Levine, Jodi	I-017
Louise (Manor School class)	I-043
Lundy, Dee	I-073
Maas, Mila	I-054
Magill, Cheryl	I-072
Mainland, Edward	I-027
Marcus, Lucy	I-023
Martin (Manor School class)	I-048
Max (Manor School class)	I-037
McMillan, Jeff	I-026
Murray, Jay	I-021
Olivia (Manor School class)	I-049
Parsons, Chris (PhD)	I-058
Petta, Janice	I-031
Plaster, Deane	I-057
Public, Jean	I-001
Rasmussen, Pat	I-018
Reed	I-071

Reinz, R. (PhD)	I-068
Salem (Manor School class)	I-044
Sara (Manor School class)	I-045
Schmidt, Robert	I-029
Selena (Manor School class)	I-038
Sinclair, Scott	I-020
Sinkin, Lanny	I-004
Stewart, Kay	I-002
Taylor (Manor School class)	I-039
Trent (Manor School class)	I-034
Wardell, Merrie B. (Rev)	I-055
Weilgart, Linda S. (PhD)	I-011
Weintraub, Rona	I-064
Weis, Laura	I-061
Weiss, Valerie	I-008
Wheeler, Jeanne	I-014
White, Sean	I-032
Williams, Craig	I-013
Williams, Taffy Lee	I-009
Wray, Russel	I-006

Comments on Proposed US Navy Low Frequency Active Sonar Deployment

1-26-2006

These are my comments on the DSEIS created for proposed deployment of the United States Navy SURTASS Low Frequency Active Sonar system. They are in addition to the comments I provided for the Draft and Final LFAS EIS/EIR.

The new LFAS DSEIS states in section 1-16 under the heading Adequacy of Scientific Information on Human Divers, *"There have been no significant changes to the knowledge or understanding for 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."*

The only reason the Navy can say there is no new information on the impact of high dB sound on divers is because they refused to conduct tests on recreation divers that exposed them to the lowest frequencies at the highest power levels LFAS will produce. And even though the Navy may say there have been no significant changes in the knowledge of the effects of sound on humans, by reference, there have been notable changes in the understanding of the effects of sound on marine mammals recently. Specifically, there was a stranding incident of marine mammals in the Bahamas that scientists estimated the received levels that caused the incident. The received level (RL) was estimated at 130dB. (Balcomb, Hildebrand 2004) If a RL of 130dB caused stranding and death of marine mammals, then it should be clear the proposed 145dB RL **estimate** for "known" recreational dive sites places SCUBA divers, snorkelers and swimmers at risk of severe negative reactions, if not fatality. **Question #1:** Why does the Navy feel they can ensonify humans at a level almost 20 times greater than what caused the stranding and death of marine mammals in the Bahamas incident?

4.5.4

I believe the current efforts to transmit sound through Earth's oceans for every conceivable military or "scientific research" experiment or system can be understood better if we examine a statement made by several well known oceanographic acoustic researchers in the October 2005 "Premier Edition" of the Acoustical Society of America's new publication "Acoustics Today." The article is titled Acoustic Remote Sensing of Ocean Gyres. (Walter Munk, Peter Worcester and Robert Spindel) In large italicized print on page 14 it states *"It is inconceivable to us that oceanographers (and other marine mammals) should not take advantage of the fact the ocean is transparent to sound."* The article also concludes with the same statement.

To me, this shows complete insensitivity and lack of respect for all the creatures, known and unknown, that live in Earth's oceans and rely on sound as a means of communicating, finding or stunning prey and navigating, but don't reside on terra firma. And now that a few Homo Sapiens have found it possible to transmit sound across ocean basins for military and "oceanographic research" purposes, we should enthusiastically do so because humans are marine mammals akin to the countless species that reside there.

It seems ironic and pathetic Homo Sapiens "higher intelligence" believes we slithered

out of the primordial soup eons ago, and now that we've become smart enough to use Earth's oceans in a manner similar to the "lower life forms" that inhabit said ocean, we must now deploy a military sonar system to theoretically protect one group of humans from another group of humans. Somewhere the idea of "higher intelligence" and "lower life forms" has been flip-flopped in my opinion.

