Gulf of Alaska Navy Training Activities
Preliminary Final Environmental Impact Statement/
Overseas Environmental Impact Statement

Commander, U.S. Pacific Fleet
Environmental - N01CE1
250 Makalapa Dr., Bldg 251
Pearl Harbor, HI 96860-3131

Appendices A-I
Volume 2

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Appendix I

Public Comments and Responses

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I PUBLIC COMMENTS

The Navy received public comments on the Draft Environmental Impact Statement / Overseas Environmental Impact Statement (EIS/OEIS) via three media; written comments, website comments, and oral comments. Regardless of the medium, all comments have been treated equally. The comments are from the public comment period for the document, December 11, 2009 through January 25, 2010.

Written comments were mailed directly to the Navy. Website comments were submitted to the Navy via the project website. Oral comments were taken directly from the official court reporter transcripts. To allow side-by-side review of the comments and the Navy responses, all comments have been converted to text and entered into a table format that follows, with the comment in one column and the Navy's response in the next column. The comments have been reproduced verbatim and accurately to the extent as possible. In some cases, the editors may have made minor errors in the translation of some handwritten letters. For this reason, a copy of each written comment has been placed at the end of Appendix I. Appendix I also contains the official court transcripts of one complete public hearing, and the oral comments made at each of the public hearings. Website comments were electronically submitted and copied directly into this Appendix, so no other reproduction was necessary.

In preparing the Gulf of Alaska (GOA) Navy Training Activities Draft EIS/OEIS, each resource section was prepared and reviewed by numerous qualified individuals, each specialists in their respective fields, to ensure that the resources and issues received a rigorous and thorough assessment. The best available scientific data and the latest peer-reviewed studies were considered.

In this Final EIS/OEIS, the Navy has made changes to the Draft EIS/OEIS, based on comments received during the public comment period. These changes include factual corrections, additions to existing information, and improvements or modifications to the analyses in the Draft EIS/OEIS. This section presents the public comments received and the Navy's responses to these comments. The changes made to the document based on comments do not result in any significant modifications to the proposed action, the alternatives considered, the affected environment or the environmental effects analyses of the Draft EIS/OEIS that would require further public participation.

Although all comments have been read and considered, some comments were not specific regarding the analyses or the alternatives in the Draft EIS/OEIS and, therefore, could not be given specific responses. As stated in the Council on Environmental Quality's (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA), 40 CFR Part 1503.3(a), "Comments on an environmental impact statement or on a proposed action shall be as specific as possible and may address either the adequacy of the statement or the merits of the alternatives discussed or both."

I.1 WRITTEN COMMENTS

The comments in this section were received in written form by organizations, agencies, tribes and individuals. The first part of the section is a copy of each of the individual comments received by the Navy. This is followed by a second section that has a consolidated table with comments in alphabetical order by commenter's name. If an organization or affiliation name was submitted, then the comment was listed under that name, not the individual.

I.1.1 ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE
INDUSTRY PREPAREDNESS PROGRAM
Marine Vessels Section

SEAN PARNELL, GOVERNOR

555 Cordova Street
Anchorage, AK 99501
PHONE: (907) 269-3094
FAX: (907) 269-7687
http://www.dec.state.ak.us

January 6, 2010

File No. 207.50 (USN)

Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, HI 96860-3131

Attention: D.A. McNair

Subject: **Department of the Navy letter 50590, Ser N01CE1/1333 dated, December 4, 2009**

Dear Mr. McNair:

The Alaska Department of Environmental Conservation has reviewed the information in the subject letter and the referenced websites regarding United States Navy training intentions within the described temporary Maritime Exercise Area in the Gulf of Alaska. It has been determined that the temporary Maritime Training Area is not within Alaska State waters. Therefore, there is no regulatory jurisdiction within the proposed training area under the provisions of Title 18, Alaska Administrative Code, Chapter 75, Oil and Other Hazardous Substances Pollution Control.

Thank you for inquiry with the Alaska Department of Environmental Conservation. If you have any questions regarding this correspondence please contact Martin Farris at (907) 269 8487 or martin.farris@alaska.gov or John Kotula at (907) 835 3037 or john.kotula@laska.gov.

Sincerely,

Betty Schorr
Program Manager

Electronic cc:
John Kotula, ADEC
Larry Dietrick, ADEC
Martin Farris, ADEC

cc:
Project file

Printed on Recycled Paper

I.1.2 ALASKA DEPARTMENT OF MILITARY AND VETERAN AFFAIRS

STATE OF ALASKA

DEPARTMENT OF MILITARY AND VETERANS AFFAIRS

OFFICE OF THE COMMISSIONER

Sean Parnell, GOVERNOR

P. O. BOX 5800
Ft Richardson, ALASKA 99505-5800
PHONE: (907) 428-6003
FAX: (907) 428-6019

January 20, 2010

Naval Facilities Engineering Command Northwest
ATTN: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mrs. Burt:

As the Commissioner of Alaska's Department of Military and Veterans Affairs, I can assure you that the Parnell Administration fully supports "Alternative 2" proposed by the U. S. Navy in its Draft "Gulf of Alaska Navy Training Activities Environmental Impact Statement / Overseas Environmental Impact Statement" (EIS/OEIS) This Administration supports the "increase training activities to include the use of active sonar, accommodate force structure changes to include new platforms, weapon systems, and training enhancement instrumentation, and conduct one additional summertime CSG exercise annually."[1] The Parnell Administration's support of Alternative 2 is steadfast given that the U.S. Navy has an excellent track record in caring for Alaska's land, sea, and air.

As you realize, the Gulf of Alaska is very important to the people of our state who rely on this area for their livelihood and subsistence needs. These areas are home to a vast array of marine mammals and the largest and most diverse fisheries in the United States. We understand that protecting the marine environment of the Gulf of Alaska is an important goal for the Navy. We appreciate the Navy following detailed programs to care for the environment and realize that the Navy continues to improve these programs as they learn more about the ocean and marine species. We also clearly understand and support the purpose of the Navy's Proposed Action is to achieve and maintain Fleet readiness using the Alaska Training Areas to support and conduct current, emerging, and future training activities. The air, land, and sea spaces of the Alaska Training Areas have and continue to provide a realistic training environment for the men and women in uniform. The State of Alaska supports this training as it provides for defense of the nation and our state. In many ways Alaska has been historically on the front lines and has provided a position of importance in strategic defense plans of our nation.

[1] GULF OF ALASKA NAVY TRAINING ACTIVITIES DRAFT EIS/OEIS DECEMBER 2009

The State of Alaska supports the Proposed Action and is confident the Navy is committed to the protection of our maritime and other natural resources. Analysis of the proposed action indicates there is no risk to public safety, human health, or the environment. Alaska has considerable experience working cooperatively with the Navy and this history shows us that the Navy is responsive to the concerns of Alaska.

Sincerely,

Thomas H. Katkus

Brigadier General Thomas H. Katkus
Commissioner

I.1.3 ALASKA MARINE CONSERVATION COUNCIL

Alaska Marine Conservation Council

Submitted by mail

Amy Burt
Gulf of Alaska EIS/OIES Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Tel.: (360) 396-0924

January 25, 2010

Re: *Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Alaska Navy Training Activities*

The Alaska Marine Conservation Council (AMCC) is a community-based organization dedicated to protecting the integrity of Alaska's marine ecosystems. Please accept these comments on behalf of our board and members who include commercial and sport fishermen, subsistence harvesters, and coastal residents throughout Alaska. These individuals and their families are culturally and economically dependent on a healthy marine and coastal environment.

AMCC submits these comments in addition to verbal testimony provided at the hearing on the Draft EIS in Kodiak, Alaska on January 7, 2010.

After review of the Draft EIS, AMCC remains concerned about the proposed increase in Navy training activities in the Gulf of Alaska (GOA). Particularly of concern are the effects of underwater noise on living marine resources, especially noise resulting from the use of sonar in this productive and important marine environment.

AMCC supports the no action alternative which would maintain current training activities and does not involve the use of sonar. The alternatives listed in the analysis are inadequate to explore a range of options for increased training potential without the use of sonar, and thereby reduce options for consideration only to the no action alternative.

Overall, the proposed action would result in dramatic changes in the acoustic marine environment inside and adjacent to the operating area that could have significant impacts on fish and marine mammals inhabiting these waters.

Designated critical habitat for the North Pacific right whale, the world's most endangered whale, is located directly adjacent to the training area, a mere 12 miles away. This is a major concern given that this population is literally teetering on the brink of extinction. Waters in the Gulf of Alaska provide vital feeding habitat particularly suited to the right whale's biological needs. Underwater noise related to the proposed Navy training activities could drive the right whales away from these feeding grounds, potentially resulting in major impacts to the North Pacific right whale population and species.

In response to measures to mitigate impacts on marine mammals with use of on board visual monitors in the form of personnel with binoculars as the primary means to reduce impact, we

healthy oceans ... healthy communities

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believe these measures to be inadequate. The proposed measures rely on observations to enact the 1,000 yard power down and the 200 yard shut down.

Fishermen can share endless stories about looking for gear in this area. Boats can spend hours and even days searching for a flag and buoy they know is there, with the benefit of locating coordinates, before spotting the gear. Studies show that visual monitoring only spots about 5% of marine mammals.

In addition, it is quite possible the Navy underestimates the number of marine mammals and fish that may be harassed, injured or killed due to lack of density estimates needed to accurately make this determination. For many reasons, there a simply no reliable estimates for current or historical abundance numbers for many of the affected marine mammals in this region.

Another factor that has not been considered in the EIS is the habituation of sperm whales with commercial fishing vessels. In recent years, interactions between commercial fishing vessels prosecuting the halibut and sablefish fisheries have had increased interactions with sperm whales as the whale approach the boats looking for an easy meal. A whale may seek out the sound of a boat to explore the vessel's activity, thereby further decreasing the effectiveness of proposed mitigation measures and increasing the whale's exposure to noise resulting from training activities.

The Draft EIS is majorly lacking in a robust analysis of fish habitat and fishing grounds that occur in the geographic area considered for training activities, which precludes any effective analysis of the potential impacts to fish and commercial fishing activities from the proposed activities. For example, the Draft EIS does not include an adequate discussion of salmon migratory routes in the Gulf of Alaska and therefore lacks a robust analysis of impacts to migrating salmon species in the region.

The Draft EIS is lacking a thorough analysis of the potential impacts to halibut and the halibut fishery. **The document includes no discussion or maps showing the major halibut regulatory area that directly overlaps the training area nor does it discuss halibut habitat in the area- this information must be added to the Draft EIS.**

The proposed training activities area overlaps Gulf of Alaska Slope Habitat Conservation Areas that are not mentioned in the Draft EIS (see: http://www.fakr.noaa.gov/habitat/efh/goashca.pdf). The Draft EIS should include maps showing the overlap of designated EFH and other important fish habitat in the Gulf of Alaska such as the Slope Habitat Conservation Areas.

Additionally, while the Draft EIS admits that "…the effects of sound on fish are largely unknown" (3.6-4.3), it concludes that the proposed activities including sonar will not adversely affect fish. AMCC advises the Navy to utilize a precautionary approach to potential impacts in data poor environments, especially when dealing with highly valuable commercial fish stocks or endangered marine mammals populations.

The Draft EIS also lacks a thorough assessment of the overlap with fishing areas, and the conclusion that there will be no socioeconomic impacts from the proposed action (including fishing) is impossible to predict without comprehensive answers to the above mentioned comments.

In addition to concerns regarding effects on marine mammals and fish as a result of the use of sonar and an increase in underwater noise from training activities, AMCC is also

Alaska Marine Conservation Council

concerned about expended, hazardous wastes expected to result from the proposed training activities. The Navy concludes in the Draft EIS, without sufficient data, that, "In general, ordnance constituents appear to pose little risk to the marine environment (3.2-5). Again, there is no specific analysis of the benthic communities where these expended materials settle, and they may include EFH as well as Habitat Areas of Particular Concern (HAPCs), or important habitat for bottom-dwelling halibut.

AMCC is dismayed that the Navy only provided the bare minimum 45-day review for the Draft EIS and did so over the holidays, leaving insufficient time for the public to review and comment on the proposed action. This lack of consideration for the public's ability to comment is unacceptable given the scope of the proposed activities. AMCC requested an extension of the Draft EIS comment period and we do so again here in our written comments.

Furthermore, new research points to the disturbing trend of ocean acidification occurring in our marine waters, with high latitude seas particularly at risk. Reduced pH levels already measured in the Gulf of Alaska pose a new and potentially significant source of stress on the food web (J. Mathis. 8/11/09. Ocean Acidification in Alaska: New findings show increased ocean acidification in Alaska waters. University of Alaska Fairbanks, School of Fisheries and Ocean Sciences. Press release. http://www.sfos.uaf.edu/oa/). Alarmingly, studies have also demonstrated that noise travels farther underwater as pH reduces, creating concern for acoustic changes in the marine environment to have an even greater impact on marine species that previously thought. (Hester, et al. 2008. Unanticipated consequences of ocean acidification: A noisier ocean at lower pH. Geophysical Research Letters. Vol. 35. http://iod.ucsd.edu/courses/sio278/documents/hester_et_al_08_ocean_noisier_pH_jrl.pdf). The Navy must consider this research and the impacts of ocean acidification on the marine environment in the EIS, especially within the cumulative impacts section.

In closing, we again urge the selection of the No Action Alternative. The proposed increase in Naval training activities in the Gulf of Alaska lies squarely within some of the most productive marine waters in the United States and the world. The Gulf is home to a myriad of marine mammals, fish and other marine species that contribute to a rich and productive tapestry of life here. Important fish habitat and fishing grounds overlaps and lies adjacent to the area proposed for training, and coastal communities rimming the Gulf of Alaska continue to rely on the health of these fisheries for their economic and cultural well-being.

Given the high stakes to the living marine resources and surrounding communities, we strongly reiterate that this is an inappropriate location for increasing Naval training exercises and introducing the use of sonar.

Sincerely,

Theresa Peterson
Kodiak Outreach Coordinator
Alaska Marine Conservation Council

Kelly Harrell
Executive Director
Alaska Marine Conservation Council

healthy oceans ... healthy communities

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I.1.4 ANDREW BAKKE

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

Please record your comments on this form to let the U.S. Navy know what concerns and comments you have on the Gulf of Alaska Navy Training Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). You may submit your comments by:

1) Depositing this form at the Comment Table before you leave tonight.
2) Submitting your comments via the project Web site at **www.GulfofAlaskaNavyEIS.com**
3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☐ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: ANDREW N. BAKKE

Organization/Affiliation:

Address:* Box 3162

City, State, Zip Code: HOMER AK. 99603

Comments: I am complety against this unnecessary program !!!

Andrew N. Bakke

Visit www.GulfofAlaskaNavyEIS.com for project information.

I.1.5 BASEL ACTION NETWORK (BAN)

From: Colby Self
To: Burt, Amy E CIV NAVFAC NW, EV1
Subject: GOA Draft EIS - Comment
Date: Monday, May 10, 2010 21:04:18

Ms. Amy Burt,

I write on behalf of the Basel Action Network (BAN) to submit comment on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for proposed Gulf of Alaska (GOA) training exercises. BAN requests consideration of the comments because they present new information that was not previously available during the comment period.

While the comment period for the draft EIS has closed, the comments provided in the attachment contain new information showing that the proposed GOA training exercises will affect the quality of the environment in a significant manner not addressed under the draft EIS. Therefore, BAN requests consideration of this new information in the final EIS or through a supplemental EIS. See 40 C.F.R. §1502.9(c)(1)(ii); Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 374 (1989).

Please find comment attached. Your acknowledgment of receipt of this e-mail and its attached comment are much appreciated.

Sincerely,

Colby Self
Basel Action Network
206.250.5652

basel action network

turn back the toxic tide

122 S. Jackson St., Suite 320
Seattle, Washington 98104
Telephone 206 652-5555 Web: www.ban.org

Mrs. Amy Burt
Gulf of Alaska EIS/OEIS Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

May 10, 2010

RE: Comment on Gulf of Alaska Navy Training Exercises Draft Environmental Impact Statement/Overseas Environmental Impact Statement

Request for Comment Consideration
The Basel Action Network (BAN) submits these comments on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for proposed Gulf of Alaska (GOA) training exercises. BAN requests consideration of the comments because they present new information that was not previously available during the comment period.

The Florida Fish and Wildlife Conservation Commission released a report in May 2010, summarizing a five-year post-sinking monitoring study on PCB leaching from the sunken Ex-USS Oriskany. The study reveals PCB concentrations in fish caught at the Oriskany site at more than twice the EPA screening limits and above the Florida Department of Health's fish advisory limits. PCB sampling results are discussed below and are relevant to the environmental impacts of the Navy's SINKEX activity in the Gulf of Alaska.

While the comment period for the draft EIS has closed, the comments provided below contain new information showing that the proposed GOA training exercises will affect the quality of the environment in a significant manner not addressed under the draft EIS. Therefore, BAN requests consideration of this new information in the final EIS or through a supplemental EIS. See 40 C.F.R. §1502.9(c)(1)(ii); Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 374 (1989).

I. Comment: Impacts from SINKEX vessels.
The Draft EIS/OEIS acknowledges that Sinking Exercises (SINKEX) will occur in the Gulf of Alaska (GOA) Temporary Maritime Activities Area (TMAA); however, the long-term environmental impacts associated with SINKEX are not discussed in the Draft EIS/OEIS.

The Navy has in the past acknowledged the presence of hazardous materials remaining within the composition of scuttled naval vessels, including, but not limited to: polychlorinated biphenyls (PCBs), asbestos, iron, lead paint, antifouling paint containing tributyltin (TBT), and polybrominated diphenyl esters (PBDEs). Yet these materials and their effects on the environment, marine life and human health are not discussed in the Draft EIS/OEIS. We ask for additional assessment of the risks associated with the ocean disposal of these toxic materials in the GOA pursuant to the SINKEX program. The assessment should state the specific amounts of each material (mentioned above) expected to be left onboard scuttled vessels, as well as their expected impacts on the environment, marine life, and human health.

II. Comment: SINKEX impact assessment is based on inconclusive research.
While removal of liquid PCBs is required before a vessel is scuttled via SINKEX, the complete removal of all or most solid material containing PCBs is not. The SINKEX general permit issued under 40 CFR 229 states *"The Navy may leave in place wire cables, felt gaskets and other felt materials that are bonded in bolted flanges or mounted under heavy equipment, paints, adhesives, rubber mounts and gaskets and other objects in which the Navy has found PCBs..."* In effect, SINKEX vessels contain large quantities of PCBs which remain in the vessel during and following sinking and are thus exposed to the marine environment.

Current SINKEX remediation practices were developed 11 years ago (1998-1999) and were based on the Sunken Vessel Study that assessed the impacts of a single SINKEX vessel, the Ex-USS Agerholm, 17 years after the vessel's 1982 sinking. At the time of the assessment, solid PCBs were not believed to leach into the marine environment and little was known about PCB transport in an aqueous setting.

In fact, the EPA allowed SINKEX to operate solely under the General Permit (issued under the Marine Protection, Research and Sanctuaries Act) and exempt from the Toxic Substances Control Act, because there was a *"lack of evidence of unreasonable risk to human health or the environment..."* considering the type of PCB material involved (solid PCBs).[1] They stated *"Solid PCBs are not believed to be readily leachable to the marine environment."*[2] These conclusions are not supported by current scientific research. While further research is both necessary and appropriate to assess the environmental impacts of SINKEX vessels, particularly the impacts of PCBs on the environment, marine life and human health, continued reliance on out-dated research is not appropriate.

III. Comment: New study shows detrimental impacts from sunken naval vessel.
In the 11 years since this *Sunken Vessel Study* (Ex-USS Agerholm), new research confirms that solid PCBs leach into the marine environment, are taken up by marine organisms, and are transferred up the food chain.

The Ex-USS Oriskany was sunk as an artificial reef 23 nautical miles off the coast of Florida in 2006 and was prepared for sinking in much the same way as SINKEX vessels. All liquid PCBs were removed from the vessel prior to sinking; therefore all documented PCB leaching is from solid PCBs. 33% of all fish sampled post-sinking in the vicinity of the Oriskany had PCB concentrations above 20 parts per billion (ppb), the EPA screening level. 21% of all fish sampled post-sinking had PCB concentrations above 50 ppb, the Florida Department of Health fish advisory threshold. Total PCB concentrations in fish samples increased 1,446% on average from pre-sinking to post-sinking.

	Pre-Sinking Oriskany Site	Post-Sinking Oriskany Site
Red Snapper Samples	17	157
Red Snapper Mean PCB Concentration	2.36 ppb	54 ppb
Total Samples	62	180
Total Mean PCB Concentration	3.8 ppb	58.75 ppb
Total Fish Above 20 ppb (EPA Screening Level)	2 (gag & king mackerel)	60
Total Fish Above 50 ppb (Florida DoH Fish Advisory Threshold)	1 (king mackerel)	38

Note: gag and king mackerel fish were not sampled post-sinking.
Source: Table developed by Author based on data provided by the Florida Fish and Wildlife Conservation Commission Post-Sinking Monitoring Study

[1] *Official letter from Carol Browner, EPA Administrator, to Richard Danzig, Secretary of the Navy, September 13, 1999.*

[2] *IBID*

There were also two sampling events in 2008 on a control reef; these results were also recently released in May 2010. The control reef is a concrete bridge rubble reef that is 8 miles from the Oriskany site. The control reef samples were taken on the same days as the Oriskany samples in 2008. PCB concentrations in fish caught at the Oriskany site in 2008 were more than 932%, on average, higher than PCB concentrations in fish caught at the control reef.

	2008 Control Reef	2008 Oriskany Reef
Red Snapper Samples	45	60
Red Snapper Mean PCB Concentration	7.6 ppb	55.22 ppb
Total Samples	61	61
Total Mean PCB Concentration	7.89 ppb	81.44 ppb
Total Fish Above 20 ppb (EPA Screening Level)	5	16
Total Fish Above 50 ppb (Florida DoH Fish Advisory Threshold)	0	12

Source: Table developed by Author based on data provided by the Florida Fish and Wildlife Conservation Commission Post-Sinking Monitoring Study

The Oriskany sampling does not merely show fish contamination in the state of Florida; rather, it shows that more than 100 naval vessels intentionally sunk in the last 10 years alone (through SINKEX and artificial reefing) have placed the marine environment and human health at unreasonable risk of toxic exposure. These risks must be assessed in the GOA EIS.

IV. Comment: PCB transport via physical and biological means.

The Navy has long argued that PCB releases in the deep ocean from SINKEX vessels (6,000 feet or greater) do not pose adverse risks to marine life at that depth. Further, the Navy has suggested that the deep benthic environment has minimal chance of physical or biological transport to the shallow marine ecosystem. However, the Draft EIS/OEIS does not have any discussion or analysis of PCB releases in the deep ocean and possible transport mechanisms.

There are at least three scientifically acknowledged modes of material transport from the deep ocean to shallow waters:

1. Upwelling;
2. Meridional Circulation Overturning; and
3. Biographic Transport.

First, the physical marine transport process called *upwelling* routinely moves materials from deep water to surface water.[3] Upwelling can occur in coastal regions as well as the open ocean,[4] and can be wind or tide-induced. Both types of upwelling do not typically occur in isolation, but rather coexist.[5] Upwelling is a vital ecological process that delivers nutrients from the benthic zone (sea floor); however, this same process is also capable of delivering PCBs from sunken Navy vessels to shallow waters.

Second, deep ocean currents and water circulation produces dynamic uplift capable of delivering sediments, with which PCBs adhere, to surface waters. Traditionally, this is known as Meridional Circulation Overturning (ocean conveyer belt), in which currents driven by wind, thermohaline circulation, and atmospheric conditions transport deep water to shallow water.[6]

[3] *Tomczak, M., 1998. Shelf and Coastal Oceanography. http://www.es.flinders.edu.au/~mattom/ShelfCoast/notes/chapter06.html*

[4] *http://oceanmotion.org/html/background/upwelling-and-downwelling.htm*

[5] *Tomczak, M., 1998. Shelf and Coastal Oceanography. http://www.es.flinders.edu.au/~mattom/ShelfCoast/notes/chapter06.html*

[6] *http://earthobservatory.nasa.gov/Newsroom/view.php?id=24124*

Finally, marine life that has taken up PCBs in deep water at the disposal site can transport PCB material via migration and predatory consumption to the shallow marine ecosystem, which can continue up the food chain to humans. Sunken vessels typically rest in the bathylpelagic zone (1,000-4,000 meters), just below the mesopelagic zone (200-1,000 meters), which exists below the epipelagic zone (200 – surface). Biographically speaking, organisms from each zone have contact with organisms from the zone above and below, allowing for food transfer and PCB uptake through the water column. "*Undoubtedly, there is considerable trophic interaction among these larger epipelagic fishes* [albacore, blue shark, swordfish, etc.] *and their meso- and bathypelagic counterparts during diel vertical migration.*"[7]

Additionally, the Deep Scattering Layer (DSL) is an assemblage of vertically migrating marine organisms that travel from the deep ocean to the shallows at night to feed, thus trophic interaction occurs.[8] DSLs have been recorded at all depths to 3,000 meters.[9]

The physicochemical properties of PCBs, including low solubility in water, very high bioconcentration factor, and very low degradation rates, determine their behavior in the environment.[10] And because PCBs are very hydrophobic (readily come out of solution), persistent, and highly lipophilic (partition into lipids and organic carbon) they readily adsorb onto particles and build up in the food chain (bio- and geoaccumulation).[11]

PCBs and other hazardous materials left on SINKEX vessels are in no way confined to the dumping site. PCBs can be transported great distances from the initial sink site via physical and biological means. The GOA EIS must include impact analysis of possible PCB transport mechanisms.

In closing, we thank you for the opportunity to submit comments on the draft EIS/OEIS and are hopeful that our concerns will be addressed in the final EIS. Should you have any questions please do not hesitate to contact me directly.

Sincerely,

Colby Self
Basel Action Network
206.250.5652

---

[7] *Monterey Bay National Marine Sanctuary Site Characterization – Biological Communities and Assemblages – Pelagic Zone. http://montereybay.noaa.gov/sitechar/pelagic5.html*

[8] *IBID*

[9] *Opdal, A.F., Godo, O.R., Bergstad, O.A., Fiksen, O, 2007. Distribution, identity, and possible processes sustaining meso- and bathypelagic scattering layers on the northern Mid-Atlantic Ridge*

[10] *Mackay, D., W.Y. Shiu, and K.C. Ma, 1992. Illustrated handbook of physical-chemical properties and environmental fate for organic chemicals, Vol. I, Monoaromatic Hydrocarbons, Chlorobenzens, and PCBs. Lewis Publishers, Boca Raton, FL, 697pp.*

[11] *Froescheis, Oliver, Ralf Looser, Gregor M. Cailliet, Walter M. Jarman and Karlheinz Ballschmiter, 2000. The deep-sea as a final global sink of semivolatile persistent organic pollutants? Part I: PCBs in surface and deep-sea dwelling fish of the North and South Atlantic and the Monterey Bay Canyon (California), Chemosphere, Volume 40, Issue 6, March 2000, Pages 651-660.*

I.1.6 AMANDA BENTLEY

November 2010

Dear Mrs. Amy Burt,

I wish to express my concern regarding the Navy's use of mid-frequency active sonar in the Gulf of Alaska in the summer of 2011. I understand that it is the intention of the Navy to undergo extensive training exercises at that time. I also understand and respect the need to maintain a level of military readiness against any and all potential threats against the United States. However, my goal for writing this letter is to open your eyes to serious and fatal damage that the Navy may inflict upon innocent and endangered marine life.

All marine life thrives on the peacefully balanced acoustic environment underwater. Disruptions to this habitat can risk animal life. It is no secret that mid-frequency sonar in aquatic environments even 300 miles from the source retains an intensity of 140 decibels, equating to a hundred times more intense than the level known to alter the behavior of large whales. The use of mid-frequency active sonar is so detrimental that it causes whales and marine mammals to dramatically change their behavior and flee their aquatic habitat forcing them to surface too quickly. Surfacing too quickly causes "the bends" resulting in cranial hemorrhaging. On multiple occasions, whales and sea turtles, too many to count, have been the sacrifice of the Navy's training exercising. Originating from a very patriotic background, I understand and fully support military readiness. However, this sort of environmental harm seems out of control. Countless whales, porpoises and other mammals strand during naval exercises: in October of 1989, 20 whales of three species stranded during naval exercises near the Canary Islands.; in January of 2006, at least 34 whales beached themselves to avoid the sonar along the coast of the Outer Banks of North Carolina as training was carried out by a naval fleet.

In an article published in the Juneau Empire, in January of 2010, it states that the Navy plans to carry out one of three proposed procedures: 1. No action as the Navy would have already reached its status quo of annual training; 2. Called Alternative 1, where the Navy increases training to a 21-day period and includes the use of mid-frequency active sonar; lastly 3. Called Alternative 2 which includes Alternative 1 plus a sinking exercise during the three week training period. I urge you to commit to your first option and halt any and all training in the Gulf of Alaska; the Navy has already it meet its annual required training between April and October, according to Eric Morrison in "Concerns grow over Navy Sonar training in the Gulf of Alaska" in January, 2010. Even though Shelia Murray, the regional environmental public affairs officer for the Navy, states in the same article, "The Navy does a lot of things to avoid any type of interaction with any type of marine mammal" there still seems to be numerous fatal strandings of aquatic life. Can the death of innocent marine life be on the Navy's conscience? Can it be on yours?

As a citizen of the earth, we all have a responsibility to preserve the life it holds. Exterminating a species, or even endangering its well-being is a serious offense as this action could be irreversible. Every organism, animal and habitat is essential to the balance of the environment. I ask that this be taken into consideration during training exercises. I hope you will find it logical and moral to limit the training exercises using such dangerous technology as mid-frequency active sonar.

Thank you for your time,

Amanda Bentley
2000 East Henrietta Rd.
Rochester, NY 14623

Sunday, January 17, 2010
Story last updated at 1/17/2010
Concerns grow over Navy sonar training in Gulf of Alaska
Environmentalists say testing of technology could harm sea life

By Eric Morrison | JUNEAU EMPIRE

Environmentalists and Alaska residents are up in arms over U.S. Navy plans to train with controversial mid-frequency active sonar in the Gulf of Alaska beginning in the summer of 2011.

The Navy says the active sonar is necessary for national security. Environmentalists warn the technology could be extremely harmful to marine mammals in the area.

The Navy held meetings throughout Alaska last week to discuss its Gulf of Alaska Training Activities Environmental Impact Statement that lays out three options for the future of the annual training.

"Basically our ultimate proposed action is to accomplish Navy training in the Gulf of Alaska," said Amy Burt, a Navy environmental planner and the project manager for he GOA EIS. "The three alternatives are different ways to accomplish the proposed actions."

The first option is no action, which would maintain the status quo of annual Navy training that takes place during 14-day period between April and October. The second option, which the Navy is calling Alternative 1, would increase the training to a 21-day period between April and October and would include use of mid-frequency active sonar.

"So we would do more training exercises associated with active sonar and also Alternative 1 would accommodate some increased level of training for some new systems and ships that are coming into the fleet," Burt said.

The third option, called Alternative 2, would be the same as Alternative 1 but would include a second 21-day training exercise and the possibility of a sinking exercise during each three-week period. The Navy would take decommissioned ships and clean them to Environmental Protection Agency standards that would be used as live fire target practice at least 50 nautical miles from shore and sunk in at least 6,000 feet of water.

The Navy presently conducts a joint exercise each summer with the U.S. Army and U.S. Air Force that it calls the Northern Edge exercise. Part of the exercise takes place in an area designated as the Gulf of Alaska Temporary Maritime Activities Area that is the shape of a polygon and is approximately 300 nautical miles in length and 150 nautical miles in width located south of Prince William Sound and east of Kodiak Island.

The use of mid-frequency active sonar has become a highly controversial issue in environmental circles because it is believed to have detrimental effects on marine mammals, particularly whales.

"The active sonar is something that we're pretty concerned about," said Jon Warrenchuck, an ocean scientist for the nonprofit international marine conservation and advocacy organization. "These exercises are planned off of Kodiak and it's right beside critical habitat for Northern Right whales and there are about 100 of these left in Alaska, they estimate. They're, if not the rarest, probably one of the rarest marine mammals in the world. This is one of the areas they've identified as critical habitat for them. It's right beside the proposed training area."

Sheila Murray, the regional environmental public affairs officer for the Navy, said there is a possibility that the mid-frequency active sonar could have adverse effects on marine mammals but said the Navy tries to avoid any type of interaction with marine mammals wherever possible. The sailors go through extensive training and there are 29 protective measures in place to minimize impacts, which includes flyovers and turning off sonar within 200 yards of marine mammals, she said.

"The Navy does a lot of things to avoid any type of interaction with any type of marine mammal," Murray said.

Tina Brown, a wildlife activist who attended the meeting in Juneau last week, said many people have concerns about how damaging the sonar potentially is to marine mammals.

"Even the people who were at the hearing to give us information did not know for the sure the effect that Navy sonar testing would have on these animals," she said. "They know that whales have been beached in areas where sonar has taken place. They don't always know that sonar caused it."

Murray said there has been some misperception in the public from language used in the EIS that people interpret to mean that anywhere from thousands to millions of marine mammals could be harmed. The Marine Mammal Protection Act requires the Navy to estimate how many "takes" it expects with the sonar.

"It does not necessarily mean kill," she said. "It's anything that changes that marine mammal's behavior. That seems to be the one thing the public doesn't seem to understand. It's not Navy language, it's regulatory language."

Some people have estimated that millions of marine mammals could die from the sonar, which Murray said is not what the EIS actually says.

"People seem to think that that is the number of marine mammals that the Navy anticipates some type of mortality happening to and that's far from the truth," she said.

The mid-frequency active sonar is believed to scare whales and could cause them to run aground, but it has been difficult to prove in the past because the Navy hasn't always had a strong track record of disclosing what its been doing, Warrenchuck said.

"There's a lot of scientific evidence out there that this type of sonar can affect whales, and particularly those that have the big melons," he said. "And 'melon' is actually a biological term for kind of the protruding head of certain whales like sperm whales or some of the beaked whales. Basically they have this big fluid-filled organ that they use for echolocation and communication and navigation and things."

Warrenchuck and Brown also mentioned concerns about the increased pollution to the area if more training is approved and more military ordinance is used and discarded in the Gulf of Alaska.

Murray said the sonar is vital for the Navy to use to protect the country.

"It actually is the only effective method for detecting any kind of threats from any modern ultra quiet submarines that countries that may not be friendly with the United States may use," she said. "There are a lot of other subs out there that use it and that is the only way the Navy can actually detect them."

Brown said she is not opposed to the Navy training, she's just opposed to where, when and how it is planning to train.

"I understand we are at war," she said. "This is not the issue. The issue is choosing a place that has such an abundance of marine wildlife and choosing that place at the time when that wildlife is most abundant. In my view that is irresponsible."

The public comment period for the draft EIS ends Jan. 25 and will then be revised by the project team. A final EIS is expected sometime in the late fall or early winter, which will also have a public comment period. A Record of Decision is expected sometime in late 2010 or early 2011 that will decide on one of the three training options.

"The summer season of 2011 would be the first time we could do anything under the EIS," Burt said.

People can make comments online at www.gulfofalaskanavyeis.com until Jan. 25 or can send a letter to the Navy by that date.

Warrenchuck said he hopes the Navy will ultimately decide on the first option and not change its training to include sonar in the Gulf of Alaska.

"We're not at war with the whales and so we would really like the Navy to minimize their impact on whales and marine mammals," he said.

• Contact reporter Eric Morrison at 523-2269 or eric.morrison@juneauempire.com.

I.1.7 GREG BROWN

United States Navy

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Draft Environmental Impact Statement/
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Naval Facilities Engineering Command Northwest
ATTN: Mrs. Amy Burt - Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

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Name: GREG R. BROWN

Organization/Affiliation:

Address:* 19400 Beardsley Way

City, State, Zip Code: Juneau, AK 99801

Comments: Attached.

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GOA Navy Sonar Reasons for Concern

Page 1 of 4

GREG R. BROWN
19400 Beardsley Way
Juneau, AK 99801

From: tmbrown3@aol.com
To: Brown_greg@Yahoo.com
Cc: TMBrown3@aol.com
Subject: GOA Navy Sonar Reasons for Concern
Date: Wed, Jan 20, 2010 3:53 pm

Marine Mammals

The Situation: The Navy has been authorized to take two million mammals per year for the next five years during its training exercises in Hawaii, the west coast, the Gulf of Mexico, and the entire Eastern seaboard; in fact, the Navy wants to deploy sonar in 80% of the world's oceans. Obviously, this issue greatly affects all of Alaska.

The immediate Alaskan concern, however, involves proposed Navy training activities in the Gulf of Alaska (GOA). All public comments must be received or postmarked no later than January 25, 2010, so time is of the essence. You may comment online at www.GulfofAlaskaNavyEIS.com. Please see below for points on which to comment.

Marine Mammals

1. According to the Marine Mammal Commission, "The Gulf of Alaska supports a diversity of marine mammals, a number of which are listed as endangered or threatened under the Endangered Species Act or designated as depleted under the Marine Mammal Protection Act. They include pinnipeds (Stellar sea lions, northern fur seals, and sea otters) and cetaceans (AT1 killer whales, eastern North Pacific right whales, Cook Inlet beluga whales), humpback whales, fin whales, sperm whales, and sei whales....Several of them are in especially critical conditions....

2. The Ocean Mammal Institute, a federal agency created to help protect marine mammals, stated serious concerns about the effects of the Navy's use of LFAS, explaining that the possible effects on marine mammals could include the following:

- death from trauma
- hearing loss
- disruption of feeding, nursing, sensing and communication (Abandoned calves have been reported in affected areas.)
- stress (making animals more vulnerable to disease and predation)
- changes in distribution and abundance of important marine mammal prey species
- subsequent decreases in marine mammal survival and productivity.

All of these effects have been witnessed in the past. See the Ocean Mammal Institute's publication "US Navy's Misinformation To Congress About LFAS." Additionally, MSNBC reported that "A National Oceanic and Atmospheric Administration study said the Navy's use of sonar contributed to the beaching of 16 whales and two dolphins in the Bahamas in 2000. Eight of those whales died, showing hemorrhaging around their brains and ear bones, possibly because they were exposed to loud noise."

3. Many scientists believe that animals seen stranded on the beach as a result of Navy sonar testing represent only a small portion of the technology's toll because severely injured animals rarely come to shore. In fact, scientists believe that mid-frequency sonar blasts may drive

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certain whales to change their dive patterns in ways their bodies cannot handle, causing debilitating and even fatal injuries; these symptoms are akin to a several case of "the bends." (NRDC) In fact, the true effects of Navy sonar testing on marine wildlife remains unknown.

4. The June, 2010, issue of Scientific American reported that the U.S. Navy's sonar generates "slow-rolling sound waves topping out at around 235 decibels, equivalent to the intensity of a Saturn rocket; the world's loudest rock bands top out at only 130. The Navy confirms that these sound waves can travel for hundreds of miles under water, and can retain an intensity of 140 decibels (100 times more intense than the level known to alter the behavior of large whales) as far as 300 miles from their source."

5. The Navy does not consider the potential cumulative impacts from multiple sound exposures. For example whales in the GOA migrate to Hawaii. The Navy seeks to cover 80% of the world's oceans with its sonar testing, including the west coast of the U.S. as well as Hawaii. Over time, multiple exposures could lead to impaired hearing abilities, as studies on the effects of sound on terrestrial mammals has shown. Too, feeding behavior and other vital behavior could be altered repeatedly, the cumulative effects of which could prove fatal.

6. The Navy does not consider the marine animals that may be affected by sonar at a significant distance from the source.

7. The Navy does not take into account the added noise pollution caused by the increase in vessel traffic during training.

8. The Navy does not consider the possibility of strikes by sub-surface submarines during transit and/or operations. The Navy lacks any evidence that passive listening is a reliable means of detecting nearby marine life.

9. Although the risk of surface vessel strikes is heightened by its operations, the Navy does not note the many limitations on the ability to see and avoid collisions with marine mammals, instead repeatedly touting lookouts as an effective means to avoid collisions with whales. The limited effectiveness of using lookouts is widely documented, yet the Navy fails to take into account the difficulty to see animals as well as the fact that many marine mammals remain under water for considerable periods of time. Beaked whales, for example, can spend up to an hour under the surface, with only short and intermittent surface intervals.

10. The Navy fails to consider the adverse impact of the massive amounts of debris that will be disposed of in the oceans during its training periods. Entanglements are serious concerns for marine mammals, often resulting in death.

11. Clearly it is likely that certain impacts on marine mammals from the Navy operations may fall within the category of Level A Harassment.

Fish and Other Marine Wildlife

12. The Navy has not evaluated the consequences of its sonar on marine fish.

12. The Navy does not provide analysis of the cumulative effects of sonar testing on commercial fishing, yet the National Marine Fisheries Service believes that sonar testing could directly and indirectly impact federally managed fishery species in North Carolina. (North

Carolinians for Responsible Use of Sonar)

13. Not everything is known about the effects of sonar on fish, but studies show that intense sound can damage fish's ears, reduce the viability of eggs and harm larvae, and retard growth. Intense sound can also cause fish to change their behavior, disrupt their navigation, communication, foraging, and schooling - and dramatically reduce catch rates. (NC Coastal Federation)

14. According to the Times-Standard, "the Navy says that shock waves from inert bombs, intact missiles and targets hitting the water's surface would injure fish in some areas," and that "underwater explosions...could hurt invertebrates...."

15. Walt Duffy with the U.S. Geological Survey's Cooperative Research Unit at Humboldt State University points out that there is limited information on the effects of sound on fish. He said that "how the activities the Navy proposes might affect surfacing and migrating salmon are also open to question." (Times-Standard)

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18. The Navy has not considered the possible effects on seabirds.

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19. The Navy has not addressed the issue of sea pollution. Humans cannot survive without a healthy ocean, and already the North Pacific is known for the North Pacific Gyre, a plastic "graveyard" at least twice the size of Texas; some believe it to be as large as the entire continental United States.

20. The Navy has not addressed the issue of air pollution.

Closing

- In October 2004 the European Parliament called for a ban in European waters of military sonar equipment and asked its twenty-five member states to stop deploying high-intensity active naval sonar. (Marine Connection)

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**** Alaskans depend on the sea for food, for income, and for pleasure. Clearly the Navy needs to train, but choosing training areas in some of the most prolific marine wildlife regions in the United States, if not the world, particularly at a time when migrating marine life is present, is, at best, irresponsible. We therefore support the "No Action Alternative," which provides for the continuation of training activities within the Alaska area at the current levels.***

Additional sources: Southern Environmental Law Center, Atlanta, Georgia

Turning the Tides, Sitka, Alaska, Chapter, Lynn Wilbur

I.1.8 TINA BROWN

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- The North Carolina Watermen United has presented a statement opposing Naval sonar training off the coast of North Carolina.

**** Alaskans depend on the sea for food, for income, and for pleasure. Clearly the Navy needs to train, but choosing training areas in some of the most prolific marine wildlife regions in the United States, if not the world, particularly at a time when migrating marine life is present, is, at best, irresponsible. We therefore support the "No Action Alternative," which provides for the continuation of training activities within the Alaska area at the current levels.***

Additional sources: Southern Environmental Law Center, Atlanta, Georgia

Turning the Tides, Sitka, Alaska, Chapter, Lynn Wilbur

I.1.9 CIVIL AIR PATROL

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

Please record your comments on this form to let the U.S. Navy know what concerns and comments you have on the Gulf of Alaska Navy Training Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). You may submit your comments by:

1) Depositing this form at the Comment Table before you leave tonight.
2) Submitting your comments via the project Web site at **www.GulfofAlaskaNavyEIS.com**
3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☐ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: 2Lt Daniel Holt CAP
Organization/Affiliation: Civil Air Patrol
Address:* 8391 Airport Blvd. #
City, State, Zip Code: Juneau, AK 99801
Comments: How can CAP be involved, help with your training activities?

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.10 CORDOVA DISTRICT FISHERMAN UNITED

Cordova District Fishermen United
P.O. Box 939
Cordova, AK 99574

January 24, 2010

Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt
Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mrs. Burt,

I am writing in response to the Draft Environmental Impact Statement relating to the Gulf of Alaska Navy Training activities. Cordova District Fishermen United (CDFU) would like to clearly state for the record that we support the U.S. Navy in their efforts to defend our great country, however we are strongly opposed to an increase in U.S Navy training exercises in the Gulf of Alaska (GOA), and in particular the use of mid-frequency sonar. We support the No Action Alternative and support a review of existing practices.

CDFU is a nonprofit political advocacy organization that directly represents the commercial fishing interests of over 1,000 fishermen in Prince William Sound, and indirectly supports the economic livelihood of the community of Cordova. For over 75 years, CDFU has strived to protect the health and sustainability of species that inhabit our waters and errs on the side of caution when assessing potential risks to these species.

As you should be aware through your extensive EIS process, Alaska has one of the richest ocean environments in the world, and the sustainability of our fisheries resources is of highest priority to our State – both from an economic and cultural perspective.

Thank you for the opportunity to comment on the Draft EIS. CDFU looks forward to reviewing the Final EIS and requests inclusion on the Navy postal mailing list to receive a full, printed copy when it is published.

Additionally, CDFU would like to request that the comment period for the Final EIS be increased to provide sufficient time for Alaska communities to respond – longer than the timeframe given during the comment period for the draft EIS, and at least 90 days.

Sincerely,

Rochelle van den Broek
Executive Director

CDFU comments on Gulf of Alaska Navy Training Activities Draft EIS/OIS Page 1 of 4 1/25/10

CDFU COMMENTS

Section: 4.1.3.1 Fishing & Section 2.6 FISH

During the explanation of commercial fishing activities there is a vague mention that a number of fisheries are at very depressed levels or are closed (referencing Richardson and Erickson 2005). The remainder of this section goes on to describe those fisheries that are currently in operation.

As acknowledged in the Draft EIS, Pacific Herring (Clupea Pallasii) are present in the GOA.

Despite the fact that this commercial fishery is currently not in operation, Pacific Herring are an ecologically and commercially significant species in the Gulf of Alaska and Prince William Sound ecosystem. Few species are of greater combined ecological and economic importance in Prince William Sound (and in many other coastal ecosystems) than is the Pacific herring[1].

Pacific Herring are central to the marine food web; providing food to marine mammals, birds, invertebrates and other fish. The Exxon Valdez Oil Spill Trustee Council (EVOSTC), a council charged with overseeing the restoration of the injured ecosystem through the use of the $900 million civil settlement and which consists of three state and three federal trustees (or their designees), has classified Pacific Herring as damaged and "Not Recovering"[2]. Pacific herring have not met their recovery objective. No strongly successful year class has been recruited into the population and health indices suggest that herring in the Sound are not fit.

Pacific herring are the subject of ongoing Trustee Council-funded research. Through this research, and the work of the Alaska Department of Fish and Game, Prince William Sound communities are hopeful for the return of a viable herring fishery in the future and are actively working towards this goal.

The collapse of the Pacific Herring fishery following the *ExxonValdez* oil spill indicates that this species is not particularly resilient to changes in their immediate marine environment. CDFU is concerned that the effects of mid-frequency sonar use in the GOA will stress an already weakened population and do not feel that this species was adequately addressed in the Draft EIS.

Acoustic Effects of Underwater Sounds to Fish

Despite their lack of resilience to changes in their environment, Pacific Herring

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[1] Brown ED and MG Carls. 1998. Pacific Herring *Clupea Pallasi*. Restoration Notebook, Sept. 1998. Exxon Valdez Oil Spill Trustee Council.

[2] Exxon Valdez Oil Spill Trustee Council. Nov, 2006. Exxon Valdez Oil Spill Restoration Plan. Update on Injured Resources and Services 2006.

(Clupeidae) have the highest hearing range indicated of all marine species identified in the GOA, at 5 kHz. Some studies, however, demonstrate that the hearing range of the Pacific Herring is in fact much greater. Wilson and Dill (2002) reported that Pacific herring (Clupea pallasii) responded to sounds up to 140 kHz. As hearing "specialists", Pacific Herring have the ability to hear over a much wider frequency range than most other fish.

Of grave concern to CDFU is the lack of available research that demonstrates the short and long term impacts to fish and marine mammals. It is apparent that there is very limited research available that focuses on the impacts of mid-frequency sonar use to fish, Pacific Herring in particular and the limited research that is available suggests that there is not only variation in effects of intense sound sources on different species of fish, but that there may also be differences based on genetics or development. Indeed, one can go even further and suggest that there may ultimately be differences in effects of sound on fish (or lack of effects) that are related to fish age as well as development and genetics, as was demonstrated by Popper et al. (2005).

Many references included in this section cite data based on freshwater fish, species not included in the GOA, and entirely different environmental conditions. These references do not fully describe the impacts to GOA specific species as there simply is not research available in this area.

Since the collapse of the herring fishery in 1996, millions of dollars have been expended to help scientists understand more about the inability of Pacific Herring to fully recover from the impacts of the *ExxonValdez* oil spill. The ultimate goal of this research is to work towards the restoration of the Pacific Herring fishery returning it to its former abundance.

The lack of adequate research on mid-frequency sonar on Pacific Herring, and other fish species in the Gulf of Alaska is alarming. It is incomprehensible that a Department of U.S. Government (EPA or the DOD) would support any alternative other than the No Action alternative based on this lack of information and available research.

4.2.8.2 Ship Strikes

This section states that releasing individual expended materials would not have any significant effects on the environment, but does not indicate whether the cumulative effect of adding specific contaminants into the marine environment was fully analyzed. Elevated concentrations of certain chemicals can cause adverse effects on aquatic biota including reduced survival, impaired reproduction, and reduced growth. Release of toxic substances in the water may be quickly diluted; however, some toxic substances have the potential to bioaccumulate in the food chain.

Information included in the Draft EIS is not sufficient to detail the myriad of toxic chemicals that will be released into GOA waters, and the tendency of each specific chemical to bioaccumulate. A table describing each chemical's tendency to bioaccumulate (or not) would more accurately demonstrate the long-term environmental impacts of the proposed training activities. Currently, this area is severely lacking

despite the extreme quantities of foreign chemicals that are proposed to be expended in the GOA. It is likely that this too is an area where research is lacking.

Table 3.2-2: Failure and Low-Order Detonation Rates of Military Ordnance

The failure rate of guns, grenades, rockets, etc. ranges from 1.78% to 8.23%. Representation as a percentage does not clearly articulate the amount of ordnance that is left in an unexploded state. As indicated in the Draft EIS, the training activities will take place in an area frequented by commercial fishermen. An increase in training activities will increase the percentage of unexploded ordnance left on the ocean floor. While the training area is large, there is no way to predict where a commercial fisherman will place their net. The fishing process can include dragging nets across the ocean floor. Unstable, unexploded ordnance poses the potential for significant risk to commercial fishermen. It is incomprehensible that the Draft EIS does not include any information on this inherent risk to public safety.

3.7.8 At-Sea Explosions

Mitigation measures used to protect marine mammals may be inadequate. The Navy uses visual inspection and passive sonar to detect marine mammals prior to and during training activities. Passive sonar does not indicate the location of marine mammals, only that they are in the vicinity. The Navy will not cease training activities simply because they detect a marine mammal on the passive sonar; they will primarily rely on visual inspections to detect marine mammals and will only cease activities if the marine mammal comes within 200 yards. Marine mammals will only be detected when they come to the water's surface, thus they may have already entered the critical threshold area before they are spotted. Migration patterns should be studied and training exercises should occur outside of their migration routes.

Ordnance cannot be released and explosives cannot be detonated until the target area is determined to be clear. Training activities are halted immediately if cetaceans, pinnipeds, or sea turtles are observed in the target area. The Gulf of Alaska is prone to extreme weather and severe storms occurring regularly during the intended training exercise timeframe. The Draft EIS is lacking information relating to adverse weather conditions and how this would significantly impede Navy's ability to visually detect marine mammals and large schools of fish. This topic is briefly mentioned in *Operating Procedures & Collision Avoidance* however mitigation in this scenario is not well defined.

Other

Information on the migration patterns of fish is not sufficient. More information is needed in this area to fully describe the potential impact an increase in training activities might have to salmon returning to Prince William Sound and the Copper River.

I.1.11 DOUGLAS DOBYNS

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

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3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt - Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☐ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: Douglas E. Dobyns, MS env science

Organization/Affiliation:

Address:* c/o DIA 1107 West 8th St., #3

City, State, Zip Code: Juneau, AK 99801

Comments: In conducting exercises under either Alternative 1 or 2, it would be good to have monitoring of the distributions and population densities of marine mammals — in study times of before, during, and afterwards of equal durations — to assess whether the mammals have been herded into particular areas.

The concern for this comment is that feeding of these marine mammals might be concentrated in areas where their ecosystem impacts are unusually concentrated. The longer-term impacts to commercial fishing should be known, if there are any. Also, inter-species of marine mammal behavior should be assessed to find if exercises have caused changes.

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.12 EPA REGION 10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

JAN 25 2010

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

Ms. Amy Burt, Environmental Planner
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, Washington 98315-1101

RE: EPA Comments on the DOD Draft EIS/OEIS for the Gulf of Alaska Navy Training Activities, EPA # 089-028-DOD

Dear Ms. Burt:

EPA has reviewed the above-referenced document (CEQ No. 20090424) in accordance with our responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. Section 309 specifically directs EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our policies and procedures, we assign a rating to the Draft EIS/OEIS (herein EIS) based on the environmental impacts of the proposed action and the document's adequacy in meeting NEPA requirements.

The EIS evaluates the potential impacts associated with current and proposed Navy training activities within the Temporary Maritime Activities Area (TMAA) located in the Gulf of Alaska (GOA). The TMAA covers an area of 42,146 square nautical miles (nm^2) of surface and subsurface ocean training area and overlying airspace. The No Action Alternative evaluates the current level of Navy training in the TMAA, which entails an annual exercise of one joint force exercise occurring over a period of no more than 14 days during the summer months. Alternative 1 includes the activities under the No Action Alternative, as well as anti-submarine warfare training, use of active sonar, and incorporation of additional training activities to incorporate force structure changes. The period for training would also increase up to 21 days. Alternative 2, the Navy's Preferred Alternative, would essentially double the activity under Alternative 1 as well as incorporate a SINKEX exercise, up to 2 times per year.

Overall we find the document to be well-organized, and the tables and maps that are included are very helpful to the reader. We recognize the short-term nature of these activities, and applaud the Navy for developing an EIS in an attempt to fully evaluate the impacts of these activities. We also appreciate that the Navy considered to the extent possible other influences and stressors on resources in the TMAA, such as climate change, and went to great lengths to include a quantitative comparison of alternatives that clearly identifies the differences in impacts amongst those alternatives.

We do have concerns, however, regarding the limited range of alternatives considered, the analysis and disclosure of impacts, lack of analysis of wastewater discharges, impacts from munitions, impacts to marine mammals from mid-range active sonar, and the limited discussion

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2

regarding mitigation activities (such as turtle-free zones). We also offer some suggestions we believe would improve the analysis, such as incorporating more detailed information on EPA's general permit and the related Letter Agreement for SINKEX, and current information for the PM 2.5 designation for the Fairbanks area, for your inclusion in the Final EIS (Enclosure 1).

We have assigned a rating of "EC-2" (Environmental Concerns-Insufficient Information) to the Gulf of Alaska Navy Training Activities Draft EIS. A copy of EPA's rating system criteria used in conducting our environmental review is enclosed (Enclosure 2). Our rating and a copy of our comments will be published in the *Federal Register*.