In theory I do agree with the statement regarding the kinship between Homo Sapiens and marine mammals. Therefore, in my opinion, when the acoustic R/V Cory Chouest was transmitting LFAS during the "classified" Magellan 2 Sea Trials conducted between June 20 and September 30, 1994 off central California's coastline, and SCUBA divers exited the water over 150 miles from the source and complained of new weird low frequency sounds that not only distracted our attention, but at times caused distinct lung vibration, the creators and proponents of the transmissions should have considered the information we provided as "coming from the horse's mouth", so to speak.

The many underwater video tapes I made with the offending LF sounds captured were summarily dismissed by some unknown Navy acoustician as "electromechanical coupling" of my hydrophone. (Comment 4-9.20 and Navy response on page 10-142 of FOEIS/EIR)

The Navy's conclusion is completely impossible as my video camera system has been tested by a respected independent acoustics researcher and found to be accurate. And furthermore, the tapes I have made underwater show divers clearly pointing to our ears or lungs in response to each pulse of sound. Several times I layed the camera on the bottom and swam into the field of view. I then made a clenched fist with every pulse I heard.

I never supplied the Navy with a copy of my original tape because they never asked. They may have obtained a copy from the Naval Postgraduate School or another source, but the data they received may have been altered before the Navy acoustician made his determination my tapes were "inconclusive."

When I took the first underwater videotape my friend and I made directly to the vaunted Naval Postgraduate School in Monterey for analysis, Professor James Miller called me within 24 hours and exclaimed we had captured the offending sounds I and other divers were complaining about on the tape I had delivered. The Navy's answer to my Comment 4-9.20 is completely contradictory to your own Naval Postgraduate School's head acoustics Professor. In newspaper articles titled "*Ocean Sound Stumps Officials*" and "*Strange Pacific Ocean noises causing a stir*," Professor Miller is quoted as saying, "The sounds could be coming from a ship far away, beyond the horizon." He is also quoted as saying an explanation for the LF noise could be #1, "A Navy ship on a classified mission," #2, "A seismic ship could be mapping the seafloor," or #3, "A civilian oceanographic ship may be performing experiments in the area." All of these conclusions were based on the tape I brought to your best and brightest Professor and Graduate students at the NPS.

In the same DSEIS section, the Navy states: "*Based on the evidence provided by the diver, his complaint involved sound in the 30 - 43Hz range. He stated that he heard and recorded LF sounds (on an underwater video recorder) on nine separate dates (from August 1994 through November 1995) in the vicinity of Point Lobos State Park (south of Carmel, CA). He further stated that analysis of the tapes showed smooth coherent energy at 38Hz. The diver could have heard sounds from the SURTASS LFA Sonar because it was operating in the area in August 1994. However, his recorded evidence is inconsistent with any sounds that the SURTASS LFA sonar could produce.*

The lowest source transmission frequency of SURTASS LFA sonar during the period was 160Hz.”

Once again, I point out that your own Naval Postgraduate Schools acoustics **Professor James Miller** stated clearly the possible sources of the noises we divers were complaining about. **His conclusions were based on the tape I provided.** In fact, he stated he had “Made 20 copies of the tape and used it for his students exam.” I was pleased to help the Naval Postgraduate School when they seemed to be without any data regarding the sounds divers were hearing during the Magellan 2 Sea Trials.

It is currently hypothesized marine mammals are suffering from a form of the “bends” when exposed to moderate levels of military sonar. The “bends”, or decompression sickness, is a serious, life threatening condition SCUBA divers suffer from when they surface too quickly after supersaturating their blood while breathing compressed air at depth. If the bubbles being found in marine mammals bloodstreams and tissues are formed when exposed to military sonar, either by scaring the animal into surfacing faster than they do normally, or by actually acoustically exciting the tissues and dispersing the air in the animals lungs into their bloodstream, then it can be postulated that SCUBA divers exposed to 145dB sound waves from LFAS transmissions will be potential victims of the same fate marine mammals exposed to naval sonar in recent years have succumbed to. All it takes for a SCUBA diver to get decompression sickness is to be forced to the surface after breathing compressed air from a depth greater than 30 ft, faster than the known and approved rate of ascension. The reason we have to come up slowly is to allow the gases our blood has absorbed at depth and higher ambient pressure to escape through our lungs during the normal breathing SCUBA divers do when underwater. Personally, I feel marine mammals lungs are being vibrated physically and air is transferred to the blood stream in this fashion. The impedance mismatch between air and water causes airspaces to vibrate at the received frequency. The data published in the Draft LFA EIS/EIR suggests SCUBA divers lungs might resonate when exposed to different frequencies of LFAS transmissions at different depths. **Question #2:** If that is the case, should SCUBA divers spend time at depth and attempt to calculate what frequency we are being exposed to and at what depth our lungs might resonate?