Thank you for the opportunity to review and provide written comments on the Gulf of Alaska Navy Training Activities Draft EIS/OEIS. If you have any questions regarding this letter, please do not hesitate to contact Jennifer Curtis of my staff at (907) 271-6324 or curtis.jennifer@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosures

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EPA REGION 10 DETAILED COMMENTS ON THE GULF OF ALASKA NAVY TRAINING EXERCISES DRAFT EIS/OEIS

Limited Range of Alternatives

The EIS evaluates a limited range of alternatives. We believe the alternatives analysis would be much improved by including alternatives that represent a more diverse level and mix of training instead of evaluating alternatives that simply build upon one another. The inclusion of an alternative with additional appropriate mitigation (40 CFR 1502.14(f)) would also expand the range of alternatives. The use of geographic and/or temporal exclusions, even within the current timeframe and TMAA, can potentially be effective in reducing impacts to marine resources. We note that the DEIS considers this suggestion in the section discussing alternatives considered but dismissed (Section 2.3.2), but does not consider restrictions within the TMAA or identified timeframe. EPA supports the selection of alternatives that minimize the impacts to the environment while meeting the project's purpose and need. For this project, we identify Alternative 1 as the action alternative with the least impacts.

Recommendation

EPA recommends that an alternative with additional mitigation measures be developed in the Final EIS, possibly incorporating geographic and/or temporal exclusions. We recommend the identification of geographic areas where training restrictions would be especially beneficial to environmental resources, such as the Seamounts and other areas with substantial upwelling, and additional discussion of how excluding such an area would affect training goals and the underlying purpose and need. We also recommend that the Navy reconsider its selection of Alternative 2 as its Preferred Alternative as it is the alternative with the greatest impacts to resources and the environment.

Analysis and Disclosure of Impacts

We are concerned that the some of the potential impacts from project activities are not properly disclosed in the EIS. Conclusions of "no substantial effect" are not always adequately demonstrated and, on some occasions, the lack of knowledge regarding resource impacts seems to be presented as justification for a conclusion of no substantial impact. This approach is frequently in the impacts analysis, and may result in some impacts being underestimated. A possible reason for these deficiencies could be the lack of data or understanding of resources and systems in the GOA. In addition, the EIS tends to assume an even distribution of resources and impacts, which does not accurately reflect the natural distribution of aquatic resources, or the likely nature of distribution and disbursement of impacts. As a result of the approach taken, the EIS seems to have averaged the impacts over the TMAA and concluded that localized impacts would be minimal and temporary, and thus not substantial. This may not be accurate, even in the open ocean.

The following are specific examples of the above concerns:

Water quality impacts. The EIS acknowledges unavoidable effects on ocean and surface water quality, including the introduction of hazardous materials from munitions, yet

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concludes that no long-term impacts to water resources would occur, and short-term impacts are not addressed.

Sonar impacts on fish. The EIS acknowledges that the "effects of sound on fish are largely unknown" and that there is a "dearth of empirical information on the effects of exposure to sound, let alone sonar, for the vast majority of fish." However, the EIS documents a study that showed a statistically significant post-exposure mortality of 20 to 30% from simulated Naval sonar signals, and another that found the use of continuous-wave transmissions within the frequency band corresponding to swim bladder resonance will escalate this impact by an order of magnitude, resulting in affects to 0.6 percent of the total stock of juvenile fish. There is no discussion, however, that continuous-wave transmissions at such frequency will not be employed, nor is there discussion regarding the avoidance measures in response to identification of populations of fish at more vulnerable life stages. The EIS concludes, however, that "limited information currently available suggests that populations of fish are unlikely to be affected by the projected rates and areas of use of military sonar."

Recommendation

We recommend the conclusions drawn in the impact analysis be reevaluated and where impacts are unknown or potentially more substantial, the EIS be revised to reflect this. We also recommend that the assumption of even distribution/disbursement or resources and impacts be reconsidered and revised, if possible, to more accurately reflect the actual spatial and temporal distribution of both.

Wastewater Discharges

The EIS states that discharges from military vessels are not considered point source discharges under the Clean Water Act but that there are Uniform National Discharge Standards for 25 discharges for military vessels up to 12 nm. Since the EIS only considers activities beyond 12 nm, it is unclear why this information was included, particularly since there is no discussion of what the anticipated wastewater discharges (type and volume) will actually occur. There is also no discussion of the impacts that will result from the wastewater discharges.

Recommendation

EPA recommends that the Final EIS clearly identify any applicable restrictions to wastewater discharges (if any) for the proposed action, the projected types and volumes of discharges, and the anticipated impacts to marine resources from those discharges. We also recommend that the Navy consider additional appropriate mitigation measures to minimize the discharges and subsequent impacts of those discharges.

Impacts from Munitions

The EIS identifies the potential for contamination from munitions components including various heavy metals releases from sonobuoys, leaching of hazardous bomb materials, release of cyanide from torpedoes, various explosives compounds such as ammonium perchlorate, picric acid, etc., and organic chemicals from underwater detonations. The EIS concludes that there would be no long-term or substantial degradation of water resources and no short-term impacts because contaminants would be diluted in the ocean and metal materials would corrode, thus preventing the deterioration of certain objects.

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We understand the assumption regarding ocean dilution; however, we believe the assumption should be substantiated with monitoring data, particularly since such activates have been occurring for nearly a decade, and are expected to continue (and possibly increase in frequency and duration) into the foreseeable future. Because of the cumulative impacts to ocean water quality, good stewardship can no longer assume that the size of the ocean will dilute and disperse all pollutants to safe levels, especially considering that metals such as copper and lead bioaccumulate in marine organisms.

Recommendation

We recommend the development and implementation of a monitoring program for the GOA to validate the Navy's conclusions that impacts would not result in long-term degradation of water resources. The Navy should conduct the necessary monitoring to substantiate the assumptions being made regarding the lack of impacts from munitions releases into the ocean environment.

Impacts to Marine Mammals from Mid-frequency Active (MFA) Sonar

We have concerns regarding impacts to marine mammals from MFA sonar in an area that historically has not had MFA sonar activity, or such activity is not disclosed in the EIS. The EIS estimates that the Preferred Alternative will result in a total of 425,551 Level B harassments from active sonar and other non-sonar acoustic sources, and possibly one Level A harassment, affecting all species of marine mammals, including all seven listed species.

We are also concerned that the impact assessment methodology (derivation of marine mammal density) assumes a uniform distribution of animals although the EIS clearly states that this is "rarely likely true". The EIS recognizes that there are many unknowns in assessing the effects and significance of marine mammal responses to sound exposures but makes no judgment based on the estimated number of harassments as to whether these impacts are anticipated to significantly affect the species. The Council on Environmental Quality (CEQ) Regulations list criteria for assessing significance: the degree to which the effects on the quality of the human environment are likely to be highly controversial, the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks, and the degree to which the action may adversely affect endangered or threatened species (40 CFR 1508.27(4),(5) and (9) respectively). When considered in this light, impacts of MFA sonar on marine mammals may be considered significant under NEPA. We understand the Navy is working with the National Marine Fisheries Service to obtain a Letter of Authorization under the Marine Mammal Protection Act.

Recommendation

We recommend the Navy consider the scientific controversy, uncertain/unknown risks, and presence of threatened and endangered species in assessing significance of impacts from MFA sonar on marine resources. EPA recommends the Navy operate sonar at the lowest practicable level to achieve mandated training levels. We recommend the approach taken for the Hawaii Range Complex be utilized, where an additional alternative was created for the Final EIS that held sonar use at minimal (existing) levels while increasing training activity.

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Mitigation Discussion and Effectiveness

Although the EIS dedicates a full chapter to mitigation, and incorporates mitigation discussion in the impact analysis, there are several instances where the mitigation measure is not clearly identified or defined, and the relevance of the measure to actual impacts is not explained. There are also references to best management practices, Navy policies and standard operating procedures, but specific actions are not always identified, and when they are, no discussion of the anticipated effectiveness of mitigation occurs. It is important that mitigation measures be discussed, especially if they are the basis for concluding that impacts will not be substantial or will not occur at all. Results of monitoring of training impacts would also be helpful to include in mitigation discussions.

Recommendation

EPA recommends further refinement of mitigation measures to include clear identification of the measure (i.e. turtle-free zone), a discussion of the anticipated effectiveness and likelihood of implementation. Monitoring efforts should be included.

General Comments

Discussion regarding SINKEX

The EIS states that the sinking exercise (SINKEX) activities will be "conducted under the auspices of a permit from the USEPA". We recognize that this is a reference to the general permit issued by EPA under the Marine Protection, Research, and Sanctuaries Act (MPRSA) for the SINKEX. However the EIS presents very little information about the requirements and conditions of this permit, or the related August 1999 Letter Agreement between the Navy and EPA.

In addition, the EIS refers to the potential for floating non-hazardous expended material to be lost (to become persistent seabed litter) or washed ashore as flotsam. It should be noted that the SINKEX general permit states that "Before sinking, appropriate measures shall be taken by qualified personnel at a Navy or other certified facility to remove **to the maximum extent practicable** all materials which may degrade the marine environment, including without limitation removing from the hulls other pollutants and all readily detachable material capable of creating debris or contributing to chemical pollution." If the sinking exercise could create floating non-hazardous expended material that will create persistent marine debris or has the potential to wash ashore, the Navy must attempt to remove such material from the marine environment. While disposal of materials during SINKEX is a permitted activity, the EIS should disclose the amount of polychlorinated biphenyls (PCBs) that would be disposed into the ocean under each of the project alternatives.

Recommendation

We recommend that the Final EIS include additional discussion to inform the reader of the conditions with the permit and agreement, including but not limited to: the removal of all PCB transformers and large capacitors; the removal of all small capacitors to the greatest extent practical; removal of readily detachable solid PCB items; the cleaning of petroleum from

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tanks; piping and reservoirs, as well as the removal of trash, floatable materials, and mercury or fluorocarbon containing materials. The Final EIS should clearly note that the requirements of both the 1999 EPA/Navy agreement and the SINKEX General Permit under 40 CFR 229.2 are to be met in order to comply with the MPRSA SINKEX General Permit. For material that is expected to become flotsam or beach debris, we recommend the consideration of additional mitigation, such as supporting marine debris cleanup efforts in areas potentially affected by such debris.

PM2.5 Designation for Fairbanks

EPA recently finalized its rule to designate portions of the Fairbanks North Star Borough as non-attainment for PM2.5. The EIS currently contains information that is now out-of-date.

Recommendation

We recommend that the Final EIS be updated to reflect the current designation as discussed in the final rule. Please see Final Rule at: (http://frwebgate6.access.gpo.gov/cgibin/PDFgate.cgi?WAISdocID=10431612308 1+4+2+0&WAISaction=retrieve).

Evaluation of World War II Dumps in the GOA

During scoping, commenters identified concerns regarding past dumpsites from the World War II era, and requested that the Navy reidentify those and consider them in the analysis. There does not appear to be any discussion regarding these sites in the document outside of the scoping summary.

Recommendation

While specific information relating to the existence, location and possible constituents of past marine dump sites may not be readily available, we recommend that any reliable information (e.g. information from the marine charts referenced by the commenter) currently available be reviewed and any conclusions, even general, regarding these sites be included in the cumulative impacts assessment in the Final EIS, if possible.

Programmatic Nature of EIS

Although the document is not currently identified as a Programmatic EIS, it does appear that the EIS is programmatic in nature as it identifies, for an unknown period of time, activities that could occur within a specified range in magnitude, scale, and timeframe. As such, it may beneficial for the Navy to identify the document as programmatic and also set an estimated timeframe for which these activities re anticipated to occur (i.e. 5 or 10 years) before reevaluation, regardless of changes to the activities. We believe that reevaluation at regular intervals is important given the complexity of the marine dynamics as well as the substantial changes being observed in the GOA.

Recommendation

We recommend that the Navy consider identifying the document as a Programmatic EIS and determine a timeframe for reevaluation.

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Consideration of MPRSA

The MPRSA is not currently listed in several lists or discussions of environmental laws applicable to this project, even though it is quite relevant to the SINKEX activities.

Recommendation

We recommend including the MPRSA in lists and discussions of environmental laws throughout the document where appropriate.

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ENCLOSURE 2

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U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections
The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns
EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections
EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory
EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

I.1.13 NINA FAUST AND EDGAR BAILEY

P.O. Box 2994
Homer AK 99603

January 15, 2010

Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt, Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Comments RE: Gulf of Alaska Navy Training Activities EIS/OEIS

Dear Sirs:

We are appalled at the proposal to expand Navy Training Activities in the Gulf of Alaska. The fact that the Navy even does any training exercises in the spring and summer in this richly biodiverse area when many whale species are migrating north and other species are spawning or giving birth, is biologically insensitive and ecologically adverse. We are strongly opposed to any proposals to expand these operations in the Gulf of Alaska.

Alaska has a long history of toxic military waste that has recently come to light. Some of this waste will affect Alaskan waters for a long time to come. The Navy's proposal to increase ocean pollution here with the enormous addition of expended hazardous material is unconscionable, especially considering the dependency of Alaskans on salmon, crab, pollock, cod and other important seafood harvested by our fishing fleets. Adding the proposed toxins from exploded ordinances threatens Alaska's clean water and fishery resources. Considering the mess left by the bombing range at the mouth of Eagle River, we know all too well how toxic exploded ordinances are.

The Sonar testing is of grave concern to the marine mammals in Gulf of Alaska waters. It is well known and well documented that sonar can disrupt marine mammals and even kill them. The Navy knows the research. We oppose the active sonar training proposals due to the very sensitive populations of marine mammals. Populations of sea otters and sea lions have fallen dramatically in the past decade, threatening their viability. Adding the stress of sonar testing to populations that are already in trouble should not be allowed.

We do not support the proposed alternatives in the EIS/OEIS. At the very least, the exercises should stay status quo. At the best, we would like to see a cease and desist of all of these exercises in these very important marine mammal and fishery areas. The cumulative effects of the added stresses the Navy is proposing may be the too much for already stressed marine mammal populations. In Alaska, our wild resources are important for our security and that should be respected.

Sincerely,

Nina Faust Edgar Bailey

Nina Faust Edgar Bailey

I.1.14 CAROLYN HEITMAN

Sent by 'certified' mail on January 25, 2010

FROM: Carolyn Heitman
P.O. Box 2303
Kodiak, Alaska 99615
cheitman@acsalaska.net

TO: Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt, Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA. 98315-1101
Phone: 360-396-0924

Enclosed are additional comments on the GOA Draft EIS/OEIS to be included with my oral comments on January 7, 2010.

I found the DEIS to be completely ***inadequate and lacking*** in the Navy's analysis of mid-frequency active sonar impacts to humans, fish and marine life (endangered North Pacific right whales e.g.) in, or near the GOA TMAA- including inland/overland areas which could potentially be affected by the Navy, Air Force and Army joint training exercises. The Navy seems to be focusing mainly on mid-frequency active sonar use in the DEIS, but there are other sonar frequencies that could be just as hazardous to marine life (and humans), such as low-frequency (LF) and extremely –low frequency (ELF) transmissions, which the Navy uses on a regular basis in various areas. If the Navy is also proposing the use of LF and ELF in the GOA TMAA or over land area, that information needs to be included in the FEIS along with the hazardous transmission effects on marine/life-mammals and humans. Also, it states in the DEIS that the Navy does not know the hazards to birds from mid-frequency active sonar at long ranges. What about the risks to humans from long range MFA sonar? Taking into consideration all of the scientific research and studies that have been done by Navy scientists and others, I suspect the hazards are known but the Navy did not want to list them in the DEIS. The hazards to humans, birds, mammals and sea life needs to be included in the FEIS/OEIS.

The GOA DEIS is mainly focused on the use of mid-frequency active sonar and some evaluations and information was omitted in the draft which should have been included for public comment. **Section 3.14-Public Safety and Section 3.14-7-Aircraft Overflights** in the GOA DEIS *very briefly* mentions potential risks to the public from ship or aircraft electromagnetic transmissions. However, in a October 22, 2008 Elmendorf Air Force-Alaska briefing by Major Rob Peck, Airspace & Range Operations Team Chief, 611 AOC Combat Operations Division, he stated that the GOA EIS is mainly a subsurface evaluation and that although the Navy was looking at airspace, there would be no airspace proposal or rulemaking associated with the EIS. Why was an airspace evaluation not done for warfare training exercises?

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I am requesting that a ***Supplemental GOA DEIS*** be done as soon as possible, so that the public has time to comment on it, even if it means a delay in releasing the FEIS. Since the Navy, Air Force and Army are cooperating and doing combat training exercises together in the GOA and elsewhere in Alaska, the *Supplemental* GOA DEIS should include all air training exercise locations, military training routes (MTR), including the two new ones which are being proposed to be added this year, all radars/sensors which will participating in future combat exercises in or near the GOA or over-land areas, including their transmission, frequency and power levels. Some examples: (a) Sea-based X-band radar (b)Cordova HAARP substation (c)Juneau AN/TPY-2 (Transportable X-band Radar) (d)Shemya radar (e)HAARP in Gakona (f) Kodiak Dual-use High-power Microwave (g) King Salmon Microwave (h)Airborne Laser Plane. Some of these sensors/radars have transmission power levels which pose a health risk to humans and animals alike. The Sea-based X-Band will be coming under the jurisdiction of the Navy later this year (MDA spokesman Richard Lehner) and if the Navy is proposing to bring the radar to Alaska for home-porting or participate in future GOA training exercises, this information also needs to be included in a GOA Supplemental DEIS as the radar's transmission power levels are extremely hazardous to humans, birds and wildlife.

The Navy assumes there will be no significant impacts to any marine life in the GOA TMAA but has no documentation in the DEIS to back up its conclusion. Very relevant 2009 Navy and Air Force documentation which *should* have been referenced and included in the GOA DEIS for public comments but is lacking, is the **May 2009 'Northern Edge Joint Training Exercise 2009' Final EA/OEA** (Elmendorf Air Force document) and the Naval Postgraduate School funded **'Cruise Report for the April 2009 Gulf of Alaska Line-Transect Survey (GOALS) in the Navy Training Exercise Area' (June 2009)**, in which scientists (including some Navy), on the NOAA ship Oscar Dyson documented marine mammal species and biological resources that would be potentially affected by Navy GOA training exercises.

Information contained in the Elmendorf Air Force document, determined that there are 37 Endangered Species Act (ESA)-listed species that potentially occur within or near the GOA Exercise Area, including 28 fish species and 7 marine mammals. **Section 3.4.1.2.3-Conclusions on Effects of Sound on Fish** in the Elmendorf AF document stated: "The data obtained to date on effects of sound on fish are very limited both in terms of number of well-controlled studies and in number of species tested. Moreover, there are significant limits in the range of data available for any particular type of sound source. Finally, most of the data currently available has little to do with actual behavior of fish in response to sound in their normal environment. There is also almost nothing known about stress effects of any kind(s) of sound on fish." The document also states that aside from a few field studies, there are no data on the most critical questions regarding behavior effects of fish and that the more critical issue is the effect of human-generated sound on the behavior of wild animals.

The Navy concedes in the **GOA DEIS/OEIS** that the effects on fish could include direct physical injury including potential death from mid-frequency active sonar, and since the GOA is a major commercial fishing area, the Navy, Air Force and Army should refrain

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from using mid-frequency active sonar or any other sonar (LFA, ELF) which has potential to kill fish, marine life or animals, and it should go without saying--the potential risks to humans. Low Frequency Active (LFA) sonar has also been known to kill fish. What exactly are the Navy's Shutdown Procedures for Schools of Fish in the GOA? That is, if Schools of Fish can be detected at all.

Another concern of the Navy's use of MFA sonar (or LFA sonar) is the fact that more than 95% of the seabirds breeding in the Continental United States nest in colonies in the Gulf of Alaska and Bering and Chukchi Seas (1992 US Fish and Wildlife Service). Approximately 60 million birds of 40 species breed in the Gulf of Alaska, plus another 50 million visit the area during the summer. According to the U.S. Geological Survey Department, some seabird populations damaged by the EXXON Valdez oil spill have not recovered. In fact, as a whole, the Gulf of Alaska has not recovered from the oil spill. It is unacceptable and unnecessary for the Navy to put further contaminations in the GOA waters and stressors on marine life and birds.

The Navy's GOA TMMA boundary line extends beyond the Aleutian Trench. The DEIS did not address what activities would take place in the trench or sonar impacts to sea life living in the trench, so this information needs to be included in the FEIS.

From the information given in the DEIS, there are no environmental benefits from GOA warfare testing. Rather the opposite is true-- the Navy's presence and activities pose potential environmental risks, especially to the endangered and threatened species found in or along the Gulf of Alaska coastline. These species have no tolerance for additional risks factors. The Navy has not proven that it can ensure the protection of marine mammals, marine life and birds in the GOA. Nor can it guarantee the safety to humans from mid-frequency transmissions.

According to a 2008 National Oceanic and Atmospheric Association (NOAA) report, increasing evidence suggests that exposure to intense underwater sound in some settings may cause certain marine mammals to strand and ultimately die. Some of these strandings are associated with mid-frequency active (MFA) military sonar."

According to recently released NATO documents, low frequency active (LFA) sonar has been used as high as 240 decibels, which is considered to be millions of times higher than the level that causes damage to humans and animals. The Navy has tested its LFA sonar on divers in the 120 to 160 decibel range, which resulted in hospitalization of the subjects. The Navy has experimented with its sonar on humpback and blue whales around Hawaii and the above levels are enough to cause permanent damage and death even for short periods of exposure. In Navy training exercises off the Bahamas, low frequency sonar levels of up to 235 decibels was used. Decibels in the 120 to 150 range caused the whales to abandon the area.

In June 2004, six beaked whales stranded in Alaska after active sonar testing during the Navy's Northern Edge exercises in the GOA. Information is limited on this event and did not come from NOAA or the Navy but from legal discovery.

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Whether or not it had anything to with the Navy's 2009 summer Northern Edge Exercises in the GOA, a 2-year old humpback whale carcass was found washed ashore on a Kodiak Island beach on August 19. It was presumed to have been dead for approximately 4 weeks, but it's possible it could have been longer. Coincidentally, Northern Edge Exercise in the GOA took place from June 15-27. The 'Red Flag Alaska' exercise (jamming frequencies) was going on from July 27-August 7. If there were any over flight exercises near the GOA, certain air activity using various transmission/ frequencies may also have interfered with the whale, as some transmissions can reach long distances.

Section 3.6.1.3-Subsistence in the previously noted **Elmendorf AF 'Northern Edge Training Exercise'** document, it states that a number of communities that could potentially be affected by air activities are either partly or entirely dependent on subsistence activities and that because of the dependence of many Alaskans on subsistence activities, low-level military overflights and their potential impact on wildlife are a particular concern. Since there was no detailed information given in the GOA DEIS/OEIS, exactly what communities (coastal or inland) has the potential to be affected by air or ship warfare activities? List them in the FEIS.

As of January 5, 2009 (Federal Register), the National Marine Fisheries Service is adjusting the total allowable catch (TAC) amounts for the Gulf of Alaska Pollock and Pacific Cod fisheries. **(Fisheries of the Exclusive Economic Zone off Alaska; Inseason Adjustment to the 2009 Gulf of Alaska Pollock and Pacific cod Total Allowable Catch Amounts.)** The reason for this adjustment is because the endangered Steller sea lions occur in the same location as the Pollock and cod fisheries and cod and Pollock are the primary prey species source for the Steller sea lions in the GOA. The seasonal apportionment of Pollock and Pacific cod harvest is necessary to ensure the ground fish fisheries are not likely to cause jeopardy of extinction or adverse modification of critical habitat for Steller sea lions. This decision by NMFS will no doubt affect commercial fishermen in the GOA but is necessary to help with the Steller sea lions survival.

Additionally, Steller sea lions lives are being jeopardized by Killer whales in the Eastern GOA (Alaska Sea Life Conservation Science Center). If restrictions are being placed on Alaska fishermen, it is only fair that restrictions also be placed on the Navy, Air Force and Army by not allowing *any warfare training exercises in the Gulf of Alaska.* The Navy has other long-time training areas such as Point Mugu off the California coast and does not need to continually impact other environmentally sensitive areas for training exercises; nor should the Navy be doing military exercises that are likely to cause jeopardy of extinction or adverse modification of critical habitat for Steller sea lions or any other endangered species. The Navy has already received a Permit of Authorization from National Marine Fisheries Service (NMFS) to incidentally take ***2 million*** marine mammals per year for the next 5 years during its training exercises in Hawaii, the West Coast, Gulf of Mexico and the entire East Coast. Currently the Navy is proposing to do training exercises off of Guam.

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According to Sheila Murray, Navy Public Relations Officer, the Navy already is conducting warfare testing programs in various U.S. locations and within the last two years has issued almost identical environmental impact statements for Warfare Training Range Complexes in the Mariana Islands, the Hawaiian Islands, Jacksonville Florida, Cherry Point, North Carolina, Southern California, and now the Navy is proclaiming that the Gulf of Alaska is the best location for realistic training exercises. The Navy has a detrimental affect on marine life wherever it goes, and then does not want to accept responsibility for its actions. The Navy should be doing its part to protect and support federally threatened and endangered species in the Gulf of Alaska, Bering Sea, the Aleutian Chain and other geographic locations, rather than applying for federal exemptions to the Marine Mammal Protection Act and Bird Migratory Act, which it is consistently doing. Also, the Navy should adhere to and be in compliance with the Alaska Coastal Zone Management Plan when Navy ships and submarines are in Alaska waters.

Information contained in the previously mentioned Navy's **GOALS** document for the GOA survey, stated that although marine mammals are present year-round in the GOA, the greatest number of animals occurs during the spring and summer. The humpback, fin and possibly the right whales, feed in the outer continental shelf and slope waters during the summer into fall, while blue, sei and sperm whale species are thought to be more pelagic (Berzin and Rovnin 1966, Rice 1974). In 1980 a survey conducted and described by Rice and Wolman 1982, it was determined that the populations of all great whales in the GOA had been severely depleted. Since that time some of these species have shown signs of recovery; however, only the eastern North Pacific gray whale has experienced a complete population recovery (Rough *et al.* 2005).

The Navy's **GOALS** project identified fin, humpback, gray, minke, and killer whales. Dall's and harbor porpoise, Pacific white-sided dolphins and Steller sea lions, harbor seals and sea otters in the GOA. There were also 36 sightings (46 individuals) of unidentified large whales, dolphins, and pennipeds.
It needs to be noted that scientist observers on the Oscar Dyson NOAA ship had to use the towed acoustic array to collect vocalizations from all acoustically active cetaceans at times when no visual survey was possible due to high seas and winds or darkness. Under these types of weather conditions it would also be impossible for ship observers to keep visual track of whales and marine life in the GOA during Navy/Air Force, Army training exercises, which could then lead to the Navy having to use potentially harmful/life-threatening Low-frequency active (LFA) sonar in an attempt to locate marine life.

In the **GOA DEIS/OEIS,** the Navy believes that the impacts of active sonar on marine mammals, turtles and birds can be decreased by using on-ship 'spotters' with high-powered binoculars, aircraft spotters, and sonar technicians, but the Navy doesn't give any detailed information on the difficulty of spotting whales at any great distance. Many whales spend more time diving than they do at the surface. Biologists have said that the Navy's abilities to spot these whales any further than 1 kilometer in more than slight winds is 'zero'.

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GOA DEIS- Table 3.14-1-Training Activities Affecting Public Safety
This section lists (1) Chaff (2) Anti-Air Warfare (AAW) Surface to Air Missile Exercise (3) EC Exercises (4) Counter Targeting Exercises
There should have been more detailed information listed on the hazards of these activities to the public and the information needs to be included in the FEIS. Chaff has caused problems in the past from Navy activities. As an example, in 1985 the Federal Aviation Administration (FAA) tracked and timed a chaff-cloud path that correlated with a Navy exercise which caused a large power outage in San Diego. The Navy paid the electric company $49,000 in damages caused by the Navy's dropping of chaff, which is made up of hair-fine particles of aluminum and fiberglass.

In a September 22, 1998 United States General Accounting Office National Security and International Affairs Division-Department of Defense report on Chaff, the report identified some unintended side effects of chaff. Chaff (a) can affect safety by interfering with air traffic control radar (b) can affect weather radar observations and the operations of friendly radar systems (c) has been reported to cause power outages and damage electrical equipment (d) has the potential chance of collecting in reservoirs and causing chemical changes that may affect water and species that use it.

Using chaff in the GOA or inland areas could have a potential life-threatening effect on marine life/ wildlife and possibly pose a health hazard risk to humans who might possibly come into contact with chaff in any situation (inhaling the aluminum/fiberglass particles or drinking them in their water supply e.g.).

Chaff can not be dispensed if prevailing winds will carry the chaff into FAA air traffic control areas or into designated high and low altitude air routes (**Standard Electronic Attack Clearance Request For Ranges'- Nov. 2002 White Sands Missile Range Army Manual**). In spite of the Navy having knowledge of chaff hazards, the Navy and Air Force continues using it in warfare training exercises and are its leading users.

Aside from the previously mentioned hazards from chaff use, another major concern is any potential risks to the electrical equipment of small or commercial aircraft in Alaska's heavily-used airspace, possibly causing the engines to fail. Rather than jeopardize the safety of humans and marine/wildlife, the use of chaff should be permanently discontinued by the Navy, Air Force and Army.

The GOA DEIS did not state if Depleted Uranium or White or Red Phosphorus use is being proposed for use in the GOA or inland areas. Include this information in the FEIS. The deposition of washout of White Phosphorus, especially in water bodies may create exposure risks to resident fish, invertebrates and waterfowl, even if the resultant White Phosphorus concentrations are in the low ppb range (**Berkowitz et.al 1981**)).
White Phosphorus is highly toxic to both experimental animals and man and is highly toxic to aquatic animals ('**Mammalian Toxicology and Toxicity to Aquatic Organism of White phosphorus and Phossy Water'** by Authors Dickinson Burrows; Jack C. Dacre: AWARE INC. Nashville TN).

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A map in the GOA DEIS **(Page 2-4)** shows Kodiak Island within a large 'restricted area' (outlined in red). Since the DEIS refers to 'activity outside the training area', but does not give further details, is Kodiak Island being proposed as a future Military Training Route (MTR) or 'restricted area' as part of future GOA warfare training exercises? Considering the fact that the Kodiak Launch Complex has access to the 'Gulf of Alaska Maritime Exercise Area' and the Air Force and Army have used the launch complex for their missile tests in past years, then it is reasonable to assume that the Navy would want to include Kodiak Island in future GOA training exercises, if a missile(s) were to be launched from the launch complex, tracked and intercepted/destroyed by whatever means during a training exercise. If Kodiak is going to be a part of future GOA warfare training exercises, the information needs to be included in the FEIS and shown on the included Alaska Military Airspace map(s).

Section 3.14-Public Safety states the public could be at risk from ship and aircraft activities and from the emissions of acoustic and electromagnetic energy (e.g. sonar and radar), but no specifics are given as to what radar or sonar systems. This needs to be discussed in further detail in the FEIS. Which radars/sensors will be transmitting into air space as part of warfare training exercises? The DEIS mentioned lasers, radio frequency and particle beam weapons, but no detailed information. Also mentioned but not discussed was 'new weapon systems'. In the FEIS list the weapon systems, their locations, maximum power levels, and transmission hazards to the public.

Through the University of Alaska-Fairbanks, the Navy funds the Kodiak High Power Microwave Array (located in Chiniak). The microwave fits into the category of what the Navy calls an 'Electromagnetic Warfare Weapon' System (the transmission power levels having the ability to interrupt the electronics on a plane or missile, causing them to "stop dead in their tracks", according to Department of Defense documents). The microwave antenna field has been upgraded since the radar was first installed and the sensors operate individually in various directions and frequencies and is a substation of the Navy's HAARP facility in Gakona. If the Navy is proposing to use the Kodiak microwave in future warfare training exercises, then it needs to be included in the FEIS along with potential transmitting hazards to the public, since many small/commercial aircraft use the airspace around Kodiak Island and also the airspace between Kodiak and other Alaska communities.

The Navy stated in the GOA DEIS that the Gulf of Alaska was the best place for the Navy, Air Force and Army to do their combined Electronic Combat training exercises. That is a fallacy because the **Nellis Range Complex-Nellis Air Force Range** in Nevada supports Department of Defense and Department of Energy '*Advanced Electronic Combat*' training and testing. Therefore, no Electronic Combat Exercises need to be tested in the Gulf of Alaska or inland areas.

Finally, the 'No Action Alternative' is not a *true* alternative because if the public chooses that first alternative, the Navy will continue doing Gulf of Alaska activities at the current levels. In the Elmendorf 'Final EA/OEA-Northern Edge Joint Training Exercise' (Proposed Action and Alternatives), five alternatives were evaluated and under the 'No

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Action Alternative', joint training exercises in the Gulf of Alaska would *not* be conducted. The GOA DEIS should also have included a 'true' No Action Alternative which would have discontinued Gulf of Alaska training exercises, as the 'No Action Alternative' also poses environmental hazards and risks. Rather than having to choose an Alternative that is really *NOT* an option, I am requesting that the Navy discontinue its environmentally damaging presence in the Gulf of Alaska.

Carolyn Heitman

Carolyn Heitman

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I.1.15 ROBERTA HIGHLAND AND ROBERT ARCHIBOLD

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

Please record your comments on this form to let the U.S. Navy know what concerns and comments you have on the Gulf of Alaska Navy Training Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). You may submit your comments by:

1) Depositing this form at the Comment Table before you leave tonight.
2) Submitting your comments via the project Web site at **www.GulfofAlaskaNavyEIS.com**
3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt - Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☒ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: Roberta Highland + Robert Archibold

Organization/Affiliation:

Address:* P.O. Box 2460

City, State, Zip Code: Homer, AK 99603

Comments: We are very concerned at the proposed of expanding Navy training activities (NTA'S) in the Gulf of AK. We oppose any expansion of these activities. However, we actually oppose any NTA'S in this highly biodiverse area. The NTA'S will pollute + cause disturbance to many species of mammals + fish.

We cannot think of any Alaskan H20'S that are already so polluted; except for Cook Inlet which has already been sacrificed to irresponsible development + a critical habitat is presently being considered; that NTA'S would not adversely affect.

We did not know of NTA'S already occurring

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

(over)

in this area & were shocked to discover they had been going on for 10 yrs - especially in May + June, which is the worst time frame for any such activities. However, as you head to the public hearing, there is no "good" time for the whales.

Active Sonar testing has been well documented to be extremely adverse to mammals, esp. whales + may possibly affect the incredible system fish use to return to "whence they came."

Humans have to do a better job of respecting our precious oceans + we have grave concerns about ocean acidification. Please see the film "Sea Change"

We understand the need for the NTA's, though it is a sad state of affairs - but reality is harsh. The Navy is is in a tough position when looking for H2O's to practice NTA's. The use of any under H2O explosives over the continental shelf could have dire consequences for any migrating mammals + fish, thus we reitterate - we are opposed to any increase in NTA's + any activities of this nature in this rich body of H2O.

Sincerely,
Roberta Highland + mom & children

P.S. Consider using the 4 E's for decision making: Economy, Environment, Energy, Ethics

I.1.16 BOBBIE IVANOFF

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

Please record your comments on this form to let the U.S. Navy know what concerns and comments you have on the Gulf of Alaska Navy Training Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). You may submit your comments by:

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   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☐ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: Bobbie Ivanoff

Organization/Affiliation:

Address:* Box 2394

City, State, Zip Code: Kodiak AK 99615

Comments: It is clear that the current LOCATION OF proposed Temporary Maritime Activities Area is directly in the path of migrating whales. Also ~~the~~ sonar is well known to negatively affect whales, dolphins. Why does alternate plans include moving - redirecting the Activity area away from, especially the path of migrating whales!

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.17 KACHEMAK BAY CONSERVATION SOCIETY

Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt, Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

January 25, 2010

The Kachemak Bay Conservation Society (KBCS) requests that the public comment period be extended for the Proposed Gulf of Alaska Navy Training Project.

The community closest to the proposed training site was left out of the public hearings, although this community would be the most likely affected. Also, notification in the newspapers was insufficient in the small communities most affected, including Homer, Kodiak, and Cordova.

KBCS reluctantly supports the **No Action Alternative.** After careful review of the DEIS, KBCS concludes that the Navy has not provided sufficient evidence or support for their claims of minimal or no impacts in a multitude of aspects. KBCS also concludes that the Navy DEIS fails to consider or completely ignores impacts that would cause incredible harm to the health and well-being of Alaska's people, wildlife, and environment.

The proposed testing area is adjacent to the eastern Kenai Peninsula and just south of the Prince William Sound. These areas are renowned tourist and fishing destinations because they are some of the world's biologically richest. The shallow shelf that skirts the edges of the GOA is highly productive, creating an abundance of prey foods for marine life large and small. Choosing to conduct testing in this area threatens the short and long-term health of the wildlife, people, and ocean in this region.

Socioeconomic Impacts:

1) In the discussion of impacts to both Socioeconomics and Fish, the Navy does not provide research into effects of its proposed activities on the types of fish that are harvested commercially (sport or commercial fishing) in this region. The DEIS makes broad discussions of generalist and specialist types of hearing among fish, and makes the claim that "most" fish are generalists. The DEIS does not state whether halibut, herring, rockfish, or salmon are generalists or specialists. Thus, they cannot make the claim of "no significant impacts."

   The DEIS does state that fish are known worldwide to avoid areas where sonar testing is being conducted. Thus, from the DEIS's own statements in this document one could reasonably conclude that the fish in the testing area would in fact avoid the area. As a result, there would be impacts on the fish.

   Given the likelihood of impacts on the fish, above, then one could reasonably conclude that the commercial fishers fishing in the proposed test area may be affected. Given that commercial fishing for some species is set to occur only at prescribed times according to federal and state laws (called "openers"), then the impacts from the testing could cause great harm to fishers who were unable to find fish or fish during times with Navy testing overlapped an opener.

   In addition, sonar testing, according to the DEIS, can cause harm to fish, thus, any harm to the fish that reduced the numbers of these fish due to disorientation, physical harm, or other aspects, could cause a reduction in the harvest of fish for that season. This would be a socioeconomic harm.

2) The DEIS also does not take into consideration the socioeconomic impacts for the tourist industry for the entire area, Seward to Homer, that are likely with the proposed alternatives. The DEIS states that for Alternative 2 the NMFS "takes" would likely be 425,551 marine mammals, much of those dolphin. In Alternative 1, this number is 215,519.

   The number of takes predicted by the DEIS is likely to cause a drop in the number of marine mammals in the area. Given that one of the primary economic businesses in the area, Seward, is whale watching, it is likely that any reduction in these animals will cause harm to the businesses that depend on the marine life in the area. Notably, the proposed testing area is immediately adjacent to the Kenai Fjords National Park, a Park that draws nearly 300,000 people every year.

Marine Mammal Impacts:

3) There is much discrepancy between how the Navy DEIS evaluates noise impacts and how other reputable marine mammal scientists evaluate these impacts. There are numerous instances of impacts on whales and dolphins by sonar testing.

   Here is a list compiled by other environmental organizations:

- **January 2006** At least four beaked whales strand in the Gulf of Almeria, Spain, while sonar exercises take place offshore.
- **January 2005** At least 34 whales of three species strand along the Outer Banks of North Carolina as Navy sonar training goes on offshore.
- **July 2004** Four beaked whales strand during naval exercises near the Canary Islands.
- **July 2004** Approximately 200 melon-headed whales crowd into the shallow waters of Hanalei Bay in Hawaii as a large Navy sonar exercise takes place nearby. Rescuers succeed in directing all but one of the whales back out to sea.
- **June 2004** As many as six beaked whales strand during a Navy sonar training exercise off Alaska.
- **May 2003** As many as 11 harbor porpoises beach along the shores of the Haro Strait, Washington State, as the USS Shoup tests its mid-frequency sonar system.
- **September 2002** At least 14 beaked whales from three different species strand in the Canary Islands during an anti-submarine warfare exercise in the area. Four additional beaked whales strand over the next several days.
- **May 2000** Three beaked whales strand on the beaches of Madeira during NATO naval exercises near shore.
- **October 1999** Four beaked whales strand in the U.S. Virgin Islands during Navy maneuvers offshore.
- **October 1997** At least nine Cuvier's beaked whales strand in the Ionian Sea, with military activity reported in the area.
- **May 1996** Twelve Cuvier's beaked whales strand on the west coast of Greece as NATO ships sweep the area with low- and mid-frequency active sonar.
- **October 1989** At least 20 whales of three species strand during naval exercises near the Canary Islands.
- **December 1991** Two Cuvier's beaked whales strand during naval exercises near the Canary Islands.

These issues should be addressed honestly and with a goal of conducting legitimate, unbiased research. Creating science that simply downplays the real effects of potentially lethal activities is morally imprudent and does not give the U.S. citizen the right to an educated choice.

4) The DEIS does not address potential impacts to marine mammals that feed primarily on the seafloor. Gray whales could easily scoop up spent debris and pollution from the proposed testing activities.

Toxicity

5) There will be an inordinate amount of toxins dumped into a region known worldwide as being particularly clean. This could have impacts on the health of all life in the ocean and economic impacts for commercial and sports fishers.

Cumulative Effects

6) The DEIS does not take into consideration elements of climate change that directly effect the proposed tests. In particular, the new scientific evidence that is showing that ph changes (acidification) of the oceans increases the transfer of sound through the ocean.

7) There is a profound lack of attention to the cumulative effects of all the toxins that the testing will discharge into the water.

8) The DEIS fails to take into consideration the impacts of the Exxon Valdez Oil Spill, particularly in regards to salmon returns and otters.

Mitigation

9) The proposed mitigation measures would fail to protect any marine life. It is wholly unreasonable to expect anyone aboard a ship to spot a whale that is more than a few yards away from the ship. The Gulf of Alaska is known to have frequent high seas, winds, and rain that would make it nearly impossible for scouts to observe whales. It is ludicrous that this mitigation measure is even proposed. The Navy was sued by NRDC over these measures, with the court finding stating that the measures were "woefully inadequate and ineffectual." According to research, only 5% of marine mammals are able to be spotted this way.

10) The DEIS eliminates important mitigation measures they were required to use elsewhere. A region as biologically rich and as economically dependent on marine life as the proposed testing region warrants much more diligent attempts at reasonable and functional mitigation measures.

11) Comparing impacts from the southern ocean region near San Diego, as was done by a representative at a public comment period, with the GOA is not logical. These are two very different ocean ecosystems. And, there is no viable commercial fishery in the region the Navy "usually" tests in, unlike the GOA.

Please reconsider your plans. Thank you for taking our comments.
Elise Wolf, KBCS

I.1.18 KACHEMAK BAY ORGANIZATION

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
Draft Environmental Impact Statement/
Overseas Environmental Impact Statement

Please record your comments on this form to let the U.S. Navy know what concerns and comments you have on the Gulf of Alaska Navy Training Activities Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). You may submit your comments by:

1) Depositing this form at the Comment Table before you leave tonight.
2) Submitting your comments via the project Web site at **www.GulfofAlaskaNavyEIS.com**
3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt - Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

☐ *Please check the box if you would like to receive a CD copy of the Final EIS/OEIS. Provide your mailing address below.*

All comments must be received or postmarked no later than January 25, 2010, to be considered in the Final EIS/OEIS.

Name: Roberta Highland

Organization/Affiliation: Kachemak Bay Organization

Address:* P.O. Box 2460

City, State, Zip Code: Homer, AK 99603

Comments:

Please include a question + answer 1½ to 1 – ~~as~~ before the public meeting / Comment time – so our questions can be answered as a group + everyone can hear the answer + learn.

In the future

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notces about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.19 RYAN KINGSBERY

January 19, 2010

Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Attn: Amy Burt, Gulf of Alaska EIS/OEIS Project Manager

Dear Amy Burt,

I am writing to voice my concern with two specific aspects of the recently released Gulf of Alaska Navy Training Activities Draft EIS/OEIS (December 2009). My personal background is weighted in northern fur seal (*Callorhinus ursinus*) population biology and marine debris entanglement, particularly in the Bering Sea/Pribilof Island region. I am currently pursuing an M.S. in Environmental Science at Alaska Pacific University in Anchorage, Alaska.

My first concern takes issue with the listing of the northern fur seal population trend as "increasing" as is stated on page 328 in Table 3.8-1 and indicated at the bottom of page 386 under section 3.8.5.4 Northern Fur Seal: Population Size and Trends. According to the Alaska Fisheries Science Center: National Marine Mammal Laboratory (NMML) 2008 Quarterly Report, pup production in the Pribilof Islands has declined at an annual rate of 5.2% since 1998.[1] Towel et al. (2006) also notes that between 1998 and 2004 pup production on the Pribilofs has declined by 6% each year.[2] I therefore contend that the listing of the northern fur seal population trend as increasing as is stated in the EIS/OEIS, is not accurate and runs counter to current population studies.

Secondly, I agree with public concerns outlined in Table 1.1: Public Scoping Comment Summary on page 69, more specifically the effects of harmful levels of noise on whales particularly both species of beaked whales (*Berardius bairdii, Ziphius cavirostris*) and endangered species such as the North Pacific Right Whale (*Eubalaena robustus*). I disagree with the statement found on page 362 under section 3.8.4.1: Impacts of Human Activity, that says there is new evidence that beaked whales are not sensitive to Navy sonar. There is sufficient evidence in the form of well-documented cases that link certain sonar frequency levels with beaked whale strandings.[3] Also, on page 349 under section 3.8.3.4: Acoustics there is mention of adverse behavioral changes observed when Right Whales are submitted to noise levels between 133 and 148 dB, but beyond this there is no other research indicated. This species in particular is the most vulnerable whale present in the TMAA due to current population numbers and therefore I think it demands special attention. In summary, I think there needs to be more convincing research and additional mitigation that takes into account the sensitivity of the aforementioned species.

Thank you for allowing me to comment on this EIS/OEIS. I look forward to your response.

Sincerely,

Ryan Kingsbery

Ryan Kingsbery

---

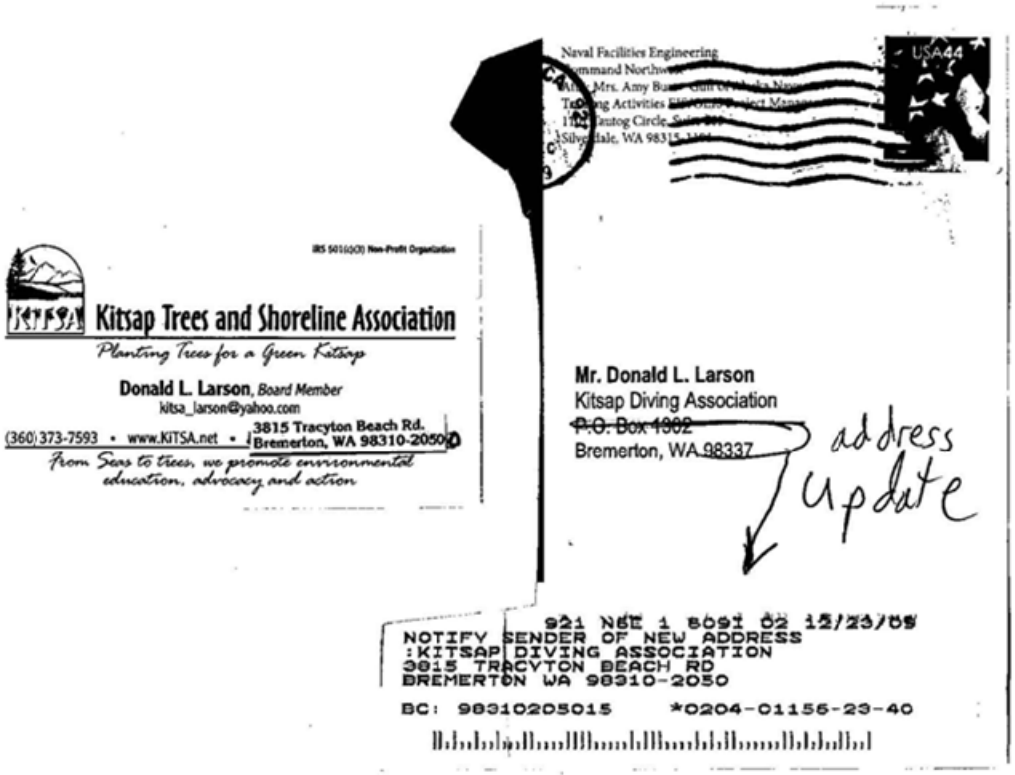
[1] Alaska Fisheries Science Center: National Marine Mammal Laboratory Quarterly Research Report (2008), PDF downloadable at http://www.afsc.noaa.gov/Quarterly/ond2008/tocNMML.htm, P.13 [website last accessed 1/18/10]

[2] Towell RG, Ream RR, York AE (2006) Decline in fur seal (Callorhinus ursinus) pup production on the Pribilof Islands. Mar Mamm Sci 22:486-491

[3] National Research Council (2003) Ocean Noise and Marine Mammals. The National Academies Press, Washington, D.C., accessed by way of University of Rhode Island, Office of Marine Programs, http://www.dosits.org/animals/effects/e1a-d.htm. [website last accessed 1/18/10]

Ryan Kingsbery 825 P Street, Anchorage, AK 99501 rkingsbery@alaskapacific.edu

I.1.20 KITSAP TREES AND SHORELINE ASSOCIATION



IRS 501(c)(3) Non-Profit Organization

Kitsap Trees and Shoreline Association

Planting Trees for a Green Kitsap

Donald L. Larson, *Board Member*
kitsa_larson@yahoo.com
(360) 373-7593 • www.KiTSA.net • 3815 Tracyton Beach Rd. Bremerton, WA 98310-2050

From Seas to trees, we promote environmental education, advocacy and action

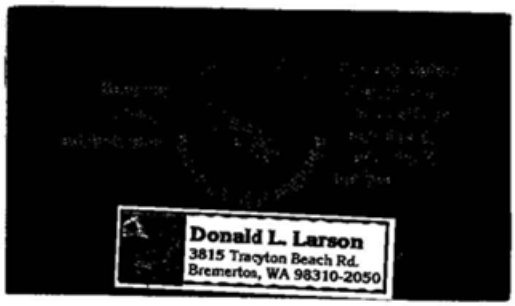
Naval Facilities Engineering
Mrs. Amy B
Activities
Silverdale, WA 98315

USA44

Mr. Donald L. Larson
Kitsap Diving Association
~~P.O. Box 1002~~
Bremerton, WA 98337

address update

921 NOV 1 8091 02 12/23/09
NOTIFY SENDER OF NEW ADDRESS
:KITSAP DIVING ASSOCIATION
3815 TRACYTON BEACH RD
BREMERTON WA 98310-2050
BC: 98310205015 *0204-01156-23-40



Donald L. Larson
3815 Tracyton Beach Rd.
Bremerton, WA 98310-2050

I.1.21 WHITNEY LOWE

The Navy has a history of poor environmental stewardship including dumping high volumes of garbage into the ocean as well as toxic materials from explosive ordinance. Consequently it is difficult to believe what they might say about being responsible with environmental impacts of their actions.

In these times of international terrorism it is easy to throw out the fear card and say all these training exercises are necessary to keep our country safe. Trumping up people's fears has routinely led to trading off the health and safety of human and other animal habitats because supposedly it was going to make us safer. At some point it would be great to think that we might learn that the answer to making us safer doesn't result from bigger and more powerfully destructive weapons, nor from destroying our surroundings in the pursuit of those weapons.

At the present moment, we have a situation of drastic concern with our worldwide fisheries and marine environment. A November 2006 article in the journal *Science* suggested there will be virtually nothing left to fish from the seas by the middle of the century if current trends of catastrophic fish populations declines continue. The primary culprits involve overfishing, pollution, and other environmental factors.

In the face of these issues it is totally irresponsible to increase military training which involves toxic dumping and tactics known to kill and injure marine life. We should be going to great lengths to do anything we can to not only mitigate our current practices that are causing that precipitous decline, but to reverse this trend. To engage further military exercises in this region that is extremely rich in sensitive marine life is a blunder of serious proportions and represents incredibly poor judgment.

Our children and descendants, in whose hands we leave this critically injured world, will be asking... What were they thinking?... We can't afford to participate in this process as it represents the epitome of irresponsibility and drastically poor judgment.

Whitney Lowe
PO Box 15303
Fritz Creek, AK 99603
wlowe97@gmail.com
907-235-2348

I.1.22 MARINE MAMMAL COMMISSION

MARINE MAMMAL COMMISSION

27 January 2010

Ms. Amy Burt
Gulf of Alaska DEIS/OEIS Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale WA 98315-1101

Dear Ms. Burt:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) referenced in the Navy's 15 December 2009 *Federal Register* notice (74 Fed. Reg. 65761) regarding proposed activities in the Gulf of Alaska. On 22 April 2008 the Commission commented on the Navy's Notice of Intent to prepare an environmental impact statement for those activities. The recommendations and rationale that follow either reinforce or expand upon those earlier comments.

RECOMMENDATIONS

The Marine Mammal Commission recommends that the Navy—

- revise its DEIS to ensure that (1) all activities included under the no-action alternative have been evaluated, (2) the alternatives evaluated and presented to decision-makers and the public include a reduction in activity level, and (3) the scope of decision-making is not constrained unnecessarily;
- resolve inconsistencies, omissions, and errors in the DEIS and either reissue it or use some other mechanism to allow decision-makers and the public to review and respond to the revised information;
- withdraw the current section of the DEIS dealing with Cook Inlet beluga whales, conduct the essential analysis of effects on this endangered stock, and reissue at least that section of the amended DEIS;
- provide explicit and detailed descriptions of the measures that will be used to avoid risks to certain species or stocks of special concern (i.e., eastern population of North Pacific right whales, western population of Steller sea lions, AT1 pod of killer whales in and around Prince William Sound [although occasionally ranging more widely], sperm whales, humpback whales, fin whales, and sei whales);
- expand the description of marine mammal habitat use in the Gulf of Alaska by reviewing the considerable body of information on species-specific distribution and movement patterns obtained from whaling records, scientific research, and other sources over the past century;
- evaluate the anticipated effectiveness of monitoring and mitigation measures; and
- require vessel commanders to retain vessel logs and reports for a minimum of three years.

4340 East-West Highway • Room 700 • Bethesda, MD 20814-4498 • T: 301.504.0087 • F: 301.504.0099
www.mmc.gov

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RATIONALE

The Commission offers the following rationale for its recommendations.

No-Action Alternative

The Marine Mammal Commission continues to believe that an action agency should use the "No-Action" alternative to represent continued activity at the same level only if those activities already have been evaluated in a previous environmental analysis. Further, a previous analysis may not be adequate for that purpose if the activities that were initially evaluated have since changed. To fulfill their purpose of fully informing decision-makers, environmental impact statements must include or at least reference evaluations of all the activities in the proposed alternatives, whether those activities are ongoing or new.

A hypothetical example may help explain the shortcomings of the Navy's current approach. If the Navy initiated activities in the Gulf of Alaska 10 years ago by conducting two exercises of one type each year, it should have completed an environmental analysis of the effects of those two exercises. If, over the past 10 years, the Navy increased its activities so that it now conducts five exercises of that type and three exercises of yet another type, then an environmental analysis based on historical data would be inadequate to describe the effects of all the Navy's current activities because the historical record does not in fact reflect the current level of activity. This undermines the intent of the National Environmental Policy Act.

The Marine Mammal Commission also continues to believe that it is inappropriate for the Navy to exclude alternatives that result in a reduction in its activities in the Gulf. By doing so, the Navy essentially limits the scope of decision-making because decision-makers are not presented with information about the consequences of possible reductions in training activities. Such an approach constrains rather than empowers decision-makers to make fully informed decisions and thereby undermines the intent of the National Environmental Policy Act.

For those reasons, the Marine Mammal Commission recommends that the Navy revise its DEIS to ensure that (1) all activities included under the no-action alternative have been evaluated, (2) the alternatives evaluated and presented to decision-makers and the public include a reduction in activity level, and (3) the scope of decision-making is not constrained unnecessarily.