4.5.5

Question #3: How will we be able to figure out if the 145dB RL transmissions will rupture our lungs or ears? I’d like to say we might “Live and learn,” but that may be wishful thinking! **Question #4:** If SCUBA divers are underwater on the bottom and LFAS transmissions begin, **(Please answer either A, B or C.)**

4.5.6

(A) We should remain at depth consuming our remaining air supply and hope the transmissions stop so we can ascend without the possibility of lung resonance.

4.5.7

(B) We should immediately make a mad dash to the surface through a layer of potential resonance and head for a recompression chamber.

(C) We should allow ourselves to be exposed to LFAS of unknown RL, continue our dive and hope we are not injured.

Question #5: If the Divers Alert Network (DAN), the insurance agency who transports SCUBA divers to hospitals in dive emergencies, becomes involved with the Navy and informs divers where and when US Navy LFAS will be operational and the potential risks involved with exposure, do you expect we will exhibit an avoidance reaction and not enter the water?

4.5.8

Question #6: Would the element of military surprise be lost if our Navy/DAN tells us, and the world, when and where U.S. Navy sonar assets are deployed?

4.5.9

Question #7: If marine mammals are first exposed to potentially injurious dB levels

when they are at depth, could they make the complicated acoustic resonance calculations that may save their lives? Since that data isn't available to them, it appears they are simple dashing to the surface through the depth where their lungs and other airspaces resonate and cause injury or death.

If marine mammals are assaulted with dangerously high dB sound waves loud enough to rupture their lungs, the result would be either blood or water filling their lungs. The air in their lungs would then be purged during their death. This would produce negative buoyancy and the deceased animal would sink to the bottom. Hence, we may not be seeing the actual results of Naval sonar, the dead marine life near the transmit vessel, and within sight of the marine mammal observers, sinks beyond detection. And since it is the airspaces within marine mammals and schools of fish that actually cause a return signal to be received by the LFAS transmit vessels passive acoustic array, when their airspaces are violated and they no longer contain air, there will be no further returns from what the Navy sonar development contractor describes as "clutter and target like objects" in an article titled "Low Frequency, High Power Density Active Sonar" by Ronald P. White, (Manager, Active Sonar Programs, Sanders, Inc. Sea Technology magazine. May 1996) The article states, *"Since 1991, Sanders, a Lockheed Martin company, has been the prime contractor for the LFA transmit subsystem (LTS). The largest, highest power, lowest frequency system built to date, LTS weighs 72 tons, including 36 long tons of array hardware..." "From May through October 1993, the SURTASS/LTS system underwent technical evaluation at sea. The LTS accumulated greater than 7,500 transmit hours, equivalent to more than 35,000 mission hours of high power, trouble-free operation without a single active projector failure."* In the same article it states, *"One of the biggest obstacles to active processing is the abundance of clutter returns from target-like objects in shallow water that can overwhelm the operator with false target indications. Until recently, it was not possible to accomplish this sorting reliably. That is, algorithmic approaches had not been developed for achieving consistent performance independent of the environment. To alleviate this active system drawback, Sanders has been engaged in R&D of active classification algorithms in the areas of low-frequency active, mid-frequency active, explosives and optical sensors in cooperation with U.S. Navy customers. The company has processed more than 10,000 echoes from submarines, schools of fish, wrecks, surface ships, and seamounts collected from a number of different deep and shallow water environments."* In a personal conversation with the article's author, Ronald White, he admitted that whales and other marine mammals also produced the same "clutter or false returns" as schools of fish.

It should be noted that the above referenced article clearly states the latest LFAS transmit system is **"The highest power, lowest frequency"** system built to date. Because the same R/V Cory Chouest conducted the well known Heard Island Feasibility Test (HIFT) back in 1991 that transmitted a 57Hz tone from the Southern Indian Ocean to receivers near Monterey, CA in the Pacific and in the Atlantic near Bermuda, it is clear the LFAS transmit system onboard the Cory Chouest during the 1994 Magellan 2 Sea Trials was capable of producing sounds of a lower frequency and at a higher power than the vessel was capable of during HIFT. **Question #8:** Why does the Final OEIS/EIR state in Section 2.1.1 "The source frequency is between 100 and 500Hz (The LFA system's physical design does not allow for transmissions below 100Hz)?? This directly contradicts the article in Sea Technology and the transmissions from the HIFT. **Question**

#9: Does the U.S. Navy SURTASS LFAS system have the ability to transmit below 100Hz? **2.1.2**
Question #10: Is the Navy calling transmissions below 100Hz something else **2.1.1**
 like Extreme Low Frequency Active Sonar? **Question #11:** Do any Navy sonar **2.1.3**
 transducers have the capability to transmit below 100Hz? **Question #12:** Does the Navy **2.1.1**
 use them, and when? The SDEIS states the LFAS sound field will never be more intense
 than the transmit level of 1 LFA projector. (215dB) **Question #13:** Why then does the
 Navy need an array of 18 transmitters? **Question #14:** Would the received level of the
 LFAS array be the same at a range of 100 miles if there was only one transducer **2.1.4**
 operating, not 18?

The opening Abstract and **Section 4 of the DSEIS states, “The R/V Cory Chouest and the USNS Impeccable are the only vessels equipped with a SURTASS LFA sonar system.”**

There is contradictory information currently available that indicates there are already 5 US Navy SWATH vessels outfitted and deployed with LFA sonar plus the R/V Cory Chouest. Jane’s Warships page 844 states under the heading **Victorious Class: Ocean Surveillance Ships (AGOS)** **2.1.6**

The Victorious T-AGOS 19
The Able T-AGOS 20
The Effective T-AGOS 21
The Loyal T-AGOS 22

The data shows they were all built and deployed prior to July 1, **1993**. The information states the sonar onboard as “UQQ2 SURTASS and LFA; towed array; passive/active surveillance.” It also states, **“The Low Frequency Active component produces both mono and bistatic performance against submerged diesel submarines in shallow water.”**

The newer T-AGOS 23 Impeccable is also spoken of, and it is confirmed the vessel will carry LFA sonar as the SEIS states.

Question #15: Have any Victorious Class SWATH vessels been built and already deployed with LFA Sonar as Jane’s suggests? **2.1.6**

Question #16: Does the Navy plan to develop any different LFA sonar transmit platforms such as deploying it on the new Sea Shadow SWATH vessels? **2.1.7**

In Technical Report #3 which focuses on LFAS impacts on humans, and was created as part of the Final OEIS/EIR, there is information that clearly indicates there have been no tests done in the lowest frequency band at the highest RL SCUBA divers will be exposed to by LFAS. Page 11 of Tech Report #3 says, ***“Although there were no differences in the reported level of aversion between the different signals presented (pure tone, 30Hz hyperbolic sweeps up and down) there were significant differences in aversion ratings among the frequencies tested. Results showed that aversion to LFS varied according to a ‘V’ shaped function between 100and 500Hz, with the most and least aversive frequencies occurring at 100Hz and 250Hz, respectively (Fothergill et al., 1998A).*** The effect of duration of the LFS exposures on aversion was tested with the most aversive frequency (100Hz) at a SPL of 136dB (Sims et al., 1997). The duration of the sound exposure lasted between 7 and 28 s with at least a 50% duty cycle between consecutive sound exposures.” The test done on volunteer Navy recreational divers then said,” The increase in sound duration from 7 to 28s did not significantly affect the aversion ratings

which were midway between “Very Slight” and “Slight”. It concluded with, “However, one of the 26 subjects tested did repeatedly provide an aversion rating greater than “Very Severe” for some of the sound exposures. These data suggest that 100Hz LFS is well tolerated at an SPL of 136dB for up to 28s in the majority of individuals (Sims et al., 1998B).

It is clear the Navy has not conducted any tests on non-military recreational or commercial divers that includes a RL of 145dB for 100 seconds at the most aversive frequency LFAS is supposedly capable of transmitting, 100Hz.