Inconsistent Descriptions of the Alternatives and Other Errors

Certain inconsistencies, omissions, and errors in this DEIS are likely to misguide decision-makers and the public and therefore warrant attention. The following are four examples of such shortcomings.

- The description of the three alternatives on page E-1 does not match the more detailed descriptions on page ES-9 and in the body of the DEIS. In particular, the Portable Undersea

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Training Range is included only in Alternative 2 on page E-1 but is included in Alternative 1 in all subsequent discussions.

- The DEIS does not provide an adequate description of SSQ-125 (Multi-Static Active Coherent or MAC), the replacement for the SSQ-110 non-explosive sound source. Although the specific source characteristics may be classified, sufficient unclassified information must be provided to permit verification in at least a general sense of the anticipated risk posed by what is obviously going to be a very loud and widely used source in Navy training.
- The DEIS does not describe the specifications for the Killer Tomato target simulator. Although it appears by inference to be some kind of smoke or optical beacon, the DEIS does not describe the device or its function or identify it with an official designation (e.g., Mk-85, TALD or LUU-2B/B) so that the reader is able to seek additional information from other resources.
- In the next to last paragraph of page 3.8-111, the DEIS includes what we believe is a typographical error in which the word *constructed* appears in place of the apparently intended word *constricted*.
- In the same paragraph, the DEIS cites speculation in Tyack (2009) that beaked whales may avoid all sounds equally. Indeed, this is just speculation on Tyack's part, and he identifies it as such. The Commission believes it is inappropriate and unreasonable to infer that sonars pose no greater risk than other sound sources when, in fact, the little evidence available on this subject indicates otherwise.

To ensure that decision-makers and the public are accurately informed about the activities proposed in this DEIS, the Marine Mammal Commission recommends that the Navy resolve inconsistencies, omissions, and errors in the DEIS and either reissue it or use some other mechanism to allow decision-makers and the public to review and respond to the revised information.

Cook Inlet Beluga Whales

The Navy excludes consideration of Cook Inlet beluga whales from analysis in the DEIS. It justifies this exclusion by citing a 1995 Air Force environmental impact statement as the appropriate document for analysis of this stock. However, the Air Force environmental impact statement does not contain an analysis of effects of aircraft noise on beluga whales in Cook Inlet and, even if it did, that analysis would be out of date. Since preparation of the 1995 statement, the Navy appears to have changed the number of aircraft and associated traffic patterns as part of an increase in joint activities with other armed forces, as noted in the current DEIS. Furthermore, since preparation of the 1995 statement, the Cook Inlet beluga whale stock has declined markedly to approximately 300 to 400 individuals, has been designated as depleted under the Marine Mammal Protection Act, and has been listed as endangered under the Endangered Species Act. Thus, neither the 1995 statement nor the DEIS under consideration provides adequate analysis of the potential effects of the proposed activities on this endangered beluga whale stock. The Marine Mammal Commission considers this a serious oversight and recommends that the Navy withdraw the current section of

the DEIS dealing with Cook Inlet beluga whales, conduct the essential analysis of effects on this endangered stock, and reissue at least that section of the amended DEIS.

Other Species or Stocks of Special Concern

As it did in its 22 April 2008 letter, the Marine Mammal Commission also recommends that the Navy provide explicit and detailed descriptions of the measures that will be used to avoid risks to certain species or stocks of special concern. These include the eastern population of North Pacific right whales, which has been reduced to fewer than 100 individuals and is vulnerable to disturbance and vessel strikes (based on data from the closely related North Atlantic right whale). Cook Inlet beluga whales were mentioned previously in this letter. Although outside the Navy's designated operating area, they are exposed to increased activity at Elmendorf Air Force Base and possibly other joint service exercises in Cook Inlet and coastal areas within the stock's range. Steller sea lions, AT1 killer whales in and around Prince William Sound (although occasionally ranging more widely), sperm whales, humpback whales, fin whales, and sei whales also were mentioned in our 22 April 2008 letter. The Commission concurs that sea otters are unlikely to enter the Navy training range area due to the distance from shore.

Habitat Analyses

With regard to marine mammals, the habitat analyses in the DEIS focus almost entirely on areas designated as critical habitat for those species that are listed as endangered or threatened under the Endangered Species Act. Such areas clearly are important and warrant extra protection, but they also are insufficient in two important respects. First, critical habitat for listed species often is poorly understood, so key habitat areas for those species may not be included. For example, critical habitat for the North Pacific right whale includes two areas, one in the southeastern Bering Sea and one off Kodiak Island in the Gulf of Alaska. The right whales that use these two areas are not thought to represent separate populations; rather, they likely move back and forth between the Gulf (and other areas of the North Pacific) and Bering Sea through certain important passes in the Aleutian Islands (e.g., Unimak, Akutan, Umnak, and Sequam Passes). These areas also may be vital to protect as they must funnel or concentrate the whales during their seasonal movements. Second, a number of species in the Gulf area are not listed under the Endangered Species Act but still use and depend on specific habitat. In fact, the records of marine mammal habitat use in the Gulf of Alaska are extensive, dating back to the 1800s. For example, northern fur seals appear to use and depend on offshore areas south of the Yakutat area. C. H. Townsend described the use of this "Fairweather Sealing Ground" and other important seal habitat in the late 1800s based on records of pelagic seal harvests. Both pinnipeds and cetaceans use the Gulf extensively. More recently, much of this information is being collected and archived and is available for management purposes. Products from the OBIS SEAMAP are available from a Web-based data archive, which also comes with a toolkit for analysis. In fact, the Navy notes on page 1-6 that the Gulf of Alaska is a complex system of shelf edges, canyons, seamounts, and freshwater intrusions, all features that are of great relevance and attractive to marine mammals and other critical ecosystem components. Although this statement generally is correct, a thorough review of existing data on marine mammal distribution and movements in the North Pacific would give the Navy much more insight into habitat use and

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the kinds of measures that might be needed to protect that habitat. With that in mind, the Marine Mammal Commission recommends that the Navy expand the description of marine mammal habitat use in the Gulf of Alaska by reviewing the considerable body of information on species-specific distribution and movement patterns obtained from whaling records, scientific research, and other sources over the past century. The Commission recognizes that this represents a considerable amount of work, but we note that the thorough literature research already completed for the "Affected Species" portions of the DEIS will probably also provide most of the information needed to define and plot the typical habitats used by each species and then factor that information into an analysis of places of special concern.

Effectiveness of Proposed Mitigation Measures

The Marine Mammal Commission repeats its now frequent recommendation that the Navy evaluate the effectiveness of its monitoring and mitigation measures. Performance tests for monitoring and mitigation measures are both technically feasible and economically reasonable. Such tests could either strengthen the Navy's position that its existing measures are adequate or, more likely, point toward steps needed to improve them. Both outcomes would provide useful information for managers responsible for ensuring the protection of marine mammals and their habitat. The Navy subjects all tactical systems to performance evaluation and doing so with its environmental systems also is necessary for the Navy to meet its commitment to good environmental stewardship.

Retention of Vessel Logs and Records

The DEIS proposes (page 5-10) that logs and records relevant to marine mammal sightings and mitigation efforts, and other critical environmental data will be destroyed after 30 days. The Marine Mammal Commission believes that destruction of such records is entirely contrary to efforts by the Navy, the regulatory agencies (primarily the National Marine Fisheries Service), the Marine Mammal Commission, and all parties interested in better characterization of interactions between Navy operations and marine mammals. Navy activities pose a variety of risks to marine mammals including, but not limited to, those emanating from the introduction of noise (e.g., sonar), blasting (e.g., ship-shock trials, weapons testing and training), and ship strikes (e.g., especially those that involve endangered large whales). Records of Navy interactions with marine mammals are critical to characterizing those risks, evaluating the efficacy of monitoring methods, evaluating the utility of mitigation measures, and identifying alternatives for avoiding unnecessary risks. To understand the effects of Navy operations, investigators must be able to reconstruct the circumstances surrounding events such as those that occurred in Haro Strait in 2003, Haro Strait in 2004, and Hanalei Bay in 2004. Destruction of vital Navy records precludes such reconstruction and undermines efforts to identify solutions that allow the Navy to conduct its exercises while ensuring that marine mammals are protected. For that reason, and because investigation of marine mammal interactions can take several years, the Marine Mammal Commission recommends that the Navy require its vessel commanders to retain vessel logs and reports for a minimum of three years.

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We hope that you find these recommendations and rationale helpful. Please contact us if you have any questions or wish to discuss them.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

I.1.23 KATHERINE MCLAUGHLIN

To: Naval Facilities Engineering Command Northwest
Attention: Mrs. Amy Burt,
Gulf of Alaska Navy Training Activities EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

RE: Public Comment

DEPARTMENT OF DEFENSE
Department of the Navy

Notice of Public Hearings for the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Alaska Navy Training Activities

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Thank you for the opportunity to comment on this draft EIS by the Department of Defense. As an environmental educator, a humpback whale researcher who works with NOAA on abundance and behavior patterns of these unique cetaceans, and a board member for Prince William SoundKeeper, a citizen water quality advocacy organization for Prince William Sound, the proposed actions by the department of defense are a great concern for me over the potential and real harm that will take place upon marine mammals, and for the amount of environmental damage that may be caused to the marine environment in general with the amount and type of ordinance and activity listed in the request.

I believe the EIS submitted by the Navy is seriously flawed. It is my belief that the U.S. Navy can conduct its exercises while safeguarding the unique and precious ecosystem of the North Gulf of Alaska without jeopardizing the safety and security of our Country.

For clarity and conciseness, the concerns outlined below were prepared by the NRDC, but speak for me as to my own personal concerns as well. Please include these comments in the administrative record.

Sincerely, Kath McLaughlin

Mrs. Katherine McLaughlin
Environmental Consultant
McLaughlin Environmental Services
PO Box 8043
Chenega Bay, AK 99574

*The Navy estimates an extraordinary amount of spent material will result from its Preferred Alternative (Alternative 2) in the GOA, including (1) a large increase in the weight of expended materials (352,000 lbs) and (2) 10,300 pounds of expended hazardous material. The Navy uses a quirky calculation to estimate that hazardous materials would account for approximately 1.2 lb per square nautical mile (assuming the materials are spread over

20% of the TMAA, and that ocean currents will rapidly disperse the expended materials, neither of which is a valid assumption).

*The Navy estimates that its sonar training exercises in the GOA from its Preferred Alternative (Alternative 2) will result in more than 425,000 marine mammal "takes" (behavioral impacts, harassment, injury, death) every year - that's over 2.125 million takes during the course of the Marine Mammal Protection Act permit it must seek from NOAA.

*In all, the Navy expects to "take" more than 20 different species of marine mammals, including 7 endangered species, in the GOA.

*Nearly all of the mitigation measures that the Navy has proposed for the GOA concern the operation of a small "safety zone" around the sonar ship. Yet it is widely agreed in the scientific community that this measure is inadequate given the far-reaching effects of Navy sonar and the difficulty of spotting marine mammals from fast-moving vessels.

*The Navy has not proposed to establish any protection areas in the GOA, despite the broad recognition that geographic protection zones are the most effective available means to mitigate sonar's impacts on marine wildlife.

*For example, no protection areas are proposed for harbor porpoises, which are acutely sensitive to sound; for endangered gray whales, which migrate directly through the TMAA; for endangered humpback whales and blue whales, which gather to feed in the TMAA; for the critically endangered North Pacific right whale, who's critical habitat is directly adjacent to the TMAA; or for any other species or habitat.

With regard to our specific concerns/question, we obviously have huge concerns with the impacts of the Navy's proposed increase in training, including:

*The Navy does not properly analyze environmental impacts. For instance, it completely disregards the serious impacts its sonar training will have on the critically endangered North Pacific right whales, whose critical habitat is only 12 nautical miles from the TMAA or the endangered gray whales, which migrate through the TMAA.

*The Navy underestimates the number of marine mammals (and fish) that will be harassed, injured and killed because it simply does not have the density estimates needed in order to accurately make this determination. The National Environmental Policy Act (NEPA) specifically requires federal agencies to obtain the data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained. See 40 C.F.R. § 1502.22(a). Here, the Navy failed to obtain data that is essential to its analysis. The Navy itself admits that it has no density estimates for endangered blue whales, North Pacific right whales, and sei whales. In addition, there are simply no reliable estimates for current or historical abundance numbers for many of the affected marine mammals in the GOA. Despite the lack of survey/density data, the Navy simply estimates that only 1 blue whale, 1 North Pacific right whale and 4 sei whales may be harmed by its use of sonar because of the "rareness" of those whales. NEPA requires more. It requires these surveys to be completed and included in the impacts analysis.

*In addition, the Navy's acoustics impact analysis ignores scientific studies contrary to its interests and uses methodologies not supported by the scientific community. Thus, the thresholds it sets for permanent injury, temporary injury (hearing loss) and behavioral change (which we would argue are too high and thus completely underestimate the actual number of wildlife that will be impacted) are invalid as a matter of science. For instance, in setting its thresholds at 195 dB for harassment and temporary injury and 215 dB for permanent injury and death, the Navy ignores a 2004 study by Nowachek et al which found that right whales respond to mid-frequency sound below 140 dB (the sound caused them to stop eating and ascend rapidly to just below the surface, making them extremely vulnerable to ship strikes).

*The Navy's cumulative impacts analysis is inadequate. Chapter 4 of the DEIS simply lists projects that could have potential cumulative impacts on the Northwest Range without actually analyzing what those impacts will be.

*The Navy's alternative analysis is also inadequate. The Navy only presents three options - maintain the status quo, add more training, or add even more training. It does not consider - or blithely dismisses - any other alternatives, some employed by the Navy itself in other training exercises and ranges.

*Finally - and most critically - the Navy does not set forth adequate measures to mitigate the harmful effects of sonar. Its proposed mitigation measures basically boil down to "safety zones" (1,000 yard power-down and 200 yard shut down) around the sonar maintained primarily by on-board visual monitors. These are the same measures that federal courts have found to be "woefully inadequate and ineffectual." (For instance, studies show that visual monitoring only spots about 5% of marine mammals. Statistically, a 5% "success" rate clearly does not cut it.) The Navy's refusal to employ better mitigation measures is astounding, because it has used more protective measures during previous training. As NRDC discovered during previous litigation against the Navy (and as our recent settlement agreement has allowed us to make public), the Navy has adopted, during previous exercises, some of the same mitigation measures we have repeatedly beseeched it to employ and which it now claims it cannot employ. These measures include siting exercises beyond the continental shelf and Gulf Stream, relocating exercises out of important habitat and to avoid certain species, and using a technique called "simulated geography" to avoid canyons and near-shore areas on at least three of its major ranges. It also restricted sonar use at night when marine mammals are harder to detect, as well as minimized the use of sonar from multiple sources at the same time. Although in Chapter 5 of the DEIS the Navy goes to some pain to describe "alternative mitigation measures considered but eliminated" - primarily for "training effectiveness" reasons - its previous adoption of the exact same measures belies its argument. The Navy's claim that it cannot implement more protective mitigation measures is therefore completely disingenuous.

I.1.24 NATIONAL DATA BUOY CENTER

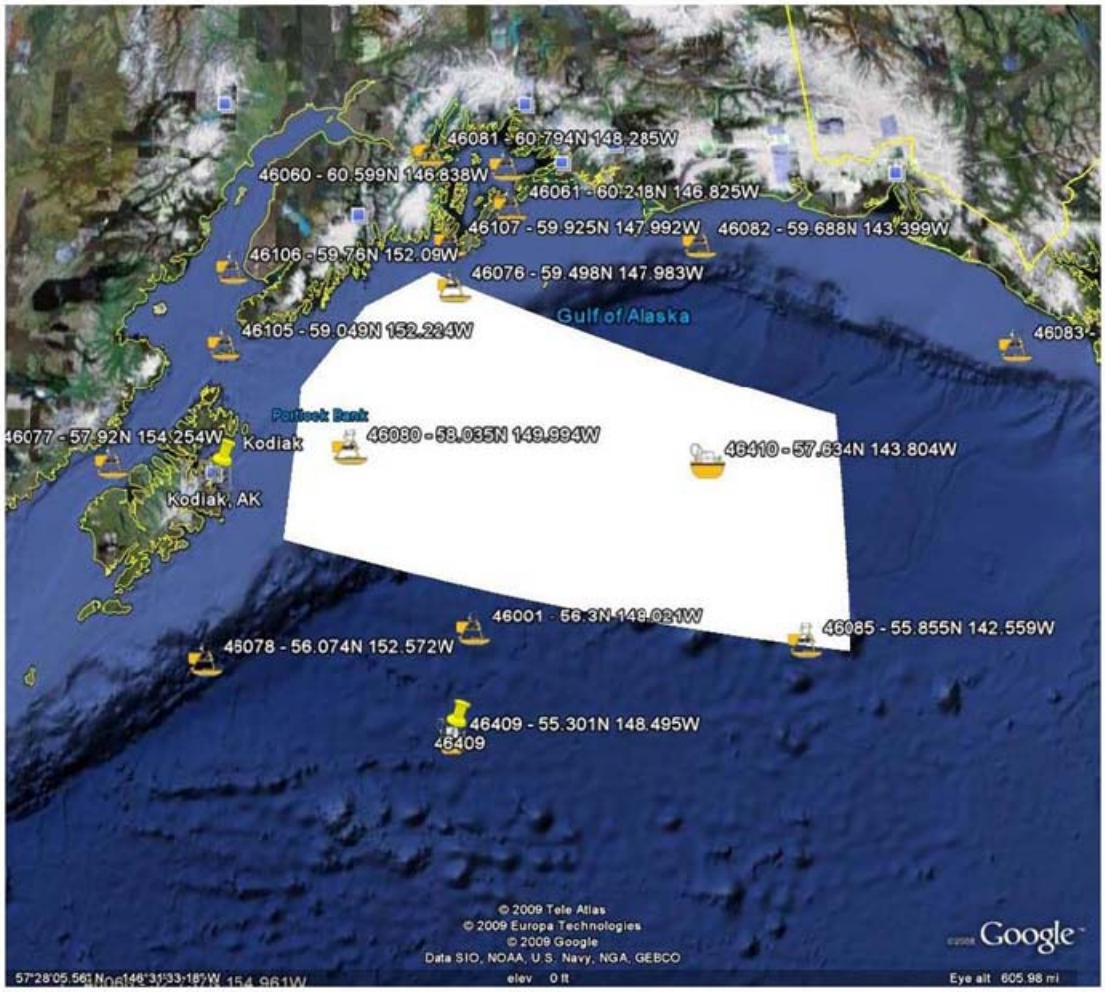
From: Craig Kohler
To: Burt, Amy E CIV NAVFAC NW, EV1
Cc: Amy.B.Cox@noaa.gov; Christian Meinig; Stephen Cucullu; Cheryl Hickey; Chung-Chu Teng
Subject: Re: Navy activities in GOA/DART
Date: Friday, January 22, 2010 8:25:32
Attachments: GOA Naval Exercise.pdf
Craig_Kohler.vcf

Graphic now attached...

Amy (Burt),
NDBC has identified the buoys/moorings that are potentially in the GOA exercise operating area. The attached graphic lists these stations, positions and watch circle radii that need to be avoided. Additional information is contained on our website (http://www.ndbc.noaa.gov/) but please don't hesitate to contact me if you have any questions.
Best regards,
Craig

Amy B. Cox wrote:
> Craig,
> We will include this information in our comments to the Navy. We are
> submitting informal comments this month as a cooperating agency on the
> project. I also spoke to the Navy contact Amy Burt today. She
> mentioned that you had already contacted her. I am glad to hear that
> coordination is in the works.
> Thank you for your time and assistance.
> Have a good weekend,
> Amy
>
>
>
> Craig Kohler wrote:
>> Amy,
>> Thank you for providing the National Data Buoy Center (NDBC) this
>> information. We were not aware of the proposed naval training
>> exercise in the GOA. I ask that you include statement that they need
>> to avoid interference with The National Data Buoy Center's DART
>> (Deep-ocean Assessment and Reporting of Tsunamis) and our automated
>> weather reporting buoys and moorings in the exercise area. These
>> networks provide critical weather and tsunami warning data to the
>> American public. For specific locations of the buoys/moorings in
>> this area, please refer to http://www.ndbc.noaa.gov/. We will also
>> provide this information to the Navy contact you provided below.
>> Best regards,
>> Craig
>>
>>
>> Amy B. Cox wrote:
>>> Hello Craig,
>>> I am writing from the NMFS Anchorage field office. We are
>>> reviewing the Navy draft environmental impact statement for the
>>> purposed training activities in the Gulf of Alaska. Matt Eagleton
>>> in our office suggested checking with Chris about your equipment in
>>> the GOA area. We just wanted to make sure that you are aware of the
>>> proposed exercises. I did not notice anything in the draft about
>>> needing to be cautious or avoid any buoys and such. They have
>>> various exercises and such planned which include explosions, live
>>> fire, vessel sinkings, etc.. The website with this information is

>>> http://www.gulfofalaskanavyeis.com/OtherResources.aspx We are
>>> writing comments to the Navy about essential fish habitat. We can
>>> mention something to the effect of:
>>> The NOAA Office of Oceanic and Atmospheric Research, Pacific Marine
>>> Environmental Lab Tsunami Program (Christian Meinig, Division Chief)
>>> maintains a tsunami monitoring network placed throughout the GOA and
>>> North Pacific. NMFS offers that coordination should be made to
>>> ensure this world-wide integrated network is not falsely activated
>>> or real-time tsunami monitoring equipment become damaged. See
>>> http://nctr.pmel.noaa.gov/Dart/index.html You may already be
>>> working with the Navy to ensure that your equipment isn't damaged.
>>> If not though, you may wish to contact them directly also. They are
>>> accepting comments until Jan. 25th for the final EIS.
>>> The contact person is
>>> Amy Burt, Environmental Planner
>>> Naval Facilities Engineering Command Northwest
>>> 1101 Tautog Circle, Suite 203
>>> Silverdale, WA 98315-1101
>>> (360) 396-0924
>>> If you need any more information please just let me know. Also,
>>> if you can let me know if you are already working with the Navy that
>>> would be great. I will not include the above comment in our letter
>>> if it is redundant then.
>>> Thank you,
>>> Amy
>>>
>>>
>>> Christian Meinig wrote:
>>>> Hello Amy:
>>>>
>>>> Thanks for the phone message regarding Navy activities possibly
>>>> affecting the DART array in GOA. The DART array is now operational
>>>> and the contact is:
>>>>
>>>> Craig Kohler
>>>> Craig.Kohler@noaa.gov
>>>>
>>>> in Stennis, MS. He is cc'd above. The locations of the buoys can
>>>> be found here: http://www.ndbc.noaa.gov/
>>>>
>>>> --cheers, Chris
>>>>
>>>
>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46106 - 59.76N 152.09W
46076 - 59.498N 147.983W
Gulf of Alaska
46105 - 59.049N 152.224W
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Portlock Bank
46077 - 57.92N 154.254W
Kodiak
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46410 - 57.634N 143.804W
Kodiak, AK
46001 - 56.3N 148.021W
46085 - 55.855N 142.559W
46078 - 56.074N 152.572W
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I.1.25 NATIVE VILLAGE OF AFOGNAK

Native Village of Afognak To embrace, protect, develop, and enhance Alutiiq culture, protect our traditional use areas and encourage unity among the Alutiiq of the Kodiak Archipelago

January 22nd, 2010

Naval Facilities Engineering Command Northwest
ATTN: Mrs. Amy Burt- Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Department of the Navy:

On behalf of the Native Village of Afognak, a federally recognized tribe of the Kodiak Archipelago, whose mission is to protect our traditional use areas for our tribal members, we are writing in response to the Draft Environmental Impact Statement for Navy Training Activities in the Gulf of Alaska.

We would like to state that we do not support activities that may adversely affect the marine life in the proposed TMAA. Not only do our members rely on the ocean for subsistence, but also many make their living from the ocean.

In closing, we understand the importance of the Navy being prepared, but not at the expense of our marine life and our ocean environment. The Native Village of Afognak strongly supports the No Action Alternative.

Sincerely,

Melissa Borton
Tribal Administrator

115 Mill Bay Road, Suite 201 * Kodiak, AK 99615 * phone 907-486-6357 * fax 907-486-6529

I.1.26 NATIVE VILLAGE OF EYAK

Native Village of Eyak
P.O. Box 1388
Cordova, Alaska 99574
Ph (907) 424-7738 * Fax (907) 424-7739

January 22, 2010

Navy Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Attn: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager

Re: Comments on Gulf of Alaska Navy Training Activities EIS/OEIS

Dear Mrs. Burt,

I am writing on behalf of the Native Village of Eyak (NVE) to comment on the Gulf of Alaska Navy Training Activities EIS/OEIS. NVE is a federally recognized tribe with our traditional use area primarily in the Prince William Sound, the Copper River, and the Gulf of Alaska. We are based in Cordova, Alaska, where most of our members currently reside. Since Cordova is an isolated rural community accessible only by air or water, the cost of living is extremely high. For that reason, the majority of our people rely heavily on subsistence hunting, fishing, and gathering for their survival. Consequently, it is imperative that we manage the environment and aquatic resources in the most sustainable and judicious manner. The health and productivity of our environment is in direct correlation with the health and productivity of our community.

The Native Village of Eyak supports the mission of the Navy and the need for readiness training. However, we are very concerned about the North Pacific and Gulf of Alaska ecosystems and encourage the Navy to take every possible precaution to protect this environment. The Gulf of Alaska and Prince William Sound are very important parts of our traditional homeland. NVE deems it vitally important to ensure that the Navy training activities do not adversely impact our aquatic resources. NVE has several concerns in relation to the training activities.

The proposed activities would release a substantial amount of hazardous materials into the marine environment. While the draft EIS contains information on the hazardous content and the pounds of hazardous materials in the individual weapons expended under each alternative, the FEIS should include a table listing the specific content and amounts of the hazardous materials contained in the total expended materials under each alternative. The EIS states that releasing individual expended materials would not have a significant effect on the environment, but does not mention whether the cumulative effect of adding those contaminants into the marine environment was analyzed. Release of toxic substances in the water may be quickly diluted; however, some toxic substances have the potential to bioaccumulate in the food chain. Will the Navy be able to ensure that our subsistence foods will still be safe to eat?

The Gulf of Alaska supports habitats of threatened and endangered populations of marine mammals and salmon. These populations have already been impacted by the Exxon Valdez Oil Spill and have just recently begun to recover. Marine mammals and fish may be physiologically or behaviorally

I.1.27 NATURAL RESOURCE DEFENSE COUNCIL - 1

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

By Facsimile and Federal Express

January 4, 2010

Mrs. Amy Burt
Gulf of Alaska EIS/OIES Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Tel.: (360) 396-0924
Fax: (360) 396-0857

Re: *Petition for Extension of Public Comment Period on the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Alaska Navy Training Activities*

Dear Mrs. Burt:

On behalf of the Natural Resources Defense Council ("NRDC") and our 1.3 million members and activists, I am writing to petition the Navy for an extension of the public comment period on its Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Alaska Navy Training Activities ("GOA DEIS").

Notice of the comment period was published in the Federal Register on December 11, 2009. See 74 Fed. Reg. 65761. The public has been given only 45 days – over religious and New Years holidays – to submit comments by January 25, 2010 on over 900 pages of dense information. In light of the voluminous information provided by the Navy in justifying its plans and the extensive range of activity proposed, we respectfully request an extension to submit written comments of at least 30 days until February 25, 2010.

Such an extension is necessary to fully protect the public interest by giving citizens the time to thoroughly analyze the Navy's proposal and submit comments on the critical issues raised therein. The Navy's GOA DEIS raises many issues that the public has never been able to address before. Notably, some of the Navy's activities may take place in critical habitat for North Pacific right whales and may affect humpback whale feeding grounds and gray whale migration routes. The public, as well as the scientific

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Santa Monica, CA 90401
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community, needs sufficient time to identify, analyze, and comment on the scope of the proposed activities and on the Navy's analysis thereof.

The Navy appropriately extended its initial comment periods for the Northwest Training Range Complex DEIS and its Undersea Warfare Training Range DEIS, thus providing an additional 30 days for the public to comment due to the sheer size of, and the many issues raised in, those DEISs. We believe at the very least that a similar extension is warranted here. Therefore, we strongly urge you to grant this petition and extend the comment period. As always, we would welcome discussion with the Navy at any time.

Very truly yours,

Taryn G. Kiekow
Staff Attorney, Marine Mammal Protection Project
Natural Resources Defense Council

Cc: Michael Payne, Chief
Permits, Conservation and Education Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

Senator Mark Begich
Peterson Tower
510 L St, Suite 750
Anchorage, AK 99501-1954

Senator Lisa Murkowski
Peterson Tower
510 L Street, Suite 550
Anchorage, AK 99501-1954

Representative Don Young
Peterson Tower
510 L St, Suite 580
Anchorage, AK 99501-1954

I.1.28 NATURAL RESOURCE DEFENSE COUNCIL - 2

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

By Overnight Delivery

January 25, 2010

Mrs. Amy Burt
Gulf of Alaska EIS/OIES Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101
Tel.: (360) 396-0924
Fax: (360) 396-0857

Re: *Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Alaska Navy Training Activities*

Dear Mrs. Burt:

On behalf of the Natural Resources Defense Council ("NRDC"), Alaska Community Action on Toxics, Alaska Marine Conservation Council, Center for Biological Diversity, Cook Inletkeeper, International Fund for Animal Welfare, Juneau Group Sierra Club, Kodiak Audubon, North Gulf Oceanic Society, Oceana, Ocean Futures Society, Prince William Soundkeeper, Sierra Club Alaska Chapter, The Kodiak Gray Whale Project, Turning the Tides, and Jean-Michel Cousteau, and our millions of members and activists, thousands of whom reside in Alaska, we appreciate the opportunity to submit comments regarding the Navy's Draft Environmental Impact Statement/ Overseas Environmental Impact Statement ("DEIS") for its Training Activities in the Gulf of Alaska ("GOA"). *See* 74 Fed. Reg. 65761 (Dec. 11, 2009). Please include these comments and attachments in the administrative record.[1]

While our organizations recognize the Navy's important role in ensuring national security, we also value the security a clean and healthy environment provides. National security and environmental integrity are not mutually exclusive, and we encourage the Navy to train in a way that protects the valuable natural resources in the GOA. We are profoundly concerned, however, that Navy's DEIS falls short of ensuring such protection. As you are aware, the Navy's preferred alternative (Alternative 2) would

[1] We aware that comments may be submitted separately by government agencies, individual scientists, environmental organizations, and the public. All of these comments are hereby incorporated by reference.

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dramatically increase the amount of training in the Temporary Maritime Activity Area ("TMAA") in the GOA between April and October every year. The TMAA extends across 42,146 square nautical miles across the GOA south of Prince William Sound and east of Kodiak Island. The Navy plans to introduce – for the first time – extensive sonar training in the GOA.[2] Its preferred alternative would use many different sources of active sonar, totaling over 1,160 hours of sonar use every year. DEIS at 3.8-146. These training exercises would also employ a battery of other acoustic sources and explosives detonations in ocean surface and undersea areas, special use airspace, and training land areas. In addition, the Navy plans to use a Portable Undersea Tracking Range, add a second carrier strike group exercise and conduct sinking exercises in the TMAA. DEIS at ES-1.

The Navy also plans to abandon at least 352,000 pounds of spent material (both hazardous and non hazardous) in the TMAA every year, including 360 bombs, 66 missiles, 644 targets and pyrotechnics, 26,376 gunshells, 11,400 small caliber rounds, and 1,587 sonobuoys. Over 10,300 pounds of this expended material is hazardous. DEIS at ES-15 to 28; 3.2-28 to 34; 3.6-34.

These proposed training activities would pose significant risk to whales, fish, and other wildlife that depend on sound for breeding, feeding, navigating, and avoiding predators—in short, for their survival. Under Alternatives 1 and 2, the Navy would employ mid-frequency active sonar, which has been implicated in mass injuries and mortalities of whales around the globe.[3] The same technology is known to affect marine mammals in countless other ways, inducing panic responses, displacing animals,

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[2] The DEIS states that no active mid-frequency sonar is used in the GOA (or at least from exercises involving carrier-strike groups). DEIS at ES-11 (describing the no Action Alternative). While it may be true that scripted exercises during Northern Edge or other major events do not currently involve mid-frequency sonar, that does not mean that individual units do not use sonar opportunistically while in the area, or that sonar is not used for sustainment training, unit-level exercises, equipment testing or calibration, or other purposes. We request that the Navy review activity over a reasonable time period to establish an actual baseline for analysis.

In previous requests to the Navy NRDC asked the Pacific Fleet review its logs for active sonar use occurring in the GOA between June 1, 2004 and July 20, 2004 – which corresponded to an unusual mortality of beaked whales in the area – and indicate in its DEIS whether mid-frequency sonar was used. The Navy did review the 2004 event in Appendix F of the DEIS and concluded that "[t]here was no ASW component to the exercise…There were no events in the Alaska Shield/Northern Edge exercise that could have caused or been related to any of the strandings…" DEIS at F-27. As noted above, just because the exercises during Northern Edge did not involve mid-frequency sonar does not mean that individual units were not using sonar opportunistically or for other purposes. We request that the Navy disclose whether ANY sonar is or has been used in the GOA over a reasonable time period (at least as far back as 2004), including for sustainment training, unit-level exercises, equipment testing or calibration, or any other purpose.

[3] Military sonar generates intense sound that can induce a range of adverse effects in whales and other species – from significant behavioral changes to injury and death. The most widely reported and dramatic of these events are the mass strandings of beaked whales and other marine mammals that have been associated with military sonar use. A brief summary of the stranding record appears in Appendix B.

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and disrupting crucial behavior such as foraging. By the Navy's own estimates, sonar training exercises from its preferred alternative will result in more than 425,000 marine mammal "takes" (behavioral impacts, harassment, injury) every year – over 2.125 million takes during the course of the permit it must obtain under the Marine Mammal Protection Act. DEIS at 3.8-148. In all, the Navy expects to "take" more than 20 different species of marine mammals, including 7 endangered species, in the TMAA. DEIS at 3.8-1 to 4. The GOA training activities would also affect fisheries and essential fish habitat and release a large amount of hazardous and expended materials into the waters. *See* Appendices A and B for a detailed discussion of impacts.

The National Environmental Policy Act ("NEPA") requires the Navy to employ rigorous standards of environmental review, including a full explanation of potential impacts, a comprehensive analysis of all reasonable alternatives, a fair and objective accounting of cumulative impacts, and a thorough description of measures to mitigate harm.

Unfortunately, the DEIS released by the Navy falls far short of these mandates and fails to satisfy the Navy's legal obligations under NEPA. Before issuing a final EIS, the Navy must revise the environmental impacts, alternatives, cumulative impacts and mitigation analysis in the DEIS (described in detail in Appendix A). It must also fully address the considerable scientific record that has developed around sonar and whale injury and mortality, and adjust its acoustic impacts analysis and assessment model accordingly (discussed in Appendices B and C). A few additional concerns are highlighted below.

One of our primary concerns is the paucity of survey data necessary to estimate marine mammal density or distribution. Without these estimates, it is impossible to adequately evaluate the impacts on marine mammals or to estimate harm, as required by NEPA. Nor can the Navy support its environmental analysis and take estimates. A closely related concern is the Navy's failure to protect any area within the TMAA from sonar training activities. There is a general consensus among the scientific community that "[p]rotecting marine mammal habitat is…the most effective mitigation measure currently available" to reduce the harmful impacts of mid-frequency sonar on marine mammals.[4] Nonetheless, the DEIS does not even consider establishing any protection areas in the TMAA where sonar training would be limited or excluded.

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[4] See Letter from Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere to Nancy Sutley, Chair, Council on Environmental Quality dated Jan. 19, 2010, *available at* http://www.nrdc.org/media/docs/100119.pdf; see also Agardy, T., Aguilar Soto, N., Cañadas, A., Engel, M., Frantzis, A., Hatch, L., Hoyt, E., Kaschner, K., LaBrecque, E., Martin, V., Notarbartolo di Sciara, G., Pavan, G., Servidio, A., Smith, B., Wang, J., Weilgart, L., Wintle, B., and Wright, A. A global scientific workshop on spatio-temporal management of noise. Report of workshop held in Puerto Calero, Lanzarote, (June 4-6, 2007); ECS Working Group: Dolman, S., Aguilar Soto, N., Notabartolo di Sciara, G., Andre, M., Evans, P., Frisch, H., Gannier, A., Gordon, J., Jasny, M., Johnson, M., Papanicolopulu, I., Panigada, S., Tyack, P., and Wright, A. Technical report on effective mitigation for active sonar and beaked whales. Working group convened by European Cetacean Society, (2009); OSPAR Commission, Assessment of the environmental impact of underwater noise. OSPAR Biodiversity Series, (2009);

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Until sufficient information on the density and distribution of marine mammals is obtained – and any salient protection areas established – the Navy should not increase sonar training in the GOA. We recommend that the Navy: (1) obtain additional data on marine mammal density and distribution in the TMAA, (2) re-analyze its impacts analysis, take estimates, and alternatives and mitigation analysis accordingly, and (3) reissue its DEIS. Should the Navy proceed before obtaining sufficient density and distribution information, we believe the law requires the adoption of the No Action Alternative until sufficient information is obtained.

The Navy Has Not Taken a "Hard Look" Under NEPA

NEPA requires that the potential environmental impacts of any "major Federal actions significantly affecting the quality of the human environment" be considered through the preparation of an environmental impact statement ("EIS"). *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989); 42 U.S.C. § 4332. The fundamental purpose of an EIS is to compel decision-makers to take a "hard look" at a particular action – both at the environmental impacts it will have and at the alternatives and mitigation measures available to reduce those impacts – *before* a decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; *Baltimore Gas & Electric v. NRDC*, 462 U.S. 87, 97 (1983); *Robertson*, 490 U.S. at 349. While NEPA "does not commend the agency to favor an environmentally preferable course of action," an agency may only make a decision to proceed after taking a "hard look" at environmental consequences. *Sabine River Auth. v. Dep't of Interior*, 951 F.2d 669, 676 (5th Cir. 1992)(internal citations omitted). This "hard look" requires agencies to obtain high quality information and accurate scientific analysis. 40 C.F.R. § 1500.1(b).

It is impossible to characterize the DEIS as taking a "hard look" because of the Navy's failure to obtain information regarding marine mammal densities and distribution. The flaws stemming from this failure reverberate throughout the DEIS, most notably in the Navy's impacts analysis, take estimates and mitigation proposals.

The Navy Lacks Sufficient Information

NEPA requires agencies to ensure the "professional integrity, including scientific integrity" of material relied upon in an EIS. 40 C.F.R. § 1502.24. To that end, agencies must make every attempt to obtain and disclose data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained. 40 C.F.R. § 1502.22(a).

The Navy simply has not obtained the required information. The Navy is unable to establish densities for many marine mammal populations in the TMAA, including blue

Parsons, E.C.M., Dolman, S.J., Wright, A.J., Rose, N.A., and Burns, W.C.G. Navy sonar and cetaceans: just how much does the gun need to smoke before we act? Marine Pollution Bulletin 56: 1248-1257 (2008).

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whales, North Pacific right whales and sei whales – all of which are endangered. DEIS at 3.8-2. Nor is it able to estimate the density of harbor porpoises, which are particularly vulnerable to acoustic impacts. DEIS at 3.8-3. The Navy argues that blue whales, North Pacific right whales and sei whales are "too few in number to allow for quantitative analysis," but it cannot escape its responsibilities under NEPA simply by claiming that whales are "very rare." DEIS 3.8-2, 5, 9. The "rareness" and low abundance of those whales, if anything, should warrant additional monitoring (including acoustic and visual), safeguards and protections – particularly of North Pacific right whales, one of the most endangered species of whales on the planet. And although the DEIS claims that blue whales are "rare" in the GOA, a 2009 study presents new evidence indicating that as the northeastern Pacific population recovers from whaling, blue whales increasingly may be returning to former GOA feeding grounds. These whales appear to be part of the same stock that is seen off of California.[5]

The Navy further acknowledges that the existing information for other species and habitat in the GOA is extremely "limited" and "localized." DEIS at 3.8-9. For instance, with the exception of Rone et al. (2009), none of the surveys focused on the TMAA itself – most surveyed nearshore areas outside the TMAA. DEIS at 3.8-9. In addition, some of the surveys were designed to count species other than those targeted in the density estimate.[6] Recognizing the dearth of data, the Navy did fund a targeted 10-day marine mammal line-transect survey conducted by Rone et al. in April 2009 that yielded the most direct data available on fin whales and humpback whales in the TMAA.[7] But that survey – hampered by several "challenges" including "limited survey time, a large survey area, inclement weather, and the lack of arrival of sonobuoys"[8] – is inadequate to establish abundance and density estimates for most marine mammals in the TMAA or to identify important marine mammal habitat. Despite these challenges, however, the survey encountered an "unexpectedly large number" of sightings of marine mammals.[9] This suggests that the TMAA represents rich habitat for cetaceans, particularly in continental shelf and slope waters, that requires further study.

Having sufficient data is essential for the Navy to meet its responsibilities under NEPA. The Navy cannot issue a final EIS (nor can the National Marine Fisheries issue a Biological Opinion under the Endangered Species Act or an incidental take permit

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[5] See Calambokidis J, Barlow J, Ford JKB, Chandler TE, Douglas AB. 2009. Insights into the population structure of blue whales in the eastern North Pacific from recent sightings and photographic identification. Marine Mammal Science 25:816-832.

[6] For example, the Moore et al survey of gray whales was designed to measure pinnipeds. See Moore, S.E., K.M. Wynne, J. Clement-Kinney, and J.M. Grebmeier, 2007. Gray whale occurrence and forage southeast of Kodiak Island, Alaska. Marine Mammal Science 23(2):419–428.

[7] See Rone, B., A. Douglas, P. Clapham, A. Martinez, L. Morse and J. Calambokidis. 2009. Cruise Report for the April 2009 Gulf of Alaska Line-Transect Survey (GOALS) in the Navy Training Exercise Area. Report issued by National Marine Mammal Laboratory and Cascadia Research. Naval Postgraduate School Tech Report # NPS-OC-09-007.

[8] Id. at 15.

[9] Id.

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under the Marine Mammal Protection Act) without adequate information on densities and distributions of marine mammals in the TMAA. Until the Navy collects the necessary information, it may be significantly underestimating marine mammal densities and thereby affecting its impact analysis and take estimates. To meet its responsibilities under NEPA, Navy should sponsor a multi-year, multi-seasonal survey effort within the TMAA that can serve as a basis for both improved environmental assessment and mitigation. Based on the results of those surveys, the Navy may need to revise its alternative analysis and site at least some of its proposed exercises in lower value marine mammal habitat elsewhere in the GOA, or adopt the No-Action Alternative. Until then, the Navy's NEPA analysis remains arbitrary and capricious.

The Navy Fails to Consider Effective Mitigation

There is general consensus that protection areas – in which the use of mid-frequency sonar would not occur – represent the most effective means currently available to reduce the impacts of mid-frequency sonar on marine mammals.[10] The National Oceanic Atmospheric Administration ("NOAA") recently completed a review of the Navy's sonar mitigation. It concluded that "ongoing mitigation efforts, in our view, must do more" to address uncertainties and protect marine mammals.[11] NOAA emphasized the importance of habitat identification and avoidance, stating that "[p]rotecting important marine mammal habitat is generally recognized to be the most effective mitigation measure currently available."[12] Yet the Navy makes no provision whatsoever for protection areas in the TMAA.

Appendix A contains a detailed description of mitigation measures that the Navy can – and should – adopt. At a minimum, however, the Navy must assess the value of marine mammal habitat[13] both in the TMAA itself and the broader GOA, and protect any higher-value areas identified. We recognize that predictive habitat modeling to determine potential marine mammal hotspots is hindered by the lack of survey data in the TMAA, which is why additional surveys absolutely must be undertaken before the Navy issues a final EIS. The survey data can then be used to generate a predictive habitat model upon which appropriate mitigation can be based.

Already there exists important marine mammal habitat that can be readily identified. The TMAA is only 16 nautical miles west of critical habitat for the highly endangered North Pacific right whale (DEIS at 3.8- 22, 23) and directly adjacent to critical habitat

[10] Supra, note 4.

[11] See Letter from Jane Lubchenco, Under Secretary of Commerce for Oceans and Atmosphere to Nancy Sutley, Chair, Council on Environmental Quality dated Jan. 19, 2010, *available at* http://www.nrdc.org/media/docs/100119.pdf

[12] Id.

[13] NOAA has committed to conduct a series of workshops to learn more about marine mammal "hotspots," particularly through available predictive models. Based on the results of these workshops, NOAA will consider additional measures to reduce harm from sonar, in future rulemakings and authorizations under the Marine Mammal Protection Act.

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for Steller sea lions (DEIS 3.8-34). The North Pacific right whale is among the most endangered species of cetaceans in the world.[14] Mid-frequency sound below 140 dB has been shown to disrupt foraging in right whales and cause them to ascend rapidly to just below the surface where they face a significantly greater risk of ship strike.[15] At a minimum, the Navy should establish a sufficient buffer between these critical habitats and the TMAA. In addition, the Navy should protect feeding grounds for humpback whales and gray whale migratory routes.[16] The Navy should also protect areas of high bathymetric relief, where there are likely to be high concentrations of beaked whales and other deep diving species.

Conclusion

For the reasons set forth above and in greater detail in the Appendices below and attached critique by Dr. David Bain, we urge the Navy to satisfy its obligations under NEPA and other applicable laws. To that end, the Navy should conduct multi-year, multi-seasonal surveys to obtain adequate information on densities and distributions of marine mammals in the TMAA. These surveys would serve as a basis for predictive habitat modeling and protective mitigation. Once the Navy obtains additional data on marine mammal density and distribution, it should re-analyze its impacts analysis, take estimates and mitigation measures accordingly and reissue its DEIS. Until this additional information is obtained, the Navy should only consider the No Action Alternative.

Thank you for your consideration of our comments, and we welcome the opportunity to discuss this matter with you at any time.

Sincerely,

Taryn Kiekow
Staff Attorney

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[14] See, e.g., Committee on the Status of Endangered Wildlife in Canada (COSEWIC), COSEWIC Assessment and Update Status Report on the North Pacific Right Whale Eubalaena japonica in Canada (2004).

[15] See D.P. Nowacek, M.P. Johnson, and P.L. Tyack, North Atlantic Right Whales (Eubalaena glacialis) Ignore Ships but Respond to Alerting Stimuli, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences 227 (2004).

[16] Gray whales migrate through this area twice a year. While they usually maintain a distance of less than 2km to the shore, they are known to move further offshore south of Kodiak Island. Peak abundance is generally in April through May for the northbound migration, and November through December for the southbound migration. In addition, some groups of gray whales form resident feeding aggregations that maintain a presence in the GOA throughout the summer feeding season off of Kodiak Island, peaking in September through November. See Moore SE, Wynne KM, Kinney JC, Grebmeier JM, Gray whale occurrence and forage southeast of Kodiak Island, Alaska. Marine Mammal Science 23:419-428 (2007).

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APPENDIX A

THE NAVY'S DEIS IS FATALLY FLAWED AND FAILS TO COMPLY WITH THE BASIC REQUIREMENTS OF NEPA

As set forth below, the Navy's DEIS does not meet the rigorous standards set forth in the National Environmental Policy Act. We urge the Navy to reissue its EIS and substantially alter the approach it has taken thus far. The Navy's scope of review must be expanded, its alternatives analysis broadened, its mitigation plan significantly improved, and its impact assessment revised to reflect the scientific evidence of mid-frequency sonar's effects on marine life. These critical steps must be undertaken if the Navy's EIS is to comply with federal law.

I. Legal Framework: The National Environmental Policy Act

The National Environmental Policy Act of 1969 ("NEPA") "declares a broad national commitment to protecting and promoting environmental quality." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 348 (1989). NEPA establishes a national policy to "encourage productive and enjoyable harmony between man and his environment" and "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. In order to achieve its broad goals, NEPA mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [it]." 42 U.S.C. § 4332.

Central to NEPA is its requirement that, before any federal action that "*may* significantly degrade some human environmental factor" can be undertaken, agencies must prepare an EIS. *Steamboaters v. F.E.R.C.*, 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original). The requirement to prepare an EIS "serves NEPA's action-forcing purpose in two important respects." *Robertson*, 490 U.S. at 349. First, "the agency, in reaching its decision, will have available, and will *carefully consider, detailed information* concerning significant environmental impacts[,]" and second, "the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision." *Id.* (emphasis added). As the Supreme Court explained: "NEPA's instruction that all federal agencies comply with the impact statement requirement…'to the fullest extent possible' [cit. omit.] is neither accidental nor hyperbolic. Rather the phrase is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle." *Flint Ridge Development Co. v. Scenic Rivers Ass'n*, 426 U.S. 776, 787 (1976).

The fundamental purpose of an EIS is to force the decision-maker to take a "hard look" at a particular action – at the agency's need for it, at the environmental consequences it will have, and at more environmentally benign alternatives that may substitute for it – before the decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; *Baltimore Gas & Electric v. NRDC*, 462 U.S. 87, 97 (1983). This "hard look" requires agencies to

obtain high quality information and accurate scientific analysis. 40 C.F.R. § 1500.1(b). "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." *Klamath-Siskiyou Wilderness Center v. Bureau of Land Management*, 387 F.3d 989, 994 (9th Cir. 2004) (*quoting Neighbors of Cuddy Mountain v. United States Forest Service*, 137 F.3d 1372, 1380 (9th Cir. 1998)). The law is clear that the EIS must be a pre-decisional, objective, rigorous, and neutral document, not a work of advocacy to justify an outcome that has been foreordained.

In nearly every respect, the Navy's DEIS fails to meet the high standards of rigor and objectivity required under NEPA. The Navy has failed to conduct the "hard look" necessary to thoroughly examine the many environmental consequences of its proposed action.

II. The Navy Fails to Properly Analyze Impacts on Marine Mammals

The Navy's DEIS does not properly analyze the environmental impacts. Its analysis also substantially understates the potential effects of sonar on marine wildlife. For instance, the Navy fails to acknowledge risks posed to a wide range of marine species – including the highly endangered North Pacific right whale – from its training activities. The DEIS concludes that only one Dall's porpoise would suffer serious injury or die during the many hours of proposed sonar training. DEIS at 3.8-148. The Navy reaches this conclusion by excluding relevant information adverse to its interests, using approaches and methods that are unacceptable to the scientific community and ignoring entire categories of impacts. As discussed in detail in Appendix C and the attached critique by Dr. David Bain, the Navy's assessment of acoustic impacts is also highly problematic.

A. Acoustic Impacts on Marine Mammals

NEPA requires agencies to ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in EISs. 40 C.F.R. § 1502.24. To that end, they must make every attempt to obtain and disclose data necessary to their analysis. *See* 40 C.F.R. § 1502.22(a). Agencies are further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community." 40 C.F.R. §§ 1502.22(2), (4), 1502.24. Such requirements become acutely important in cases where, as here, so much about a program's impacts depend on newly emerging science.

In this case, the Navy's assessment of impacts is consistently undermined by its failure to meet these fundamental responsibilities of scientific integrity, methodology, investigation, and disclosure. As set forth in greater detail in Appendix C and the attached critique by Dr. Bain, the DEIS disregards a great deal of relevant information adverse to the Navy's interests, uses approaches and methods that would not be

acceptable to the scientific community, and ignores whole categories of impacts. In short, it leaves the public with an analysis of harm—behavioral, auditory, and physiological—that is at odds with established scientific authority and practice. The Navy must revise its acoustic impacts analysis, including its thresholds and risk function, to comply with NEPA.

B. Other Impacts on Marine Mammals

The activities proposed for the GOA may have impacts that are not limited to the effects of ocean noise. Unfortunately, the Navy's analysis of these other impacts is cursory and inadequate.

First, the Navy fails to adequately assess the impact of stress on marine mammals, a serious problem for animals exposed even to moderate levels of sound for extended periods.[17] DEIS at 3.8-72 to 73. As the Navy has previously observed, stress from ocean noise—alone or in combination with other stressors, such as biotoxins—may weaken a cetacean's immune system, making it "more vulnerable to parasites and diseases that normally would not be fatal."[18] Moreover, according to studies on terrestrial mammals, chronic noise can interfere with brain development, increase the risk of myocardial infarctions, depress reproductive rates, and cause malformations and other defects in young—all at moderate levels of exposure.[19] Because physiological stress responses are highly conservative across species, it is reasonable to assume that marine mammals would be subject to the same effects. Yet despite the potential for stress in marine mammals and the significant consequences that can flow from it, the Navy unjustifiably assumes that such effects would be minimal.

Second, the Navy fails to consider the risk of ship strikes with large cetaceans, as exacerbated by the use of active acoustics. DEIS at 3.8.3 and 3.8.4 generally. For example, right whales have been shown to engage in dramatic surfacing behavior, increasing their vulnerability to ship strikes, on exposure to mid-frequency alarms

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[17] See National Research Council, Ocean Noise and Marine Mammals.

[18] Navy, Hawaii Range Complex Draft Environmental Impact Statement/ Overseas Environmental Impact Statement at 5-19 to 5-20 (2007). Additional evidence relevant to the problem of stress in marine mammals is summarized in A.J. Wright, N. Aguilar Soto, A.L. Baldwin, M. Bateson, C.M. Beale, C.Clark, T. Deak, E.F. Edwards, A. Fernández, A. Godinho, L. Hatch, A. Kakuschke, D. Lusseau, D. Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, Do marine mammals experience stress related to anthropogenic noise?, 20 International Journal of Comparative Psychology, 274-316 (2007); see also T.A. Romano, M.J. Keogh, C. Kelly, P. Feng, L. Berk, C.E. Schlundt, D.A. Carder, and J.J. Finneran, Anthropogenic Sound and Marine Mammal Health: Measures of the Nervous and Immune Systems Before and After Intense Sound Exposure, 61 Canadian Journal of Fisheries and Aquatic Sciences 1124, 1130-31 (2004).

[19] See, e.g., E.F. Chang and M.M. Merzenich, Environmental Noise Retards Auditory Cortical Development, 300 Science 498 (2003) (rats); S.N. Willich, K. Wegscheider, M. Stallmann, and T. Keil, Noise Burden and the Risk of Myocardial Infarction, European Heart Journal (2005) (Nov. 24, 2005) (humans); F.H. Harrington and A.M. Veitch, Calving Success of Woodland Caribou Exposed to Low-Level Jet Fighter Overflights, 45 Arctic vol. 213 (1992) (caribou).

above 133 dB re 1 μPa (SPL)—a level of sound that can occur many tens of miles away from the sonar systems slated for the GOA.[20] DEIS 3.8-96. A conservative approach would assume that other large whales (which, as the DEIS repeatedly notes, are already highly susceptible to vessel collisions) are subject to the same hazard. For instance, fin whales also occur within the GOA and appear to be particularly vulnerable to ship strikes.[21] Indeed, in a recent 16-year survey of ship strikes in Washington State waters, fin whales "had the highest incidence of ante-mortem ship strike" of the seven species of large whales examined.[22] Even the DEIS finds that "[w]orldwide historical records indicate fin whales were the most likely species to be struck by vessels." DEIS at 3.8-16. But the DEIS then dismisses the effects of vessel strikes on fin whales based solely on an "unpublished preliminary summary of opportunistically collected reports." DEIS at 3.8-16. The DEIS fails to discuss even the potential for mortality or injury to fin whales from ship strikes. NEPA's hard look requires the Navy to undertake a far more detailed examination of this potentially significant source of mortality for fin whales under even the No Action Alternative, as well as from the increase in vessel traffic that would occur under Alternatives 1 and 2.