It is my belief the Navy cannot proceed as planned. The inadequacies I mention above would seem to only allow a maximum RL of 136dB at “known dive sites” which equates to a 9dB reduction from the planned RL of 145dB in near shore waters where most, but not all diving and snorkeling occurs. I’d sure hate to be a Abalone snorkeler looking for a nice quiet place to hunt these tasty mollusks only to be blasted with RL’s higher than 145dB because he/she was in an area not on the list of “known dive sites”. I think the potential for disaster is very real for unknowing snorkelers as well as SCUBA divers. If a snorkeler descends to depth and is suddenly assaulted by an unknown manmade sonar transmission at 145 or even 136dB and their lungs start vibrating, they would immediately bolt to the surface as they only have that one breath of air. Similar to what marine mammals may be doing when they surface too quickly and suffer air in their bloodstreams/organs when exposed to sonar technologies.

In the Final OEIS/EIR, the Navy has summarily dismissed these same assertions on the grounds they conducted tests on trained Navy SCUBA divers. In the document titled “Exposure Guidelines for Navy Divers Exposed to Low-Frequency Sonar”, (Pestorous, Curly, May 14, 1996) there were Navy divers exposed to LF sound up to a level of 160dB at a frequency of 160Hz.

This test was designed to develop exposure guidelines for U.S. Navy divers, not recreational divers who are not part of the military by either induction or volunteering. As such, any use of this data by the Navy to help establish exposure guidelines for recreational or commercial divers is completely inappropriate and invalid.

The above referenced experiment had its first section titled **“The Larger Problem”**. These problems were listed as,

Community Noise,

1. Non-military divers and swimmers
2. Marine mammals and other marine fauna
3. Political/socio-economic issues
4. Legal/Liability issues.

The test also included what was described as a “Symptomatic event” that involved a 32 year old male experienced Navy diver. He was exposed to 160dB for 15 minutes at 60 FSW. At about 12 minutes experienced dizziness, somnolence, inability to concentrate, and residual tingling in arms for -20 minutes. He received immediate medical attention but relapsed after 1 hour and was transported to Tindal AFB hospital for observation. Recovered overnight but relapsed on his drive home. Was eventually returned to diving status. Retired voluntarily with no medical disability. As recently as 1996, complained of

irritability and minor memory dysfunction. Subsequently suffered a “seizure.” Now being treated with anti-depressant and anti-seizure drugs.

Clearly this incident shows very negative reactions when humans are exposed to levels of 160dB. **Question #17:** If trained, informed Navy qualified divers can’t stand LFS for even 15 minutes at 160dB, why does the Navy feel they can expose marine life to a level 100’s or thousands of times more powerful than that? In my opinion common sense would dictate marine mammals not be exposed to any levels higher than what has been shown by your own data to cause extreme negative reactions in humans. And because the testing done on volunteer recreational Navy divers showed negative reactions at 136dB after just 28 seconds, it is my opinion the Navy cannot subject all the marine life / mammals to a level higher than 136dB. And furthermore, the Bahamas incident showed a RL of 130dB to cause stranding and death of marine mammals, the RL for marine life and divers must be kept well below that level. Even the 130dB level is 1000 times more powerful than levels shown to cause SCUBA divers to react to LFS within the LFAS frequency band. Tech Report #3 says on page 9, *“If it can be inferred that the minimum auditory threshold is the point at which human behavior may be altered by the presence of LFS, then these results suggest that SCUBA divers will first detect and possibly react to LFS (within the frequency range 100 - 500Hz) at SPLs between 84 and 100dB.”*

4.0.4

The same document referred to earlier, “Exposure Guidelines for Navy Divers Exposed to Low-Frequency Active Sonar“, has a section clearly stating the guidance developed is not appropriate for recreational divers. Under the heading **Exposure Guidance and the Diver** it says the test applies to **“All divers meetings medical qualifications for Navy diving.”** Some of the symptoms the Navy divers reported were: **“Vibrations, numbness, vertigo, imbalance, motion sickness, dizziness and abdominal/chest sensations.”** It also says, **“Psychological considerations: possibility of adverse reaction by uninformed diver.”**

Question #18: If Divers Alert Network (DAN) doesn’t manage to contact all divers that happen to be in the water when the Navy ensonifies them with LFAS, will the Navy claim it’s DANs fault for failure to notify? **Question #19:** Or will the Navy take full legal responsibility for any negative reactions they cause from their planned LFAS transmissions?