Third, in the course of its training activities, the Navy would release a host of toxic chemicals, hazardous materials and waste into the marine environment that could pose a threat to marine mammals over the life of the range. Under its preferred alternative, the Navy also plans to abandon at least 352,000 pounds of spent material (both hazardous and non hazardous) in GOA waters every year, including 360 bombs, 66 missiles, 644 targets and pyrotechnics, 26,376 gunshells, 11,400 small caliber rounds, and 1,587 sonobuoys. Over 10,300 pounds of this expended material is hazardous. DEIS at ES-15 to 28; 3.2-28 to 34; 3.6-34. Nonetheless, the DEIS fails to adequately consider the cumulative impacts of these toxins on marine mammals from past, current, and proposed training exercises. Careful study is needed into the way toxins might disperse and circulate within the area and how they may affect marine wildlife. The Navy's assumption that expended materials and toxics would dissipate or become buried in sediment leads to a blithe conclusion that releases of hazardous material would have no adverse effects. Given the amount of both hazardous and nonhazardous materials, this discussion is inadequate under NEPA.

Fourth, the Navy does not adequately analyze the potential for and impact of oil spills. As evidenced by the 1989 *ExxonValdez* oil spill, there is a significant existing risk of an oil spill in the GOA. This risk is exacerbated by increasing the tempo and intensity of Navy training, which will involve more vessels, more transits, and longer missions

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[20] Nowacek et al., North Atlantic Right Whales, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences at 227. The North Pacific right whale is an endangered species closely related to the studied North Atlantic right whale.

[21] See http://www.cascadiaresearch.org/WestportBm20090113.htm

[22] Annie B. Douglas, Incidence of ship strikes of large whales in Washington State, Journal of the Marine Biological Association of the United Kingdom, 2008, 88(6), 1121–1132, *available at* http://www.cascadiaresearch.org/reports/Douglas%20et%20al%202008-Incidence%20of%20ship%20strikes%20of%20large%20whales.pdf.

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throughout the TMAA.[23] In light of this history and the extraordinarily valuable and sensitive natural resources that occur in the GOA, the Navy must evaluate its spill response plan and station salvage equipment accordingly.

Finally, the Navy's analysis cannot be limited only to direct effects, *i.e.*, effects that occur at the same time and place as the training exercises that would be authorized. 40 C.F.R. § 1508.8(a). It must also take into account the activity's indirect effects, which, though reasonably foreseeable (as the DEIS acknowledges), may occur later in time or are further removed. 40 C.F.R. § 1508.8(b). This requirement is particularly critical in the present case given the potential for sonar exercises to cause significant long-term impacts not clearly observable in the short or immediate term (a serious problem, as the National Research Council has observed).[24] Thus, for example, the Navy must not only evaluate the potential for mother-calf separation but also the potential for indirect effects—on survivability—that might arise from that transient change. 40 C.F.R. § 1502.16(b).

Without further consideration of these impacts, and mitigation and alternatives developed to address those impacts, the DEIS does not pass NEPA muster.

C. Other Impacts on Wildlife

The same concerns that apply to marine mammals – such as injury or death from mid-frequency active sonar, collisions with ships, bioaccumulation of toxins, and stress – apply to sea turtles, birds and other biota as well. The Navy must adequately evaluate impacts and propose mitigation for each category of harm. 40 C.F.R. §§ 1502.14, 1502.16.

The effects of mid-frequency active sonar on sea turtles are glossed over on the grounds that their best hearing range appears to occur below 1 kHz. DEIS at 3.7-5 to 6. But having their best acoustic sensitivity in this range does not mean that sea turtles are oblivious to noise at higher frequencies. As the Navy admits, juvenile and adult loggerheads hear sounds all the way up to 1 kHz, suggesting that they continue to detect sounds at higher levels, including potentially the lower end of the intense mid-frequency sources intended for the range. Furthermore, they have been shown to engage in startle and escape behavior – behavior that may involve diving and surfacing – and to experience heightened stress in response to vessel noise. Thus, a more rigorous analysis of potential impacts of mid-frequency sonar is necessary.

[23] We note that the Navy should include in its analysis and disclose to the public a chart that shows how its operating areas overlap shipping lanes, recommended routes, and Areas to Be Avoided as an indication of the potential for conflict with other vessels.

[24] "Even transient behavioral changes have the potential to separate mother-offspring pairs and lead to death of the young, although it has been difficult to confirm the death of the young." National Research Council, Ocean Noise and Marine Mammals at 96.

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Nor is the Navy's reasoning with regard to seabirds any more sound. Although the Navy acknowledges that "little is known about the general hearing or underwater hearing capabilities of birds" (DEIS at 3.9-7), it then inexplicably concludes that because ther is "no evidence that birds utilize sound underwater to forage or locate prey…[any] effects were unlikely". DEIS at 3.9-8. Such reasoning does not bear up to any serious scrutiny. Seabirds occur in the GOA, dive underwater (in some cases to depths of hundreds of feet), and are sensitive to same frequencies used by the Navy's acoustic sources. They must receive further analysis in the DEIS, both for the direct impacts they may suffer on exposure to the Navy's acoustic sources and for the impacts they may incur indirectly through depletion of prey species and hard bottom habitat. 40 C.F.R. § 1502.16(a), (b).

Without further consideration of these species, the Navy's review is incomplete.

III. The Navy Failed to Analyze the Impacts on Fish and Fisheries

The GOA is a highly productive region for fish populations. It supports some of the most productive and commercially important fisheries in the United States (including salmon, halibut, crab, shrimp, pollock, Pacific cod, and mackerel fisheries). The TMAA supports six species of salmonoids – five of which are designated as "endangered" or "threatened" (Chinook, coho, chum, pink, and sockeye salmon and steelhead trout). The TMAA also supports hundreds of other species, including Pacific halibut, groundfish (walleye pollock, Pacific, sablefish, rockfishes, rex sole, Dover sole, arrowtooth flounder, etc.), dungeness crab, and scallops. In addition, 68 fish and invertebrate species with federally designated essential fish habitat occur in the TMAA.

In its DEIS, the Navy fails to acknowledge the impacts of anthropogenic sound on fish, fisheries and essential fish habitat. On the one hand, the Navy claims that there is a "dearth of empirical information on the effects of exposure to sound, [especially] sonar…." DEIS at 3.6-43. Yet on the other hand it ignores a wide-range of scientific studies on the impacts of noise on fish, claiming the studies "would be very difficult to extrapolate" and "focused on behavior of individuals of a few species and it is unlikely their responses are representative of the wide diversity of other marine fish species." DEIS at 3.6-27, 43. The Navy is therefore able to conclude — without basis —that noise from its training activities – including both mid-frequency active sonar and underwater detonations – would have no significant impact on fish, fisheries and essential fish habitat.

The Navy's conclusion not only contradicts the available scientific literature on noise but also ignores the valid concerns of fishermen. For example, fisherman concerned with declining catch rates wrote letters opposing the Navy's proposal to build an Undersea Warfare Training Range off the coast of North Carolina in 2005. Those fishermen reported sharp declines in catch rates in the vicinity of Navy exercises.

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A. Decline in Catch Rates

For years, fisheries in various parts of the world have complained about declines in their catch after intense acoustic activities (including naval exercises) moved into the area, suggesting that noise is seriously altering the behavior of some commercial species.[25] A group of Norwegian scientists attempted to document these declines in a Barents Sea fishery and found that catch rates of haddock and cod (the latter known for its particular sensitivity to low-frequency sound) plummeted in the vicinity of an airgun survey across a 1600-square-mile area. In another experiment, catch rates of rockfish were similarly shown to decline.[26] Drops in catch rates in these experiments range from 40 to 80 percent.[27] A variety of other species, herring, zebrafish, pink snapper, and juvenile Atlantic salmon, have been observed to react to various noise sources with acute alarm.[28]

In their comments on the Navy's Draft Environmental Impact Statement for the proposed Undersea Warfare Training Range off the coast of North Carolina, several fishermen and groups of fishermen independently reported witnessing sharp declines in catch rates of various species when in the vicinity of Navy exercises.[29] These reports are also indicative of behavioral changes –such as a spatial redistribution of fish within the water column – that could similarly affect the fisheries in the GOA.

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[25] See "'Noisy' Royal Navy Sonar Blamed for Falling Catches," Western Morning News, Apr. 22, 2002 (sonar off the U.K.); Percy J. Hayne, President of Gulf Nova Scotia Fleet Planning Board, "Coexistence of the Fishery & Petroleum Industries," www.elements.nb.ca/theme/fuels/percy/hayne.htm (accessed May 15, 2005) (airguns off Cape Breton); R.D. McCauley, J. Fewtrell, A.J. Duncan, C. Jenner, M.-N. Jenner, J.D. Penrose, R.I.T. Prince, A. Adhitya, J. Murdoch, and K. McCabe, Marine Seismic Surveys: Analysis and Propagation of Air-Gun Signals, and Effects of Air-Gun Exposure on Humpback Whales, Sea Turtles, Fishes, and Squid 185 (2000) (airguns in general).

[26] A. Engås, S. Løkkeborg, E. Ona, and A.V. Soldal, Effects of Seismic Shooting on Local Abundance and Catch Rates of Cod (Gadus morhua) and Haddock (Melanogrammus aeglefinus), 53 Canadian Journal of Fisheries and Aquatic Sciences 2238-49 (1996); J.R. Skalski, W.H. Pearson, and C.I. Malme, Effects of Sound from a Geophysical Survey Device on Catch-Per-Unit-Effort in a Hook-and-Line Fishery for Rockfish (Sebastes spp.), 49 Canadian Journal of Fisheries and Aquatic Sciences 1357-65 (1992). See also S. Løkkeborg and A.V. Soldal, The Influence of Seismic Exploration with Airguns on Cod (Gadus morhua) Behaviour and Catch Rates, 196 ICES Marine Science Symposium 62-67 (1993).

[27] Id.

[28] See J.H.S. Blaxter and R.S. Batty, The Development of Startle Responses in Herring Larvae, 65 Journal of the Marine Biological Association of the U.K. 737-50 (1985); F.R. Knudsen, P.S. Enger, and O. Sand, Awareness Reactions and Avoidance Responses to Sound in Juvenile Atlantic Salmon, Salmo salar L., 40 Journal of Fish Biology 523-34 (1992); McCauley et al., Marine Seismic Surveys at 126-61.

[29] See comments compiled by the Navy and posted on the Undersea Warfare Training Range EIS site, *available at* http://www.projects.earthtech.com/USWTR (e.g., comments of S. Draughon, S. Fromer, L. and F. Gromadzki, D. Pendergrass, and North Carolina Watermen United).

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B. Permanent Injury and Mortality

The Navy's conclusion that underwater noise will result in only "minimal harm" to fish ignores the scientific literature. A number of studies, including one on non-impulsive noise, show that intense sound can kill eggs, larvae, and fry outright or retard their growth in ways that may hinder their survival later.[30] Significant mortality for fish eggs has been shown to occur at distances of 5 meters from an airgun source; mortality rates approaching 50 percent affected yolksac larvae at distances of 2 to 3 meters.[31] With respect to mid-frequency sonar, the Navy itself has noted that "some sonar levels have been shown [in Norwegian studies] to be powerful enough to cause injury to particular size classes of juvenile herring from the water's surface to the seafloor."[32] Also, larvae in at least some species are known to use sound in selecting and orienting toward settlement sites.[33] Acoustic disruption at that stage of development could have significant consequences.[34] Although the Navy acknowledges that eggs and larvae may be more susceptible to sound, it caveats that acknowledgement with the excuse that "more well-controlled studies are needed." DEIS at 3.6-43. However, federal law does not allow the Navy to ignore the valid scientific studies that have already been conducted simply because they are contrary to its interest.

As the Navy is aware after recently completing consultation with both NMFS (for salmon) and the U.S. Fish and Wildlife Service (for bull trout) over its Explosive Ordinance Disposal ("EOD") training exercises in Puget Sound, underwater explosions are responsible for high direct mortality to fish species present in the area. Indeed, the underwater detonation of just five pounds of plastic explosives has been observed to kill over 5,000 fish with swim bladders, with more accurate estimates ranging as high as 20,000 fish. There are a variety of live-fire training exercises, some of which involve underwater explosions of torpedoes and other ordnance that will take place in the GOA. Given the variety of fish and fisheries inhabiting these waters, the Navy's failure to analyze these effects in significant detail is stunning.

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[30] See, e.g., C. Booman, J. Dalen, H. Leivestad, A. Levsen, T. van der Meeren, and K. Toklum, Effecter av luftkanonskyting på egg, larver og yngel (Effects from Airgun Shooting on Eggs, Larvae, and Fry), 3 Fisken og Havet 1-83 (1996) (Norwegian with English summary); J. Dalen and G.M. Knutsen, Scaring Effects on Fish and Harmful Effects on Eggs, Larvae and Fry by Offshore Seismic Explorations, in H.M. Merklinger, Progress in Underwater Acoustics 93-102 (1987); A. Banner and M. Hyatt, Effects of Noise on Eggs and Larvae of Two Estuarine Fishes, 1 Transactions of the American Fisheries Society 134-36 (1973); L.P. Kostyuchenko, Effect of Elastic Waves Generated in Marine Seismic Prospecting on Fish Eggs on the Black Sea, 9 Hydrobiology Journal 45-48 (1973).

[31] Booman et al., Effecter av luftkanonskyting på egg, larver og yngel at 1-83.

[32] Navy, Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for the Southern California Range Complex 3.7-66 to 3.7-67 (2008). In the GOA, the Navy would operate sonar at higher levels than those used in the Norwegian studies.

[33] S.D. Simpson, M. Meekan, J. Montgomery, R. McCauley, R., and A. Jeffs, Homeward Sound, 308 Science 221 (2005).

[34] Popper, Effects of Anthropogenic Sounds at 27.

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C. Hearing Loss

One series of recent studies showed that passing airguns can severely damage the hair cells of fish (the organs at the root of audition) either by literally ripping them from their base in the ear or by causing them to "explode."[35] Fish, unlike mammals, are thought to regenerate hair cells, but the pink snapper in these studies did not appear to recover within approximately two months after exposure, leading researchers to conclude that the damage was permanent.[36] It is not clear which elements of the sound wave contributed to the injury, or whether repetitive exposures at low amplitudes or a few exposures at higher pressures, or both, were responsible.[37] As with marine mammals, sound has also been shown to induce temporary hearing loss in fish. Even at fairly moderate levels, noise from outboard motor engines is capable of temporarily deafening some species of fish, and other sounds have been shown to affect the short-term hearing of a number of other species, including sunfish and tilapia.[38] For any fish that is dependent on sound for predator avoidance and other key functions, even a temporary loss of hearing (let alone the virtually permanent damage seen in snapper) will substantially diminish its chance of survival.[39]

D. Breeding Behavior

NMFS has observed that the use of mid-frequency sonar could affect the breeding behavior of certain species, causing them, for example, to cease their spawning choruses, much as certain echolocation signals do.[40] The repetitive use of sonar and other active acoustics could thus have significant adverse behavioral effects on some species of fish and those who depend on them.

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[35] R. McCauley, J. Fewtrell, and A.N. Popper, High Intensity Anthropogenic Sound Damages Fish Ears, 113 Journal of the Acoustical Society of America 640 (2003).

[36] Id. at 641 (some fish in the experimental group sacrificed and examined 58 days after exposure).

[37] Id.

[38] A.R. Scholik and H.Y. Yan, Effects of Boat Engine Noise on the Auditory Sensitivity of the Fathead Minnow, Pimephales promelas, 63 Environmental Biology of Fishes 203-09 (2002); A.R. Scholik and H.Y. Yan, The Effects of Noise on the Auditory Sensitivity of the Bluegill Sunfish, Lepomis macrochirus, 133 Comparative Biochemisty and Physiology Part A at 43-52 (2002); M.E. Smith, A.S. Kane, & A.N. Popper, Noise-Induced Stress Response and Hearing Loss in Goldfish (Carassius auratus), 207 Journal of Experimental Biology 427-35 (2003); Popper, Effects of Anthropogenic Sounds at 28.

[39] See Popper, Effects of Anthropogenic Sounds at 29; McCauley et al., High Intensity Anthropogenic Sound Damages Fish Ears, at 641.

[40] Letter from Miles M. Croom, NMFS Southeast Regional Office, to Keith Jenkins, Navy (Jan. 31, 2006); see also J.J. Luczkovich, "Potential Impacts of the U.S. Navy's Proposed Undersea Warfare Training Range on Fishes" (2006) (presentation to Navy).

In sum, the Navy arbitrarily dismisses the potential for adverse impacts on fish. The Navy also capriciously dismisses the notion that fisheries in the area would suffer economic loss, even though – judging by the comments from North Carolina fishermen in 2005 – its training activities appear to have disrupted fishing in the past. Just like the training proposed in North Carolina, the available evidence here underscores the need for a more serious and informed analysis than the Navy currently provides. To comply with the requirements of NEPA, the Navy should rigorously analyze the potential for behavioral, auditory, and physiological impacts on fish, including the potential for population-level effects, using models of fish distribution and population structure and conservatively estimating areas of impact from the available literature. 40 C.F.R. § 1502.22. The Navy must also meaningfully assess the economic consequences of reduced catch rates on commercial and recreational fisheries (as well as on marine mammal foraging) in the GOA. It should also consider avoiding essential fish habitat, spawning grounds and other areas of important habitat for fish species, especially hearing specialists. Notably, as with marine mammals, the Navy does not consider exclusion of important fish habitat or fisheries in the TMAA.

IV. The Navy's Proposed Mitigation Measures Fail to Protect Marine Wildlife

To comply with NEPA, an agency must discuss measures designed to mitigate its project's impact on the environment. *See* 40 C.F.R. § 1502.14(f). There is a large and growing set of options for the mitigation of noise impacts to marine mammals and other marine life, some of which have been imposed by foreign navies[41]—and by the Navy itself, in other contexts—to limit harm from high-intensity sonar exercises. Yet here the Navy does little more than set forth an abbreviated set of measures, dismissing effective measures out of hand.

All of the mitigation that the Navy has proposed for sonar impacts boils down to the following: a very small safety zone around the sonar source, maintained primarily with visual monitoring by personnel with other responsibilities, with aid from shipboard passive monitoring when personnel are already using such technology. Under the proposed scheme, operators would power-down the system if a marine mammal is detected within 1,000 yards and shut-down the system if a marine mammal is detected within 200 yards. DEIS at 5-8 to 13.

This mitigation scheme disregards the best available science on the significant limits of visual monitoring. Visual detection rates for marine mammals generally approach only 5 percent. Moreover, the species perhaps most vulnerable to sonar-related injuries, beaked whales, are among the most difficult to detect because of their small size and diving behavior. It has been estimated that in anything stronger than a light breeze, only one in fifty beaked whales surfacing in the direct track line of a ship would be

[41] See S.J. Dolman, C.R. Weir, and M. Jasny, Comparative Review of Marine Mammal Guidance Implemented during Naval Exercises, __ Marine Pollution Bulletin __ (Dec. 12, 2008).

sighted; as the distance approaches 1 kilometer, that number drops to zero.[42] Right whales are also notoriously hard to detect, and the Navy plans to train next to critical habitat for the highly endangered North Pacific right whale. Right whales are uniquely vulnerable to ship strikes because they often hover on or near the surface of the water. Due to their dark coloration and lack of a dorsal fin, however, they are difficult to detect. The Navy's reliance on visual observation as the mainstay of its mitigation plan is therefore profoundly misplaced.

Further, the Navy's assurances that it will consider when planning exercises, several conditions that contribute to marine mammal stranding events provides no reassurance. Among the conditions the Navy will "consider" include: (1) areas of 1,000 m depth near a shoreline where there is a rapid change in bathymetry; (2) multiple ships or submarines operating sonar; (3) chokepoints and embayments; and (4) the historical presence of strong surface ducting conditions. DEIS at 5-12 to 13. While we applaud the Navy for recognizing these conditions of concern, NEPA requires more. The Navy must impose concrete mitigation measures rather than rhetorical issues of concern.

The Navy's ineffective mitigation measures are all the more remarkable given its adoption of more protective measures during previous training. For example, the Atlantic Fleet has repeatedly sited exercises beyond the continental shelf and Gulf Stream, relocated exercises out of important habitat and to avoid certain species, and used a technique called "simulated geography" to avoid canyons and near-shore areas on at least three of its major ranges. It has also restricted sonar use at night when marine mammals are harder to detect, as well as minimized the use of sonar from multiple sources at the same time.[43]

In this light, the Navy's claims that it cannot implement more protective mitigation measures ring false. DEIS at 5-28 to 41. Although the Navy goes to some pain to describe "alternative mitigation measures considered but eliminated" —primarily for "training effectiveness" reasons—its previous adoption of the same measures belies its argument. Clearly the Navy has done more to mitigate the harmful effects of sonar in previous exercises than what it proposes for the GOA. It can, and must, do more to mitigate the harm on marine wildlife.

A. Protection Zones

As discussed above, there is scientific consensus that geographic mitigation represents the most effective means currently available to reduce the impacts of mid-frequency

[42] J. Barlow and R. Gisiner, Mitigating, Monitoring, and Assessing the Effects of Anthropogenic Noise on Beaked Whales, 7 Journal of Cetacean Research and Management 239-249 (2006).

[43] Final Comprehensive Overseas Environmental Assessment for Major Atlantic Fleet Training Exercises February 2006, Prepared for United States Fleet Forces Command in accordance with Chief of Naval Operations Instruction 5090.1B pursuant to Executive Order 12114; *See also* Atlantic Fleet Exercises Using Mid-Frequency Sonar Mitigation Chart.

sonar on marine mammals.[44] The Navy should obtain additional data on marine mammal density and distribution in the TMAA, which would serve as a basis for predictive habitat modeling. Based on that additional information, the Navy should consider adopting protection zones in the GOA where sonar activity will be banned.

B. Mitigation of Navy Debris and Expended Material

The DEIS fails to set forth any mitigation measures concerning the massive amount of discarded debris and expended materials associated with the increased training in the GOA. The Navy claims that ocean currents will rapidly disperse the expended materials and thus no mitigation is required. "In NEPA's demand that an agency prepare a detailed statement on 'any adverse environmental effects which cannot be avoided should the proposal be implemented,' is an understanding that the EIS will discuss the extent to which adverse effects can be avoided." *Robertson*, 490 U.S. at 352-53. The Navy's "all-or-nothing approach" is not a sufficient discussion of how the adverse impacts of expended material can be avoided. By failing to explore mitigation measures for expended materials, the Navy does not even attempt to avoid, minimize, rectify, reduce, or compensate for its dumping of debris – all of which are options included in the CEQ regulation's definition of "mitigation." 40 C.F.R. § 1508.20.

C. Other Mitigation Measures

In addition to considering protection zones and mitigation for expended materials, the Navy should adopt the following measures:

1) Seasonal avoidance of marine mammal feeding grounds, calving grounds, and migration corridors;

2) Avoidance of, or extra protections in, marine protected areas;

3) Avoidance of bathymetry likely to be associated with high-value habitat for species of particular concern, including submarine canyons and large seamounts, or bathymetry whose use poses higher risk to marine species;

4) Avoidance of fronts and other major oceanographic features, such as areas with marked differentials in sea surface temperatures, which have the potential to attract offshore concentration of animals, including beaked whales;[45]

5) Avoidance of areas with higher modeled takes or with high-value habitat for particular species;

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[44] Supra, note 4.

[45] See, e.g., Carretta et al., U.S. Pacific Marine Mammal Stock Assessments: 2007 at 142 (reporting that "Baird's beaked whales have been seen primarily along the continental slope from late spring to early fall.").

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6) Concentration of exercises to the maximum extent practicable in abyssal waters and in surveyed offshore habitat of low value to species;

7) Use of sonar and other active acoustic systems at the lowest practicable source level, with clear standards and reporting requirements for different testing and training scenarios;

8) Expansion of the marine species "safety zone" to a 4km shutdown, reflecting international best practice, or 2 km, reflecting the standard prescribed by the California Coastal Commission;[46]

9) Suspension of relocation of exercises when beaked whales or significant aggregations of other species are detected by any means within the orbit circle of an aerial monitor or near the vicinity of an exercise;

10) Use of simulated geography (and other work-arounds) to reduce or eliminate chokepoint exercises in near-coastal environments, particularly within canyons and channels, and use of other important habitat;

11) Avoidance or reduction of training during months with historically significant surface ducting conditions, and use of power-downs during significant surface ducting conditions at other times;

12) Use of additional power-downs when significant surface ducting conditions coincide with other conditions that elevate risk, such as during exercises involving the use of multiple systems or in beaked whale habitat;

13) Planning of ship tracks to avoid embayments and provide escape routes for marine animals;

14) Suspension or postponement of chokepoint exercises during surface ducting conditions and scheduling of such exercises during daylight hours;

15) Use of dedicated aerial monitors during chokepoint exercises, major exercises, and near-coastal exercises;

16) Use of dedicated passive acoustic monitoring to detect vocalizing species, through established and portable range instrumentation and the use of hydrophone arrays off instrumented ranges;

17) Modification of sonobuoys for passive acoustic detection of vocalizing species;

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[46] California Coastal Commission, Adopted Staff Recommendation on Consistency Determination CD-08606 (2007); Approved Letter from M. Delaplaine, California Coastal Commission, to Rear Adm. Len Hearing, Navy (Jan. 11, 2007).

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18) Suspension or reduction of exercises outside daylight hours and during periods of low visibility;

19) Use of aerial surveys and ship-based surveys before, during, and after major exercises;

20) Use of all available range assets for marine mammal monitoring;

21) Use of third-party monitors for marine mammal detection;

22) Establishment of long-term research, to be conducted through an independent agent, on the distribution, abundance, and population structuring of protected species in the GOA, with the goal of supporting adaptive geographic avoidance of high-value habitat. Notably, additional critical habitat is likely to be identified in the GOA, and research should be undertaken to identify this critical habitat;

23) Application of mitigation prescribed by state regulators, by the courts, by other navies or research centers, or by the U.S. Navy in the past or in other contexts;

24) Avoidance of fish spawning grounds and of important habitat for fish species potentially vulnerable to significant behavioral change, such as wide-scale displacement within the water column or changes in breeding behavior;

25) Evaluating before each major exercise whether reductions in sonar use are possible, given the readiness status of the strike groups involved;

26) Dedicated research and development of technology to reduce impacts of active acoustic sources on marine mammals;

27) Establishment of a plan and a timetable for maximizing synthetic training in order to reduce the use of active sonar training;

28) Prescription of specific mitigation requirements for individual classes (or sub-classes) of testing and training activities, in order to maximize mitigation given varying sets of operational needs; and

29) Timely, regular reporting to NOAA, state coastal management authorities, and the public to describe and verify use of mitigation measures during testing and training activities.

Consideration of these measures is minimally necessary to satisfy the requirements of NEPA, and we note that similar or additional measures may be required under the Marine Mammal Protection Act, Endangered Species Act, and other statutes.

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V. The Navy Fails to Properly Analyze Cumulative Impacts

In order to satisfy NEPA, an EIS must include a "full and fair discussion of significant environmental impacts." 40 C.F.R. § 1502.1. It is not enough, for purposes of this discussion, to consider the proposed action in isolation, divorced from other public and private activities that impinge on the same resource; rather, it is incumbent on the Navy to assess cumulative impacts as well, including the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future significant actions." *Id.* § 1508.7. A meaningful cumulative impact analysis must identify (1) the area in which the effects of the proposed project will be felt; (2) the impacts that are expected in that area from the proposed project; (3) other actions—past, present, proposed, and reasonably foreseeable—that have had or are expected to have impacts in the same area; (4) the impacts or expected impacts from these other actions; and (5) the overall impact that can be expected if the individual impacts are allowed to accumulate. *Grand Canyon Trust v. FAA*, 290 F.3d 339, 345 (D.C. Cir. 2002) (quotation and citation omitted). The Navy "cannot treat the identified environmental concern in a vacuum." *TOMAC v. Norton*, 433 F.3d 852, 863 (D.C. Cir. 2006) (*quoting Grand Canyon Trust*, 290 F.3d at 345).

The Navy's cumulative impact analysis fails to meet these basic requirements. Nowhere in its cumulative impact analysis does the Navy consider—let alone reach the conclusion—that the *sum* of the various environmental impacts that are enumerated will be limited. DEIS at 4-1 to 27. The Navy's analysis cannot provide such support because the Navy fails to explain what the sum of these impacts is expected to be. NEPA requires more than just a recital of possible impacts: it requires the Navy to actually analyze the overall impact of the accumulation of individual impacts. *Grand Canyon Trust*, 290 F.3d at 345. The DEIS fails to make this analysis.

The Navy must also consider the full effects of its sonar training. It simply assumes that all behavioral impacts are short-term in nature and cannot affect individuals or populations through repeated activity—even though the anticipated takes at its preferred alternative would affect the same populations.

Nor does the Navy consider the potential for acute synergistic effects from sonar training. Although the DEIS discusses the potential for ship strike in the training area (DEIS 4-20 to 21), it does not consider the greater susceptibility to vessel strike of animals that have been temporarily harassed or disoriented by certain noise sources. The absence of analysis is particularly glaring in light of the Haro Strait incident, in which killer whales and other marine mammals were observed fleeing away from the sonar vessel at high speeds.[47] Neither does the Navy consider the synergistic effects of

[47] Christopher Dunagan, Navy Sonar Incident Alarms Experts, Bremerton Sun, May 8, 2003.

noise with other stressors in producing or magnifying a stress-response.[48] For these reasons alone, the Navy should have concluded that the cumulative and synergistic impacts from sonar training are significant and focused its efforts to analyze and develop mitigation measures to avoid those impacts.

The Navy acknowledges that the GOA is crowded with human and military activities, many of which introduce noise, chemical pollution, debris, and vessel traffic into the habitat of protected species. DEIS at 4-1 to 7; 4-18-27. Yet it inexplicably fails to conclude what the cumulative effects will be for all those activities.

Given the scope of the proposed action, the deficiencies of the Navy's cumulative impacts assessment represents a critical failure of the DEIS. At a minimum, the Navy must evaluate the potential for cumulative impacts on populations that would occur in and near the GOA, clearly define the extent of expected cumulative impacts, and assess the potential for synergistic adverse effects (such as from noise in combination with ship-strikes).

VI. The Navy Fails to Properly Analyze Reasonable Alternatives

NEPA requires agencies to consider alternatives to their proposed actions. To comply with NEPA, an EIS must "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. This alternatives requirement has been described in regulation as "the heart of the environmental impact statement." *Id.* § 1502.14. The courts describe the alternatives requirement equally emphatically, citing it as the "linchpin" of the EIS. *Monroe County Conservation Council v. Volpe*, 472 F.2d 693 (2d Cir. 1972). The agency must therefore "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." 40 C.F.R. § 1502.14(a). Consideration of alternatives is required by (and must conform to the independent terms of) both sections 102(2)(C) and 102(2)(E) of NEPA. Here, the Navy's alternatives analysis misses the mark.

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[48] A.J. Wright, N. Aguilar Soto, A.L. Baldwin, M. Bateson, C.M. Beale, C.Clark, T. Deak, E.F. Edwards, A. Fernández, A. Godinho, L. Hatch, A. Kakuschke, D. Lusseau, D. Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, Do marine mammals experience stress related to anthropogenic noise?, 20 International Journal of Comparative Psychology, 274-316 (2007); see also Andrew J. Wright, Natacha Aguilar Soto, Ann L. Baldwin, Melissa Bateson, Colin M. Beale, Charlotte Clark, Terrence Deak, Elizabeth F. Edwards, Antonio Fernández, Ana Godinho, Leila Hatch, Antje Kakuschke, David Lusseau, Daniel Martineau, L. Michael Romero, Linda Weilgart, Brendan Wintle, Giuseppe Notarbartolo-di-Sciara, and Vidal Martin. Anthropogenic noise as a stressor in animals: a multidisciplinary perspective, 20 International Journal of Comparative Psychology, 250-273 (2007).

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A. Failure to Identify Environmental Impact-Based Alternatives

The Navy claims it "considers potential environmental impacts" while executing its responsibilities under federal law, including NEPA. DEIS at 1-1. But the Navy's alternatives were not selected to "inform decision-makers and the public" of how the Navy could "avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. Instead, as discussed in the DEIS and below, the Navy chose alternatives based on factors unrelated to the proposed action's environmental impacts.

Further, at no point in the DEIS does the Navy discuss how the alternatives pose different environmental choices for the public and decisionmakers. The DEIS fails entirely to comply with NEPA's regulations, requiring the Navy to "present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among option by the decisionmaker and the public." 40 C.F.R. § 1502.14. The Navy fails to sharply define the environmental issues applicable to each alternative and include these differences in a comparison of alternatives. There is simply no comparison of the risks and benefits of each alternative site showing what is and is not known and what species and habitats would be most at risk from each alternative.

B. Identification of Alternative Sites

The DEIS does not include any discussion of alternative sites, instead proposing a No Action alternative (maintaining the current level of activities), Alternative 1 (increasing training activities, including sonar training), and the preferred Alternative 2 (increasing training activities, sonar training, additional strike exercises and range enhancements). The Navy's analysis is devoid of geographic alternatives. The information the Navy does include indicates that factors of convenience and cost dominated the decision. Factors of mere convenience alone cannot dictate an agency's choice of alternatives to evaluate in an EIS. An agency must discuss all reasonable alternatives—those that will accomplish the purpose and need of the agency and are practical and feasible—not simply those it finds most convenient. 40 C.F.R. § 1502.14. "The primary purpose of the impact statement is to compel federal agencies to give serious weight to environmental factors in making discretionary choices." *I-291 Why? Ass'n v. Burns*, 372 F.Supp. 233, 247 (D. Conn. 1974). If an agency is permitted to consider and compare the environmental impacts of its proposed action with only equally convenient alternatives—and permitted to omit from such analysis any alternatives that are less convenient, no matter that they might result in significant environmental benefits—this purpose would be thwarted.

Carefully siting the activities proposed to occur in the range to avoid concentrations of vulnerable and endangered species and high abundances of marine life is the most critical step the Navy can take in reducing the environmental impacts of this project. Because the Navy has failed to undertake an alternatives analysis that allows it to make an informed siting choice, however, the DEIS is inadequate and must be revised.

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C. Other Reasonable Alternatives

The DEIS fails to consider any alternatives beyond increasing the level of training. Therefore, many reasonable alternatives are missing from the Navy's analysis that might fulfill that purpose while reducing harm to marine life and coastal resources. For example:

(1) The DEIS fails entirely to consider avoiding seasonal habitat, or any other seasonal variation in marine life abundance (such as migration routes). Omitting even the mere *consideration* of any alternative that recognizes the need to protect endangered and sensitive marine life is unacceptable.

(2) The DEIS fails to include a range of mitigation measures among its alternatives. Many such measures have been employed by the U.S. Navy in other contexts, as discussed above; and there are many others that should be considered. Such measures are reasonable means of reducing harm to marine life and other resources on the proposed range, and their omission from the alternatives analysis renders that analysis inadequate.

(3) The Navy's statement of purpose and need contains no language that would justify the limited set of alternatives that the Navy considers (or the alternative it ultimately prefers). Yet it is a fundamental requirement of NEPA that agencies preparing an EIS specify their project's "purpose and need" in terms that do not exclude full consideration of reasonable alternatives. 40 C.F.R. § 1502.13; *City of Carmel-by-the-Sea v. United States Dep't of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997) (*citing Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991)). "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate," *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir. 1992), and an EIS errs when it accepts "as a given" parameters that it should have studied and weighed. *Simmons v. U.S. Army Corps of Eng'rs*, 120 F.3d 664, 667 (7th Cir. 1997).

In sum, the DEIS shortchanges or omits from its analysis reasonable alternatives that might achieve the Navy's core aim of testing and training while minimizing environmental harm. For these reasons, we urge the Navy to revise its DEIS to adequately inform the public of all reasonable alternatives that would reduce adverse impacts to whales, fish, and other resources. 40 C.F.R. § 1502.1.

VII. The Navy Fails to Analyze the Impacts on Wildlife Viewing Interests and Recreation

Just as it fails to consider the direct, indirect, and cumulative impacts of increased training in the GOA on the region's marine mammals and other fish and wildlife, the DEIS does not adequately consider the effects on wildlife viewing and other wildlife-

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dependent recreational interests. The DEIS makes no mention of the value lost from the harm to marine mammals that attract a number of our organizational members and members of the public to the potentially affected areas of the GOA. Nor does it address the potential economic value lost from decreased tourism (*e.g.*, whale watching, cruise ships, etc.), particularly those areas centered on observing whales and other marine mammals in their natural habitats.

One of NEPA's explicit purposes is to "assure esthetically and culturally pleasing surroundings," 42 U.S.C. 4331(b)(2), and caselaw makes clear that an agency must adequately consider such recreational impacts in its NEPA analysis. *See, e.g., Lujan v. NWF*, 497 U.S. 871, 887 (1990) ("no doubt that recreational use and aesthetic enjoyment are among the sorts of interests NEPA [was] specifically designed to protect"); *LaFlamme v. FERC*, 852 F.2d 389, 401 (1988) (because "there were substantial questions raised regarding whether the project may significantly affect recreational use in the project area, and that FERC failed to explain or discuss" these impacts, the court found that "this record reflects a decision which is neither 'fully informed or well-considered,'" and therefore concluded the agency's decision not to prepare an EIS was unreasonable).

VIII. Project Description and Meaningful Public Disclosure

Disclosure of the specific activities contemplated by the Navy is essential if the NEPA process is to be a meaningful one. *See, e.g., LaFlamme v. F.E.R.C.*, 852 F.2d 389, 398 (9th Cir. 1988) (noting that NEPA's goal is to facilitate "widespread discussion and consideration of the environmental risks and remedies associated with [a proposed action]").

For meaningful public input, the Navy must describe source levels, frequency ranges, duty cycles, and other technical parameters relevant to determining potential impacts on marine life. The DEIS provides some of this information, but it fails to disclose sufficient information about active sonobuoys, acoustic device countermeasures, training targets, or range sources that would be used during the exercises. DEIS at Appendix H. And the DEIS gives no indication of platform speed, pulse length, repetition rate, beam widths, or operating depths—that is, most of the data that the Navy used in modeling acoustic impacts.

The Navy—despite repeated requests—has not released or offered to release CASS/GRAB or any of the other modeling systems or functions it used to develop the biological risk function or calculate acoustic harassment and injury. *See, e.g.,* DEIS at Appendix D.

In addition, the Navy has also ignored repeated Freedom of Information Act requests regarding information and reports cited in the DEIS.

These models, reports, and requests for information must be made available to the public, including the independent scientific community, for public comment to be

meaningful under NEPA and the Administrative Procedure Act. 40 C.F.R. §§ 1502.9(a), 1503.1(a) (NEPA); 5 U.S.C. § 706(2)(D) (APA). In addition, guidelines adopted under the Data (or Information) Quality Act also require their disclosure. The Office of Management and Budget's guidelines require agencies to provide a "high degree of transparency" precisely "to facilitate reproducibility of such information by qualified third parties" (67 Fed. Reg. 8452, 8460 (Feb. 22, 2002)); and the Defense Department's own data quality guidelines mandate that "influential" scientific material be made reproducible as well. We encourage the Navy to contact us immediately to discuss how to make this critical information available.

IX. Compliance With Other Applicable Laws

A number of other statutes and conventions are implicated by the proposed activities. Among those that must be disclosed and addressed during the NEPA process are the following:

(1) The Marine Mammal Protection Act ("MMPA"), 16 U.S.C. § 1361 et seq., which requires the Navy to obtain a permit or other authorization from NMFS or the U.S. Fish and Wildlife Service prior to any "take" of marine mammals. The Navy must apply for an incidental take permit under the MMPA, and NRDC will submit comments regarding the Navy's application to NMFS at the appropriate time.

(2) The Endangered Species Act, 16 U.S.C. § 1531 et seq., which requires the Navy to enter into formal consultation with NMFS or the U.S. Fish and Wildlife Service, and receive a legally valid Incidental Take Permit, prior to its "take" of any endangered or threatened marine mammals or other species, including fish, sea turtles, and birds, or its "adverse modification" of critical habitat. *See, e.g.*, 1536(a)(2); *Romero-Barcelo v. Brown*, 643 F.2d 835 (1st Cir. 1981), *rev'd on other grounds*, *Weinberger v. Romero-Carcelo*, 456 U.S. 304, 313 (1982). Given the scope and significance of the actions and effects it proposes, the Navy must engage in formal consultation with NMFS and the U.S. Fish and Wildlife over the numerous endangered and threatened species in the GOA.

(3) The Coastal Zone Management Act, and in particular its federal consistency requirements, 16 U.S.C. § 1456(c)(1)(A), which mandate that activities that affect the natural resources of the coastal zone—whether they are located "within or outside the coastal zone"—be carried out "in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." The Navy must fulfill its CZMA commitments along the Alaska coast.

(4) The Magnuson-Stevens Fisheries Conservation and Management Act, 16 U.S.C. § 1801 et seq. ("MSA"), which requires federal agencies to "consult with the Secretary [of Commerce] with respect to any action authorized, funded, or

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undertaken, or proposed to be authorized, funded, or undertaken" that "may adversely affect any essential fish habitat" identified under that Act. 16 U.S.C. § 1855 (b)(2). In turn, the MSA defines essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. § 1802 (10). The GOA contains such habitat. As discussed at length above, anti-submarine warfare exercises alone have the significant potential to adversely affect at least the waters, and possibly the substrate, on which fish in these areas depend. Under the MSA, a thorough consultation is required.

(5) The Marine Protection, Research and Sanctuaries Act, 33 U.S.C. § 1401 et seq., which requires federal agencies to consult with the Secretary of Commerce if their actions are "likely to destroy, cause the loss of, or injure any sanctuary resource." 16 U.S.C. § 1434(d)(1). Since the Navy's exercises would cause injury and mortality of species, consultation is clearly required if sonar use takes place either within or in the vicinity of the sanctuary or otherwise affects its resources. Since sonar may impact sanctuary resources even when operated outside its bounds, the Navy should indicate how close it presently operates, or foreseeably plans to operate, to such sanctuary and consult with the Secretary of Commerce as required.

In addition, the Sanctuaries Act is intended to "prevent or strictly limit the dumping into ocean waters of any material that would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities" (33 U.S.C. § 1401(b)), and prohibits all persons, including Federal agencies, from dumping materials into ocean waters, except as authorized by the Environmental Protection Agency. 33 U.S.C. §§ 1411, 1412(a). The Navy has not indicated its intent to seek a permit under the statute.

(6) The Migratory Bird Treaty Act, 16 U.S.C. § 703 et seq. ("MBTA"), which makes it illegal for any person, including any agency of the Federal government, "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory birds except as permitted by regulation. 16 U.S.C. § 703. After the District Court for the D.C. Circuit held that naval training exercises that incidentally take migratory birds without a permit violate the MBTA, (see *Center for Biological Diversity v. Pirie*, 191 F. Supp. 2d 161 (D.D.C. 2002) (later vacated as moot)), Congress exempted some military readiness activities from the MBTA but also placed a duty on the Defense Department to minimize harms to seabirds. Under the new law, the Secretary of Defense, "shall, in consultation with the Secretary of the Interior, identify measures-- (1) to minimize and mitigate, to the extent practicable, any adverse impacts of authorized military readiness activities on affected species of migratory birds; and (2) to monitor the impacts of such military readiness activities on affected species of migratory birds." Pub.L. 107-314, § 315 (Dec. 2, 2002). As the Navy acknowledges, many migratory birds occur within the GOA. The Navy must therefore consult with the Secretary of the Interior regarding measures to

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minimize and monitor the effects of the proposed range on migratory birds, as required.

(7) Executive Order 13158, which sets forth protections for marine protected areas ("MPAs") nationwide. The Executive Order defines MPAs broadly to include "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." E.O. 13158 (May 26, 2000). It then requires that "[e]ach Federal agency whose actions affect the natural or cultural resources that are protected by an MPA shall identify such actions," and that, "[t]o the extent permitted by law and to the maximum extent practicable, each Federal agency, in taking such actions, shall avoid harm to the natural and cultural resources that are protected by an MPA." *Id.* The Navy must therefore consider and, to the maximum extent practicable, must avoid harm to the resources of all federally- and state-designated marine protected areas.

The proposed activities also implicate the Clean Air Act and Clean Water Act as well as other statutes protecting the public health. The Navy must comply with these and other laws.

X. Conflicts with Federal, State and Local Land-Use Planning

NEPA requires agencies to assess possible conflicts that their projects might have with the objectives of federal, regional, state, and local land-use plans, policies, and controls. 40 C.F.R. § 1502.16(c). The Navy's training and testing activities may affect resources in the coastal zone and within other state and local jurisdictions, in conflict with the purpose and intent of those areas. The consistency of Navy operations with these land-use policies must receive more thorough consideration.

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APPENDIX B

IMPACTS OF SONAR

Strandings and Mortalities Associated with Sonar

Scientists agree, and the publicly available scientific literature confirms, that the intense sound generated by active sonar can induce a range of adverse effects in whales and other species, from significant behavioral changes to stranding and death. By far the most widely-reported and dramatic of these effects are the mass strandings of beaked whales and other marine mammals that have been associated with military sonar use.

Over the last decade, the association between military active sonar and whale mortalities has become a subject of considerable scientific interest and concern. That interest is reflected in the publication of numerous papers in peer-reviewed journals, in reports by inter-governmental bodies such as the IWC's Scientific Committee, and in evidence compiled from a growing number of mortalities associated with sonar. Yet the DEIS only glosses over these stranding incidents.

In March 2000, for example, sixteen whales from at least three species— including two minke whales—stranded over 150 miles of shoreline along the northern channels of the Bahamas. The beachings occurred within 24 hours of Navy ships using mid-frequency sonar in those same channels.[49] Post-mortem examinations found, in all whales examined, hemorrhaging in and around the ears and other tissues related to sound conduction or production, such as the larynx and auditory fats, some of which was debilitative and potentially severe.[50] It is now accepted that these mortalities were caused, through an unknown mechanism, by the Navy's use of mid-frequency sonar.

The Bahamas event is merely one of numerous mortality events coincident with military activities and active sonar that have now been documented, only some of which the Navy discusses:[51]

(1) Canary Islands 1985-1991 – Between 1985 and 1989, at least three separate mass strandings of beaked whales occurred in the Canary Islands, as reported in *Nature*.[52] Thirteen beaked whales of two species were killed in the

[49] Commerce and Navy, Joint Interim Report at iii, 16.

[50] Id.

[51] The following is not a complete list, as other relevant events have been reported in Bonaire, Japan, Taiwan, and other locations. See, e.g., R.L. Brownell, Jr., T. Yamada, J.G. Mead, and A.L. van Helden, Mass Strandings of Cuvier's Beaked Whales in Japan: U.S. Naval Acoustic Link? (2004) (IWC SC/56E37); J.Y. Wang and S.-C. Yang, Unusual Cetacean Stranding Events of Taiwan in 2004 and 2005, 8 Journal of Cetacean Research and Management 283-292 (2006); P.J.H. van Bree and I. Kristensen, On the Intriguing Stranding of Four Cuvier's Beaked Whales, Ziphius cavirostris, G. Cuvier, 1823, on the Lesser Antillean Island of Bonaire, 44 Bijdragen tot de Dierkunde 235-238 (1974).

[52] M. Simmonds and L.F. Lopez-Jurado, Whales and the Military, 337 Nature 448 (1991).

February 1985 strandings, six whales of three species stranded in November 1988, and some twenty-four whales of three species stranded in October 1989—all while naval vessels were conducting exercises off shore.[53] An additional stranding of Cuvier's beaked whales, also coinciding with a naval exercise, occurred in 1991.[54] It was reported that mass live strandings occurred each time exercises took place in the area.[55]

(2) Greece 1996, 1997 – In 1996, twelve Cuvier's beaked whales stranded along 35 kilometers on the west coast of Greece. The strandings were correlated, by an analysis published in *Nature*, with the test of a low- and mid-frequency active sonar system operated by NATO.[56] A subsequent NATO investigation found the strandings to be closely timed with the movements of the sonar vessel, and ruled out all other physical environmental factors as a cause.[57] The following year saw nine additional Cuvier's beaked whales strand off Greece, again coinciding with naval activity.[58]

(3) Virgin Islands 1999 – In October 1999, four beaked whales stranded in the U.S. Virgin Islands as the Navy began an offshore exercise. A wildlife official from the Islands reported the presence of "loud naval sonar."[59] When NMFS asked the Navy for more information about its exercise, the Department's response was to end the consultation that it had begun for the exercise under the Endangered Species Act.[60] In January 1998, according to a NMFS biologist, a beaked whale "stranded suspiciously" at Vieques as naval exercises were set to commence offshore.[61]

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[53] Id.

[54] V. Martín, A. Servidio, and S. Garcia, Mass Strandings of Beaked Whales in the Canary Islands, in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 33-36 (2004).

[55] Simmonds and Lopez-Jurado, Whales and the Military, 337 Nature at 448.

[56] A. Frantzis, Does Acoustic Testing Strand Whales? 392 Nature 29 (1998).

[57] See SACLANT Undersea Research Center, Summary Record, La Spezia, Italy, 15-17 June 1998, SACLANTCEN Bioacoustics Panel, SACLANTCEN M-133 (1998).

[58] Id.; A. Frantzis, The First Mass Stranding That Was Associated with the Use of Active Sonar (Kyparissiakos Gulf, Greece, 1996), in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 14-20 (2004).

[59] Personal communication of Dr. David Nellis, U.S. Virgin Island Department of Fish and Game, to Eric Hawk, NMFS (Oct. 1999); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002).

[60] Letter from William T. Hogarth, Regional Administrator, NMFS Southeast Regional Office, to RADM J. Kevin Moran, Navy Region Southeast (undated); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002).

[61] Personal communication from Eric Hawk, NMFS, to Ken Hollingshead, NMFS (Feb. 12, 2002).

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(4) Bahamas 2000 – As described above.

(5) Madeira 2000 -- In May 2000, four beaked whales stranded on the beaches of Madeira while several NATO ships were conducting an exercise near shore. Scientists investigating the stranding found that the whales' injuries—including "blood in and around the eyes, kidney lesions, pleural hemorrhage"—and the pattern of their stranding suggest "that a similar pressure event [*i.e.*, similar to that at work in the Bahamas] precipitated or contributed to strandings in both sites."[62]

(6) Canary Islands 2002 – In September 2002, at least fourteen beaked whales from three different species stranded in the Canary Islands. Four additional beaked whales stranded over the next several days.[63] The strandings occurred while a Spanish-led naval exercise that included U.S. Navy vessels and at least one ship equipped with mid-frequency sonar was conducting anti-submarine warfare exercises in the vicinity.[64] The subsequent investigation, as reported in the journals *Nature* and *Veterinary Pathology*, revealed a variety of traumas, including emboli and lesions suggestive of decompression sickness.[65]

(7) Washington 2003 – In May 2003, the U.S. Navy vessel USS *Shoup* was conducting a mid-frequency sonar exercise while passing through Haro Strait, between Washington's San Juan Islands and Canada's Vancouver Island. According to one contemporaneous account, "[d]ozens of porpoises and killer whales seemed to stampede all at once . . . in response to a loud electronic noise echoing through" the Strait.[66] Several field biologists present at the scene reported observing a pod of endangered orcas bunching near shore and engaging in very abnormal behavior consistent with avoidance, a minke whale "porpoising" away from the sonar ship, and Dall's porpoises fleeing the vessel in large numbers.[67] Eleven harbor porpoises—an abnormally high number

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[62] D.R. Ketten, Beaked Whale Necropsy Findings 22 (2002) (paper submitted to NMFS); L. Freitas, The Stranding of Three Cuvier's Beaked Whales Ziphius Cavirostris in Madeira Archipelago—May 2000, in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 28-32 (2004).

[63] Vidal Martin et al., Mass Strandings of Beaked Whales in the Canary Islands, in Proceedings of the Workshop on Active Sonar and Cetaceans 33 (P.G.H. Evans & L.A. Miller eds., 2004); Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446-57.

[64] Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446; K.R. Weiss, Whale Deaths Linked to Navy Sonar Tests, L.A. Times, Oct. 1, 2002, at A3.

[65] Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446-57; Jepson et al., Gas-Bubble Lesions, 425 Nature at 575-76.

[66] Christopher Dunagan, Navy Sonar Incident Alarms Experts, Bremerton Sun, May 8, 2003.

[67] NMFS, Assessment of Acoustic Exposures at 6, 9.

given the average stranding rate of six per year—were found beached in the area of the exercise.[68]

(8) Kauai 2004 – During the Navy's conduct of a major training exercise off Hawaii, called RIMPAC 2004, some 150-200 whales from a species that is rarely seen near shore and had never naturally mass-stranded in Hawaii came into Hanalei Bay, on the island of Kaua'i. The whales crowded into the shallow bay waters and milled there for over 28 hours. Though the whales were ultimately assisted into deeper waters by members of a local stranding network, one whale calf was left behind and found dead the next day. NMFS undertook an investigation of the incident and concluded that the Navy's nearby use of sonar in RIMPAC 2004 was the "plausible, if not likely" cause of the stranding.[69]

(9) Canary Islands 2004 – In July 2004, four dead beaked whales were found around the coasts of the Canary Islands, within one week of an NATO exercise. The exercise, Majestic Eagle 2004, was conducted approximately 100 kilometers north of the Canaries. Although the three whale bodies that were necropsied were too decomposed to allow detection of gas embolisms, systematic fat embolisms were found in these animals.[70] The probability that the whales died at sea is extremely high.[71]

(10) North Carolina 2005 – During and just after a U.S. training exercise off North Carolina, at least thirty-seven whales of three different species stranded and died along the Outer Banks, including numerous pilot whales (six of which were pregnant), one newborn minke whale, and two dwarf sperm whales. NMFS investigated the incident and found that the event was highly unusual,

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[68] NMFS, Preliminary Report: Multidisciplinary Investigation of Harbor Porpoises (Phocoena phocoena) Stranded in Washington State from 2 May – 2 June 2003 Coinciding with the Mid-Range Sonar Exercises of the USS Shoup 53-55 (2004) (conclusions unchanged in final report). Unfortunately, according to the report, freezer artifacts and other problems incidental to the preservation of tissue samples made the cause of death in most specimens difficult to determine; but the role of acoustic trauma could not be ruled out. Id.

[69] B.L. Southall, R. Braun, F.M.D. Gulland, A.D. Heard, R.W. Baird, S.M. Wilkin, and T.K. Rowles, Hawaiian Melon-Headed Whale *(Peponacephala electra)* Mass Stranding Event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31); See also R.L. Brownell, Jr., K Ralls, S. Baumann-Pickering and M.M. Poole, Behavior of melon-headed whales, *Pepnoncephalia electra*, near oceanic islands, Marine Mammal Science, (publication pending 2009).

[70] A. Espinosa, M. Arbelo, P. Castro, V. Martín, T. Gallardo, and A. Fernández, New Beaked Whale Mass Stranding in Canary Islands Associated with Naval Military Exercises (Majestic Eagle 2004) (2005) (poster presented at the European Cetacean Society Conference, La Rochelle, France, April 2005); A. Fernández, M. Méndez, E. Sierra, A. Godinho, P. Herráez, A. Espinosa de los Monteros, F. Rodríguez, F., and M. Arbelo, M., New Gas and Fat Embolic Pathology in Beaked Whales Stranded in the Canary Islands (2005) (poster presented at the European Cetaecan Society Conference, La Rochelle, France, April 2005).

[71] Id.

being the only mass stranding of offshore species ever to have been reported in the region, and that it shared 'a number of features' with other sonar-related mass stranding events (involving offshore species which stranded alive and were atypically distributed along the shore). NMFS concluded that sonar was a possible cause of the strandings and also ruled out the most common other potential causes, including viral, bacterial, and protozoal infection, direct blunt trauma, and fishery interactions.[72]

(11) Spain 2006 – Four Cuvier's beaked whales stranded on the Almerian coast of southern Spain, with the same suite of bends-like pathologies seen in the whales that stranded in the Canary Islands in 2002 and 2004.[73] A NATO response force was performing exercises within 50 miles at the time of the strandings.

Some observations can be drawn from these incidents. For example, beaked whales, a group of deep-water species that are seldom seen and may in some cases be extremely rare, seem to be particularly vulnerable to the effects of active sonar. A 2000 review undertaken by the Smithsonian Institution, and reported and expanded by the IWC's Scientific Committee and other bodies, supports this conclusion, finding that every mass stranding on record involving multiple species of beaked whales has occurred with naval activities in the vicinity.[74] Indeed, it is not even certain that some beaked whale species naturally strand in numbers.

But the full magnitude of sonar's effects on these species—or on other marine mammals—is not known. Most of the world lacks networks to identify and investigate stranding events, particularly those that involve individual animals spread out over long stretches of coastline, and therefore the mortalities that have been identified thus far are likely to represent only a subset of a substantially larger problem. For example, most beaked whale casualties (according to NMFS) are bound to go undocumented because of the remote siting of sonar exercises and the small chance that a dead or injured animal would actually strand.[75] It is well understood in terrestrial ecology that dead and dying animals tend to be grossly undercounted given their rapid assimilation into the environment, and one would of course expect profound difficulty where offshore

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[72] A.A. Hohn, D.S. Rotstein, C.A. Harms, and B.L. Southall, Multispecies Mass Stranding of Pilot Whales (Globicephala macrorhynchus), Minke Whale *(Balaenoptera acutorostrata)*, and Dwarf Sperm Whales *(Kogia sima)* in North Carolina on 15-16 January 2005 (2006) (NOAA Tech. Memo. NMFS-SEFSC-53).

[73] International Whaling Commission, Report of the Scientific Committee, Annex K at 28 (2006) (IWC/ 58/Rep1).

[74] Marine Mammal Program of the National Museum of Natural History, Historical Mass Mortalities of Ziphiids 2-4 (Apr. 6, 2000); see also 2 J. Cetacean Res. & Mgmt., Supp., Annex J at § 13.8 (2000) (report of the IWC Scientific Committee, Standing Working Group on Environmental Concerns).

[75] J.V. Carretta, K.A. Forney, M.M. Muto, J. Barlow, J. Baker, and M. Lowry, U.S. Pacific Marine Mammal Stock Assessments: 2006 (2007).

marine species are concerned.[76] Along the eastern seaboard and in the Gulf of Mexico, all beaked whale sightings during NMFS shipboard surveys have occurred at considerable distances from shore.[77]

Furthermore, although the physical process linking sonar to strandings is not perfectly understood, the record indicates that debilitating and very possibly lethal injuries are occurring in whales exposed to sonar at sea—only some of which may then strand. As first reported in the journal *Nature*, animals that came ashore during sonar exercises off the Canary Islands, in September 2002, had developed large emboli in their organ tissue and suffered from symptoms resembling those of severe decompression sickness, or "the bends."[78] It has been proposed that the panic led them to surface too rapidly or pushed them to dive before they could eliminate the nitrogen accumulated on previous descents. This finding has since been supported by follow-on papers, by published work in other fields, and by expert reviews.[79] In any case, the evidence is considered "compelling" that acoustic trauma, or injuries resulting from behavioral responses, has in some way led to the deaths of these animals.[80]

Other Harmful Effects of Sonar

Strandings and mass mortalities, though an obvious focus of much reporting and concern, are likely only the tip of the iceberg of sonar's harmful effects. Marine mammals are believed to depend on sound to navigate, find food, locate mates, avoid

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[76] See, e.g., G. Wobeser, Investigation and Management of Disease in Wild Animals 13-15 (1994); P.A. Alison, C.R. Smith, H. Kukert, J.W. Deming, B.A. Bennett, Deep-Water Taphonomy of Vertebrate Carcasses: A Whale Skeleton in the Bathyal Santa Catalina Basin, 17 Paleobiology 78-89 (1991).

[77] G.T. Waring, E. Josephson, C.P. Fairfield, and K. Maze-Foley, eds., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2006 at 232-33, 238, 288, 292, 296 (2007) (NOAA Tech. Memo. NMFS NE 201) (data from NMFS surveys, showing all beaked whales sightings at significant distances from shore).

[78] See P.D. Jepson, M. Arbelo, R. Deaville, I.A.P. Patterson, P. Castro, J.R. Baker, E. Degollada, H.M. Ross, P. Herráez, A.M. Pocknell, F. Rodríguez, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Jaber, V. Martín, A.A. Cunningham, A. Fernández, Gas-Bubble Lesions in Stranded Cetaceans, 425 Nature 575-576 (2003); Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 415.

[79] E.g., Cox et al., Understanding the Impacts. Of course it would be a mistake to assume that an animal must suffer bends-like injury or some other sort of acoustic trauma in order to strand. Some may die simply because the noise disorients them, for instance. See, e.g., NMFS, Assessment of Acoustic Exposures at 9-10.

[80] Cox et al., Understanding the Impacts; see also P.G.H. Evans and L.A. Miller, Concluding Remarks, in Proceedings of the Workshop on Active Sonar and Cetaceans 74 (2004); K.C. Balcomb and D.E. Claridge, A Mass Stranding of Cetaceans Caused by Naval Sonar in the Bahamas, 8(2) Bahamas Journal of Science 1 (2001); D.E. Claridge, Fine-Scale Distribution and Habitat Selection of Beaked Whales (2006) (M.Sc. thesis); E.C.M. Parsons, S.J. Dolman, A.J. Wright, N.A. Rose, and W.C.G. Burns, Navy Sonar and Cetaceans: Just How Much Does the Gun Need to Smoke before We Act? 56 Marine Pollution Bulletin 1248 (2008).

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predators, and communicate with each other. Flooding their habitat with man-made, high-intensity noise interferes with these and other functions. In addition to strandings and non-auditory injuries, the harmful effects of high-intensity sonar include:

- temporary or permanent loss of hearing, which impairs an animal's ability to communicate, avoid predators, detect and capture prey, and avoid ship strikes;
- avoidance behavior, which can lead to abandonment of habitat or migratory pathways;
- disruption of biologically important behaviors such as mating, feeding, nursing, or migration, or loss of efficiency in conducting those behaviors;
- aggressive (or agonistic) behavior, which can result in injury;
- masking of biologically meaningful sounds, such as the call of predators or potential mates;
- chronic stress, which can compromise viability, suppress the immune system, and lower the rate of reproduction;
- habituation, causing animals to remain near damaging levels of sound, or sensitization, exacerbating other behavioral effects; and
- declines in the availability and viability of prey species, such as fish and shrimp.

Over the past 20 years, a substantial literature has emerged documenting the range of effects of ocean noise on marine mammals.[81]

Marine mammals are not the only species affected by undersea noise. Impacts on fish are of increasing concern due to several recent studies demonstrating hearing loss and widespread behavioral disruption in commercial species of fish and to reports, both experimental and anecdotal, of catch rates plummeting in the vicinity of noise sources. Further, the death of species not protected by federal law reduces prey available to listed species. And noise has been shown in several cases to kill, disable, or disrupt the behavior of invertebrates, many of which possess ear-like structures or other sensory mechanisms that could leave them vulnerable. It is clear that intense sources of noise are capable of affecting a wide class of ocean life.

[81] For a review of research on behavioral and auditory impacts of undersea noise, see, e.g., L.S. Weilgart, The Impacts of Anthropogenic Ocean Noise on Cetaceans and Implications for Management, 85 Canadian Journal of Zoology 1091-1116 (2007); W.J. Richardson, C.R. Greene, Jr., C.I. Malme, and D.H. Thomson, Marine Mammals and Noise (1995); National Research Council, Ocean Noise and Marine Mammals (2003); Whale and Dolphin Conservation Society, Oceans of Noise (2004).

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APPENDIX C

CRITIQUE OF THE NAVY'S ACOUSTICS ANALYSIS

We urge the Navy to substantially alter the approach it has taken thus far. The Navy must revise its acoustic impact analysis to reflect the evidence of mid-frequency sonar's effects on marine life. Unfortunately, the Navy's current assessment of acoustic impacts disregards a great deal of relevant information adverse to its interests, uses approaches and methodologies that would not be acceptable to the scientific community, and ignores whole categories of impacts. Before issuing a final EIS, the Navy should (1) reduce its thresholds or risk function for marine mammal injury, hearing loss, and significant behavioral change, in accordance with the available science; (2) address the considerable scientific record that has developed around sonar and whale injury and mortality; and (3) revise its impact assessment model to take account of complex sound fields, synergistic effects from multiple sound sources, and the presence of vulnerable populations in the TMAA such as the North Pacific right whale, blue whale, fin whale, humpback whale, sei whale, sperm whale and Steller sea lion.

Thresholds of Injury, Hearing Loss and Behavioral Change

At the core of the Navy's assessment of acoustic impacts are the thresholds it has established for physiological and behavioral effects. There are gross problems with the Navy's thresholds, as discussed below.

1. Permanent Threshold Shift

The Navy sets the threshold for permanent threshold shift ("PTS"), which is the highest threshold for direct physical injury, at 215 dB re 1 μPa^{2}•s for cetaceans; 266 dB re 1 μPa^{2}•s for California sea lions, Steller sea lions, and Northern fur seals; and 224 dB re 1 μPa^{2}•s for Northern elephant seals. DEIS at 3.8-90. These thresholds are inconsistent with the scientific literature.

For instance, the Navy disregards data gained from actual whale mortalities. The best available scientific evidence, as reported in the peer-reviewed literature, indicates that sound levels at the most likely locations of beaked whales beached in the Bahamas strandings run far lower than the Navy's threshold for injury here: approximately 150-160 dB re 1 μPa for 50-150 seconds, over the course of the transit.[82] A further modeling effort, undertaken in part by the Office of Naval Research, suggests that the mean exposure level of beaked whales, given their likely distribution in the Bahamas' Providence Channels and averaging results from various assumptions, may have been

[82] J. Hildebrand, "Impacts of Anthropogenic Sound," in T.J. Ragen, J.E. Reynolds III, W.F. Perrin, and R.R. Reeves, Conservation beyond Crisis (2005). See also International Whaling Commission, 2004 Report of the Scientific Committee, Annex K at § 6.3.

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lower than 140 dB re 1 μPa.[83] Factoring in duration, then, evidence of actual sonar-related mortalities would compel a *maximum* energy level threshold for serious injury on the order of 182 dB re 1 $\mu Pa^{2*}s$, at least for beaked whales. Indeed, to pay at least some deference to the literature, the Navy—under pressure from NMFS—has previously assumed that non-lethal injury would occur in beaked whales exposed above 173 dB re 1 $\mu Pa^{2*}s$.[84]

In addition, the DEIS glosses over – in a single paragraph – published research on bubble growth in marine mammals, which separately indicates the potential for injury and death at levels far lower than what the Navy proposes. DEIS at 3.8-94. According to the best available scientific evidence, as represented by multiple papers in flagship journals such as *Nature* and *Veterinary Pathology*, gas bubble growth is the causal mechanism most consistent with the observed injuries;[85] in addition, it was singularly and explicitly highlighted as plausible by an expert panel convened by the Marine Mammal Commission, in which the Navy participated.[86] The Navy concedes that "a popular hypothesis regarding a potential cause of [marine mammal] strandings is that tissue damage results from a 'gas and fat embolic syndrome'" (DEIS at 3.8-94), but then fails to actually evaluate the potential impacts. NEPA requires agencies to evaluate all "reasonably foreseeable" impacts, which, by definition, include "impacts which have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason." 40 C.F.R. § 1502.22. The scientific literature supporting bubble growth rises far above this standard, and the Navy's failure to incorporate it into its impact model is arbitrary and capricious. Thus, the Navy's refusal to consider these impacts is insupportable under NEPA. 40 C.F.R. §§ 1502.22, 1502.24.

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[83] J. Hildebrand, K. Balcomb, and R. Gisiner, Modeling the Bahamas Beaked Whale Stranding of March 2000 (2004) (presentation given at the third plenary meeting of the U.S. Marine Mammal Commission Advisory Committee on Acoustic Impacts on Marine Mammals, 29 July 2004).

[84] See, e.g., Navy, Joint Task Force Exercises and Composite Training Unit Exercises Final Environmental Assessment/ Overseas Environmental Assessment at 4-44, 4-46 to 4-47 (2007).

[85] See, e.g., A. Fernández, J.F. Edwards, F. Rodríguez, A. Espinosa de los Monteros, P. Herráez, P. Castro, J.R. Jaber, V. Martín, and M. Arbelo, 'Gas and Fat Embolic Syndrome' Involving a Mass Stranding of Beaked Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals, 42 Veterinary Pathology 446 (2005); P.D. Jepson, M. Arbelo, R. Deaville, I.A.P. Patterson, P. Castro, J.R. Baker, E. Degollada, H.M. Ross, P. Herráez, A.M. Pocknell, F. Rodríguez, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Jaber, V. Martín, A.A. Cunningham, and A. Fernández, Gas-Bubble Lesions in Stranded Cetaceans, 425 Nature 575-576 (2003); R.W. Baird, D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow, Diving Behavior of Cuvier's (Ziphius cavirostris) and Blainville's (Mesoplodon densirostris) Beaked Whales in Hawai'i," 84 Canadian Journal of Zoology 1120-1128 (2006).

[86] T.M. Cox, T.J. Ragen, A.J. Read, E. Vos, R.W. Baird, K. Balcomb, J. Barlow, J. Caldwell, T. Cranford, L. Crum, A. D'Amico, G. D'Spain, A. Fernández, J. Finneran, R. Gentry, W. Gerth, F. Gulland, J. Hildebrand, D. Houser, T. Hullar, P.D. Jepson, D. Ketten, C.D. MacLeod, P. Miller, S. Moore, D. Mountain, D. Palka, P. Ponganis, S. Rommel, T. Rowles, B. Taylor, P. Tyack, D. Wartzok, R. Gisiner, J. Mead, and L. Benner, Understanding the Impacts of Anthropogenic Sound on Beaked Whales, 7 Journal of Cetacean Research & Management 177-87 (2006).

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Finally, the Navy's exclusive reliance on energy flux density levels ("ELs") as a unit of analysis is misplaced. DEIS at 3.8-91 to 93. It is appropriate for the Navy to set dual thresholds for behavioral effects, one based on ELs and one based on sound exposure levels ("SELs").

2. Temporary Threshold Shift

The DEIS sets its threshold for temporary hearing loss and behavioral effects, or "temporary threshold shift" ("TTS"), at 195 dB re 1 μPa^{2}•s for cetaceans; 206 dB re 1 μPa^{2}•s for California sea lions, Steller sea lions, and Northern fur seals; and 204 dB re 1 μPa^{2}•s for Northern elephant seals. DEIS at 3.8-90. It bases its cetacean threshold primarily on a synthesis of studies on two species of cetaceans, bottlenose dolphins and beluga whales, conducted by the Navy's SPAWAR laboratory in San Diego and, to a lesser extent, by researchers at the University of Hawaii. DEIS at 3.8-85 to 86.

Notably, the Navy's extrapolation of data from bottlenose dolphins and belugas to all cetaceans is not justifiable. Given the close association between acoustic sensitivity and threshold shift, such an approach must presume that belugas and bottlenose dolphins have the best hearing sensitivity in the mid-frequencies of any cetacean. However, harbor porpoises and killer whales are more sensitive over part of the mid-frequency range than are the two species in the SPAWAR and Hawaii studies.[87] Furthermore, the animals in the studies may not represent the full range of variation even within their own species, particularly given their age and situation: the SPAWAR animals, for example, have been housed for years in a noisy bay.[88]

3. "Risk Function" for Behavioral Effects

There are many glaring problems with the Navy's adoption of an acoustic risk function to estimate the probability of behavioral effects. Dr. Bain sets forth a detailed critique, which is attached to this letter. Several problems are discussed below.

In contrast to the Navy's 2005 DEIS for the Undersea Warfare Training Range (which established a threshold of 190 dB re 1 μPa^{2}•s) and the threshold which NMFS insisted the Navy adopt during RIMPAC 2006 and subsequent exercises off California and Hawaii (173 dB re 1 μPa^{2}•s), here the Navy redefines its position by applying a dose-response risk function to measure behavioral effects that begins at 120 dB re 1 μPa and reaches its mean at 165 dB re 1 μPa. DEIS at 3.8-98 to 101. Agencies are not entitled to substantial deference under the Administrative Procedure Act when they reverse previously held positions. Some of the more significant problems with the Navy's new

[87] Richardson et al., Marine Mammals and Noise at 209.

[88] M.L.H. Cook, Behavioral and Auditory Evoked Potential (AEP) Hearing Measurements in Odontocete Cetaceans (2006) (Ph.D. thesis).

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position include misusing SPAWAR and Haro Strait data, as well as failing to include data from the Hanalei Bay incident.

Once again, the Navy relies on studies of temporary threshold shift in captive animals for its primary source of data. DEIS 3.8-95 to 98. Marine mammal scientists have long recognized the deficiencies of using captive subjects in behavioral experiments, and to blindly rely on this material, to the exclusion of copious data on animals in the wild, is not supportable by any standard of scientific inquiry. Cf. 40 C.F.R. § 1502.22. The problem is exacerbated further by the fact that the subjects in question, roughly two belugas and five bottlenose dolphins, are highly trained animals that have been working in the Navy's research program in the SPAWAR complex for years.[89] Indeed, the disruptions observed by Navy scientists, which included pronounced, aggressive behavior ("attacking" the source) and avoidance of feeding areas associated with the exposure, occurred during a research protocol that the animals had been rigorously trained to complete.[90] The SPAWAR studies have several other major deficiencies that NMFS, among others, has repeatedly pointed out. In relying so heavily on them, the Navy has once again ignored the comments of numerous marine mammal behaviorists on the Navy's USWTR DEIS, which sharply criticized the Navy for putting any serious stock in them.[91]

In addition, the Navy appears to have misused data garnered from the Haro Strait incident—one of only three data sets it considers—by including only those levels of sound received by the "J" pod of killer whales when the USS *Shoup* was at its closest approach. DEIS at 3.8-96 to 97. These numbers represent the maximum level at which the pod was harassed; in fact, the whales were reported to have broken off their foraging and to have engaged in significant avoidance behavior at far greater distances from the ship, where received levels would have been orders of magnitude lower.[92] Not surprisingly, then, the Navy's results are inconsistent with other studies of the effects of various noise sources, including mid-frequency sonar, on killer whales. We must insist that the Navy provide the public with its propagation analysis for the Haro Strait event.

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[89] See, e.g., S.H. Ridgway, D.A. Carder, R.R. Smith, T. Kamolnick, C.E. Schlundt, and W.R. Elsberry, Behavioral Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, *Tursiops truncatus*, to 1-Second Tones of 141 to 201 dB re 1 μPa (1997) (SPAWAR Tech. Rep. 1751, Rev. 1).

[90] C.E. Schlundt, J.J. Finneran, D.A. Carder, and S.H. Ridgway, Temporary Shift in Masked Hearing Thresholds of Bottlenose Dolphins, Tursiops truncatus, and White Whales, Delphinapterus leucas, after Exposure to Intense Tones, 107 Journal of the Acoustical Society of America 3496, 3504 (2000).

[91] See comments from M. Johnson, D. Mann, D. Nowacek, N. Soto, P. Tyack, P. Madsen, M. Wahlberg, and B. Møhl, received by the Navy on the Undersea Warfare Training Range DEIS. These comments are hereby incorporated into this letter. See also Letter from Rodney F. Weiher, NOAA, to Keith Jenkins, Naval Facilities Engineering Command Atlantic (Jan. 30, 2006); Memo, A.R. document 51, NRDC v. Winter, CV 06-4131 FMC (JCx) (undated NOAA memorandum).

[92] See,. e.g., NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with *USS Shoup* Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington—5 May 2003 at 4-6 (2005).

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The Navy also fails to include data from the July 2004 Hanalei Bay event, in which 150-200 melon-headed whales were embayed for more than 24 hours during the Navy's Rim of the Pacific exercise. According to the Navy's analysis, predicted mean received levels (from mid-frequency sonar) inside and at the mouth of Hanalei Bay ranged from 137.9 dB to 149.2 dB.[93] The Navy has from the beginning denied any connection between its major international exercise and the mass stranding. However, the Navy's specious reasoning is at odds with the stranding behavior observed during the event and with NMFS' report on the matter, which ruled out every other known potential factor and concluded that sonar was the "plausible if not likely" cause.[94] The Navy's failure to incorporate these numbers into its methodology as another data set is unjustifiable.

Furthermore, the risk function should have taken into account the social ecology of some marine mammal species. For species that travel in tight-knit groups, an effect on certain individuals can adversely influence the behavior of the whole. (Pilot whales, for example, are prone to mass strand for precisely this reason; the plight of the 200 melon-headed whales in Hanalei Bay, and of the "J" pod of killer whales in Haro Strait, and the most recent stranding of melon-headed whales in the Philippines may be pertinent examples.) Should those individuals fall on the more sensitive end of the spectrum, the entire group or pod can suffer significant harm at levels below what the Navy would take as the mean. In developing its "K" parameter, the Navy must take account of such potential indirect effects. 40 C.F.R. § 1502.16(b).

We must also note that the Navy's exclusive reliance on sound pressure levels ("SPLs") in setting a behavioral threshold is misplaced. The discussion in the DEIS speaks repeatedly of uncertainty in defining the risk function and recapitulates, in its summary of the earlier methodology, the benefits implicit in the use of a criterion that takes duration into account. It is therefore appropriate for the Navy to set dual thresholds for behavioral effects, one based on SPLs and one based on energy flux density levels ("ELs").

Finally, the Navy's threshold is applied in such a way as to preclude any assessment of long-term behavioral impacts on marine mammals. It does not account, to any degree, for the problem of repetition: the way that apparently insignificant impacts, such as subtle changes in dive times or vocalization patterns, can become significant if experienced repeatedly or over time.[95]

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[93] Navy, 2006 Supplement to the 2002 Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment D-1 to D-2 (May 2006).

[94] B.L. Southall, R. Braun, F.M.D. Gulland, A.D. Heard, R.W. Baird, S.M. Wilkin, and T.K. Rowles, Hawaiian Melon-Headed Whale *(Peponacephala electra)* Mass Stranding Event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31); See also R.L. Brownell, Jr., K Ralls, S. Baumann-Pickering and M.M. Poole, Behavior of melon-headed whales, *Pepnoncephalia electra*, near oceanic islands, Marine Mammal Science, (publication pending 2009).

[95] The importance of this problem for marine mammal conservation is reflected in a recent NRC report, which calls for models that, inter alia, translate such subtle changes into disruptions in key activities like feeding and breeding that are significant for individual animals. National Research

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In sum, the Navy has established thresholds and a risk function that are fundamentally inconsistent with the scientific literature on acoustic impacts and with marine mammal science in general. Indeed, using these thresholds to support a final EIS would violate NEPA.

Modeling of Acoustic Impacts

The Navy bases its calculation of marine mammal impacts on a series of models that determine received levels of sound within a limited distance of a sonar array and then estimate the number of animals that would therefore suffer injury or disruption. It is difficult to fully gauge the accuracy and rigor of these models with the limited information that the DEIS provides; but even from the description presented here, it is clear that they are deeply flawed. Among the non-conservative assumptions that are implicit in the model:

(1) As discussed above, the thresholds established for injury and behavioral effects are inconsistent with the available data and are based, in part, on assumptions not acceptable within the field;

(2) The Navy does not properly account for reasonably foreseeable reverberation effects (as in the Haro Strait stranding incident),[96] giving no indication that its modeling sufficiently represents areas in which the risk of reverberation is greatest;

(3) The model fails to consider the possible synergistic effects of using multiple sources, such as ship-based sonars, in the same exercise, which can significantly alter the sound field. It also fails to consider the combined effects of multiple exercises, which, as NMFS indicates, may have played a role in the 2004 Hanalei Bay strandings;[97]

(4) In assuming animals are evenly distributed, the model fails to consider the magnifying effects of social structure, whereby impacts on a single animal within a pod, herd, or other unit may affect the entire group;[98] and

(5) The model, in assuming that every whale encountered during subsequent exercises is essentially a new whale, does not address cumulative impacts on the breeding, feeding, and other activities of species and stocks.

Council. Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects 35-68 (2005).

[96] NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with *USS Shoup* Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington, 5 May 2003 (2005).

[97] Southall et al., Hawaii Melon-Headed Whale at 31, 45.

[98] The effects of this deficiency are substantially increased by the Navy's use of a risk function, rather than an absolute threshold, to estimate Level B harassment.

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Before issuing a final EIS, the Navy must revise its flawed modeling systems and make them available to the public.

CRITIQUE OF THE RISK ASSESSMENT MODEL EMPLOYED TO CALCULATE TAKES IN THE HAWAII RANGE COMPLEX SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT

David E. Bain, Ph.D.

Abstract

Rather than using a fixed received level threshold for whether a take is likely to occur from exposure to mid-frequency sonar, the Navy proposed a method for incorporating individual variation. Risk is predicted as a function of three parameters: 1) a basement value below which takes are unlikely to occur; 2) the level at which 50% of individuals would be taken; and 3) a sharpness parameter intended to reflect the range of individual variation. This paper reviews whether the parameters employed are based on the best available science, the implications of uncertainty in the values, and biases and limitations in the model. Data were incorrectly interpreted when calculating parameter values, resulting in a model that underestimates takes. Errors included failure to recognize the difference between the mathematical basement plugged into the model, and the biological basement value, where the likelihood of observed and predicted takes becomes non-negligible; using the level where the probability of take was near 100% for the level where the probability of take was 50%; and extrapolating values derived from laboratory experiments that were conducted on trained animals to wild animals without regard for the implications of training; and ignoring other available data, resulting in a further underestimation of takes. In addition, uncertainty, whether due to inter-specific variation or parameter values based on data with broad confidence intervals, results in the model being biased to underestimate takes. The model also has limitations. For example, it does not take into account social factors, and this is likely to result in the model underestimating takes. This analysis has important management implications. First, not only do takes occur at far greater distances than predicted by the Navy's risk model, the fact that larger areas are exposed to a given received level with increasing distance from the source further multiplies the number of takes. This implies takes of specific individuals will be of greater duration and be repeated more often, resulting in unexpectedly large cumulative effects. Second, corrections need to be made for bias, and corrections will need to be larger for species for which there are no data than for species for which there are poor data. Third, the greater range at which takes would occur requires more careful consideration of habitat-specific risks and fundamentally different approaches to mitigation. The value of the model is that it provides a focus for future research on the effects of noise on marine mammals. In particular, the sensitivity analysis indicates the primary need for data is determining response probabilities of a wide range of species when exposed to received levels near the level at which 50% of individuals respond.

Introduction

The Navy distinguishes two types of takes: Level A, in which there is immediate injury or death; and Level B, in which there is no immediate injury, but cumulative exposure may lead to harm at the population level. However, in certain contexts, Level B harassment may lead to Level A takes through indirect mechanisms.

The population effects of Level A takes on populations are relatively easy to assess, as individuals that are killed are obviously removed from the population, and those that are injured are more likely to die whenever the population is next exposed to stress.

Calculating the population effects of Level B takes is a topic of contemporary research (Trites and Bain 2000). For example, Bain (2002a) explored using energetic consequences of behavior change in conjunction with population dynamics models to estimate population effects of Level B takes. Stress concurrent with Level B harassment would have additional population consequences. Stress may occur in the absence of behavioral change, or the absence of change in significant behavioral patterns such as foraging or nursing, or exclusion from optimal habitat. Lusseau et al. (2006) concluded disturbance caused a decline in and posed a significant threat to the survival of the bottlenose dolphin population in Doubtful Sound, New Zealand. While they noted vessel strikes were occurring (Level A takes), cumulative behavioral effects (Level B takes) were believed to be the primary threat to the population.

Models relating acoustic exposure to takes thus are not sufficient by themselves to interpret the effects of noise on populations. It is likely that different magnitudes of effect, whether physical harm, behavioral change that leads to physical harm, disruption of significant behavioral activities, or behavioral changes that pose negligible risk to populations when they occur only rarely but can become significant when exposure is prolonged or repeated, will have different relationships to noise. The different magnitudes of takes will have different population consequences. Thus it will be challenging to synthesize results of multiple studies, as different measured endpoints may belong on different curves relating them to noise, and different endpoints will have different population consequences. Further, the population consequences can depend on the health of the population (Bain 2002a). All these factors need to be considered when evaluating the environmental consequences of exposing marine mammals to noise.

Unconditional effects

Temporary Threshold Shifts in captive marine mammals are commonly used as an index of physical harm (e.g., Nachtigall et al. 2003, Finneran et al. 2002 and 2005, Kastak et al. 2005). Limiting experimental noise exposure to levels that cause temporary effects alleviates ethical concerns about deliberately causing permanent injury. However, repeated exposure to noise that causes temporary threshold shifts can lead to permanent hearing loss. In fact, chronic exposure to levels of noise too low to cause temporary threshold shifts can cause permanent hearing loss. Animal models (e.g., rats, cats,

monkeys, chinchillas) have been used for tests of noise causing permanent physical harm (Henderson et al. 1991, Gao et al. 1992, Blakeslee et al. 1978, Clark 1991). Damage to hearing from noise exposure is an example of unconditional injury from noise. OSHA (2007) requires limiting human exposure to noise at 115 dB above threshold (equivalent to 145 dB re 1 μPa for killer whales, Szymanski et al. 1999) to 15 minutes.

Stress reactions are another available index (e.g., Romano et al. 2004). Ayres (personal communication) found evidence suggesting that whale watching results in increased levels of stress hormones in wild killer whales.

Conditional effects

Changes in behavior resulting from noise exposure could result in indirect injury in the wild. A variety of mechanisms for Level B harassment to potentially lead to Level A takes have been identified.

Gas bubble lesions have been observed in beaked whales (Jepson et al. 2003, Fernandez et al. 2005, Cox et al. 2006). A variety of mechanisms have been proposed for this. While some have proposed these may be due to acoustically mediated bubble growth, and hence are an unconditional consequence of noise exposure (Crum and Mao 1996), it is more likely that these result from decompression sickness. That is, changes in dive behavior may prevent clearance of nitrogen gas from the body, resulting in larger bubbles than would occur in undisturbed dive patterns. One possible change is that beaked whales may remain submerged for an unusually long period of time, and then rapidly ascend. The rapid ascent is a change in behavior that prevents nitrogen from remaining in solution in the blood. Zimmer and Tyack (2007) questioned whether the rapid ascent mechanism would actually result in lesions, and proposed another behavior change that might occur is interruption of deep dives. Deep dives allow the lungs to collapse, preventing nitrogen from reaching the body. Further, a series of rapid breaths at the surface can be used to clear nitrogen absorbed under pressure. Interruption of the normal surface interval can allow nitrogen to build up over time. Changes in depths of dives are of more concern than rapid ascents as this mechanism would be applicable to a wide range of species, while if the rapid ascent mechanism is involved, it would be primarily a concern for deep diving species (Zimmer and Tyack 2007).

While failure to flee may lead to injury in beaked whales, flight may lead to injury in other species. Minke whales have been found stranded after sonar exercises (NOAA and Navy 2001). A minke whale was observed traveling at high speed during exposure to mid-frequency sonar in Haro Strait in 2003. It is easy to see how such behavior would lead to stranding when a beach is located in front of the whale, as minke whales lack echolocation and visibility is limited underwater. Exhaustion from rapid flight leading to heart or other muscle damage (Williams and Thorne 1996) could also account for increased mortality such as was observed in harbor porpoises following sonar exercises in Juan de Fuca and Haro Straits in April and May of 2003. Harbor porpoises, in contrast to

Dall's porpoises, rarely engage in sustained high energy activities such as rapid swimming or bow riding, and hence are less adapted to long distance flight responses.

Even successful flight may have negative survival consequences. In the absence of disturbance, individuals will tend to occupy optimal habitat. Displacement from optimal habitat will have consequences that will depend on the duration of the displacement, the quality of the alternate habitat, and the condition of the individuals at the time of displacement.

Separation of individuals from social units is another consequence of noise exposure that may lead to mortality. In 2003 in Haro Strait, some killer whales responded to mid-frequency sonar by seeking shelter behind a reef. Others chose to flee, resulting in splitting of a pod that historically spent all of its time together as a single unit. While no deaths resulted from this particular incident, other killer whales have been observed separated from their social units resulting in death prior to reunion or requiring human intervention to restore the individual to its social unit (Schroeder et al. 2007).

Temporary threshold shifts may conditionally lead to harm. Impaired hearing ability increases vulnerability to ship strike. In 2003, blunt force trauma was identified as a cause of death in the investigation of harbor porpoise mortalities following exposure to mid-frequency sonar in Washington State. A minke whale was nearly struck by a research vessel in the area where one had been observed fleeing mid-frequency sonar exposure. These species are familiar with boats in that area, and normally avoid them by a wide margin when they can hear them coming.

Impaired auditory ability may also increase predation risk. For example, Dahlheim and Towell (1994) reported an attack by killer whales on white-sided dolphins. The approach by the whales went undetected due to the noise of the research vessel. Further, impaired hearing may impair foraging ability and communication (Bain and Dahlheim 1994).

The Risk Function Model

The risk function uses three parameters. B is the received level at which the most sensitive individuals start to respond with changes in significant behaviors such as foraging. K is the difference in received level between the level at which half of individuals respond and the level at which the most sensitive individuals respond. That is, B+K is the level at which 50% of individuals respond. A is a shape parameter that attempts to capture the variability in responsiveness of the population. That is, are essentially all the individuals the same and the bulk of them become responsive when the received level is near B+K, in which case a simple threshold model would provide a good approximation, or is there a lot of variation in the population, in which case many individuals become responsive when received levels are near B?

The model is based on the hypothesis that some individuals start to respond at lower levels than others. It anticipates that some individuals will hold out until very high levels

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before responding. The model includes parameters that allow it to be applied appropriately to species with differing noise tolerance. However, the Navy used one set of parameter values to predict the responses of all species. This paper reviews the accuracy of the choice of parameter values, the implications of using the wrong parameter values, and whether the model makes unbiased predictions when uncertainty in the parameter values exists.

Limitations

Like many models, the risk model has limitations. It fails to take into account social interactions. For example, the model anticipates that individuals may move away from a source at different exposure levels, but fails to recognize that this would result in individuals becoming separated from the group. This is likely to lead to the curve becoming asymmetrical, with the "holdouts" responding to the behavior of their schoolmates rather than the sound. As the area exposed to lower levels of noise is larger than the area exposed to higher levels of noise, this would result in more individuals being affected than the model predicts for social species.

The model does not account for multiple sources. Kruse (1991), Williams and Ashe (2007) and Bain et al. (2006) noted that killer whale responses to vessels varied with the number of vessels present. The magnitude of certain responses increased on the order of 10% per source, although Williams and Ashe (2007) noted that large numbers of sources could result in changes in the opposite direction of small numbers of sources, potentially canceling out the effect. That is, rather than a risk function that simply identifies how likely a response is to occur, one that takes into account the magnitude of the response would be ideal.

Pingers have been used to reduce entanglement in gillnets. Kraus et al. (1997) were able to reduce entanglement of harbor porpoises by 90%. Gearin et al. (1996, 2000) used more pingers, and were able to reduce entanglement by 95%. While this could be accounted for by the fact that more pingers increase the minimum sound level at the net (Bain 2002b), Laake et al. (1997, 1998, 1999) found porpoises typically remained much farther from the net than the spacing between pingers, even after the avoidance response declined due to habituation. Thus, the effect of multiple sources seems larger than the effect of fewer sources. Pingers have also been successful in protecting other species from nets (Barlow and Cameron, 1999; Cameron 1999, Stone et al. 1997).

In addition to quantitative changes in response to multiple sources, there may be a qualitative change in the response. For example, noise is used in drive fisheries of many odontocete species to cause stranding or near strandings. That is, multiple sources were used to displace individuals in a particular direction, and the consequences (stranding) were more serious than displacement from the source alone as would result from exposure to a single source.

The risk to the population of qualitatively different responses varies not only with the type of response, but the circumstances. If the response is going ashore, fatalities are highly likely to result. If the response is slowly moving away for a short period of time, no fatalities are likely to result. However, if the response is to slowly move away from a prime feeding area for an extended period of time, and the population is food limited, fatalities may result, and the number is likely to be related directly to the duration of exclusion from the feeding area, and only indirectly to the cumulative sound energy received.

Finally, the model assumes that marine mammals behave independently from each other. This is not likely to be the case. Even species that are normally solitary, like harbor seals, have been observed to school in response to high energy noise (personal observation). To remain a member of a group, individuals must remain in geographic proximity to each other. As more sensitive individuals move away, others who are not sufficiently disturbed by the sound itself would need to move as well to remain members of the group. The result is likely to be a step function at moderate exposure levels rather than the gradual increase in risk predicted by the model. The result would be that risk is underestimated. The proportion of individuals necessary to lead all individuals to respond in a similar manner to noise is likely to vary among species, and propensity to mass strand may be a good predictor of the importance of this effect.

Datasets

The Navy chose to rely upon three datasets.

Captive cetaceans

Studies of captive marine mammals provide an excellent setting for identifying direct effects of sound. E.g., one of the datasets employed by the Navy consists of studies relating short-term exposure of bottlenose dolphins and belugas to high levels of noise to Temporary Threshold Shifts. The Navy (Dept. Navy 2008b, p 3-7) noted aggressive behavior toward the test apparatus, suggesting stress was another consequence of the test (see also Romano et al. 2004). Such effects would be unconditional results of noise exposure.

However, extrapolation of the level at which aggression was observed to the level at which behaviorally mediated effects might occur in the wild is problematic, as this depends on how well trained the subjects were. For example, the Navy has been a leader in training dolphins and other marine mammals to cooperate with husbandry procedures. Tasks like taking blood, stomach lavage, endoscopic examination, collection of feces, urine, milk, semen and skin samples, etc. once required removing individuals from the water and using several people to restrain them. With training, painful and uncomfortable procedures can be accomplished without restraint and with a reduction in stress that has significantly extended lifespans of captive marine mammals (Bain1988).

That is, the absence of avoidance or aggressive behavior does not imply an absence of physical harm, much less the absence of potential for behavior changes that may lead to indirect harm.

Physical harm may occur in the wild without avoidance responses as well. Yano and Dahlheim (1995) found killer whales continued to predate on longlines despite being physically injured by deterrents such as gunshots. Reeves et al. (1996) reviewed other examples from fishery interactions of injurious approaches to deterrence failing.

If belugas and bottlenose dolphins are like killer whales, and the 50% risk level is about 15 dB below the 50% risk level for behavioral change in trained animals (see below), this would put their value around 170 dB re 1 μPa. Even this is likely to be an overestimate, as boat motors with a source level of 165 dB re 1 μPa can cause behavioral changes in bottlenose dolphins (Nowacek et al. 2001.) This new value, 170 dB re 1 μPa, averaged with the other Navy datasets, would drop the average 50% risk level to 160 dB re 1 μPa.

Killer whales

The second dataset is killer whales exposed to mid-frequency sonar from the USS Shoup in Haro Strait, Washington, in May, 2003. The level quoted in the HRC SDEIS (Dept. Navy 2008b) is an estimate of the received levels experienced when mid-frequency sonar was transmitted from about 3 km away. This level caused major behavioral changes in 100% of exposed whales (Risk=1 for Level B takes of a magnitude that in other contexts or species could lead indirectly to physical harm), but was not to believed to have caused Level A takes (the whales did not strand, and received levels were estimated to be too low to have caused threshold shifts, NMFS OPR 2005) in any individuals (Risk = 0). However, much more data are available from the May, 2003 Shoup incident. Behavioral changes were first observed at 47 km (where the received level was estimated to be 121 dB). The behavioral response was tail slapping by about 25% of the individuals observed, which is consistent with observed responses to vessel noise at a similar level. At a distance greater than 22 km, the direction of travel changed away from a feeding area, and hence foraging behavior was disrupted. At this distance, the received level may have increased to the neighborhood of 135 dB re 1 μPa with about 6 dB of reduced spreading loss and 6 dB reduced absorption. This would be comparable to a vessel traveling at low speed approaching to within 10 m, which is very difficult to accomplish without causing whales to turn away. 100% of killer whales responded by abandoning their feeding ground and moving away from the noise source at this received level. While vessels cause diversion from straight-line paths, they have not been observed to displace killer whales from feeding areas (vessels have been observed to displace killer whales from resting areas, but this is likely mediated by presence rather than noise, as the effect is observed in the presence of silent vessels, Trites et al. 1995). Thus it is not surprising that a qualitatively different behavioral response was exhibited. The peak exposure level was estimated to be 175 dB re 1 μPa (HRC SDEIS, although NMFS noted that estimated levels tended to overestimate measured levels by 1-10 dB [NMFS OPR 2005], so the peak exposure level may have been only 165 dB). In addition to changing

travel patterns, the pod split, with approximately 50% of the pod continuing to shelter in an acoustic shadow zone, and the other 50% fleeing at high speed. Such behavior has not been observed in the presence of vessels alone. It should be emphasized that 100% of killer whales exhibited a disruption of a significant life process, foraging, at a level that may have been less than 135 dB re 1 μPa, in contrast to the value used in the SDEIS, 169.3 dB re 1 μPa for a 50% response.

Additional datasets are available for killer whale responses to noise. E.g., in Bain and Dahlheim's (1994) study of captive killer whales exposed to band-limited white noise in a band similar to that of mid-frequency sonar at a received level of 135 dB re 1 μPa, abnormal behavior was observed in 50% of the individuals. This is far lower than the level observed in bottlenose dolphins. In addition, Bain (1995) observed that 100% of wild killer whales appeared to avoid noise produced by banging on pipes (fundamental at 300 Hz with higher harmonics) to the 135 dB re 1 μPa contour. This indicates the difference between wild and captive killer whales (non-zero risk in captive marine mammals might correspond to 100% risk in wild individuals of the same species), as well as implying that risk of 100% may occur by 135 dB re 1 μPa for this genus in the wild.

Further, killer whales begin responding to vessel traffic at around 105-110 dB re 1 μPa with minor behavioral changes. By 135 dB re 1 μPa, disruption of foraging may approach 100%. Received level appears to be more important than proximity (Bain 2001). For risk to increase from near 0 at 105 dB re 1 μPa to near 100% by 135 dB re 1 μPa, with A=10, the 50% risk level would need to be about 120 dB re 1 μPa. Substituting 120 for 169 dB re 1 μPa reduces the average level for 50% risk by about 16 dB to 144 dB re 1 μPa. Substituting 135 dB re 1 μPa would reduce the average by 8 dB to 157 dB re 1 μPa.

Finally, the Navy's characterization of the killer whale dataset is incorrect. They indicate the effects observed in the presence of mid-frequency sonar in Haro Strait were confounded by the presence of vessels. However, the effects of vessels on killer whales have been extensively studied (e.g., Kruse 1991, Williams et al. 2002ab, Bain et al. 2006). Behavioral responses attributed to mid-frequency sonar are qualitatively different than those observed to vessels alone. While the observations are anecdotal, they were not inconsistent. The sonar signal was blocked from reaching the whales with full intensity by shallow banks or land masses during three segments of the observation period. The "inconsistencies" can be attributed to differences in behavior depending on whether there was a direct sound path from the Shoup to the whales. It should be noted there was extensive study of this population prior to exposure (see Bigg et al. 1990 and Olesiuk et al. 1990 for a description of typical research protocols), as well as extensive post-exposure monitoring (e.g., Bain et al. 2006).

Right whales

Similarly, the right whale data relied upon are of limited value. While they clearly illustrate that the value at which 50% of animals are influenced is below 135 dB re 1 μPa

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and are therefore helpful in determining the upper limits of the B+K value, they lack sufficient low level exposures needed to fit the low end of the curve. As with killer whales, the Navy misused the data. They averaged values which resulted in 100% response. Thus the average value exceeds the level resulting in a 50% risk.

Right whales exposed to alerting devices consistently responded when received levels were above 135 dB re 1 μPa. Due to the small sample size (six individuals), it is unclear whether this is close to the 50% risk, the 100% risk level, or both. These data do not allow identification of B, as lower exposure levels were not tested. In mysticetes exposed to a variety of sounds associated with the oil industry, typically 50% exhibited responses at 120 dB re 1 μPa. Thus right whales may be similar to killer whales.

The consequences of using incorrect values can be seen by comparing the observed results of the right whale exposures to alert signals (Nowacek et al. 2004) with those predicted by the Navy model. Using the values of B=120, K=45, and A=10 in the HRC SDEIS (Dept. Navy 2008b), the probability of responses for the exposed whales are shown in column two of Table 1. The formula underestimated the number of takes by a factor of over 500. The Navy proposed using A=8 for mysticetes in recognition of this, and the results are shown in column 3. While improved, the model still underestimated takes by a factor of 183. One could try B=105 and K=15. Using A=10 provides a reasonable approximation, overestimating takes by 20% (column 4). A better approximation is provided by A=2, which predicts the number of takes within 2% (column 5). While the probability of all four right whales exposed to the highest alert signals responding is much less than one in a billion based on the Navy model and allows one to unequivocally reject the Navy's choice of parameter values as applying to that species, numerous other combinations of parameter values would fit the data as well as the values shown in the table here. Substituting 120 dB re 1 μPa for 139 dB re 1 μPa results in an average 6 dB lower at 159 dB re 1 μPa.

Table 1. Risk for right whales (model vs. observed)

Received Level (dB re 1 μPa)	RISK B=120,K=45,A=10	RISK B=120,K=45,A=8	RISK B=105,K=15,A=10	RISK B=105,K=15,A=2
Responded				
148	0.008647	0.022021	0.999973	0.891548
143	0.001217	0.004641	0.999908	0.86521
137	5.92E-05	0.000415	0.999488	0.819864
135	1.7E-05	0.000153	0.999026	0.800039
133	4.06E-06	4.86E-05	0.998059	0.777052
No Response				
134	8.52E-06	8.79E-05	0.998633	0.788974
Error Factor	502	183	0.83	1.01

Datasets not considered

The Navy incorrectly concludes that additional datasets are unavailable. In addition to the other killer whale datasets mentioned above, data illustrating the use of acoustic harassment and acoustic deterrent devices on harbor porpoises illustrate exclusion from foraging habitat (Laake et al. 1997, 1998 and 1999, Olesiuk et al. 2002). Data are also available showing exclusion of killer whales from foraging habitat (Morton and Symonds 2002), although additional analysis would be required to assess received levels involved. The devices which excluded both killer whales and harbor porpoises had a source level of 195 dB re 1 μPa, a fundamental frequency of 10 kHz, and were pulsed repeatedly for a period of about 2.5 seconds, followed by a period of silence of similar duration, before being repeated. Devices used only with harbor porpoises had a source level of 120-145 dB re 1 μPa, fundamental frequency of10 kHz, a duration on the order of 300 msec, and were repeated every few seconds. Harbor porpoises, which the Navy treats as having a B+K value of 120 dB re 1 μPa (with A large enough to yield a step function) in the AFAST DEIS (Dept.Navy 2008a), 45 dB lower than the average value used in the HRC SDEIS, may be representative of how the majority of cetacean species, which are shy around vessels and hence poorly known, would respond to mid-frequency sonar. Even if harbor porpoises were given equal weight with the three species used to calculate B+K, including them in the average would put the average value at 154 dB re 1 μPa instead of 165 dB re 1 μPa.

Harbor porpoise responses to various acoustic devices have been documented in captivity and the wild. Pingers with a source level of 130 dB re 1 μPa displace wild harbor porpoises to a distance of at least 100-1000 m, where the received level was likely in the

neighborhood of 80-90 dB re 1 μPa. Studies of harbor porpoises in captivity also found responses to acoustic deterrent devices, but could not be tested at such distances due to limitations in facility size (Kastelein et al. 1997, 2001). This is another example of how studies with captive cetaceans can produce misleading results. Airmar devices with a source level of 195 dB re 1 μPa displaced an estimated 95% of harbor porpoises to a distance of 3 km. While received levels were not measured, they could have been in the neighborhood of 120-130 dB re 1 μPa. These findings are well modeled with a B value of 70 dB re 1 μPa, a K value of 25, and an A value of 4.

Many species are poorly known, due in part to difficulties approaching them from boats and in part because they do not fare well in captivity. Species that may exhibit vulnerability to noise comparable harbor porpoises include many species of Stenella (e.g., striped dolphins), beaked whales, sperm whales (which are best studied from sailboats rather than motorized vessels, and show disruption of foraging at levels below 130 dB re 1 μPa, Jochens et al. 2006), and numerous poorly known species. In contrast, Dall's porpoises are known to bow ride, and appear far less easily disturbed by noise from airguns than harbor porpoises (Calambokidis et al. 1998). They may be an example of a relatively noise tolerant species like the bottlenose dolphins included in the SDEIS.

There are also data that are based on other noise sources. E.g., effects of vessel traffic on whale and dolphin behavior could be interpreted in terms of received levels. While engine noise tends to be continuous rather than intermittent like sonar, in a reverberant environment, mid-frequency sonar may be received as a nearly continuous sound (personal observation).

Likewise, records of marine mammal responses to broadband noise sources like airguns are also likely to be informative. While it may be difficult to extrapolate levels resulting in takes due to potential differences in perception of broadband and narrowband signals, and pulses rather than continuous sounds, they can give an idea of the range of intra-specific and inter-specific variation in B and K values and be applicable to determining the A parameter.

E.g., Calambokidis et al. (1998) found harbor seal responses to airguns typically consisted of visually orienting at received levels from 143 to 158 dB re 1 μPa and moving away at received levels from 158 dB to 185 dB re 1 μPa. However, one harbor seal oriented at 163 dB re 1 μPa rather than moving away. The highest measured received levels for Dall's porpoises were about 170 dB re 1 μPa, but only about 142 dB re 1 μPa for harbor porpoises. Similarly, the highest received levels measured for California sea lions were about 180 dB re 1 μPa, but only about 160 dB re 1 μPa for Steller sea lions. The highest measured received level was also 160 dB re 1 μPa for gray whales. That is, closely related species pairs may differ in their responsiveness to noise by over 20 dB, and taxonomically diverse species pairs may exhibit similar responsiveness.

TTS data similar to those available for cetaceans have been collected from harbor and elephant seals, and California and Steller sea lions (Kastak et al. 1999, 2005). As with cetaceans, field data suggest the Navy parameter values will underestimate takes of some

pinniped species, though they may provide a reasonable approximation for harbor seals and California sea lions (e.g., the data described above). Pinniped hearing in species studied to date is less sensitive than in cetaceans (e.g., California sea lions, Schusterman et al. 1972; Steller sea lions, Kastelein et al. 2005; harbor seals, Møhl 1968; northern fur seals, Moore et al. 1987; odontocetes, Au 1993), and it is commonly assumed they are less vulnerable to noise as a result. However, comparisons of Steller sea lions with Dall's porpoises and gray whales exposed to airgun noise indicates this is not always the case. A detailed consideration of pinnipeds is beyond the scope of this paper.

Using the datasets discussed above, 50% risk levels based on trained cetaceans may be 165 dB re 1 μPa, 120 dB re 1 μPa for killer and right whales, and 95 dB re 1 μPa for harbor porpoises. The average of 95, 120, 120 and 165 is 125 dB, 40 dB lower than the 50% risk value of 165 dB used in the Navy model. Even if one uses more stringent criteria for what constitutes takes (120 dB for harbor porpoises, 135 dB for killer and right whales, and 170 dB for bottlenose dolphins), the average would be 140 dB, which is 25 dB lower than the Navy model. Setting B to 100, K to 40, and A to 10 would result in roughly 40 times the number of takes than the model predicts using the Navy's parameter values.

Parameter values

The use of default values for model parameters is problematic. The available data are likely to be biased toward noise tolerant species. That is, species that are intolerant of noise are difficult to approach closely enough to study. They tend to fare poorly in captivity. E.g., spinner dolphins and harbor porpoises showed very poor survivorship in captivity, in contrast to bottlenose dolphins (Bain 1988). Thus averages based on available data are likely to underestimate effects on species for which data are not available.

While the Navy has proposed assuming noise tolerance is predictable along taxonomic lines, which correlate with hearing ability, empirical data do not support this assumption (Bain and Williams 2006). Likewise, there is interspecific variation in noise tolerance in fish (Kastelein 2008).

B Value

The basement value should be set low enough that the risk function predicts takes at the lowest of the level resulting in unconditional injuries, the level at which behaviorally mediated injuries are possible, and the level resulting in minor behavioral changes or stress that can have population level effects with sustained or repeated exposure.

An important property of the model is that the biologically observed basement value is different than the mathematical basement value. The Navy proposes using 120 dB re 1 μPa as the basement value. They indicate the selection of this value is because it was commonly found in noise exposure studies. However, 120 dB re 1 μPa has broadly been

found as the value at which 50% of individuals responded to noise, not a small percentage. Further, a mathematical B of 120 dB corresponds to a risk of less than 2% at 150 dB (with K=45 and A=10), which would be difficult to detect in empirical studies. That is, the studies should be re-evaluated to determine the level at which a small percentage of individuals responded, and then a further correction for the difference between mathematical B and the empirically determined biological B would be needed.

However, further consideration should be given to the nature of the responses used in those studies to determine whether they represent significant behavioral changes or are only likely to have a population scale effect with sustained or repeated exposure.

For example, many looked at changes in migration routes resulting from noise exposure, and found that 50% of migrating whales changed course to remain outside the 120 dB re 1 μPa contour (Malme et al. 1983, 1984). These results might be interpreted in several ways. They could be seen as minor changes in behavior resulting in a slight increase in energy expenditure. Under this interpretation, they would not qualify as changes in a significant behavior, and are irrelevant to setting the basement value. They could be interpreted as interfering with migration, even though the whales did not stop and turn around, and hence 120 dB would make an appropriate B+K value rather than B value. Third, the change in course could have been accompanied by a stress response, in which case the received level at which the course change was initiated rather than the highest level received (120 dB re 1 μPa) could be taken as the biological basement value.

As discussed above, sensitive species like harbor porpoises may be significantly affected by levels below 100 dB re 1 μPa (Kastelein et al. 1997, 2000, 2001). Foraging behavior of killer whales can be disrupted by levels on the order of 105-110 dB re 1 μPa or less (Williams et al. 2002ab, data in Bain et al. 2006). These are far below the 120 dB re 1 μPa level proposed, and as mentioned above, the mathematical B value needed to predict detectable changes at 110 dB would be far lower than 110 dB. For example, B=80, K=45, and A=10 predicts a risk of less than 2% at 110 dB.

K Value

The K value reflects the difference between the mathematical B value and the level at which 50% of individuals respond. Since determining the B value has problems of its own, this critique will focus on determining the B+K value. The 50% risk level is relatively easy to determine, and has been commonly reported in the literature, as noted in the SDEIS. However, the most common value was 120 dB re 1 μPa, as noted in the SDEIS, yet these studies were not used to calculate B+K. Instead, other datasets were used, and the numbers derived were not the 50% risk levels. As mentioned above, there are problems with extrapolation of responses in trained animals to wild animals, and the right and killer whale values were based on levels that resulted in nearly 100% risk, not 50% risk. (It may not be possible to determine a level at which 50% risk occurred in killer whales, but perhaps collaboration among killer whale researchers, whale watch operators, and the Navy might identify the B+K level for that event).