Conclusion and request for “No Action”

In conclusion, I must request with the strongest language possible the Navy take the “No Action” option regarding deployment of the Low Frequency Active Sonar system.

This conclusion is based on the fact recent stranding incidents and deaths of Marine Mammals appear to have occurred when the unfortunate beings were exposed to military sonar at levels well below the planned SCUBA diver RL of 145dB. (i.e. Bahamas stranding and death at 136dB)

The Navy has not conducted any research on the impact of 145dB, 100Hz sound exposure on recreational divers. For that matter, they have not conducted this experiment on Navy divers either according to available information. The test done on the Navy qualified divers may have subjected the divers to a higher RL of 160dB, but not at the

“most aversive” frequency of 100Hz.

When divers in the Monterey area complained about new weird sounds while diving and recorded the offending sounds, the Navy dismissed the incident by saying my data is inaccurate. That still doesn't explain the fact SCUBA divers were screaming about and reporting high intensity low frequency sounds when diving. It seems no matter what data is presented, the Navy will try and deny responsibility instead of using it's assets to locate and inform the public what's going on. You have proven through your actions you intend to avoid all responsibility for the negative reactions you cause.

In my own case, as a PADI Divemaster you have forced me to abandon the thing I loved most in my existence. After being subjected to the Magellan 2 Sea Trials high db LF sounds in the Monterey area, I actually heard and recorded the transmissions while diving in Fiji. The Navy assertion the LFAS system isn't the main source of sound in any ocean basin is laughable. Your transmissions are easily heard for thousands of miles. We divers can't even hear the shipping lanes just 15 miles offshore. If we could, we would probably be informing Sanctuary officials of the sounds. If LFAS is to operate over ten times closer to shore than Magellan was to Monterey, the potential negative impacts should be obvious. I also have been exposed to the Navy 3kHz “standard” sonar implicated in recent marine mammal strandings when diving in Hawaii. The divers with me said they thought “*either their ears were ringing, or they were going crazy.*” This type of Naval sonar didn't produce lung vibration, but it certainly ruined a great dive. I haven't been diving since 1998. It's a clear avoidance reaction to being exposed to Naval sonar. I had hoped to buy a dive shop somewhere in the tropics and live a divers life for my remaining years on Earth, but with your LFAS system and other sonar technologies roaming the planet and ensonifying divers in all ocean basins, fulfilling my dream is now not feasible.

And the fact remains the Navy has already built and deployed several SWATH LFAS transmit vessels back in the early 1990's according to available public information.

In the article I referenced at the beginning of my comments, **Acoustic Remote Sensing of Ocean Gyres**, there is a statement in the Acknowledgements section that says, “Munk (Walter) subsequently briefed Vice President Gore on ATOC.” (The Scripps Acoustic Thermometry of Ocean Climate test that transmitted LF sound on ocean basin scales) “When Munk encountered Vice President Gore on a number of occasions following the briefing, the Vice President referred to Munk as the *Whale Killer*.”

I can say from my own experience, the U.S. Navy, it's contractors and the organizations involved with developing, testing and deploying high power density active sound transmission systems are the destroyers of worlds. What's next, sound controlled autonomous underwater nuclear weapons? And oh, by the way, why don't you shut off the communication system that sends low frequency sounds to our submarine fleet. Its characteristics are almost identical to your LFAS system. Its encrypted information is being transmitted into the public domain and I fear the encryption codes will be stolen or sold to your adversaries.

In is my opinion the Navy should not expose civilian recreational divers or commercial divers to a RL of LFAS that will cause distraction or disruption of their dive. In Technical Report #3 it states divers may first react to sound in the LF band at a level between 84 and 100dB. I believe that to be true, so therefore subjecting divers to sounds beyond 100dB may cause serious life threatening problems and subject the Navy to potential litigation. Remember, a RL of 130dB caused death of marine mammals in the

Bahamas incident. I also believe there will be a noticeable negative impact to the entire dive industry if LFAS is deployed as planned in Alternative #1.

In advance, thank you for answering these question in the Final LFAS SOEIS. And thanks for the extra 45 days to comment on this global scale proposal.

Yours truly,

Jay R. Murray