The 50% risk level is the median level at which individuals begin to respond, not the mean as calculated in the SDEIS. While there are data suggesting risk of threshold shift is related to duration of exposure, and hence the consequences of exposure to continuous noise sources would be different than exposure to intermittent sources, there are no such data for behaviorally mediated effects. Many species strongly avoid motorized vessels, and hence are more vulnerable to noise than the average of the species considered above. Such species are likely to include those in the sperm and beaked whale families, Pacific right whales, blue whales, melon-headed and pygmy killer whales, right whale dolphins, and Clymene, striped and rough-toothed dolphins. A smaller number of species, like Dall's porpoises, are more tolerant of noise sources than the average of the species considered above. Thus it is unlikely that the average value of B+K across cetacean species would be above 120 dB re 1 μPa, although the value would vary across species.

A value

While the A value is described as relating to the sharpness of the risk function, it also influences the symmetry of the function. As A increases, risk is redistributed from low noise levels to higher noise levels. The relative risk to the population, as opposed to risk to individuals, can be described as the risk to individuals at a given received level times the relative number of individuals receiving that level. As the sound spreads to larger areas, more individuals are exposed to lower levels of noise. The shape of the risk function and the spreading loss model determine the received level that poses the most risk to the population. At high received levels, the risk to the population may be small, because although the risk to individuals is high, the number of individuals likely to be exposed is small. At low levels, the risk to the population may be again small, because although the number of individuals exposed is high, the risk to those individuals is low. At intermediate values, the population experiences the most risk. When A is low, the risk to the population peaks near B, and at high A values, the risk is concentrated near B+K.

The choice of A value appears arbitrary. The Navy indicated they wanted to allow for more response at low levels, and adjusted the A value to accomplish this. However, this would have been better accomplished by lowering the B and B+K values as suggested above.

The significance of an A value underestimating the number of individuals responding to low levels of noise and overestimating the number of individuals responding to high levels of noise is that the area exposed to low levels of noise is larger than the area exposed to high levels of noise, so the calculation would lead to an underestimate of takes.

Calambokidis et al. (1998) employed an appropriate methodology for obtaining data for calculating A values of marine mammals exposed to airguns. They used a small vessel which moved toward and away from the seismic survey vessel, and hence were able to observe behavior and measure received values at distances of over 70 km as well as close

to the seismic survey vessel. Thus they were able to observe normal behavior in the presence of low levels of noise, as well as identify levels above which 100% of individuals exhibited behavioral change, and note inter-specific variation in response curves.

Interaction of Terms

It appears that B+K is a stronger predictor of the number of takes than either factor separately. As a result, similar risk curves can be generated for many different pairs of B and K as long as the sum is held constant. K and A together determine the range over which risk rises from 5% to 95%. Similarly, pairs of K and A over a range of values can generate similar risk curves.

With B=120, K=45, and A=10, the risk function predicts risk is near zero at received levels near 120, and that over 99.9% of takes will occur above 138 dB re 1 μPa. Even with A = 8, 99.9% of takes occur at levels above 135 dB. With A values this large, B is better described as the level at which the risk function is undefined (it requires dividing by 0) rather than the level at which risk becomes negligible. That is, the mathematical basement value and the biological basement value are different. The level at which data from marine mammals show barely detectable risk will be far above the mathematical basement value when K is 45 and A is 8 or 10. When K or A are small, the mathematical and biological B values become similar.

Another way of looking at the difference between the mathematical and biological basement value is to ask how much risk is detectable. In field studies, it will be difficult to distinguish responses that occur in only 5% of individuals from baseline behavior. Even if a study were sensitive enough to detect this, the received level to cause 5% risk is more than 30 dB above the mathematical B value for B=120, K =45 and A=8 or 10. That is, if risk becomes biologically detectable at 120 dB, the B value used in the equation for risk should be far lower. When the model uses the biological B value as the mathematical B value, it does not accurately predict the observed pattern of takes.

Long range effects

The Navy expressed uncertainty over whether there would be long distance effects, even when sound levels were received that are known to cause effects at close range. While I am not aware of observations at 65 nautical miles, responses at over 20 miles have been observed in killer whales to mid-frequency sonar, as well as at over 15 miles to mid-frequency sonar in Dall's porpoises, and harbor porpoises appeared to respond to airguns at over 40 nm (personal observation). The porpoises were responding at distances greater than they would respond to natural predators (killer whales), which are not believed to be detectable at those ranges.

Further evidence of long range responses to noise can be seen in differences in detection rates of some species using acoustic means and ship-based observations. Such studies indicate that species like Pacific right whales and blue whales avoid motorized vessels at distances which place them over the horizon (Wade et al. 2006, Širović 2006).

Uncertainty and Bias

To assess the effects of uncertainty in the parameter values (B, K, and A) on bias in the estimated number of takes, the following method was used. Two spreading loss models were used. A spherical spreading loss model was used, although this was likely to underestimate received levels, particularly at long distances. The other was spherical spreading at close range followed by a cylindrical spreading loss at longer distances model. An accurate model would depend on actual conditions, which would vary from one sonar exercise to another, both as bottom topography varies from place to place and the structure of the water column varies from time to time. The two models chosen should bracket actual conditions, and will serve for purposes of illustration at this stage. In both models, absorption at 3.5 kHz was used to correct for excess attenuation (Richardson et al. 1995). A source level of 235 dB re 1 μPa was assumed for purposes of illustration.

Individuals were assumed to be distributed uniformly with distance from the source, although in practice, action areas will be large enough that density could reasonably be expected to vary. The action area was divided into concentric rings 10 meters across. As the diameter of the ring increased, the area within the ring increased:

$$A = \pi r_o^2 - \pi r_i^2$$

where r_o is the outer diameter and r_i is the inner diameter of the ring.

The risk was calculated for individuals within the ring using the Navy equation, and the relative number of individuals experiencing that risk level was based on the area of the ring. As in the equation for the individuals, the cumulative impact on the population was normalized to 1 based on the Navy default parameters. The effects of uncertainty were observed by allowing the parameters to vary above and below the default values.

Using this model, the contributions of the innermost rings were small, due to their small area, and the contribution of the outermost rings were small, due to the low risk experienced by individuals in those ring. Figures 1-20 show the shape of the risk function and the relative numbers of takes that would occur as a function of received level for a variety of parameter value combinations.

Selected values of B, K and A were used to calculate relative effects, and the results are shown in Table 2 for a spherical spreading model, and Table 3 for a model that assumes spherical spreading for the first 2 km and then cylindrical spreading after that. The default values are shown in bold. Take numbers are based on Alternative 3 in the Hawaii

Range Complex SDEIS (Dept. Navy 2008b), which in turn is based on the No Action Alternative, Table 3.3.1-1. Where the number of takes approaches the size of the population, the actual number of takes will be smaller than shown in the table. However, individuals will be taken multiple times and the duration of takes will be longer than if the calculated number of takes were small. Presumably, longer and more frequent takes of individuals will have more impact on the population than takes due to single exposures.

Table 2. Sensitivity Analysis based on a spherical spreading model

B	K	A	Spreading Model	Relative Effect	Humpback takes	Striped Dolphin takes	Basis
80	45	10	Inv. Square	185.29	2,826,414	867,898	Vary B
90	45	10	Inv. square	75.25	1,147,864	352,471	Vary B
100	45	10	Inv. square	23.92	364,876	112,041	Vary B
110	45	10	Inv. square	5.68	86,643	26,605	Vary B
120	**45**	**10**	**Inv. square**	**1.00**	**15,254**	**4,684**	**SDEIS**
130	45	10	Inv. square	0.14	2,136	656	Vary B
140	45	10	Inv. square	0.02	305	94	Vary B
120	5	10	Inv. Square	167.18	2,550,164	783,071	Vary K
120	15	10	Inv. square	62.22	949,104	291,439	Vary K
120	25	10	Inv. square	18.33	279,606	85,858	Vary K
120	35	10	Inv. square	4.47	68,185	20,937	Vary K
120	**45**	**10**	**Inv. square**	**1.00**	**15,254**	**4,684**	**SDEIS**
120	55	10	Inv. square	0.23	3508	1077	Vary K
120	65	10	Inv. square	0.06	915	281	Vary K
120	75	10	Inv. square	0.01	153	47	Vary K
120	45	1	Inv. square	42.40	646,770	198,602	Vary A
120	45	5	Inv. square	3.27	49,881	15,317	Vary A
120	45	8	Inv. square	1.40	21,356	6,558	Vary A
120	**45**	**10**	**Inv. square**	**1.00**	**15,254**	**4,684**	**SDEIS**
120	45	12	Inv. Square	0.80	12,203	3,747	Vary A
120	45	20	Inv. Square	0.52	7,932	2,436	Vary A
120	45	100	Inv. Square	0.39	5,949	1,827	Vary A
120	**45**	**10**	**Inv. square**	**1.00**	**15,254**	**4,684**	**SDEIS**
105	15	10	Inv. square	251.39	3,834,703	1,177,511	*Orcinus*
105	15	8	Inv. square	250.96	3,828,144	1,175,497	
70	25	10	Inv. square	1070.25	16,325,594	5,013,051	*Phocoena*
70	25	8	Inv. square	1067.49	16,283,492	5,000,123	*Phocoena*

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Table 3. Sensitivity analysis based on a model with spherical spreading for 2 km followed by cylindrical spreading.

B	K	A	Spreading Model	Relative Effect	Humpback takes	Striped Dolphin takes	Basis
80	45	10	Hybrid	132.20	2,016,579	619,225	Vary B
90	45	10	Hybrid	65.31	996,239	305,912	Vary B
100	45	10	Hybrid	25.30	385,926	118,505	Vary B
110	45	10	Hybrid	6.67	101,744	31,242	Vary B
120	**45**	**10**	**Hybrid**	**1.00**	**15,254**	**4,684**	**SDEIS**
130	45	10	Hybrid	0.08	1,220	325	Vary B
140	45	10	Hybrid	.005	76	23	Vary B
120	5	10	Hybrid	127.23	1,940,771	595,947	Vary K
120	15	10	Hybrid	59.67	910,213	279,496	Vary K
120	25	10	Hybrid	21.39	326,238	100,177	Vary K
120	35	10	Hybrid	5.37	81,901	25,149	Vary K
120	**45**	**10**	**Hybrid**	**1.00**	**15,254**	**4,684**	**SDEIS**
120	55	10	Hybrid	0.18	2,724	836	Vary K
120	65	10	Hybrid	0.04	570	175	Vary K
120	75	10	Hybrid	0.01	143	44	Vary K
120	45	1	Hybrid	34.16	521,077	160,005	Vary A
120	45	5	Hybrid	3.65	55,665	17,093	Vary A
120	45	8	Hybrid	1.51	23,016	7,067	Vary A
120	**45**	**10**	**Hybrid**	**1.00**	**15,254**	**4,684**	**SDEIS**
120	45	12	Hybrid	0.73	11,103	3,409	Vary A
120	45	20	Hybrid	0.35	5,353	1,644	Vary A
120	45	100	Hybrid	0.17	2,593	796	Vary A
120	**45**	**10**	**Hybrid**	**1.00**	**15,254**	**4,684**	**SDEIS**
105	15	10	Hybrid	171.9	2,622,166	805,181	*Orcinus*
105	15	8	Hybrid	171.3	2,612,718	802,279	
70	25	10	Hybrid	516.41	7,877,318	2,418,864	*Phocoena*
70	25	8	Hybrid	514.46	7,847,573	2,409,731	*Phocoena*
80	45	10	Hybrid	132.20	2,016,579	619,225	"Average"species
100	40	10	Hybrid	40.88	623,525	191,464	Stringent criteria
120	45	10	Social75	1.004	15,315	4,703	75% step
120	45	10	Social50	1.06	16,169	4,965	50% step
120	45	10	Social25	1.49	22,728	6,979	25% step
120	45	10	Social10	3.02	46,067	14,146	10% step

An interesting characteristic of the Navy model is that uncertainty causes it to be biased to underestimate risk. The reason for this bias is that the area receiving higher than the level of sound associated with a 50% risk based on default values is smaller than the area receiving lower levels. Thus if a species is 10 dB more sensitive than predicted (the B value), the cumulative risk is underestimated by a factor of 5.68, while if it is overestimated by 10 dB the correction is 0.14. Similarly, if the error is 20 dB, the correction factors are 23.92 and 0.02, respectively. However, the values average to 6.15, not 1 as would be the case if the default values provided an unbiased estimate. Errors in K show a similar pattern.

Likewise, if the default value of A is too low, it makes little difference in the estimated number of takes. However, if the default value of A is higher than the actual value, the effect on the population can be seriously underestimated when default values are used.

It should also be noted that the bias increases with increasing uncertainty.

Another source of uncertainty is propagation. As noted above, there is uncertainty over propagation that depends on the structure of the water column. Expectations can be based on historical measurements, and actual conditions can be measured to allow re-running propagation models with actual conditions. However, when received levels as a function of distance are higher than predicted, the result is asymmetrical relative to an error of the same magnitude in the opposite direction, as is the case for errors in the receiver parameters. E.g., when a sound channel forms, the area receiving enough noise to cause takes will dramatically increase.

Finally, the magnitude of the difference between parameter values based on reanalysis of the datasets used by the Navy (with harbor porpoises added, a species included in the AFAST Draft DEIS, Dept. Navy 2008a), and the Navy analysis should be emphasized. The number of takes predicted for an average species differs by a factor of more than 100. For humpbacks, this suggests individuals would be taken an average of about 250 times. Of course, when refresh times are taken into account, the number of retakes would be below this number, but the duration of takes would go up as a result. The cumulative effect on the population is likely to be far higher with the increased number and duration of takes predicted when more realistic parameters are used than when the Navy parameters are used.

SEL vs. SPL

Studies with captive marine mammals suggest that SEL provides a good predictor of Temporary Threshold Shift. That is, there is a tight relationship among signal strength, duration, and TTS. However, for behaviorally mediated effects, this relationship is likely to be different. SPL is likely to qualitatively determine the response for signals longer than 1 ms in duration. As long as signals are produced sufficiently often, the duration from the first signal to the last is likely to be more important than the SEL. That is, for

low received levels, one second signals produced every 40 seconds for 120 minutes are likely to have more impact than a continuous signal that lasts 10 minutes, even though the latter contains far more sound energy (600 seconds versus 180 seconds), as a behavioral response will be sustained for hours rather than minutes.

When attempting to predict effects of takes on the population, a take table with multiple columns should be developed. One based on SEL could be used to characterize direct effects such as threshold shifts. The next two should be based on SPL. The first of these should be analyzed to evaluate the total number of individuals that would change their behavior as a result of noise exposure, with particular attention paid to exposure in high risk areas (canyons, near shore, near shipping lanes) for potential indirect injuries. The third analysis would consider duration of exposure (in hours of exercise rather than in the SEL sense) to determine whether factors such as stress, displacement from preferred habitat, changes in foraging success and predation risk, etc., would result in cumulative effects that would alter population growth in a manner equivalent to lethal removals (Bain 2002a).

Summary

In summary, development of a function that recognizes individual variation is a step in the right direction. However, the selected equation is likely to produce underestimates of takes. This is due both to social factors increasing the likelihood of a response at low exposure levels, and asymmetries in the number of individuals affected when parameters are underestimated and overestimated due to uncertainty. Thus it will be important to use the risk function in a precautionary manner.

The sensitivity analysis reveals the importance of using as many datasets as possible. First, for historical reasons, there has been an emphasis on high energy noise sources and the species tolerant enough of noise to be observed near them. Exclusion of the rarer datasets demonstrating responses to low levels of noise biases the average parameter values, and hence underestimates effects on sensitive species. In particular, exclusion of the Navy's own interpretation of harbor porpoise data resulted in an increase of B+K by 11 dB, and a reduction in estimated takes by a factor of about 5. Second, uncertainty is correlated with bias. That is, even if a representative set of noise exposure-response data are used to calculate parameter values, the statistical uncertainty resulting from small samples results in biased parameter estimates that lead to underestimation of effects. Thus when estimating takes, it will be important to correct for bias. When estimating population effects on poorly known species, it will be important to be precautionary.

An important error in the selection of parameter values was in interpretation of existing data. Extrapolating behavioral changes in beluga and killer whales and bottlenose dolphins trained to tolerate physical harm that is in their long-term best interest to the threshold for onset of any physical harm in wild individuals is problematic. A similar mistake was made with the right whale data. The level at which 100% of individuals responded was used as the value at which 50% of individuals responded (B+K).

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Likewise, the level at which 100% of killer whales responded to mid-frequency sonar is less than the value derived for B+K in the HRC SDEIS (Dept. Navy 2008b).

The "broad overview" of studies reported responses to received levels of 120 dB re 1 μPa by 50% of individuals. That is, 120 dB re 1 μPa should be taken as a "default" value for B+K, not B. Studies which looked at the level at which statistically significant changes were observed, rather than the level at which 50% of individuals responded found lower levels for B. As a result, B is overestimated, and B+K (the level at which risk is 50%) is as well. The use of data from trained dolphins and white whales biased the average B+K value upward. The exclusion of the effects of AHD's and ADD's on harbor porpoises further biases these values, though the sensitivity analysis suggests that using average values to extrapolate takes is unlikely to be accurate due to the broad range of inter-specific variation.

It is likely that biological B values should be in the range from just detectable above ambient noise to120 dB re 1 μPa. The resulting mathematical B value could be tens of dB lower, not the 120 dB re 1 μPa proposed. For many species, risk may approach 100% in the range from 120-135 dB re 1 μPa, putting K in the 15-45 dB range. A values do not seem well supported by data, and in any case, are likely to be misleading in social species as the risk function is likely to be asymmetrical with a disproportionate number of individuals responding at low noise levels. Re-evaluating the datasets identified by the Navy and including harbor porpoises, an average B+K value of 125 dB was found, and the over-representation of species that fare well in captivity likely biases the average above what it would be for all species. Rather than one equation fitting all species well, parameters are likely to be species typical. As realistic parameter values are lower than those employed in the HRC SDEIS (Dept. Navy 2008b), AFAST DEIS (Dept. Navy 2008a) and related DEIS's, take numbers should be recalculated to reflect the larger numbers of individuals likely to be taken. The difference between the parameter values estimated here and those used in the SDEIS suggests takes were underestimated by two orders of magnitude.

The large number of takes predicted when more sensitive species are used as sources of the parameters indicates that many individuals are likely to be taken many times, and the potential for population scale effects to result from small behavioral changes becomes significant.

Assuming spherical spreading out to 2 km followed by cylindrical spreading, B=120, K=45 and A=10 (the Navy values), most takes occur where the received level is greater than 157 dB re 1 μPa and the distance is less than 13 km. With stringent criteria for what constitutes a take derived in the reanalysis (B=120, K=20, A=10), most takes would occur where the received level is below 145 db re 1 μPa and the distance is over 43 km. With the average values calculated here (B=80, K=45, and assuming A=10), most takes would occur where the received level is below 135 dB re 1 μPa and the distance is over 80 km. These values predict over 100 times more takes as the Navy values, as well as the need for very different approaches to mitigation.

21

The Navy recognizes that the occurrence of conditional effects is important to assessing the impact of noise exposure. As such effects are the result of both received levels and environmental conditions, permit conditions will be important in determining these. The potential for conditional harm suggests using mitigation to limit the potential for actual harm. E.g., the risk of causing stranding can be minimized by restricting exercises to areas far from shore. Limiting the duration of exposure can limit the consequences of long-term displacement, risk of injury from prolonged flight, and limit cumulative effects. The risk of causing gas bubble lesions can be minimized by restricting use near canyons, for extended periods of time, and limiting the number of sources. The absolute effects can be minimized by conducting exercises in areas where population density is low, or at times of year when species of concern are absent.

Finally, it will be important to assess the cumulative effects of noise combined with other factors and population status (Wade and Angliss 1997) to assess the likely effects of sonar exercises on marine mammal populations.

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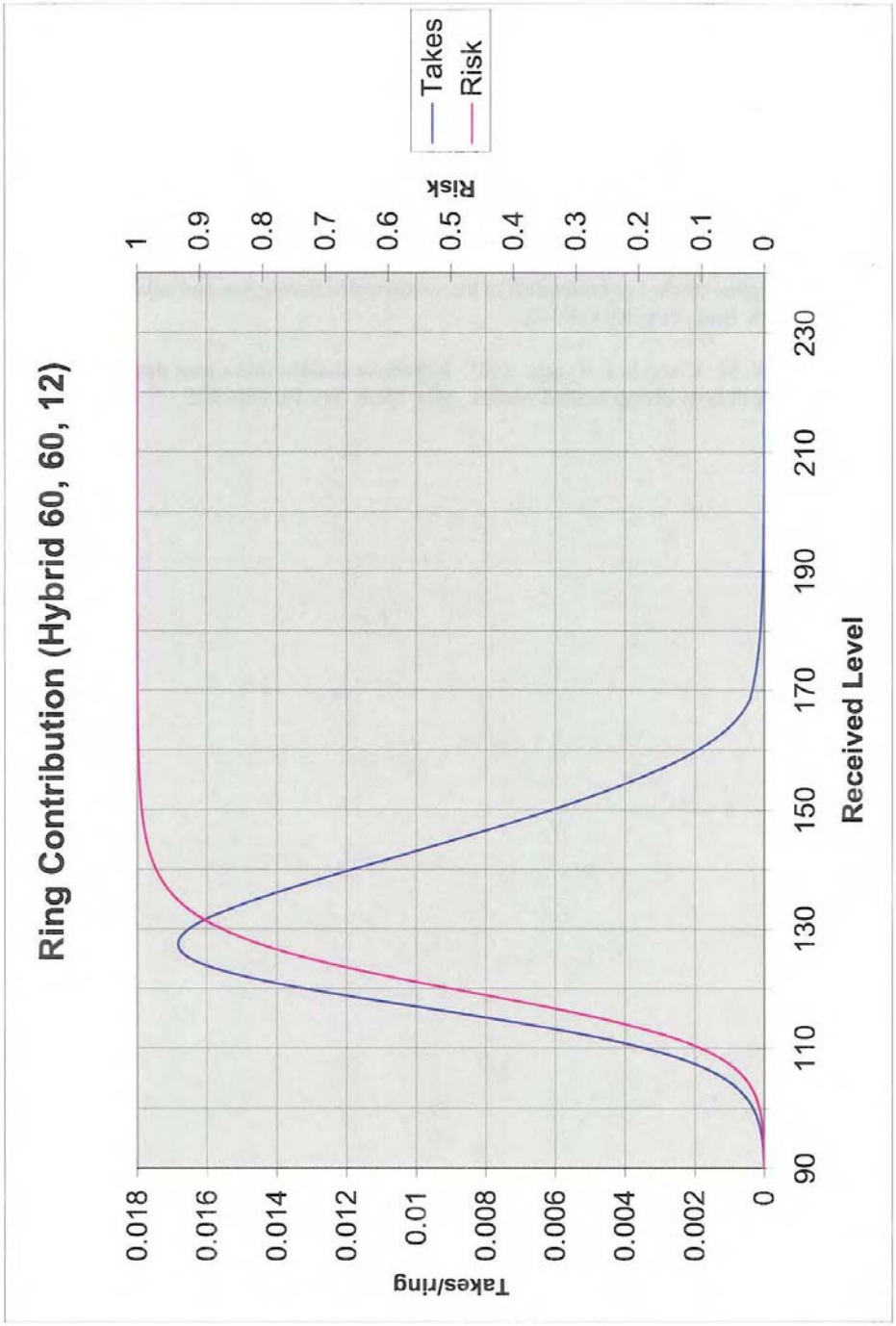
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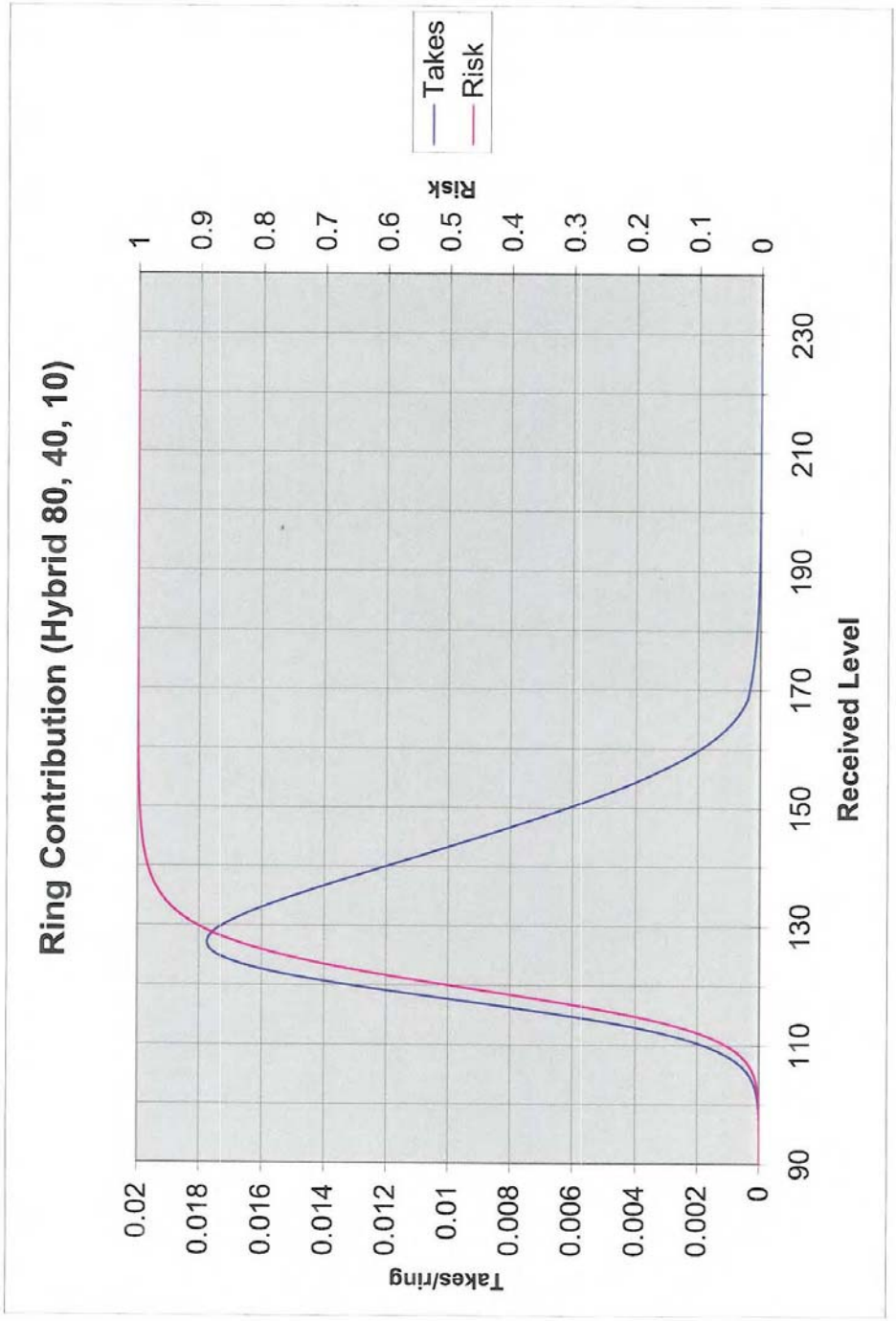
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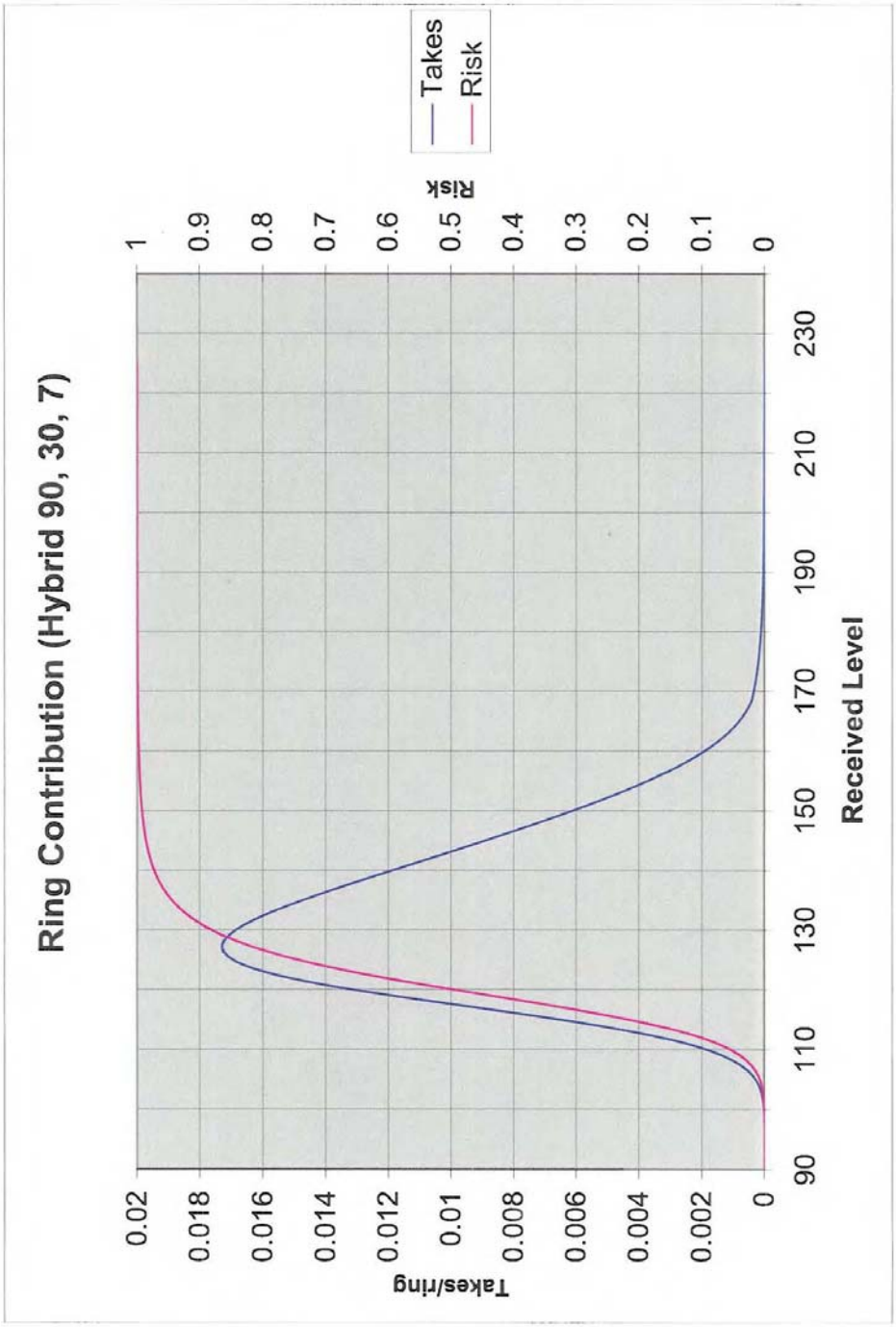
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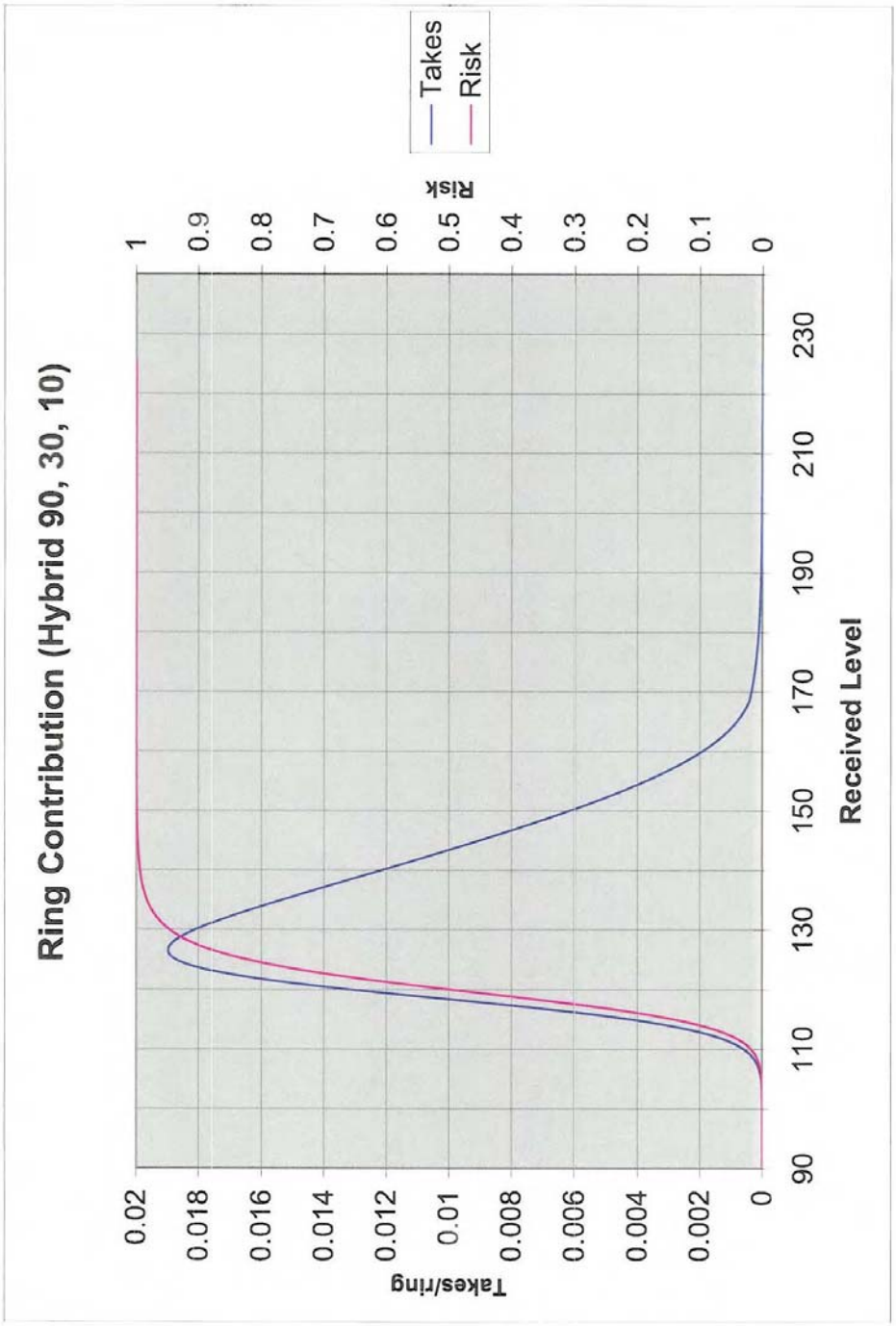
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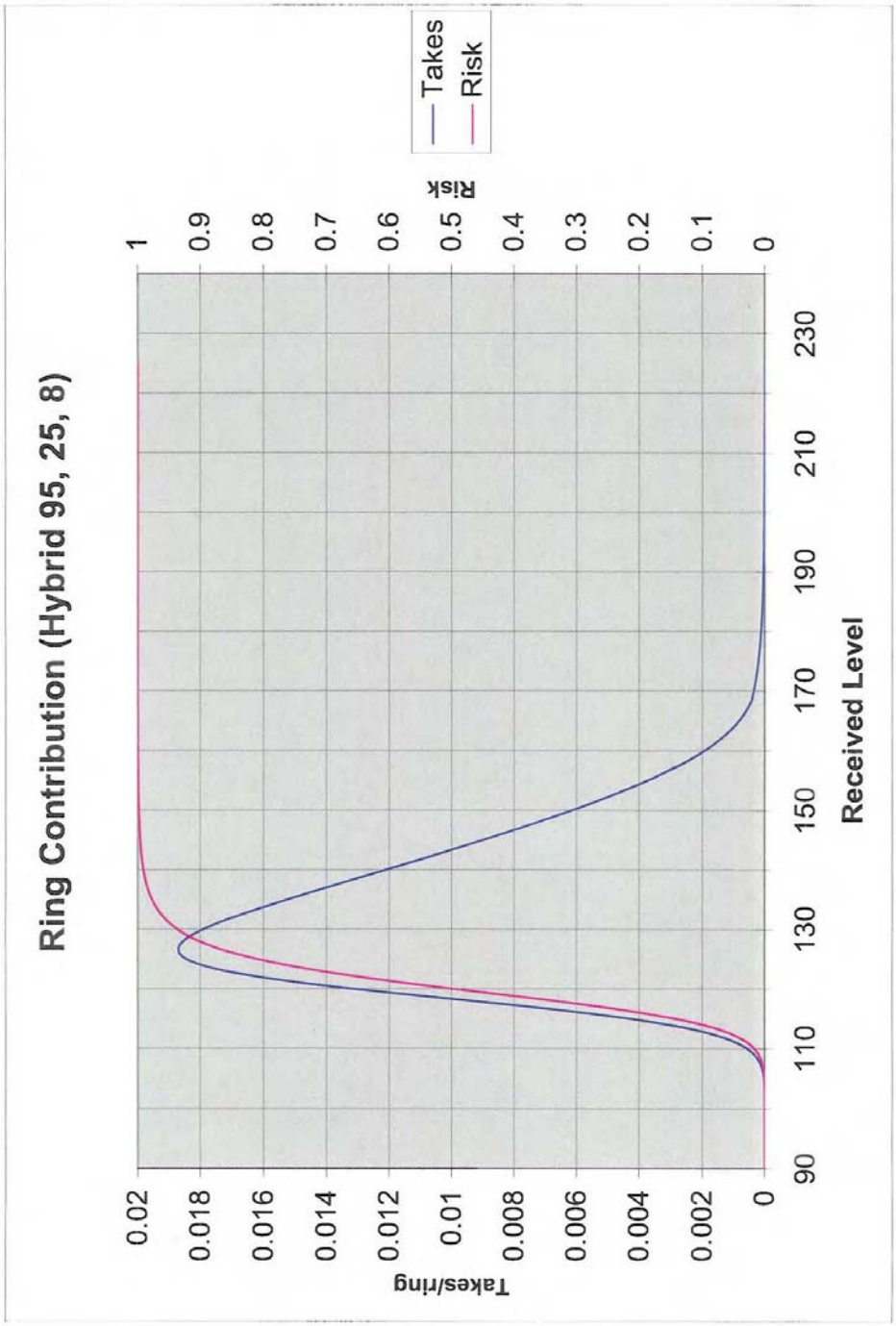
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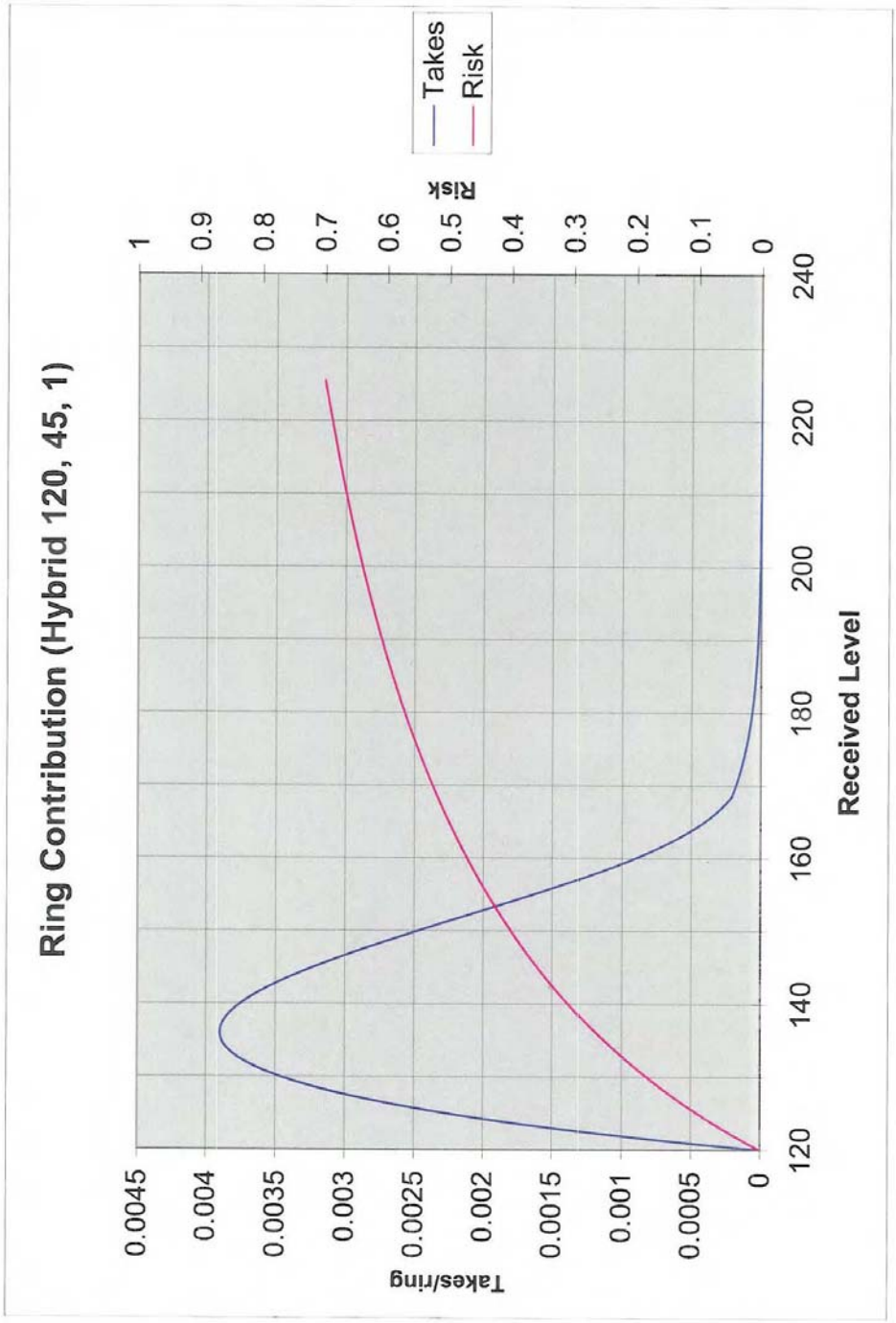
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Takes
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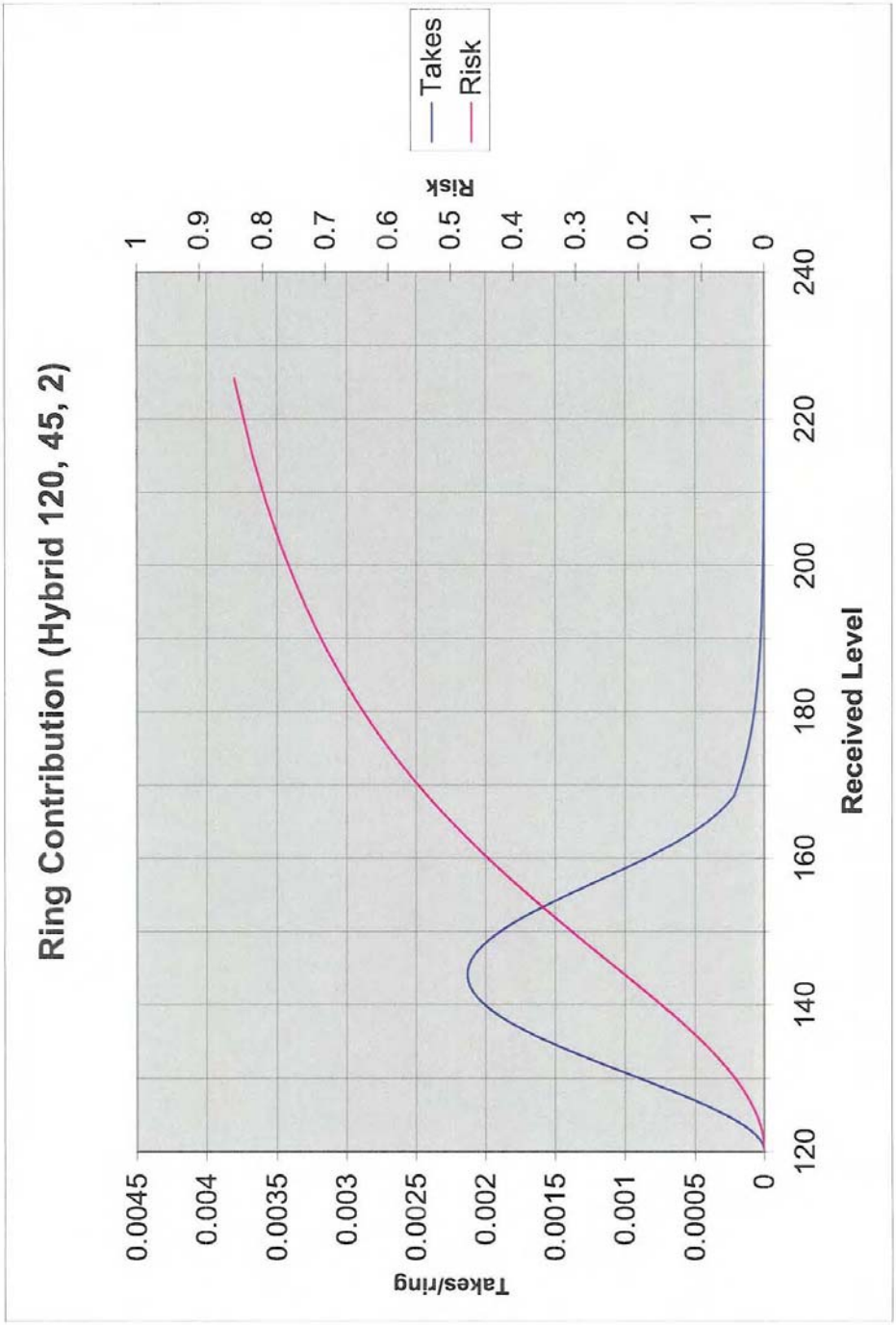
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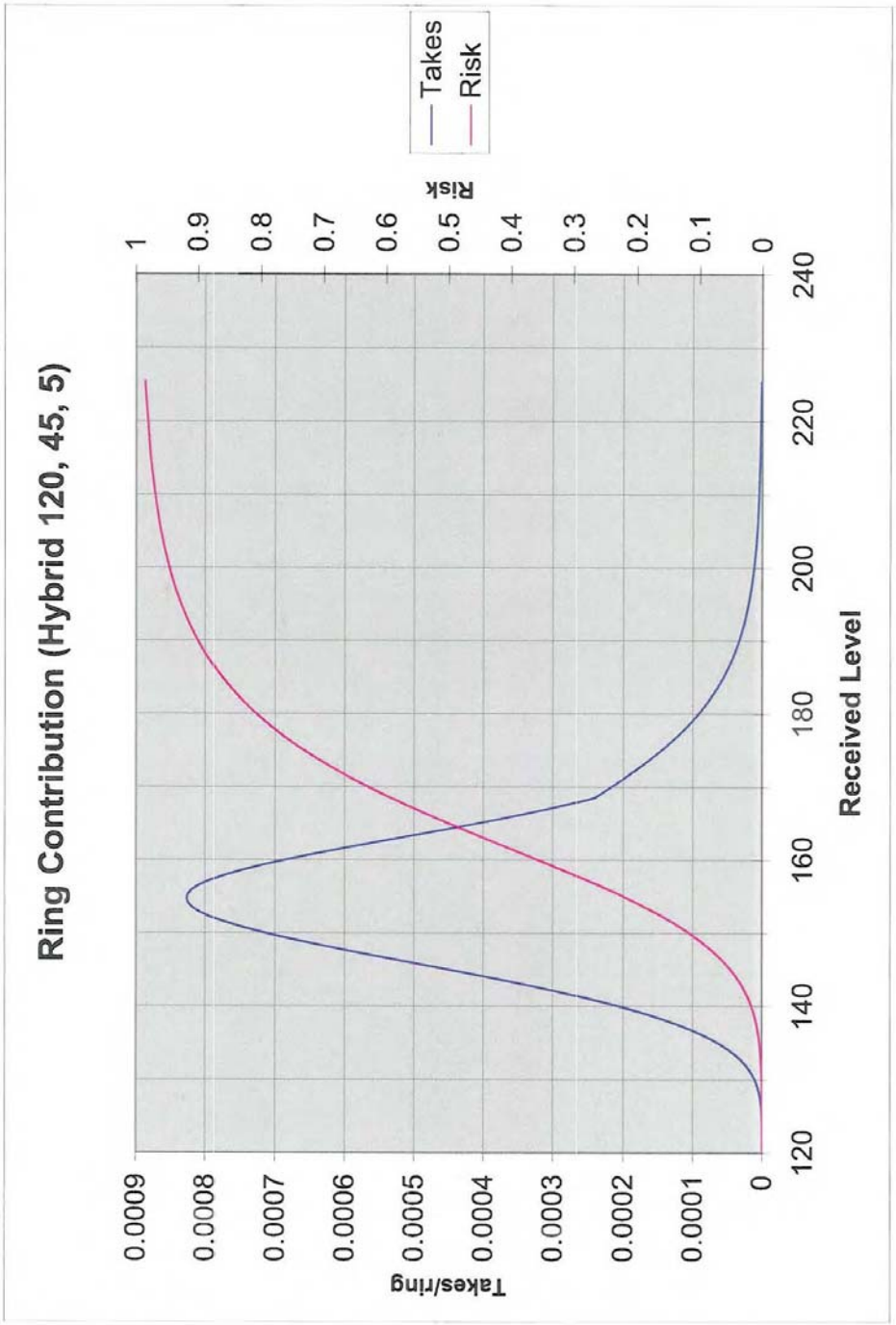
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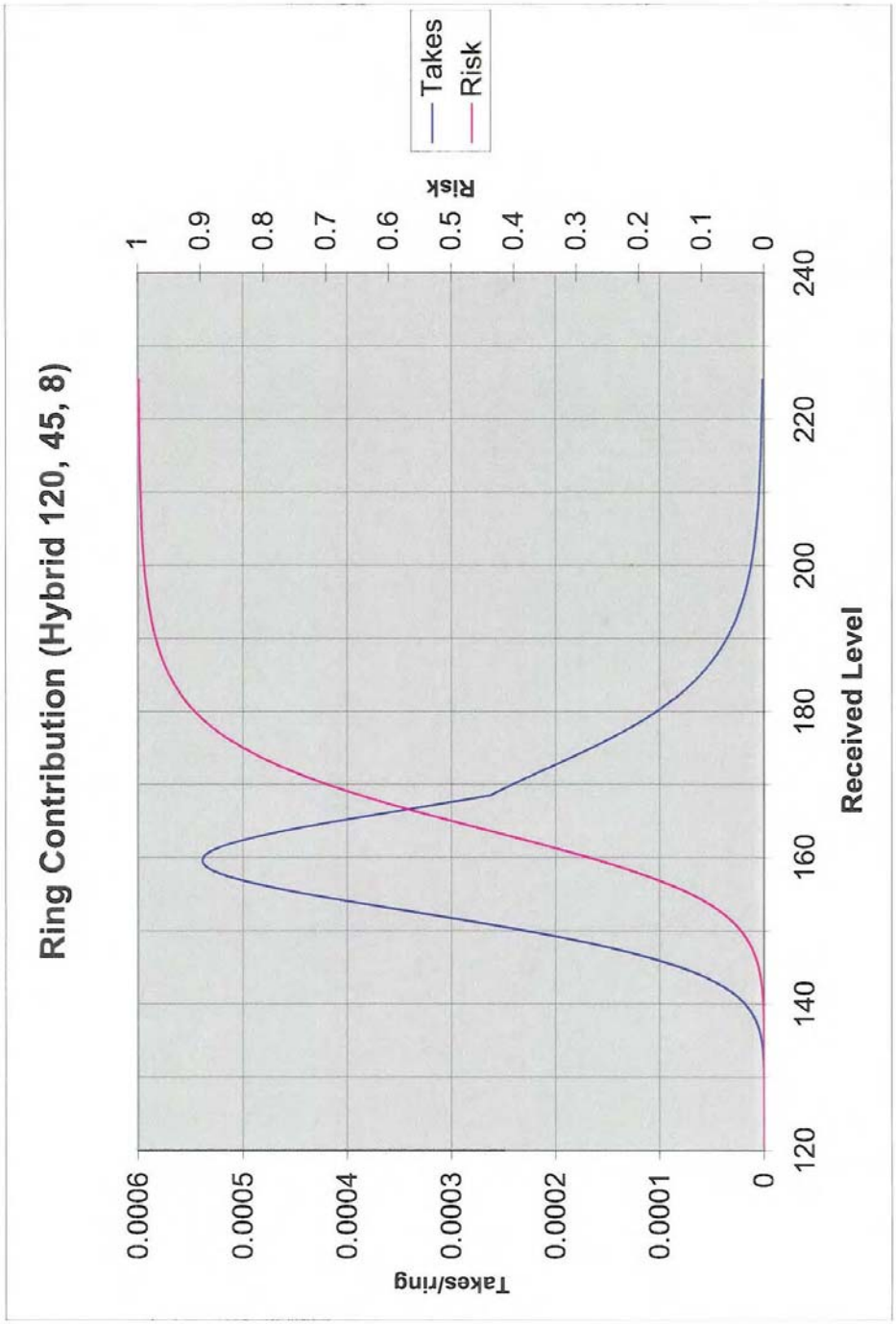
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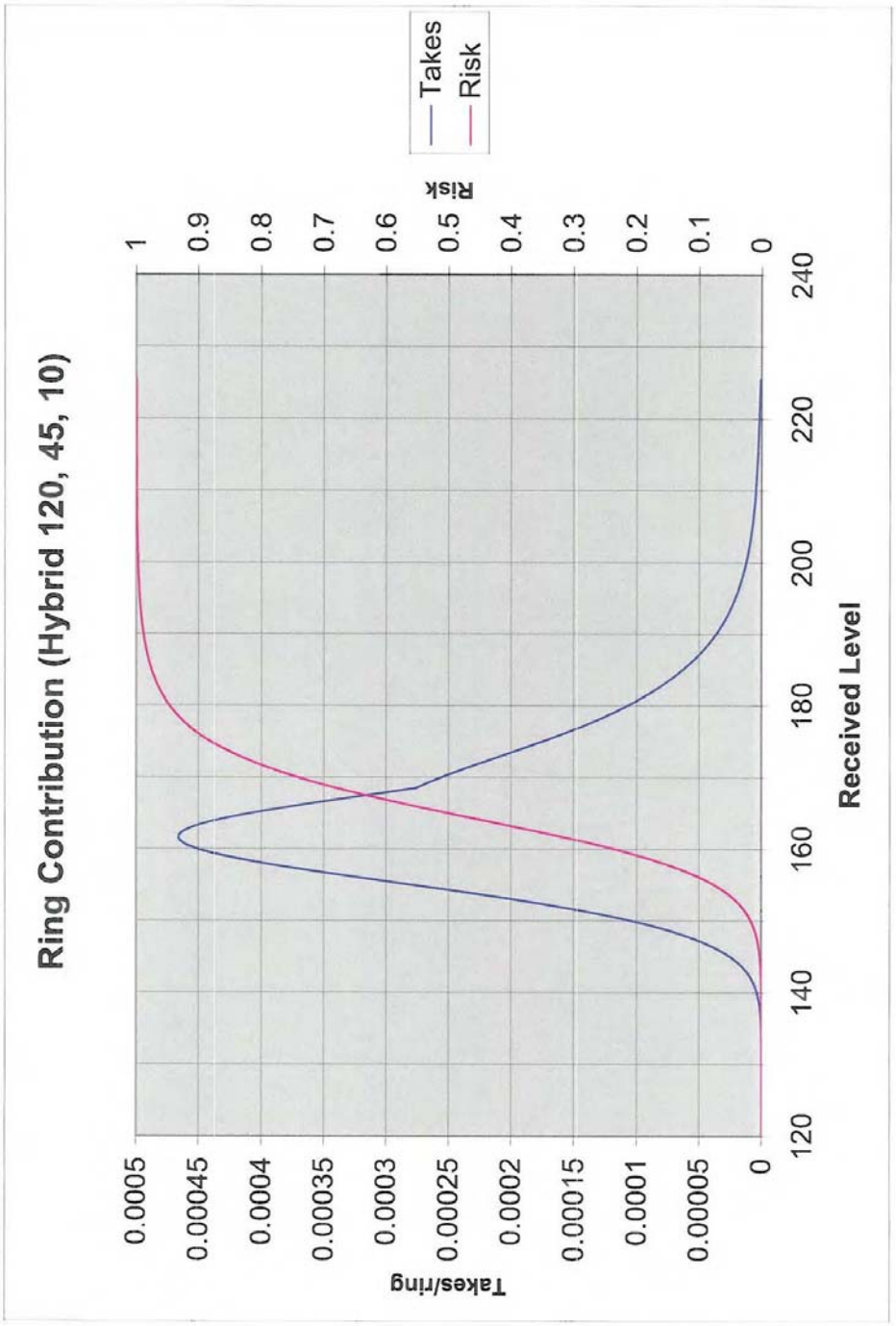
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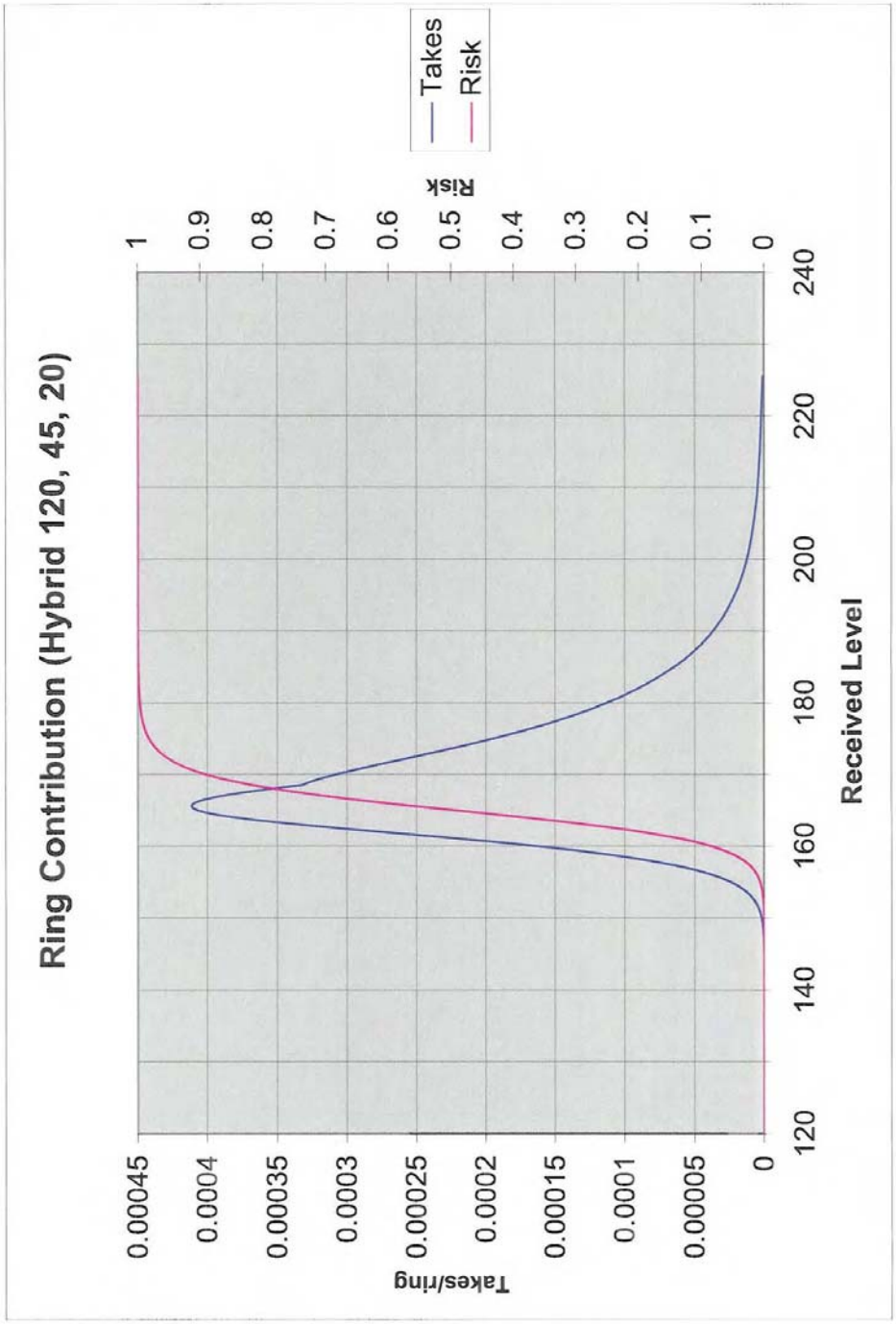
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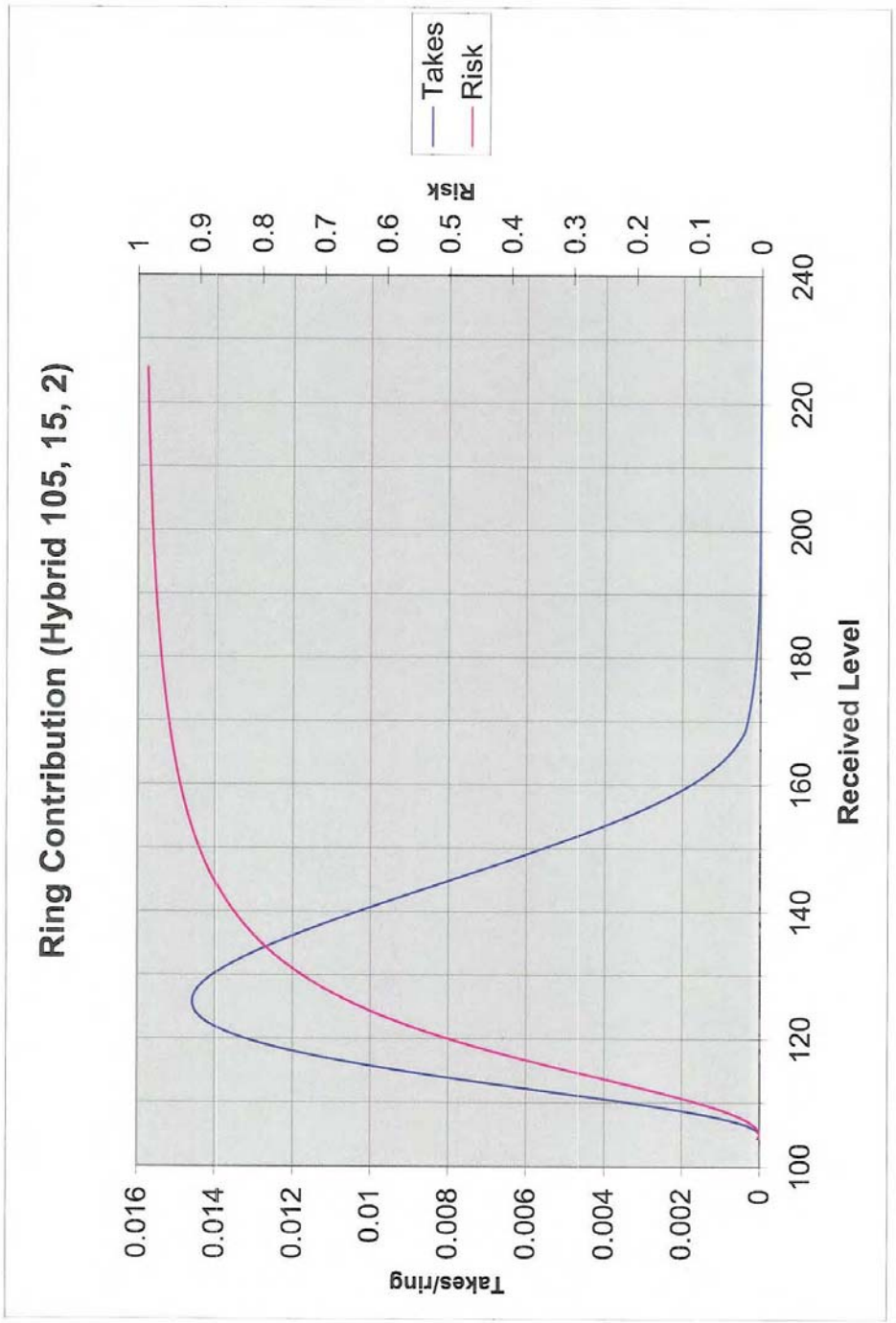
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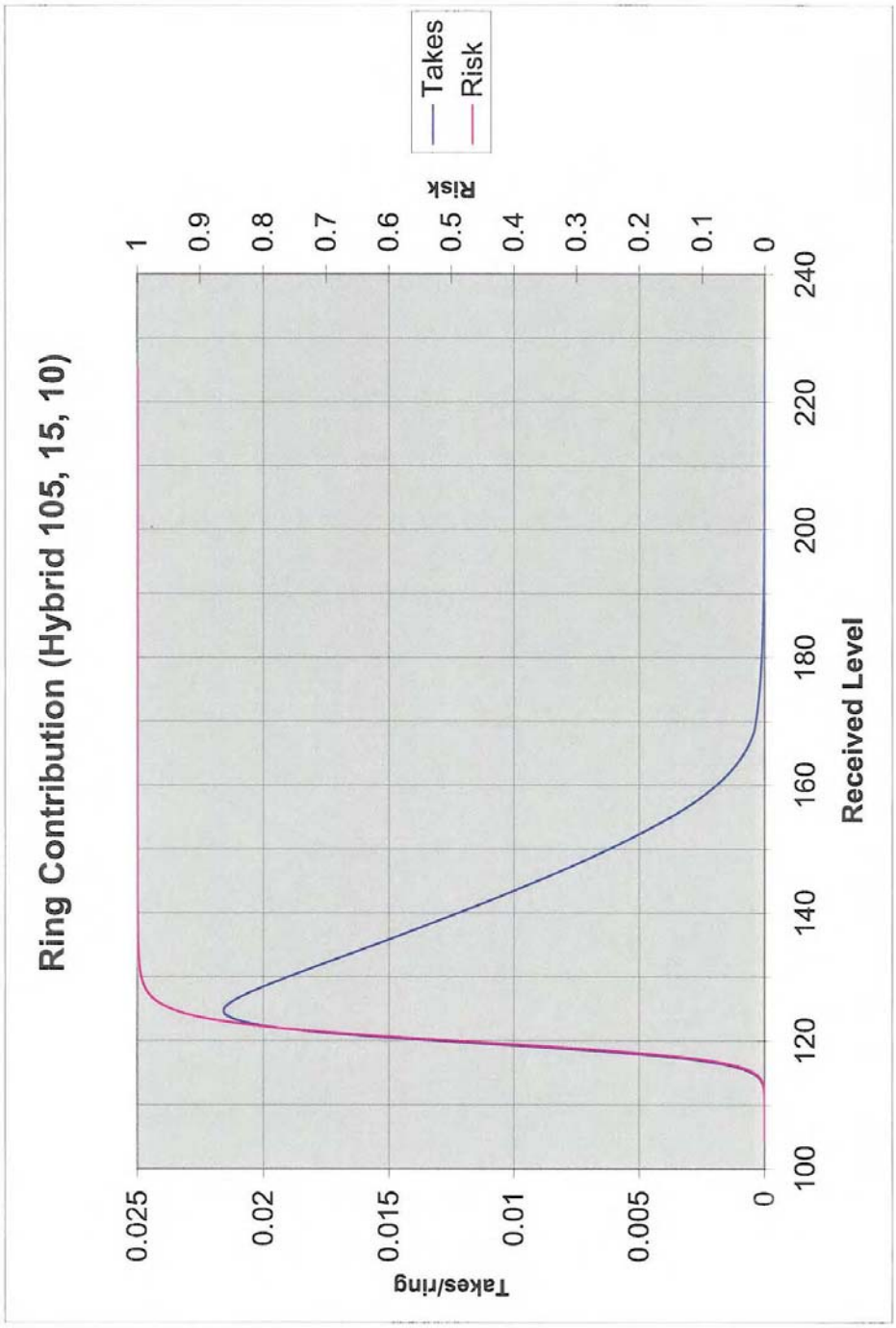
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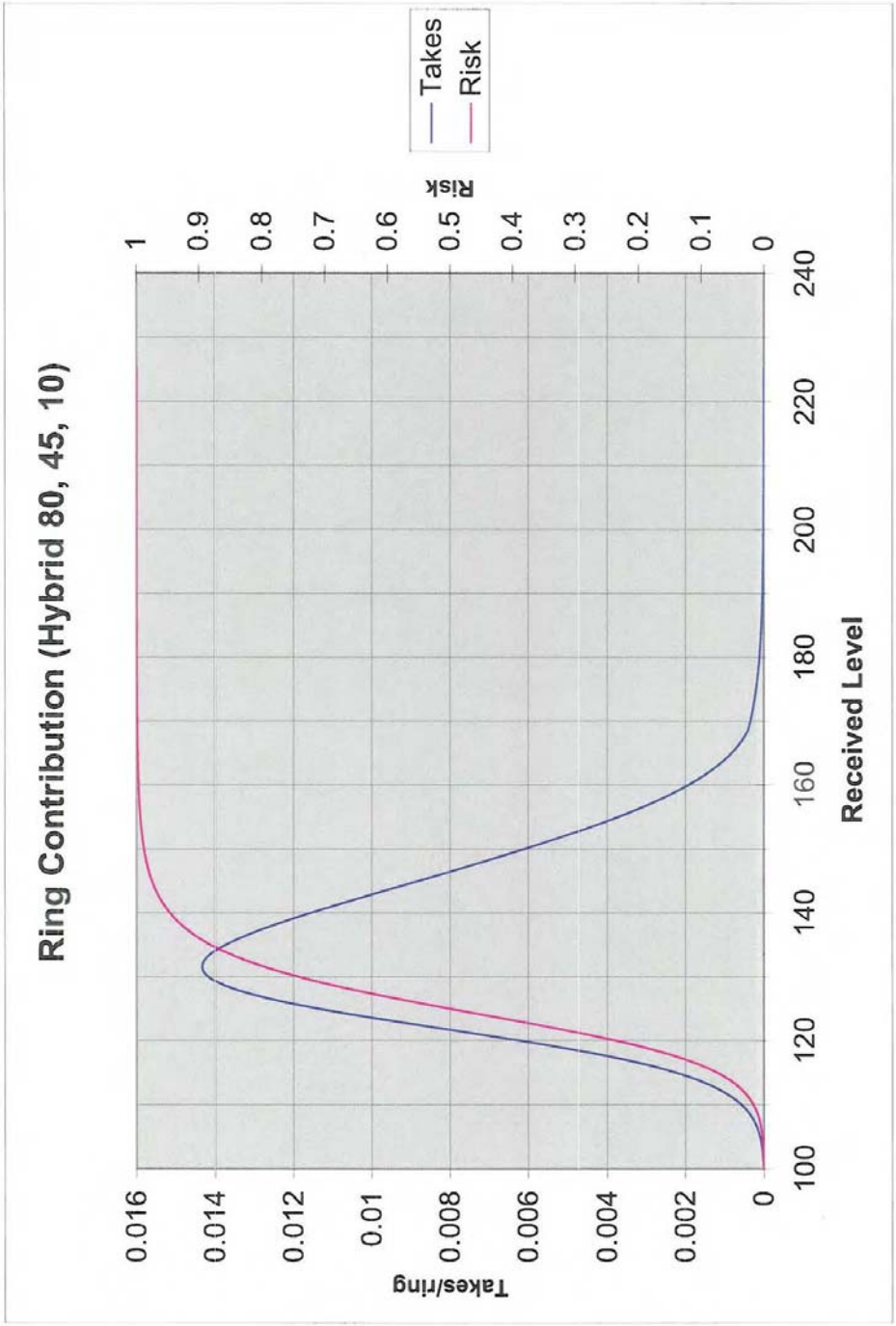
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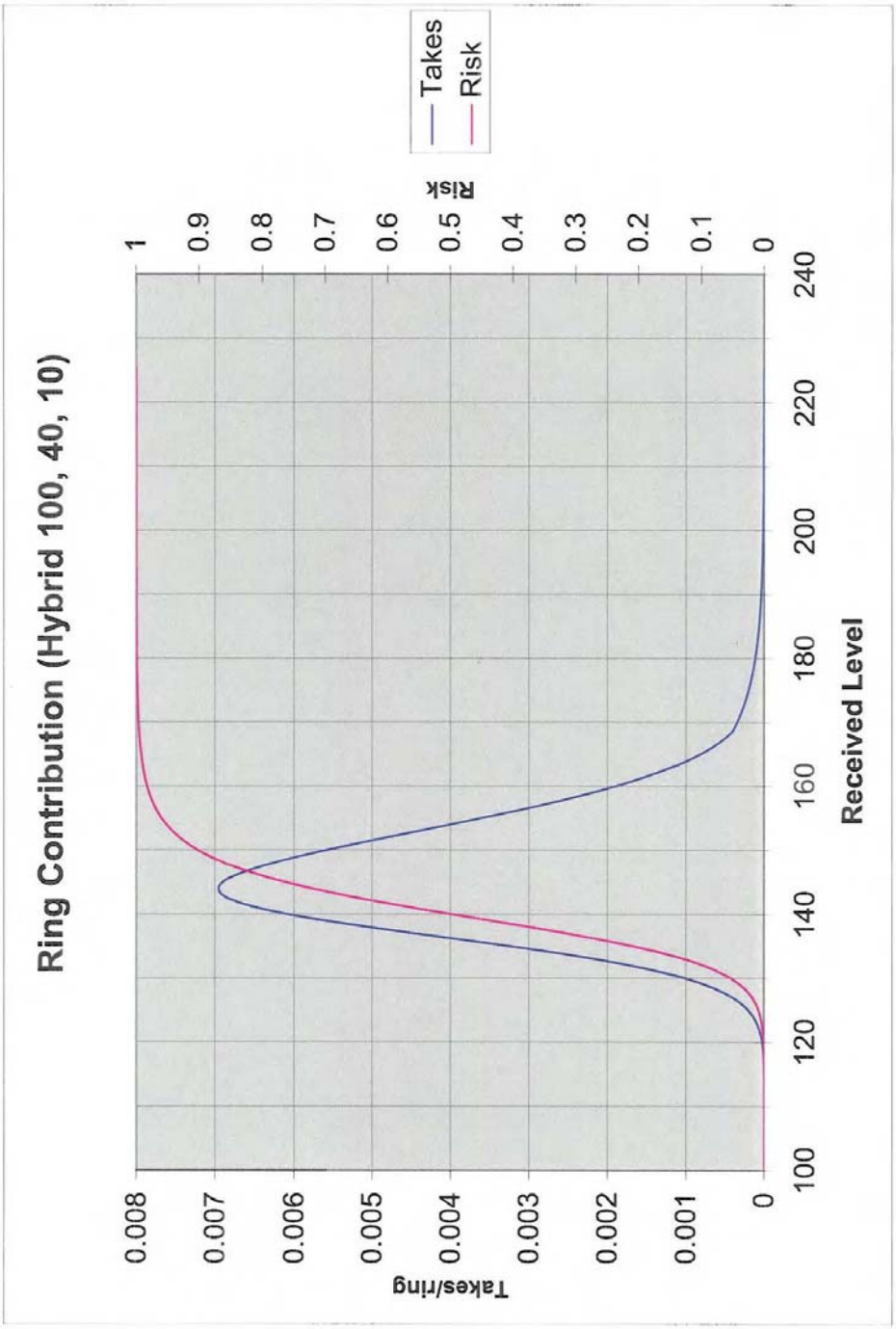
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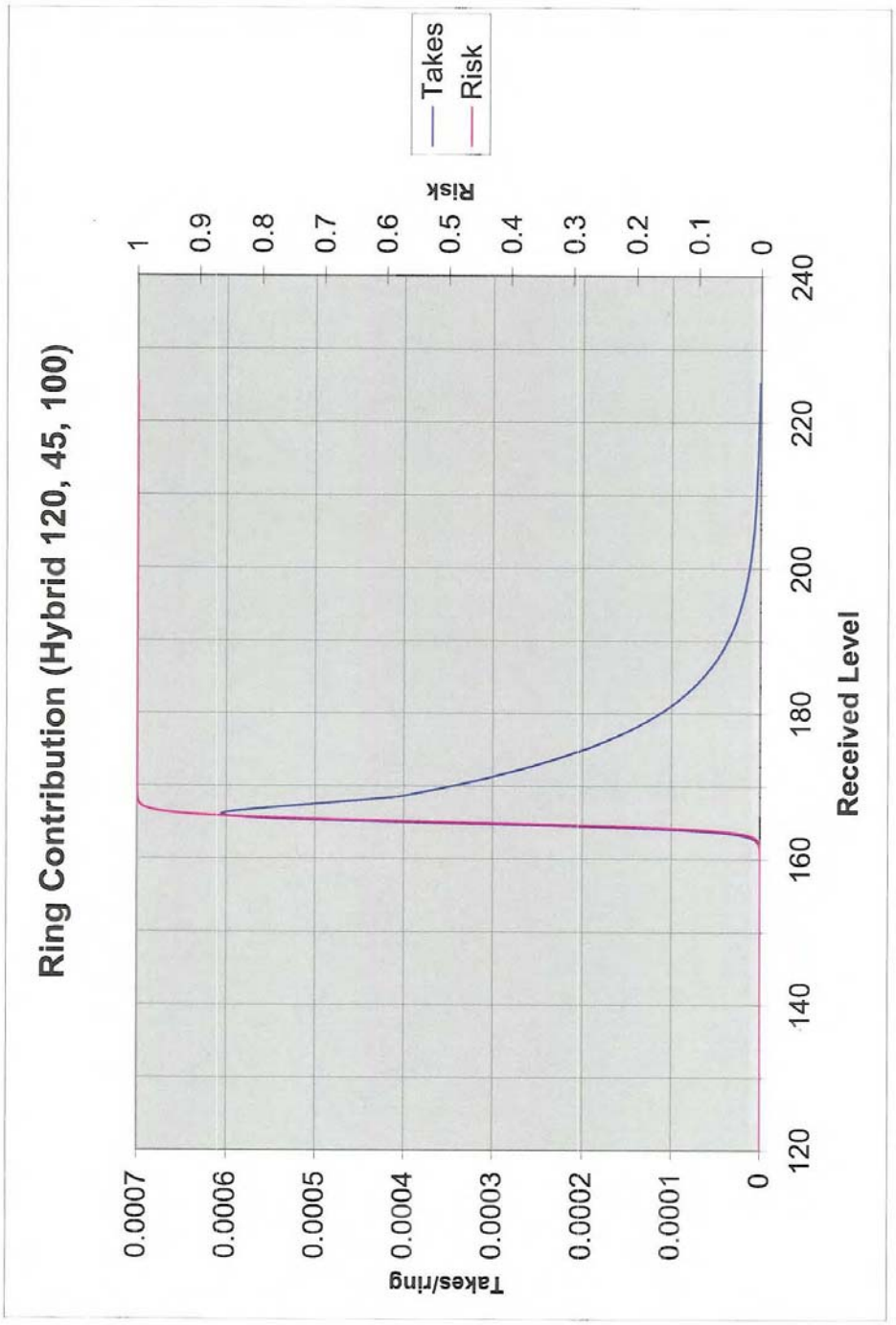
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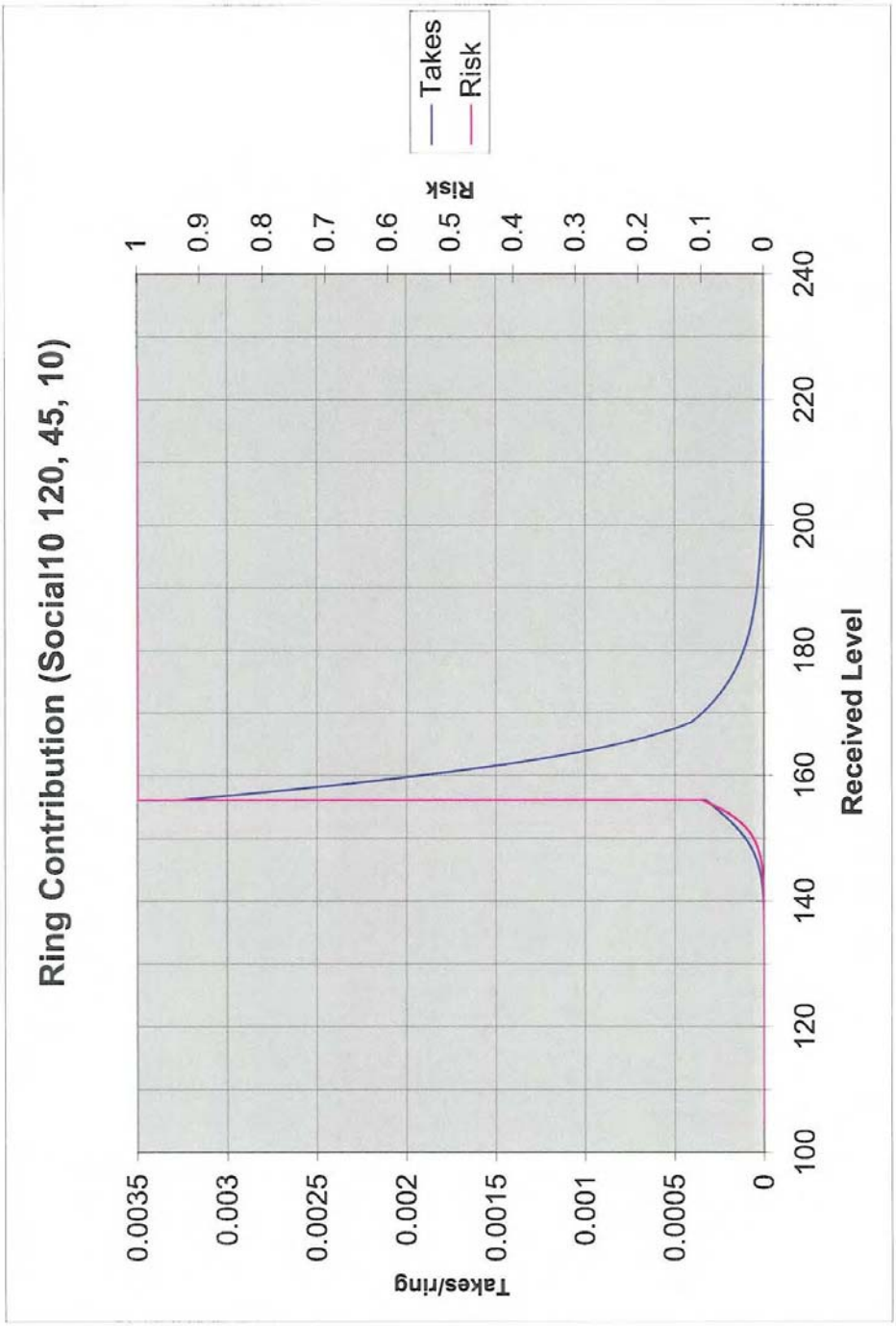
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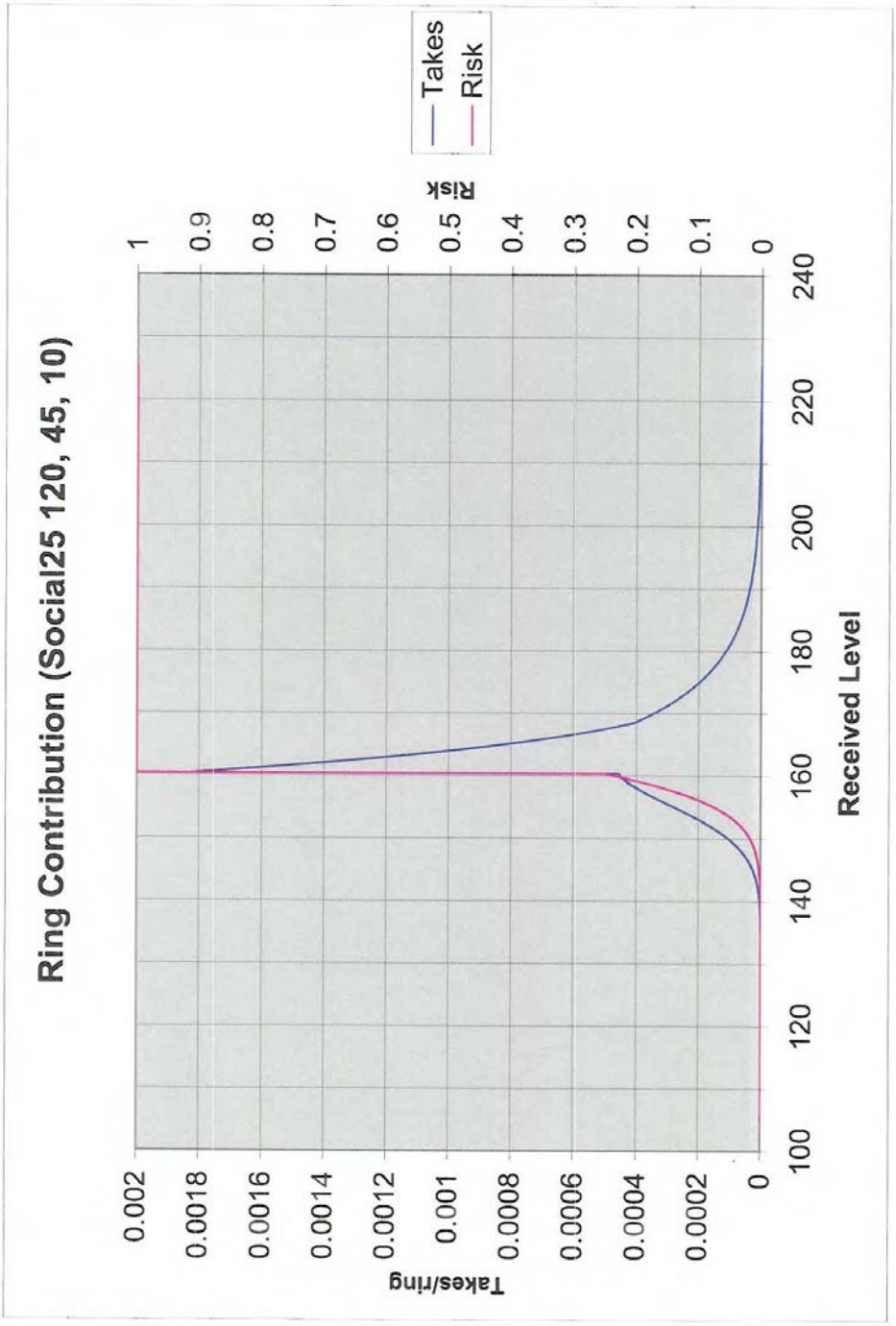
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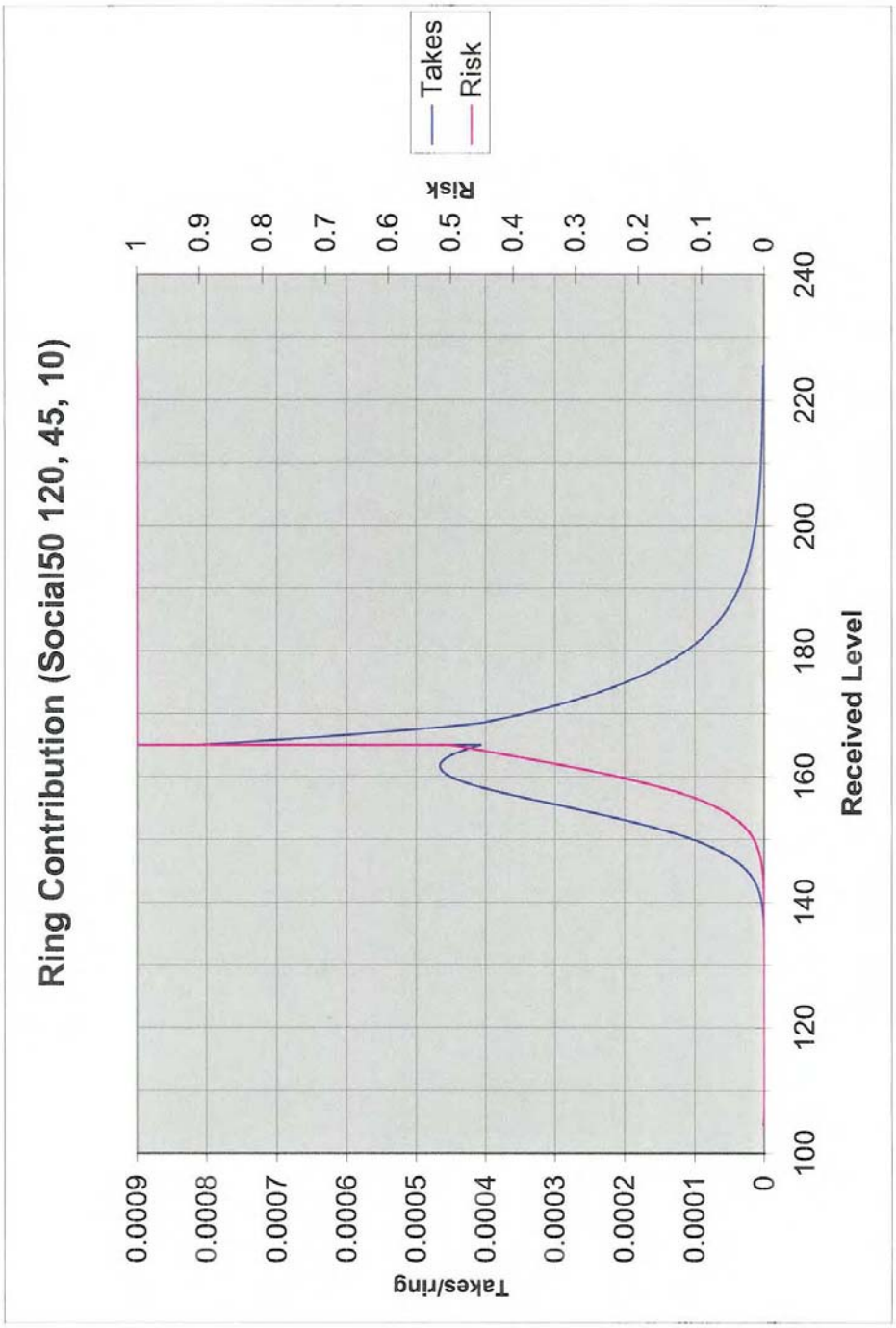
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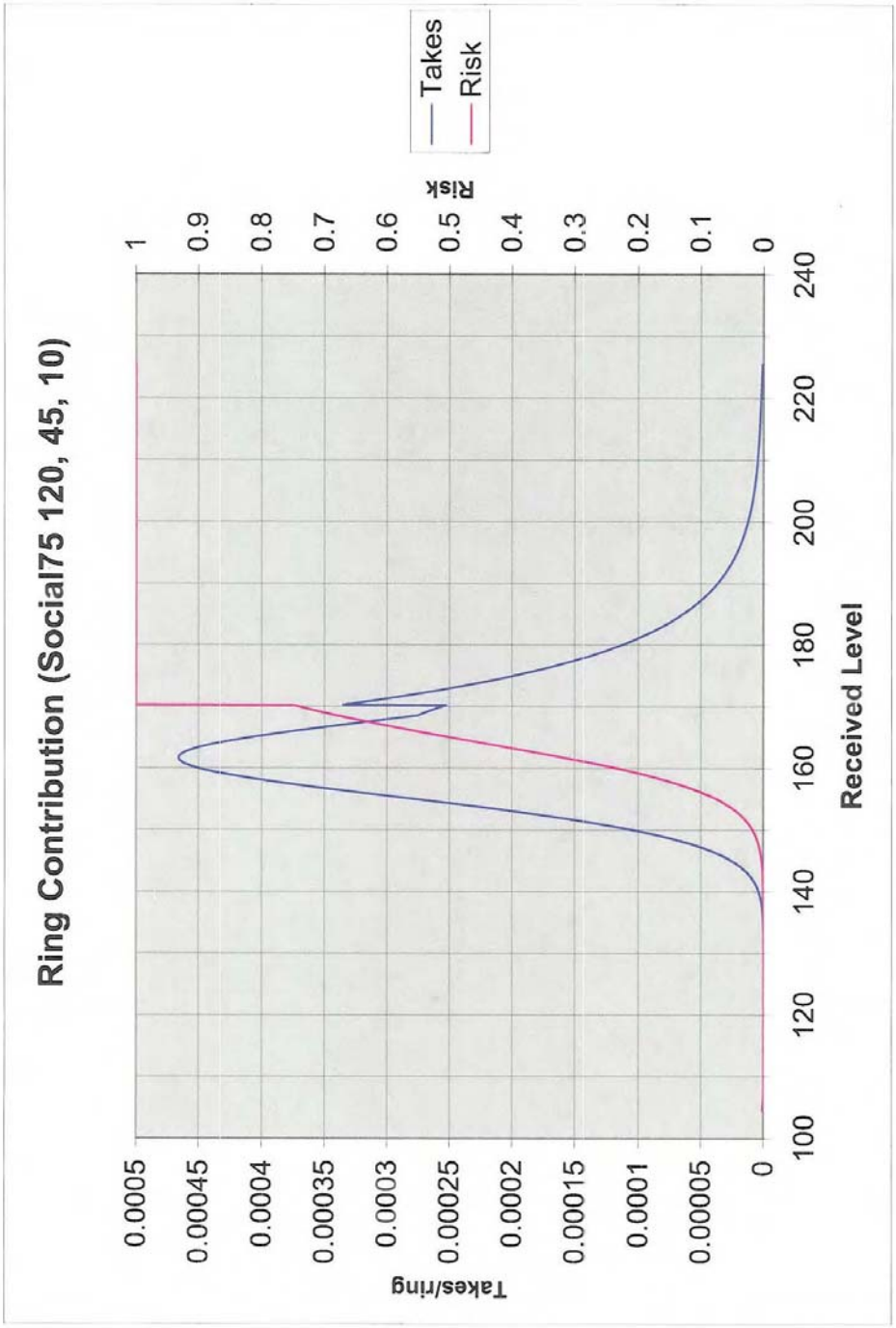
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I.1.29 OCEAN CONSERVATION RESEARCH - 1

OCEAN CONSERVATION RESEARCH

Science and technology serving the sea

Mrs. Amy Burt
Gulf of Alaska EIS/OIES Project Manager
Naval facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA
98315-1101

December 24, 2009

Ref: 5090 Ser N01CE1/1333

Re: Request for extension of public comment period.
Gulf of Alaska Navy Training Activities Draft EIS/OEIS

Dear Mrs. Burt,

We have just received this week (December 20, 2009) by US mail the Gulf of Alaska Navy Training Activities draft EIS/OEIS, with the enclosure letter dated December 4 2009. I can not attest to the reason for the late delivery as the envelope was not stamped with a postmark.

Nonetheless we believe that as was the case in the December 2005 issuance of the US Undersea Warfare Training Range (USWTR 70 Federal Register 62101-62103), the Gulf of Alaska Draft EIS/OEIS is far too lengthy and detailed, and far too important to have the public comment period constrained by a temporal conflict with the traditional American winter holidays.

Therefore we respectfully request that the public comment period for this document be extended an additional 10 business days from Jan. 25 to Feb. 8, 2010.

Extending the comment period would also be consistent with the extension given to the 2005 USWTR Draft EIS for much the same reason.

Additionally I am concerned that the public hearings are all limited to Alaska. While the proposed range is closest to that state, in is in both Federal and International waters and thus subject to the concerns of all US Citizens, not just Alaskans. We believe that asking concerned US citizens and marine stakeholders to travel to Alaska in the dead of winter poses an undue burden on those who do not live in Alaska, so we request that at least two public hearings be hosted in the lower 48 states, preferably in California and/or Washington DC. This would assure that a broad representation of citizens and

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stakeholders could become informed about the proposed training range, and provide comments for the record.

Thank you for your considering our request for an extension of the public comment period for the Gulf of Alaska Navy Training Activities Draft EIS/OEIS

Sincerely,

Michael Stocker
Director

Cc: Admiral Patrick M. Walsh
Commander
US Pacific Fleet
Department Of the Navy
250 Makalapa Drive
Pearl Harbor, Hawaii
96860-3131

2

I.1.30 OCEAN CONSERVATION RESEARCH - 2

OCEAN CONSERVATION RESEARCH

Science and technology serving the sea

Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt, Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Re: 5090 Ser. N01CE1/1333 Comments on the Gulf of Alaska Navy Training Activities Environmental Impact Statement/Overseas Environmental Impact Statement

January 21, 2010

Cc: Dr. Jane Lubchenco, Director, NOAA
Nancy Sutley, Chair, Whitehouse Council on Environmental Quality
Hon. Barbara Boxer, US Senate, Chair of Environment and Public Works.

Dear Mrs. Burt,

We have taken the opportunity to review the Draft Environmental Impact Statement for the Gulf of Alaska Navy Training Activities (GOA-DEIS) Temporary Marine Activities Area (TMAA). While the document reflects much work and a comprehensive exploration into the possible impacts of the proposed additional uses of the GOA as required by the National Environmental Policy Act (NEPA), we believe that the GOA-DEIS leaves much to be desired if it is to be considered a guiding document for environmental stewardship.

This observation is made in particular light of the fact that despite our assumptions about the boundless ability of the ocean to absorb the assaults of human enterprise we are rapidly finding that the ocean is in very poor shape. This is a consequence of reckless resource extraction (which is not under the Navy's purview) and relentless dumping and pollution (which is). The fact is that in many of the more extreme cases, ocean environmental degradation has been a significant product of the militarization of ocean habitats.

We are seeing that the long term accumulation of toxics and "inert" trash is causing global scale problems with impacts on all marine biota. We are seeing the gradual and

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slow release of chemicals bio-accumulating and bio-concentrating throughout the entire food chain – including in humans, who consume the products of the ocean at the highest trophic levels.

Bio-accumulation and concentration of toxics had not been part of the models used when decisions were made to use the ocean as a chemical toilet. But now we know better. We also know that some chemicals once thought of as benign are having profound effects on biological function such as compromised reproductive health, mutation, carcinomas, and neurological damage in "parts per trillion" concentrations. Knowing this, it is unconscionable to continue to treat the ocean as a toxic waste dump.

While many of the toxic substances in the ocean are a product of civilian dumping and unintentional runoff from terrestrial as well as marine sources, a preponderance of terrestrial Superfund sites are due to reckless military hubris. There is no indication that the Navy has been any different in their stewardship of the sea. This is substantiated in our comments to the GOA-DEIS herein.

The GOA-DEIS largely concerns the addition of Anti-Submarine Warfare (ASW) activities currently not included in the existing training range and operations. As such the proposed operations will be introducing an acoustical systems component to the training range. This includes both the introduction of acoustical energy into the environment, as well as chemicals and other pollution from expendable materials, acoustical systems, and associated equipment. It also includes an extra component of underwater explosives – used for acoustical signals as well as for weapons ordnance.

I am limiting our comments to impacts on fish and marine mammals; and while the main focus of Ocean Conservation Research is the bio-acoustic impacts of human generated noise on the marine environment, I also include our concerns for chemical pollution in the training area. The models and assumptions used in the GOA-DEIS for chemical and toxics "mitigation" serve as a philosophical as well as a systematic model for noise pollution inasmuch as that while the jurisdiction and management of the training range fits within prescribed borders, acoustical energy and chemical pollutants, and their impacts on marine life and environment that would result from the proposed exercises are not so tidily constrained.

Symptomatic of this is that while the dumping of expended materials under "Alternative 1" and Alternative 2" is not increased within US territorial waters (which are subject to NEPA and other US environmental laws), there are substantial increases of expendables dumped in non-US Territorial waters (which are not subject to US environmental laws).

This situation clearly illustrates the effectiveness of NEPA in protecting US territorial waters, but is also shows the "avoidance relationship" that the US Navy has for NEPA and by extension other US environmental laws.

The overarching problem here is that while the jurisdictional boundaries of US environmental laws are clearly defined at 12 nm from the US Coast, energy and chemical pollutants and other destructive practices in the ocean are not subject to those boundaries. Animals impacted by reckless dumping practices, marine mammal acoustical "takes," damage to fish and fisheries food-stock (and habitat) are all trans-boundary problems in the ocean. And just because an animal or habitat is outside of US jurisdiction, it does not mean that the damage is any less grave than damage that occurs within US territorial waters.

The boundaries of our Federal laws are practically established as a consequence of the likelihood of enforcement, not as an expression of diminished impacts. If the US Navy is to uphold laws which express the priorities of the American People, the impact categories outlined in the various tables and "Environmental Consequences" statements in the GOA-DEIS[1] belie the Navy's stated concern to be "stewards of the sea."

It is within the context of the US Navy's responsible stewardship of the ocean – along with the understanding that the ocean is in terrible shape – that I submit the following comments and concerns for the proposed activities in the Gulf of Alaska Warfare Training Range.

Our overarching recommendation is the "No Action Alternative" and to not include ASW training exercises proposed in either Alternative 1 or Alternative 2 in the Gulf of Alaska Temporary Marine Activities Area (TMAA) for the following summary reasons:

- It is becoming increasingly and shockingly clear, the ocean is in precarious shape due to continuous and expanding insults of human enterprise and adventure. This must figure into all of our deliberations and practices that compromise ocean habitat.
- Of all ocean areas within US Territorial reach, the Gulf of Alaska is one of the least assaulted areas and should remain so.
- The US Navy has recently expanded Anti-submarine Warfare training areas in Atlantic (USWTR), the Northwest Warfare Training Range Complex, Hawaii Range

[1] The jurisdictional distinction is made throughout the GOA-DEIS as to whether the impact standards – and thus mitigation thresholds, adhere to NEPA (inside 12 nm) or Executive Order [EO] 12114 (outside of US Territorial waters).

Complex, and the Southern California Warfare Training Range Complex. Adding the Gulf of Alaska is not justified by any scarcity of other training areas.

- The chemical, toxic and "inert" pollution models used in the GOA-DEIS are over-simplistic and do not take into account current state of knowledge about accumulation and concentrations of chemical, toxic, and "inert" pollutant behavior throughout the entire ocean, and up and down the entire food chain – including humans.
- Insufficient data provided on the sonar characteristics and source levels so a complete assessment of the potential impacts presented in the DEIS are incomplete.
- The bio-acoustic impact models used in the GOA-DEIS are over-simplistic and do not represent wild animal impacts or behaviors and do not account for the agonistic qualities and characteristics of the various signals that would be introduced into the environment.
- Mid and high frequency sonar acoustic impact data on fish is lacking and does not justify the DEIS conclusion that impacts are "negligible or non-existent."
- The mortality "risk continuum" for fish due to explosives is inadequate and suspiciously biased to appear much more benign than it is.
- The conclusion in the DEIS section on fish admits that very little is known about the impacts of sonar on fish – which contradicts the summary table statement that "sonar used in Navy exercises would result in minimal harm to fish or EFH."
- The exposure risk models of marine mammals appear to contain many examples of "statistical manipulations of convenience" which erodes both the credibility of the models and the integrity of the entire GOA-DEIS.
- The model of bio-acoustic impact of explosives on marine mammals is over simplistic. It models the animals as "linear input devices" and does not account for synergistic effects of stress on the animal or the destruction of habitat and food sources.
- The issuance of the DEIS over the winter holidays – truncating the available comment period is cause for suspicions that the Navy is disingenuous about seeking public input on this cumbersome, comprehensive, but nonetheless inadequate document. This established a justifiable foundation of mistrust as we evaluated the document.

We have substantiated these assertions below. Given the limited time that was available for review we had to focus on the more obvious concerns. If we actually had the full 45 days required by NEPA not interrupted by holidays and obligatory year-end activities our comments would be much more comprehensive and informative. Nonetheless we were able to provide the forgoing, which more than adequately substantiates our recommendation that the "No Action Alterative" is the preferred alternative for the GOA-DEIS.

"Expended Materials"

While Ocean Conservation Research is focused on understanding and finding solutions to the impacts of human generated noise on marine life, we are compelled to comment on the chemical, toxics, and "inert" pollution from expended materials in the proposed DEIS. This is because, as indicated above, this dumping of chemicals in the ocean needs to be curtailed. The US Navy's continued disregard for the mounting biological evidence that chemicals are seriously impacting the global ocean is indicative of a larger hubris that plagues the entire GOA-DEIS.

This hubris is characteristically represented in the following comment from the Executive Summary section Table ES 3.1:

> "Outside of U.S. territory, air pollutant emissions would increase substantially, mainly from increased surface vessel and aircraft activities. • SINKEX would generate a substantial portion of the air pollutants that would be emitted under Alternative 2. • Although Alternative 2 would increase emissions of air pollutants over the No Action Alternative, emissions outside of U.S. territorial seas would not cause an air quality standard to be exceeded"

Believing that air pollution (in this case) or marine pollution respects US Territorial boundaries is particularly short sighted in light of what we know about air and ocean circulation patterns; especially in the GOA and arctic waters.

Also in Table ES-3: Summary of Effects: "Expended materials under Alternative 2 would not have a substantial effect on the marine environment." The phrase "substantial effect" needs to be more clearly defined, because the numbers and weights of materials expended annually (under preferred Alternative 2) provided in Table 3.2-18 and Table 3.2-19 indicate 10,000 lbs. of hazardous materials per year. Without even evaluating the toxicity of the specific materials, 10,000 lbs. per year is not insignificant.

Our current state of knowledge about the impacts of hazardous substances on marine life, and the effects of bio-concentration as hazardous materials move up the trophic levels do not constitute an inconsequential impact. Hazardous materials are not static; they are hazardous because they are dynamic. And just because a deposit of hazardous materials might be statistically hard to detect, we can assume that over time the accumulation of these materials in the environment will have negative impacts on marine life.

Additionally, framing the hazard in long time frames does not decrease the impacts. For example on page 3.2-12 we find "In instances where seawater corrodes the sonobuoy, that corrosion takes at least 40 years."

What will happen after 40 years? Will the ocean be somehow immune to the effects? And on page 3.2-23 "Most of these materials are relatively inert in the marine environment, and will degrade slowly." What does "relatively inert" mean?

Throughout the "Expended Materials" section we find the repeated use of the phrase "quickly dispersed by (or diluted by) ocean and tidal currents" troubling. It seems that the US Navy assumption is that once dispersed outside of the training range that the substances are no longer a problem. But we have found that chaff, plastics, and drifting chemical pollutants are a significant and growing global environmental problem because ocean currents end up pulling them into oceanic gyres where they end up in dangerous concentrations, polluting the food supply from the lowest trophic levels on up. While much of this has been accidental or incidental to global consumption, the US Navy deliberately adding to this mess – particularly with known military toxins is unconscionable.

Acoustic Impacts

While we know that the ocean is largely an acoustic environment, the understanding about role of acoustics across the vast array of marine animals is rudimentary at best. In some cases we have not been able to procure evidence that our noises have any impact at all, and in other cases we are baffled by the extreme impacts that human generated noise has wrought on marine life.

As we roll back the frontiers of our ignorance it will be wise to assume precaution. This would mandate that we gather as much evidence as possible and populate our models with the most accurate, concise, and up-to-date data as possible.

We are concerned about the impacts of the noise generated in the training range on marine animals both inside and outside of the training range. This includes impacts on migratory and resident marine mammals as well as migratory and resident fish - particularly fish with a high commercial value, including but not limited to salmon, halibut, herring, haddock, Pollack, and crab, the consequent impacts on the commercial fishery, and the consequent impacts on links in the regional food chain.

Noises of concern are the noises from explosive ordinance, mid-frequency sonar, sonar jamming signals, communication and surveillance sonar, and mechanical noises

associated with warfare exercises such as engine noise, propeller cavitation, and through-hull transmitted mechanical noise.

One of our dominant systematic concerns expressed throughout this document is that a preponderance of audiometrics for fish and marine mammals are derived from laboratory test signals that have very little correlation to the exposure signals of concern – particularly the various acoustic communication and sonar signals.

This situation is exacerbated by the presentation of sonar systems in the DEIS Appendix H "Acoustic Systems Descriptions" section wherein the various acoustic systems were generally described and qualified in terms of their frequency bands (Low, Mid, and High frequency) but source levels were not provided, and in most cases there was no indication of signal qualities (e.g.: short "pings" or longer data-streams). Both exposure levels and signal qualities have bearing on the biological impacts so a complete assessment of the potential impacts presented in the DEIS are incomplete.

This is also the case with the Portable Undersea Training Range (PUTR) (section H.1.9) in terms of transponder frequencies, source levels, and signal characteristics.

Without knowing more about the signal characteristics of these devices it is impossible to derive and accurate impact model; to determine how different these signals are from the audiometric signals used to establish auditory thresholds in subject animals, or determine if there are acoustical characteristics of these signals that may be of greater concern than just their amplitude.

Seminal to this discussion is the assumption that all hearing animals have a need to discriminate pitch. While mammals, including marine mammals, have organs of pitch discrimination (the cochlea) it is not clear that any other animal family has a need to discriminate pitch. It is likely that other animals have acoustical perceptions tailored to their specific habitat priorities that do not include pitch discrimination.

Almost without exception, all audiograms taken of marine animals are a comparison of frequency and amplitude sensitivities. It is possible that in lieu of pitch and level perceptions, that many fish (or other marine animals) could be sensitive to other characteristics of acoustical energy; that in place of level or time-of arrival differences between sound receptors, these animals can distinguish phase differences between 'particle' and 'pressure gradient' acoustical energy. In this context, time-domain cues across these physical characteristics of acoustical energy are much more important than frequency or amplitude cues.

This could cut both ways in regards to the acceptable noise levels for fish in the subject environment: Up to the point where the acoustical mechanics of the noise in the environment and the acoustical compliance of the organism are in conflict with the noise levels, a particular fish may not even perceive the noise. This would explain why fish residing in extremely turbulent settings (like corvina or surf perch) can endure extreme, noise-saturated acoustical settings and still respond to subtle acoustical stimulus in their environment.[2] This could mean that very loud but distant noise sources might have much less impact on an animal than quieter but closer noises.

This is germane to the DEIS because the preponderance of audiograms and threshold shift procedures used to determine the acoustical sensitivities of fish in the cited studies[3] used either sinusoidal signals or band limited 'pink' noise[4]. While this statement doesn't answer many questions in regard to the impacts of the noise generated by the proposed TMAA project on various fish exposed to the noises of the program, it highlights the fact that the assumptions used to frame the impact models do not reflect the actual acoustical situation proposed in the program. This is particularly evident in the fact that some of the proposed acoustical signals will not be sinusoidal, rather some signals will include fast rise times and high "crest factors"[5] which are significantly different from sinusoidal signals.

This shortcoming can only be addressed by doing systematic testing on various fish using signals and levels that more closely match the signals proposed for the TMAA, especially the mid frequency communication sonars that overlap the known audiological response of the subject fish and contain either rich harmonic content, fast rise times, and crest factors at or above unity.

Using the actual sonar signals to determine acoustical thresholds would also clarify the impacts of the proposed signals on other marine biota, where again the preponderance of audiological or physiological impact data are taken from sinusoidal or 'pink noise' sources.

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[2] J. Engelmann, W. Hanke, J. Mogdans & H. Bleckmann "Neurobiology: Hydrodynamic stimuli and the fish lateral line" 2000 Nature 408, p.51-52

[3] The GOA-DEIS cites Scholik and Yan, 2002 and Wysocki and Ladich, 2005. These studies also evaluate three fresh water species: The goldfish (*Carassius auratus*) and the Rafael catfish *Platydoras costatus*) both live in still, turbid waters, (thus their particular acoustical adaptations), and the sunfish (*Lepomis gibbosus*), a clear water inhabitant. These animals are not good models for open ocean fish that live in a completely different acoustic habitat.

[4] Band limited "Pink Noise" is typically derived from Fourier Transfer derived Gaussian noise constructed from sine waves without any coherent time-domain component.

[5] Crest factor is the ration of peak to RMS value of a signal. Pure sinusoidal waves have a crest factor of .707; pure "square waves have a crest factor of 1; repetitive impulse sounds have a crest factor greater than 1.

Marine invertebrates have mechanoreceptors that are adapted to the sinusoidal motions of their environment. Sometimes these motions are relatively energetic (such as the acoustical energy generated by heavy currents and wave motions), so these animals may not be as affected by extreme sinusoidal energy. On the other hand, fast rise times or high crest factors used in some acoustical communication signals may exceed the acoustical compliance of the organism and damage it. These types of signals need to be explored with various marine invertebrates and plankton prior to excluding all of these animals from consideration of acoustic impacts in the GOA-DEIS.

Acoustic Impacts: Fish

In chapter 3.6 on fish, and most notably under section 3.6.2.2 Assessment Framework it is stated repeatedly that there are many data gaps in the literature on the impacts of noise on fish. The remark that "it is hard to extrapolate between species or conditions" is abundantly found throughout this section, substantiating the general position that there is a high level of uncertainty in the known impacts of noise on fish.

But the absence of data does not mean the absence of harm, and precautionary practices would dictate that some known statistical mean of harm would be used to set mitigation thresholds. What is done throughout this section ambiguates the probable impacts with biased metrics. For example the correlation of impulse impact mortality relative to body mass and charge size taken from Young's equations[6] were extrapolated into tables 3.6-4: "Range of Effects for at-Sea Explosions" and table 3.6-5: "Estimated Fish-Effects Ranges for Explosive Bombs" to indicate the distance at which 10% mortality would occur (also noted as "90% survival" in the DEIS.)[7]

This metric ambiguates the perspective that fish at or *outside* of the specified range have a 10% or greater survival rate. There is a mortality continuum from 10% - 100% mortality *inside* that range. So while for example only 10% of the fish greater than 30 lbs will be killed at 578 feet by a 500 lb. bomb, it is highly likely that the death rate will be significantly higher for smaller fish with the mortality continuum scaling down to only 10% at 1289 feet and beyond.

[6] Young, G.A.. 1991. Concise methods for predicting the effects of underwater explosions on marine life. Naval Surface Warfare Center, Dahlgren, Virginia.
[7] GOA-DEIS 3.6-31

The Young paper also only states short term or instant mortality. It does not evaluate intermediate and long term damage to the animals and their biological function that will kill them within days or weeks from the assault.[8]

The type of explosive is also not integrated into the metric. Rise times of explosives have a significant bearing on mortality.[9] Different explosives have varying impulse rise times[10] so without knowing what was used in the literature and what explosives are proposed in the GOA-DEIS this entire section along with the extrapolated metrics are meaningless.

The conclusion on the impacts of sonar on fish found in the DEIS on page 3.6-43 tidily sums it up: "the effects of sound on fish are largely unknown…There is a dearth of empirical information on the effects of exposure to sound, let alone sonar, for the vast majority of fish."

Given this admission (strengthened by the remaining text in the paragraph), the conclusion in table 3.6.10 "Because only a few species of fish may be able to hear the relatively higher frequencies of mid-frequency sonar, sonar used in Navy exercises would result in minimal harm to fish or EFH" contradicts the conclusion that 'we know nothing.' Either we know nothing, or we know that no harm will come from sonar exposure. Not both. Given that "we know nothing" supersedes the assumption that no harm will come from exposure, the former statement prevails.

We also do know that there are many fish that do hear well in the ranges covered by Mid-frequency and High frequency sonar[11] although currently there are no published exposure tests on these animals using MF and HF sonars. The auditory bandwidth sensitivity of these fish was probably a consequence of evolutionary pressure to hear the sounds of their main predators, the odontocetes – indicating that other odontocete prey may as well perceive and thus be impacted by Mid or High Frequency sonars.

An important element of certainty is missing from our understanding of fish responses to MF and HF sonar signals. The Popper 2008[12] report frequently cited in the DEIS refers to contract studies on the impacts of MF and HF sonars on fish, but the paper is only used to

[8] McCauley et al., High Intensity Anthropogenic Sound Damages Fish Ears, J. Acoust. Soc. Am. 113 (2003).
[9] Stocker, M "Examination and evaluation of the effects of fast rise-time signals on aquatic animals" J. Acoust. Soc. Am. 120, 3267 (2006)
[10] Fry, Donald H 1953 "Observations on the effect of black powder explosions on fish life." Calif. Fish and Game v.39:2
[11] Mann, D.A., D.M. Higgs, W.N. Tavolga, M.J. Souza, and A.N. Popper. 2001. "Ultrasound detection by clupeiform fishes." The Journal of the Acoustical Society of America 109: 3048-3054.
[12] Popper, A.N. 2008. Effects of Mid- and High-Frequency Sonars on Fish. Naval Undersea Warfare Center Division. Newport, Rhode Island. Contract N66604-07M-6056

cite known and published data about fish hearing. The impact data is not cited and the paper is a US Navy contract paper and has not been published in peer reviewed journals.

So what we are left with is data derived from audiograms taken of marine animals are a comparison of frequency and amplitude sensitivities using sinusoidal derived signals.[13] It is possible that in lieu of pitch and level perceptions, that many fish (or other marine animals) could be sensitive to other characteristics of acoustical energy; that in place of level or time-of arrival differences between sound receptors, these animals can distinguish phase differences between 'particle' and 'pressure gradient' acoustical energy. In this context, time-domain cues across these physical characteristics of acoustical energy are much more important than frequency or amplitude cues.

While this statement doesn't answer many questions in regard to the impacts of the noise generated by the proposed GOA training range operations on various fish exposed to the noises of the operations, it highlights the fact along with the "dearth of empirical information on the effects of exposure to sound, let alone sonar,"[14] that fish will be exposed to signals for which we have even less data and will include signals with fast rise times and high "crest factors"[15] which are significantly different from sinusoidal signals.

This shortcoming can only be addressed by doing systematic testing on various fish using signals and levels that more closely match the signals currently being used or developed for modern ASW operations, especially the mid frequency communication sonars that overlap the known audiological response of the subject fish and contain either rich harmonic content, fast rise times, and crest factors at or above unity.

Using the actual sonar signals to determine acoustical thresholds would also clarify the impacts of the proposed signals on other marine biota, where again the preponderance of audiological or physiological impact data are taken from sinusoidal or 'pink noise' sources. Marine invertebrates have mechanoreceptors that are adapted to the sinusoidal motions of their environment. Sometimes these motions are relatively energetic (such as the acoustical energy generated by heavy currents and wave motions), so these animals may not be as affected by extreme sinusoidal energy. On the other hand, fast rise times or high crest factors used in some acoustical communication signals may exceed the acoustical compliance of the organism and damage it. These types of signals need to be

[13] Most audiograms either use single frequency sinusoid signals or band limited "Pink Noise" which is typically derived from Fourier Transfer derived Gaussian noise constructed from sine waves without any coherent time-domain component. These signals are very unlike mid-frequency sonar signals.
[14] GOA-DEIS 3.6-43
[15] Crest factor is the ration of peak to RMS value of a signal. Pure sinusoidal waves have a crest factor of .707; pure "square waves have a crest factor of 1; repetitive impulse sounds have a crest factor greater than 1.

explored with various marine invertebrates and plankton prior to concluding that they are not impacted by loud, fast rise-time, high crest-factor sonar signals.

But in the absence of evidence clearly indicating harm, the GOA-DEIS takes the "let's see if anything floats up to the surface" approach – which has left our ocean in such bad shape already.

Acoustic Impacts: Marine Mammals

While the modeling of the impacts of acoustical exposure in section 3.8.7.2 "Acoustic Effects: Assessing Marine Mammal Responses to Sound" is extensive, detailed, and comprehensive, given the other quirky statistical models found throughout the entire GOS-DEIS (and the predictable history of biased mathematical and statistical models in prior Navy DEIS documents), frankly I worry when the Navy's statistical modelers are given so much text space to synthesize decades of scientific study into their own home-spun complex risk-continuum.

Symptoms of this are ambiguously presented in the opening gambit on Table 3.8-1[16] wherein the density of given species of concern are presented in a density metric of animals per km^2. While I understand the statistical value of having a distribution number that represents the probability of interactions within a prescribed data set, the fact of the matter is that there is no such thing as ".0019" of a Humpback whale, or even a ".1892 of a Dall's porpoise." And once the statistical arguments get to this point they are in their third derivation which indicates that they are being set up for a statistical model of convenience.

While we did review the models that use these metrics in Appendix D and at face value they appear to be based on reasonable assumptions, given some of the other biased and quirky models used in the Fish Impacts section we would need to run these models in a few scenarios to assure that they do yield cogent and credible results. For example the setting the cutoff extent of the integral to 120dB seems to be based on either excluding the harbor porpoise form the marine mammal response data set or modifying the harbor porpoise risk function to a "heaviside step function"[17] smells suspiciously like manipulations of statistical convenience.

Unfortunately given the truncated comment period on the GOA-DEIS due to the issuance of this over the traditional winter holidays we did not have as much time as would be required to review the entire architecture of the US Navy statistical arguments justifying their particular models. Suffice it to say that in addition to the forgoing comments, we suspect that there are clever manipulations afoot.

Of course none of these characterizations require a response under NEPA, but the following criticisms substantiate these claims.

[16] GOA-DEIS section 3.8-2 through 4.
[17] GOA-DEIS Appendix D-31, also Section 3.8-101

There are many questionable assumptions made in the GOA-DEIS regarding the actual levels of Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) in marine mammals. As inferred in the DEIS, PTS levels are on marine mammals are derived numerically and not actually known. This is because we have not intentionally subjected marine mammals to PTS levels (for compassionate reasons). I will review the PTS assumptions below, but the foundation of the PTS assumptions used in the DEIS are made from data derived from TTS studies. Furthermore, these studies have all been done on test-habituated animals, and in many cases these animals are quite old. Additionally, these studies include a level of assumptions that belie the actual data. For example a study featured in the GOA-DEIS by Finneran, Carder et al. (JASA 2005)[18] used mature (18-20 years) or old (38 – 40 years) animals that have been systematically exposed to noise studies for many years. The subjects have lived in a busy environment full of anthropogenic noise, so it is highly likely that they have been habituated to the test environment. It is clear that these animals do not represent different species of wild marine animals across a broader – and mostly younger – age range, in their own environment.

Model inaccuracies due to habituation in the instance of this study is compounded by the fact that the test animals may employ biological protections to prepare them for their tests – protections akin to the "wincing" that visual animals use to protect their eyes from damage. Terrestrial animals have a mechanism, like "wincing" in their middle ears that protect them from damaging sounds. This mechanism is a tightening of the tensor tympani muscles around the middle ear ossicles, protecting the hearing organ from physical damage.[19] While this mechanism is fast acting in response to "surprise" stimulus, once terrestrial animals are habituated to expect loud noise, the system is activated by the expectation. In humans the mechanism kicks in when noise levels reach 75dB SL (re: 20μPa) – about 10dB SL below where OSHA guidelines for TTS-level noise exposures occur in humans, and about 50dB SL below where PTS occurs.

The middle ear structure of marine mammals differs significantly from the middle ears of terrestrial animals. We are just learning about how environmental sounds are conveyed into the odontocete's inner ears. This mechanism seems to include the lipid channels in their lower jaws,[20] and the mobility of the bulla (the bone envelope that houses the

[18] James Finneran, Donald Carder, Carolyn Schlundt, Sam Ridgeway "Temporary threshold shift in bottlenose dolphins (*Tursiops Truncatus*) exposed to mid frequency tones." October 2005 J. Acoust. Soc. Am. 118(4) p.2696
[19] Pierre Buser and Michel Imbert "Audition" 1992. MIT Press. p. 110 - 112.
[20] Heather Koopman, Suzanne Budge, Darlene Ketten, Sara Iverson "The Influence of Phylogeny, Ontogeny and Topography on the Lipid Composition of the Mandibular Fats of Toothed Whales:

cochlea and semicircular canals). While this mechanism does include the same middle ear ossicles of terrestrial mammals, these bones in cetaceans can be rigidly attached to each other and connected differently (by way of ligaments) to the tympanic membrane.[21] While the ears of the odontocetes or mysticetes do not have the same tensor tympani found in terrestrial mammals, it is probable that these hearing specialist animals would have an analogous system to protect their inner ears from periodic or occasional sound levels that would otherwise damage their organs of hearing.[22] If this assumption is correct, then the "sound test" habituated dolphins would obviously yield much higher thresholds for TTS than their wild, un-habituated counterparts – given that they will always "prepare" for acoustical assaults when asked to perform in a given testing situation.

But even assuming that the legacy of TTS testing done on these test-habituated animals does accurately reflect the TTS levels for all wild, un-habituated animals, the data used to establish an "appropriate" TTS levels all show onset of TTS occurring between 185dB and 190dB (re: $1\mu Pa^2$-s).

In the DEIS these levels are presented on a chart that includes three different signal types;[23] impulsive signals representing distant explosions,[24] seismic airguns,[25] and tone bursts.[26]

This disparity in signal types is noted in the text, but with the exception of two cases of TTS as a consequence of seismic signals (one at 185dB re: $1\mu Pa^2$-s and the other at 190dB) the chart represents TTS as a consequence of pure tone bursts. (It was in this Schlunt et.al. study that the test-habituated beluga whale subject attacked the testing

Implications for Hearing" 2003 Paper delivered at the Environmental Consequences of Underwater Sound conference, May 2003.

[21] G.N. Solntseva, "The auditory organ of mammals"1995 p. 455 in "Sensory Systems of Aquatic Mammals' R.A. Kastelein, J.A. Thomas and P.E. Nachtigall eds. De Spil press.

[22] This system might involve thermo-regulating the viscosity, and thus the acoustical compliance of the lipids through regulating blood circulation around the organs -- thereby attenuating or accentuating acoustical transfer through the organ as needed.

[23] Not from Nachtigall et. Al. 2004 as stated in the DEIS. Additionally Chart 3.8.7 is mislabels "Existing TTS Data for Cetaceans when is should be labeled "Some TTS Data for Cetaceans." Many other peer reviewed TTS models exists that are not represented in the chart.

[24] Finneran, J.J., C.E. Schlundt, D.A. Carder, J.A. Clark, J.A. Young, J.B. Gaspin, and S.H. Ridgway. 2000. Auditory and behavioral responses of bottlenose dolphins (Tursiops truncatus) and a beluga whale (Delphinapterus leucas) to impulsive sounds resembling distant signatures of underwater explosions. Journal of the Acoustical Society of America. 108:417-431.

[25] Finneran, J.J., R. Dear, D.A. Carder, and S.H. Ridgway. 2002. Temporary shift in masked hearing thresholds in odontocetes after exposure to single underwater impulses from a seismic watergun. Journal of the Acoustical Society of America. 111:2929-2940.

[26] Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway. 2000. Temporary shift in masked hearing thresholds of bottlenose dolphins, Tursiops truncatus, and white whales, Delphinapterous leucas, after exposure to intense tones. Journal of the Acoustical Society of America. 107:3496-3508.

apparatus before the tests were complete). You might say that this illustrates that there is a physiological as well as a behavioral difference in impacts between the various signals rather than the conclusion that there is a clear threshold at 195dB as indicated in the DEIS.

Nonetheless the chart takes a "statistical mean" to justify raising the TTS level to 195dB.[27] This elevated level is justified in part by the statement: "Use of the minimum value would overestimate the amount of incidental harassment because many animals counted would not have experienced onset TTS."[28] This highlights one of my concerns; why do harassed animals need to experience onset of TTS? While it may be important to find the absolute value for onset of TTS in our model animal, the purpose here is to avoid harassing animals, not derive "statistical precision" on the exposure levels that will always produce TTS in test-habituated animals. For this reason the data should be used as found and as presented; that onset of TTS occurs in test-habituated animals at 185dB (re: $1\mu Pa^2$-s).

The statement in the DEIS that "The growth and recovery of TTS are analogous to those in land mammals. This means that, as in land mammals, cetacean [TTS] depend on the amplitude, duration, frequency content, and temporal pattern of the sound exposure"[29] is correct, but the DEIS-adapted assumptions used in the following bullet points in this section to build the argument omit the critical characteristics of "frequency content, and temporal pattern," ignoring the evidence that signal characteristics have a stronger bearing on TTS thresholds than amplitude.[30]

So the fundamental argument here is that as in the fish studies, none of the tests performed on marine mammals used to substantiate the Navy's impact and mitigation models used signals that simulated the actual sonar signals proposed in the GOA ASW activities.

Most papers cited for the DEIS used either sinusoidal tones or impulse noises. These signals do not elicit the same behavioral responses as more complex signals.[31] The test subjects of most papers cited for the DEIS were also older (over 30 years old), test-habituated animals that have been in captivity and used as test subjects for a large portion

[27] GOA-DEIS Section 3.8-87
[28] GOA-DEIS Section 3.8-92
[29] GOA-DEIS Section 3.8-87
[30] Roger P. Hamernik and Wei Qiu "Energy-independent factors influencing noise-induced hearing loss in the chinchilla model" J. Acoust. Soc. Am. 110 (6), December 2001
[31] R.A. Kastelien, D. Goodson, L. Lein, and D. de Haan. "The effects of acoustic alarms on Harbor Porpoise (*Phocena phocena*)" 1997 P.367-383 in A.J. Read, P.R. Wiepkema, and P.E. Nachigall eds. "The Biology of Harbor Porpoise" de Spil publishers, Woerned, The Netherlands.

of their lives.[32] The captive animals are accustomed to coming into a test area for their livelihood and while they provide TTS data for their specific physiology, they are poor stand-ins for a majority of marine mammals that will be impacted by the GOA proposal.

In terms of the range of impact relative to signal amplitude, Kastelein and Rippe studied younger animals (harbor porpoise *Phocena phocena*)[33] with more appropriate test signals yielded significantly different results than the assumptions made in the GOA-DEIS. These animals demonstrated an aversion to more complex signals in the frequency range of the proposed sonars and at 130dB re: 1μPa@1m. (Animals used in this study were recently taken into captivity and approximately 3 years old.)

While the signals used in this study were specifically designed to repel net-predatory marine mammals, the signals are closer in form to many communication sonars than to the sinusoidal waves or band limited pink noise used in the DEIS citations. Another study by Verboom and Kastelein indicates that more complex signals induce a discomfort threshold level for younger, less habituated marine mammals (*P. phocena* and harbor seal *Phoca vitulina*) at or below 133dB re:1μPa@1m.[34] This study extrapolates a TTS level for these animals at 150 dB(*w*) re:1μPa@1m for the harbor seal, and 137dB(*w*) re:1μPa@1m for the harbor porpoise. The paper also goes on to suggest that hearing injury – PTS, will occur in the Harbor seal and Harbor porpoise at 190dB and 180dB respectively – 50% to 500% less energy than the 195dB level that the GOA-DEIS presents as the thresholds for MMPA Level B harassment.

Like the estimated PTS levels used in the DEIS, the TTS figures from the Verboom and Kastelein (2005) study are extrapolations – extrapolating from behavioral responses to noise exposure of young, healthy marine mammals against known human auditory responses. The disparity between the TTS figures used by Verboom and Kastelein and the numbers used in the DEIS indicate a high degree of scientific uncertainty in the models and extrapolation methods used in both sets of assumptions. I am more inclined to accept the Verboom Kastelein numbers for three reasons: 1) they were not cited or crafted under the rubric of justifying a proposed program; 2) their studies were not funded by an agency whose desired actions would be limited by more precautionary

[32] e.g. J. J. Finneran, C. E. Schlundt, D. A. Carder, J. A. Clark, J. A. Young, J. B. Gaspin, S. H. Ridgway Auditory and behavioral responses of bottlenose dolphins (*Tursiops truncatus*) and a beluga whale (*Delphinapterus leucas*) to impulsive sounds resembling distant signatures of underwater explosions. J. Acoustical Soc. of America. V.108(1) July 2000.

[33] R.A, Kastelien, H.T. Rippe " The Effects of Acoustical Alarms on the Behavior of Harbor Porpoises (*Phocena phocena*) in a floating pen" Marine Mammal Science 16(1) p. 46 – 64. January 2000

[34] W.C. Verboom and R.A. Kastelein. "Some examples of marine mammal 'discomfort thresholds' in relation to man-made noise." June 22, 2005. Proceedings from the 2005 Undersea Defense Technology conference 2005, Sponsored by TNO, P.O. Box 96864, 2509 JG The Hague, The Netherlands.

results,[35] and 3) they are inherently more precautionary, in that they examine the thresholds of behavioral response, not the upper limits of physiological response.

Regarding the estimation of PTS onset relative to TTS levels used in the DEIS,[36] I find these data troubling as well. The linear regressions adapted from the W.D. Ward et al papers[37] cited in the DEIS were all taken from human subjects – highly visually adapted terrestrial mammals. Ward's research indicates a threshold of PTS by examining the maximum recoverable TTS in human and finds that humans can recover from a TTS of 50dB without permanently damaging their hearing. The Ward studies are "conservatively" tempered in the DEIS by incorporating a study of cats by Miller[38] that indicates that cat's threshold of PTS is at 40dB recoverable TTS.[39]

The cat is also a highly visually adapted terrestrial animal, though it is more dependent on aurality than humans.[40] One correlation can be deduced here is that animals that are more dependent of sound cues are less able to recover from extreme TTS. Thus if there is a 10 dB disparity in recovery levels between humans (50dB TTS) and cats (40dB TTS), it might easily follow that cetaceans who rely almost exclusively on acoustical cues would be even less likely to recover from extreme TTS and may indicate a PTS threshold at TTS level of 30dB. If we use this assumption, the onset of PTS in cetaceans may only be 15dB above the onset of TTS,[41] not the "conservative" 20dB modeled in the DEIS.

Given the forgoing, we might assume from the data presented in the DEIS that the onset of TTS occurs at 185dB re: $1\mu Pa^2$-s (as shown in the DEIS without incorporating the "statistical mean" tool), and that the onset of PTS could then be as low as 200dB re:$1\mu Pa^2$-s (taking the above assumption about recoverable TTS levels in highly

[35] Hal Whitehead and Linda Weilgart "Science and the management of underwater noise: Information gaps and polluter power." J. Acoust. Soc. Am., Vol. 110, No. 5, Pt. 2, November 2001 142nd Meeting: Acoustical Society of America.

[36] GOA-DEIS 3.8-88–92

[37] e.g.: Ward, W.D. "Recovery from high values of temporary threshold shift." J. Acoust. Soc/ Am., 1960. Vol. 32:497–500.

[38] Miller, J.D., C.S. Watson, and W.P. Covell. 1963. "Deafening effects of noise on the cat."Acta Oto-Laryngologica Supplement Vol. 176:1–91.

[39] The DEIS states further that "A variety of terrestrial mammal data sources point toward 40 dB as a reasonable estimate of the largest amount of TS that may be induced without PTS" though no citations are provided for this statement.

[40] Ralph E. Beitel "Acoustic pursuit of invisible moving targets by cats" JASA – 1996. Vol.105(6) p.3449 This paper indicates that cats will follow acoustic cues without needing to visually identify the cue, unlike humans, who will use an auditory cue to help localize a source of noise which they will then "look for."

[41] Using the same extrapolation and linear regression found in the DEIS and using 30dB TTS as the maximum recoverable TTS level: There is a 24 dB TS difference between onset-TTS (6 dB) and onset-PTS (30 dB).The additional exposure above onset-TTS that is required to reach PTS is therefore 24 dB divided by 1.6 dB/dB, or 15dB.

acoustically-adapted animals). While these revised numbers are "lower" than the proposed thresholds of TTS and PTS (suggested for all marine mammals), they are based on assumptions that are still of questionable validity, inasmuch as they are based on extrapolated models that meld terrestrial, highly visual animals with old, test-weary odontocetes. I feel that this methodology provides a poor stand-in for a diverse variety of wild marine mammals, in their own habitat, being subjected to extreme levels of noise that they are not biologically adapted to or trained to expect.

Regarding the DEIS section 3.8-92 "Criteria and Thresholds for Level B Harassment from Non-TTS:" The authors of this section state that there is no metric to determine the "annoyance" levels of non-verbal animals. I suggest that the subjective term "annoyance" be replaced with the more observable characteristic of "disturbance." Many papers on disturbance levels in marine mammals are available[42] and can be used in lieu of trying to find published papers on the subjective "annoyance levels."

The behavioral effects section 3.8-92 does mention that "…there are few observations and no controlled measurements of behavioral disruption of cetaceans caused by sound sources with frequencies, waveforms, durations, and repetition rates comparable to those employed by the tactical sonars to be used on the proposed TMAA." This statement is the first indication in the DEIS that the authors have identified that the paucity of data derived from exposing animals to actual sonar signals is a shortcoming of the analysis.

The "risk function adapted from Feller"[43] could prove to be a useful tool, but like any model, the output is only as good as the input. As such, any data using the trained and long-term habituated animals at the San Diego test facility must be categorically dismissed because the SCC animals have been treated as "biological input devices" and thus are a very poor analogy for wild animals. Surprisingly the conclusions in the DEIS reflect exactly the opposite conclusion, although some of the shortcomings are addressed (limited species range and the animals trained for TTS tests, not behavioral tests).

The data from the Haro Strait incident[44] should be tailored to reflect that the J-pod orcas were already being set upon by groups of whale-watching tour-boats (of which they must

[42] e.g.: John R. Buck, Peter L. Tyack "An avoidance behavior model for migrating whale populations" The Journal of the Acoustical Society of America. April 2003. Volume 113, Issue 4, p. 2326 wherein gray whale avoidance threshold of 135dB re: 1μPa was established. See also W.C. Verboom and R.A. Kastelein. "Some examples of marine mammal 'discomfort thresholds' in relation to man-made noise." June 22, 2005. Proceedings from the 2005 Undersea Defense Technology conference 2005, Sponsored by TNO, P.O. Box 96864, 2509 JG The Hague, The Netherlands.

[43] GOA-DEIS 3.8-94

[44] Fromm, D. 2004. "Acoustic Modeling Results of the Haro Strait For 5 May 2003." Naval Research Laboratory Report, Office of Naval Research, 30 January 2004.

be habituated) so there is a probability that their "disturbance" thresholds would have been elevated from their non-set-upon or wild habitat state. Thus the impact risk thresholds modeled with the risk function using the Haro Strait data should be weighted down by some amount. While this is reflected in the DEIS, any weighting factor would be arbitrary.

In the absence of empirical data some model must be used. The risk function is heading in the right direction, but with the limited input sources the weighting should favor a lower threshold than what unweighted inputs from Haro Strait and SCC inputs would yield. We believe that the Nowacek data[45] is the "cleanest" of all three, but as noted in the DEIS the alerting signals do not approximate MFA Sonar signals, although the relatively low behavioral threshold for mysticetes is supported by Di Iorio and Clark[46] in seismic sparker signals.

Meanwhile excluding the fairly comprehensive and robust harbor porpoise data from the input set, or modifying the same risk function curve used in the other three inputs is arbitrary. With the paucity of data – both in terms of studies as well as species, qualified data should not be excluded from the input data set, nor should any clean data be modified to accommodate for arbitrary considerations just because the data does not fit the desired outcome of the model.

The fact is that the years of Kastelein data on harbor porpoises more accurately represent the behavioral responses of near wild animals because 1) these animals are the most recently wild captive animals, 2) the testing done on these animals is done with signals more characteristically akin to MF and HF sonar, 3) the tests are focused on behavioral responses, not operant conditioning, and 4) the testing environments have been specifically designed or cited to eliminate high levels of background noise and specular reflections found in most training enclosures.

Additionally, tailoring the harbor porpoise data because they "inhabit shallow and coastal waters suggest[ing] a very low threshold level of response for both captive and wild animals"[47] flies in the face of glomming together mysticetes and odontocetes that do fit a convenient risk function. If the justification for melting together three disparate species under three disparate conditions is due to the paucity of behavioral data available, then

[45] Nowacek, D.P., M.P. Johnson, and P.L. Tyack. 2004. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. Proceedings of the Royal Society of London, Part B 271:227-231.
[46] Lucia Di Iorio and Christopher W. Clark "Exposure to seismic survey alters blue whale acoustic communication" Biol. Lett. 23 February 2010 vol. 6 no. 1 51-54
[47] GOA-DEIS 3.8-101

the Tyack et. al[48] controlled exposure work on beaked whales should not have been excluded from the data set. This is particularly the case since the exposure tests were funded by the US Office of Naval Research and included beaked whales – a species of particular concern. Perhaps the Tyack results were not included because they showed behavioral responses to signal Receive Levels as low as 117 dB (re: 1 μPa)?

In section 3.8-106, Table 3.8-7a "Approximate Distance to Effects for At-Sea Explosives in the Temporary Maritime Activities Area" the metric is not stated. Are these feet or meters? Without this data the table is meaningless.

Regarding the general topic of behavioral responses to explosions, it is extremely reductionist to assume that agonistic response linearly correlates to exposure level regardless of the signal source or characteristic. The DEIS assumes that the response value of an explosion is equivalent to the response value of other impulsive but natural sounds such as thunder or calving icebergs. I don't believe that it would be too anthropomorphic to assume the analogy to human response to explosions; and that our response to explosions in our own neighborhood, or even across town would definitely be different than our response to thunder.

The clear fact is that explosions from military ordnance have the acoustical signature of things being destroyed. Regardless of the collateral damage to animals and habitat, military explosions are a product of destruction. This plays into physiological impacts and behavioral responses, but also into psychological disruption, inducing stress and anxiety, compromising biological function. The DEIS fails to bring this into the discussion.

Additionally, despite the appearances presented in the inverted impact model used to examine the impacts of explosions on fish (evaluated in this document), explosions will cause fish mortality and habitat destruction which will in turn compromise food abundance for marine mammals. To what extent is not included in the DEIS analysis.

For the foregoing reasons we advise the "No Action Alternative" be used.

In the event that the US Navy sees to dismiss the foregoing arguments, or accommodates them to their best "practicable manner" and proceeds with Action Alternative 1 or Action Alternative 2, we advise the deployment of third-party (non military) aerial and marine observers to scan coastlines and littoral waters for marine mammal stranding incidents

[48] Tyack, P. et. al.. "Effects of sound on the behavior of toothed whales." J. Acoust. Soc. Am. Volume 123, Issue 5, pp. 2984-2984 (May 2008)

during the exercises. The GOA is sparsely populated with very long stretches of uninhabited coastline. Should some catastrophic impacts of the TMAA operations kill or maim marine mammals causing them to strand there is a high probability that the event would go unnoticed or unreported without an active, non-biased watch.

Sincerely,

Michael Stocker
Director

I.1.31 SUSAN PAYNE

Naval Facilities Engineering Command Northwest
Attn: Mrs. Amy Burt, Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

January 21, 2010

Dear Commander of the Navy and Ms. Burt,

Your Gulf of Alaska DEIS does not offer the NO Action option and does not provide any alternatives other than more of your action using LFA, which has been demonstrated to negatively impact marine life, outright death of marine mammals and the disruption of fish migration. As I have testified before, I am opposed to Navy activities that use active sonar and depleted uranium.

I propose that you change the dates of operations to more accurately reflect the conditions in which an attack on the US will likely occur, under the most severe conditions. This would be winter in the Gulf of Alaska. Your choice of summer in these proposed waters directly impacts migrating animals, many Endangered, and fishermen trying to make a living on fish such as salmon that only migrate shoreward at this time. Your assertion that you need support services leads me to conclude that this summertime mission is just a salmon and halibut charter opportunity for the Navy. You talk of realistic operations, then conduct your work in the winter.

Depleted Uranium and other toxics will enter the food chain and accumulate in the tissues of marine mammals and commercially important fish species. We have spent millions of dollars and years trying to sell the purity of our fisheries. You in your actions on some of the most productive fisheries habitat in the world will contribute to the demise of our fish quality and our markets. The cumulative effect of toxics on marine mammals will lead to deaths that cannot be quantified and attributed to your actions. How will you mitigate these impacts?

Finally, the Navy should conduct themselves under the same regulations that the general public must, the Endangered Species Act, the Marine Mammal Protection Act, and all other rules of the Land. Since your draft only allows for the continuance of these activities, then limit them to only the necessary, and locate and time them to impact the fewest.

Sincerely,
Susan Payne
Susan Payne
Kodiak, AK 99615

Ps.

Your online comment form did not allow the paste function. This is not friendly to the public wishing to comment online as it requires us to retype our entire letter.

I.1.32 ANDREA PETERSON

United States Navy

Public Hearing Comment Form

Gulf of Alaska Navy Training Activities
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3) Mailing this form to:
   Naval Facilities Engineering Command Northwest
   ATTN: Mrs. Amy Burt – Gulf of Alaska EIS/OEIS Project Manager
   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

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Name: Andrea C Peterson

Organization/Affiliation: self

Address:* 9338 Northland St.

City, State, Zip Code: Juneau, AK 99801

Comments: My concern is that you are planning this testing at the height of our Alaskan summer in the nutrient rich waters of the Gulf of Alaska. Marine Mammal numbers are at their highest then because they are drawn to these waters to feed. I also know you will not be able to guarantee there are no marine mammals in the area being tested.

Stellar sea lions and many of our whales are endangered. I'm not willing to sacrifice any of them to Naval/Airforce Testing.

Please find a spot without the rich environment,

over →

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ocean life and procinity to shore. This seems to be one of the worst sights and seasons possible.

Whales are most active in Alaskan waters from mid April through October, and we always have some whales in our waters year round.

I'm not sure what the answer is, but testing under these conditions will be damaging to our environment and ocean creatures.

I.1.33 MIKE PETERSON

United States Navy

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Name: Mike Peterson - Mike Peterson 1-20-2010

Organization/Affiliation: Self

Address:* P.O. Box 240913

City, State, Zip Code: Douglas, AK 99824

Comments: Like many in the State of Alaska, I am concerned about the effects of sonar to the sealife within the Gulf.
As a Vietnam Veteran I remain distrustful of military motives in peaceful waters.
I would advocate for a 60 day period of observation, after the exercises, to document any and all damage that may have resulted from any testing to the marine life of the Gulf - within the boundaries as set forth by the U.S. Navy for the purpose of this training.
All documented material would be turned over to State DNR, Secretary of the Interior, Dept. of Alaska Fish + Game Governor's office, and local newspaper in Anchorage, Juneau, Kodiak, Seward + Dutch Harbor.

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*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.34 CAROLYN RAMSEY

P.O. Box 190562
Anchorage, Alaska 99519
19 October 2010

Amy Burt, Environmental Planner
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Ms. Burt,

I am writing to you as a concerned citizen and resident of Anchorage, Alaska. This letter addresses a few of my concerns about the *Gulf of Alaska Navy Training Activities Draft EIS/OEIS.* I understand that the U.S. Navy has "identified the need to support and conduct current, emerging, and future training activities". I understand that the the men and women in our United States Military require such training so that they can be prepared for any and all situations that may arise. This training however needs to remain at the No Action Alternative. The other option would be for the U.S. Navy to find another location away from the vast marine and endangered species that inhabit our Alaskan waters.

As noted in the Draft EIS/OEIS Appendix F page F-18 "Animals in or near an intense noise source can die from profound injuries related to shock wave or blast effects." Alaska Department of Fish and Game has developed blasting standards that say "no person may discharge an explosive that produces or is likely to produce an instantaneous pressure change greater than 2.7 pounds per square inch in the swim bladder of a fish". Considering salmon, whales and other various marine species either are fish or rely on these fish. The risk to our Alaskan food chain is unacceptable under the Alternative 1 and Alternative 2 proposals. Alaska's economy is based in natural resources and the seafood industry is its third most important natural resource. The No Action Alternative is the only option.

As noted in the Draft EIS/OEIS Appendix F page F-18 "Acoustic exposures have been demonstrated to kill marine mammals and result in physical trauma, and injury (Ketten 2005)." Mass stranding of beaked whales and porpoise have been reported in association with the use of active sonar. The disorientation and unusual behavior patterns in whales, porpoise, and many other various marine mammals have been reported in association with the use of active sonar. With the vast marine and endangered species that inhabit the Gulf of Alaska the use of active sonar in any degree is unacceptable. The No Action Alternative is the only option.

The temperatures of the Gulf of Alaska range from approximately 40 - 50 degrees, due to these cold temperatures it will take the expended ordinances hazards material much longer to degrade and dissipate therefore placing the marine ecosystem in the Gulf of Alaska in even greater danger for an even longer period of time. Again this is another reason Alternative 1 and Alternative 2 are unacceptable. The No Action Alternative is the only option.

I suggest that the U.S. Navy continue its development of interactive computer simulation software and hardware that can be used to train its sonar technicians. This will assist in limiting the damage done to the earths marine life. Mankind has been doing irrefutable damage to our earth and the life that inhabits it for many years. The damage to the ecosystem is growing each and every day. While I understand the United States Navy needs to train its personal, the risk of further damage to Alaska's fragile marine environment must be kept at a minimum. This is why the No Action Alternative is the only acceptable option.

Respectfully

Carolyn Ramsey

I.1.35 CARL RANNEY

United States Navy

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   1101 Tautog Circle, Suite 203
   Silverdale, WA 98315-1101

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Name: Carl L. Ranney

Organization/Affiliation: Self

Address:* P.O. Box 2105

City, State, Zip Code: Cordova, AK 99574

Comments: I think that the sheling in the gulf wonn't have any major afects on the wildlife. In fact I think that the fragments from the destroyed ship if it lands on flat sea bed will aculy previd fish habatat.

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I.1.36 KRIS RANNEY

United States Navy

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Name: Kris Ranney

Organization/Affiliation: Boyscouts

Address:* P.O. Box 2105

City, State, Zip Code: Cordova, AK, 99574

Comments: I was wondering if the sinking of ships in the Gulf would afect the Helibut population there. As far as I know the area where you will sink ships is also home to this deep water fish species, most leave for the warmer shalow waters closer to shore in the summer but the larger fish do not come as close. Some may stay over the shelf. It takes 25 years for one of these fish to grow over 100 pounds, if you hit and killed a 600 pound fish it would take hundreds of years to replace!

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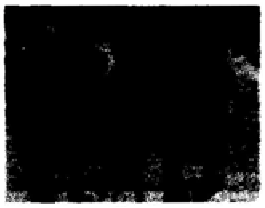
*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.37 LIBBY RIDDLES



Libby Riddles
Blazing Kennels
PO Box 15253
Fritz Creek, AK 99603
907-235-2997
lriddles@alaska.net

TO:Naval Facilities Engineering Command Northwest
ATTN: Mrs. Amy Burt -Gulf of Alaska EIS/OEIS project Manager
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Dear Mrs Burt,

I urge you to reconsider doing especially sonar testing in the Gulf of Alaska between Prince William Sound and Kodiak and also in the Seward area.

Our ocean wildlife takes enough of a hit between the occaisional oil spills, the over-fishing, the acidification of the ocean, and other factors. Adding unreasonable risks to animals like sea lions, whales, seals, sea otters and other marine wildlife including the fish just doesn't make any sense. Sonar has been proven to be very stressful to mammals that use it for navigation especially, making them prone to beaching and other health issues we are just beginning to understand.We depend on these animals for subsistence, and also for the tourist trade, and they deserve to exist in their own right without unnessecary harassament.

Please reconsider doing your practise sessions in areas that are not so sensitive to ocean wildlife, and the people that depend on them.
Explosives and sinking ships in this area seems like a really bad idea as well, for the same reasons.

Thank you for your consideration,

Libby Riddles
Iditarod Champion
Alaska Resident since 1973

I.1.38 RICHARD STEINER

United States Navy

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Name: Richard Steiner

Organization/Affiliation: Professor, University of Alaska Marine Advisory Program

Address:* 2221 E. Northern Lts. Blvd. #118

City, State, Zip Code: Anchorage, AK. 99508

Comments:

I strongly recommend that the exercises be re-located farther offshore, to minimize impact to the shelf ecosystem.

At a minimum, no potentially impactful activities should be conducted over or near the continental slope or shelf (shallower than 1000 fm or 2000 m depth). As well, all activities should be conducted only from October – February, to minimize impacts on seasonal migrant marine mammals + birds.

over please →

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I recommend that any such exercises be conducted outside of 200 n.miles from shore, and only in winter, thereby minimizing impact on seasonal resources.

As well, independent marine mammal observers need to be included to clear the safety zone, a large zone needs established (at least to verify no harmful exposure to noise), and no exercises should be conducted

I.1.39 STACY STUDEBAKER

Mrs. Amy Burt
Gulf of Alaska Gulf of Alaska EIS/OIES Project Manager
Naval Facility Engineering Command Northwest
1101 Tautog Circle
Silverdale, WA 98315-1101

Dear Mrs. Burt, 1/22/10

Navy Needs Better Data

The Navy visited Kodiak on Jan. 7 to brief the community on its proposed increase of training activities in the Gulf of Alaska (GOA) Temporary Maritime Activity Area (TMAA) which encompasses 42,146-square nautical miles just to the north of Kodiak Island. What least impressed me about the meeting was the Navy's arrogance and the lack of data in its presentation. I'm all for the readiness of our military, but not at the expense of vast amounts of marine life and the health of our immediate ocean environment upon which our community makes its living.

With our ocean's health and its ability to sustain life already compromised from so many other factors, the cumulative impacts, which you barely address, of these training activities in our area may cause irreparable harm to ocean life and losses to our local economy.

At the meeting the Navy discussed the 900-page Draft Environmental Impact Statement that it has been preparing for the last two years. It is now being circulated for public review. The EIS was boiled down to a few information bullets on posters stating nothing the Navy is planning to do in its exercises in the GOA would have any significant impacts on the environment! Any data upon which the Navy could make such unscientific claims were absent on the posters or in the presentation and woefully inadequate in the 900 page document.

The Navy's proposed training activities in the GOA would pose significant risk to whales, fish, and marine birds that depend on the area for breeding, feeding, navigating, and avoiding predators, in short, for their survival. Many exercises would employ mid-frequency active sonar, used to locate submarines, which has been implicated in mass injuries and mortalities of whales around the globe. The same technology is known to affect marine mammals in countless other ways, including inducing panic responses, displacing animals and disrupting crucial behavior such as foraging.

The Navy estimates its sonar training exercises in the GOA from its Preferred Alternative (Alternative 2) will result in more than 425,000 marine mammal "takes" (behavioral impacts, harassment, injury and death) every year. That's more than 2.125 million takes during the course of the Marine Mammal Protection Act permit it must seek from National Oceanic and Atmospheric Administration. Those numbers don't even account for the animals that die as a result of your experiments and quickly sink to the bottom. How can the Navy claim a FONSI on marine mammals when you are applying for such a permit?

In all, the Navy expects to "take" more than 20 different species of marine mammals, including seven endangered species, in the GOA. Beaked whales are barely mentioned because very little is known about them or their habitats. There may be many species of these small whales in the GOA. They dwell in deeper waters in trenches where they feed on squid and are very vulnerable to sonar because of the natural amplification and concentration of sound in marine canyons. Since they can stay underwater for up to 2 hours, it is impossible to mitigate harm to them with visual monitoring from the deck of a ship. They are among the most vulnerable and you have barely mentioned them.

The Navy's expanded training activities in the GOA also would affect fisheries and essential fish habitat, damage hard bottom habitat, and release into coastal waters a variety of hazardous materials such as spent rounds of ammunition and unexploded ordnance containing chromium, chromium compounds, depleted uranium and other hazardous materials. The report estimates an extraordinary amount of spent material will result from Preferred Alternative (Alternative 2) including a large increase in the weight of expended materials (352,000 pounds) and 10,300 pounds of hazardous material. That does not include entire ships the Navy plans to sink as part of its exercises. No data were presented on the impacts of sonar on fish and in particular, schools of salmon that swim directly through the test area.

Nearly all of the mitigation measures the Navy has proposed for the GOA concern the operation of a small "safety zone" around the sonar ship. Yet it is widely agreed in the scientific community that this measure is inadequate given the far-reaching effects of Navy sonar and the difficulty of spotting marine mammals from fast-moving vessels by a few people standing on the deck with binoculars. Most fishermen would agree that it is impossible, even under the best conditions in the open ocean, to spot anything on the surface of the ocean.

The Navy is not planning to establish any protection areas in the GOA, despite the broad recognition that geographic protection zones are the most effective available means to mitigate sonar's impacts on marine wildlife.

For example, no protection areas are proposed for harbor and Dall's porpoises, which are acutely sensitive to sound; for endangered gray whales, which migrate directly through the TMAA; for endangered humpback whales, sei and blue whales, which gather to feed in the TMAA; or for the critically endangered short-tailed albatross or North Pacific right whales, whose critical habitat is directly adjacent to the TMAA.

The Navy underestimates the number of marine mammals, fish and birds that will be harassed, injured and killed because it simply does not have the density estimates needed in order to accurately make this determination.

The National Environmental Policy Act (NEPA) specifically requires federal agencies to obtain the data necessary to their analysis. Here, the Navy failed to obtain data that is essential to its analysis. In addition, there are simply no reliable estimates for current or historical abundance numbers

for many of the affected marine mammals in the GOA. How can you claim "Finding of No Significant Impact" when you don't even know what's there?

The Navy does not attempt to address the effects of sonar and contaminants on plankton, the very base of our marine food chain and only briefly addresses the cumulative impacts on the marine ecosystem.

The Navy's alternative analysis also is inadequate. The Navy only presents three options; No Action Alternative — maintaining the present levels of training without sonar, Alternative (1) — add more training with sonar, or Alternative (2) — add even more intensive training with a lot more sonar. It does not consider any other alternatives, some employed by the Navy itself in other training exercises and ranges.

Finally, and most critically, the Navy does not offer adequate measures to mitigate the harmful effects of sonar. Its proposed mitigation measures basically boil down to "safety zones" (1,000 yard power-down and 200 yard shut down) around the sonar maintained primarily by on-board visual monitors. These are the same measures that federal courts have found to be "woefully inadequate and ineffectual." For instance, studies show that visual monitoring only spots about 5 percent of marine mammals. Statistically, a 5 percent "success" rate clearly does not cut it.

In conclusion, there is no scientific basis for the claims you make that nothing you are proposing to do in your test area, and in our back yard, will have any significant impacts on marine life. You are coming to Alaska to test this deadly technology because you have been legally blocked from doing so in other states and your assumption is that you can get away with it here because of our small, scattered population that won't put up much of a fuss. Please don't do any more harm to our ocean and adopt the No Action Alternative.

Sincerely,
Stacy Studebaker

Stacy Studebaker is a biologist, a 30-year Kodiak resident and coordinator of The Kodiak Gray Whale Project.

I.1.40 SUZANNE TORIAN

United States Navy

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Name: Suzanne Torian

Organization/Affiliation:

Address:* P.O. Box 3162

City, State, Zip Code: Homer, Alaska 99603

Comments:

I am categorically opposed to the Gulf of Alaska Navy Training Activities as proposed. Please do not allow this activity to proceed.

Visit www.GulfofAlaskaNavyEIS.com for project information.

*Provide your mailing address to receive future notices about the Gulf of Alaska Navy Training Activities EIS/OEIS.

I.1.41 TRUSTEES FOR ALASKA

TRUSTEES FOR ALASKA

A Nonprofit Public Interest Law Firm Providing Counsel to Protect and Sustain Alaska's Environment

1026 W. 4th Ave., Suite 201 Anchorage, AK 99501 (907) 276-4244 (907) 276-7110 Fax
Email: ecolaw@trustees.org Web address: www.trustees.org

January 25, 2010

Mrs. Amy Burt
Gulf of Alaska EIS/OES Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, WA 98315-1101

Re: Comments on Gulf of Alaska Navy Training Exercises Draft Environmental Impact Statement/Overseas Environmental Impact Statement.

On behalf of the Alaska Community Action on Toxics, Alaska Marine Conservation Council, Center for Biological Diversity, Cook Inletkeeper, Kodiak Audubon Society, Kodiak Gray Whale Project, North Gulf Oceanic Society, Prince William Soundkeeper, and Turning the Tides, Trustees for Alaska submits the following comments on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement for proposed Gulf of Alaska Training Exercises.[1] The Navy proposes a series of training exercises in the Gulf of Alaska (GOA) and Alaska's inland training areas, collectively referred to as the Alaska Training Areas (ATA). Within the ATA, the Navy has delineated the GOA Temporary Maritime Activity Area (TMAA), a 42,146 square nautical miles (nm) zone south of Prince William Sound and east of Kodiak Island.

The purpose of the Proposed Action is to achieve and maintain fleet readiness using the ATA to support and conduct current, emerging, and future training activities. Gulf of Alaska Navy Training Exercises Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS) at 1-2. The need for the Proposed Action is to enable the Navy to meet its statutory responsibility to organize, train, equip, and maintain combat-ready naval forces and to successfully fulfill its current and future global mission of winning wars, deterring aggression, and maintaining freedom of the seas. *Id.*

The DEIS/OEIS only considers three alternatives, including the no-action alternative. With regards to actions in the TMAA, the two action alternatives only differ in the number of exercises (with Alternative 2, the preferred alternative, including a

[1] Trustees for Alaska incorporates by reference comments submitted by other government agencies, individual scientists, environmental organizations and the public.

second 21-day training exercise in the GOA) and the addition of a sinking exercise under Alternative 2.

The Navy estimates that its sonar training exercises in the GOA from its Preferred Alternative (Alternative 2) will result in more than 424,620 marine mammal "takes" (behavioral impacts, harassment, injury, death) every year. DEIS/OEIS at 3.8-147. Over the course of the five year Letter of Authorization (LOA) permit, to be issued under the Marine Mammal Protection Act (MMPA), total take would exceed 2.125 million. In all, the Navy expects to "take" more than 20 different species of marine mammals, including 7 endangered species, in the GOA.

1. The Navy's proposed exercises and the use of mid-frequency sonar pose unacceptable harm to marine mammals and the Navy has failed to fully assess available mitigative measures.

Trustees for Alaska fully supports the comprehensive comments submitted by the Natural Resources Defense Council regarding the impact of the proposed use of mid-frequency active (MFA) sonar on marine mammals in the GOA. Trustees for Alaska reiterates, briefly, the major concerns with mid-frequency sonar use in the GOA and the lacking DEIS/OEIS analysis of impacts from the training exercises in the GOA.

First, nearly all of the mitigation measures that the Navy has proposed for the GOA concern the operation of a small "safety zone" around the sonar ship. Yet it is widely agreed in the scientific community that this measure is inadequate given the far-reaching effects of Navy sonar and the difficulty of spotting marine mammals from fast-moving vessels.

Second, the Navy has not proposed to establish any protection areas in the GOA, despite the broad recognition that geographic protection zones are the most effective available means to mitigate sonar's impacts on marine wildlife. For example, no protection areas are proposed for harbor porpoises, which are acutely sensitive to sound; for endangered gray whales, which migrate directly through the TMAA; for endangered humpback whales and blue whales, which gather to feed in the TMAA; for the critically endangered North Pacific right whale, who's critical habitat is directly adjacent to the TMAA; or for any other species or habitat.

Third, the Navy's acoustics impact analysis ignores scientific studies contrary to its interests and uses methodologies not supported by the scientific community. Thus, the thresholds it sets for permanent injury, temporary injury (hearing loss) and behavioral change are invalid as a matter of science. For instance, in setting its thresholds at 195 dB for harassment and temporary injury and 215 dB for permanent injury and death, the Navy ignores a 2004 study by Nowachek et al which found that right whales respond to mid-frequency sound below 140 dB (the sound caused them to stop eating and ascend rapidly to just below the surface, making them extremely vulnerable to ship strikes).

Finally – and most critically – the Navy does not set forth adequate measures to mitigate the harmful effects of sonar. Its proposed mitigation measures basically boil down to "safety zones" (1,000 yard power-down and 200 yard shut down) around the sonar maintained primarily by on-board visual monitors. *See* DEIS/OEIS at 5-12. These are the same measures that federal courts have found to be "woefully inadequate and ineffectual." *Natural Resources Defense Council v. Winter*, 527 F.Supp.2d 1216, 1221-1222 (C.D.Cal. 2008). Studies indicate that visual monitoring only spots about 5% of marine mammals. Statistically, a 5% "success" rate is absolutely insufficient to be considered an effective mitigative measure. The DEIS/OEIS is also inadequate because it fails to acknowledge that the Navy has employed other more successful mitigation measures during previous training. These measures (which include some of the same mitigation measures environmental conservation organizations have supported but the Navy now claims cannot be employed) include siting exercises beyond the continental shelf and Gulf Stream, relocating exercises out of important habitat and to avoid certain species, and using a technique called "simulated geography" to avoid canyons and near-shore areas on at least three of its major ranges. The Navy has also restricted sonar use at night when marine mammals are harder to detect, as well as minimized the use of sonar from multiple sources at the same time. Although Chapter 5 of the DEIS/OEIS describes "alternative mitigation measures considered but eliminated," it fails to explain why these measures are not employable when they have been adopted and successfully implemented in the past. *See* DEIS/OEIS at 5-28. The Navy's claim that it cannot implement more protective mitigation measures is therefore unsupported by the DEIS/OEIS.

2. <u>The DEIS/OEIS fails to take the requisite "hard look" at the impacts of the proposed action on endangered species and critical habitat.</u>

Several endangered and threatened species may occur within in the TMAA including: various listed salmonids (Chinook salmon, coho salmon, chum salmon, sockeye salmon, and steelhead), various sea turtles (leatherback, loggerhead, green, and olive ridley), blue whales, fin whales, humpback whales, sei whales, sperm whales, North Pacific right whales, stellar sea lions, and short-tailed albatross. The DEIS/OEIS fails to adequately assess the impacts of the proposed action on endangered species, nor how adverse impacts will be minimized and mitigated. The DEIS/OEIS fails to provide a proper analysis of the serious impacts its sonar training and expended materials will have on the critically endangered North Pacific right whales, whose critical habitat is only 12 nautical miles from the TMAA or the endangered gray whales, which migrate through the TMAA.

3. <u>The DEIS/OEIS fails to provide a satisfactory analysis of impacts, based on complete data.</u>

The DEIS/OEIS underestimates the number of marine mammals (and fish) that will be harassed, injured and killed because the Navy simply does not have the density estimates needed in order to accurately make this determination. The National

Environmental Policy Act (NEPA) specifically requires federal agencies to obtain the data necessary to their analysis. The simple assertion that "no information exists" does not excuse the Navy from conducting the requisite analysis to fully understand the impacts of its proposed action and make a reasoned choice amongst its alternatives. *See* 40 C.F.R. § 1502.22(a) (unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained).

The Navy failed to obtain data essential to its analysis. The Navy itself admits that it has no density estimates for endangered blue whales, North Pacific right whales, sei whales, sea turtles, California sea lion, harbor porpoise, and harbor seal.3.7-2 and 3.8-109. In addition, there are simply no reliable estimates for current or historical abundance numbers for many of the affected marine mammals in the GOA. Despite the lack of survey/density data, the Navy simply estimates that only 1 blue whale, 1 North Pacific right whale and 4 sei whales may be harmed by its use of sonar because of the "rareness" of those whales. NEPA requires more. It requires these surveys to be completed and included in the impacts analysis.

4. The DEIS/OEIS cumulative impacts analysis fails to provide quantified and detailed information about other activities that may cumulative impact the environment, including marine mammals and fish.

The DEIS/OEIS cumulative impacts analysis is inadequate because it fails to provide the requisite quantified and detailed information about other activities and associated impacts. Table 4-1 simply lists projects that could have potential cumulative impacts with the proposed activity in the GOA without actually analyzing what those impacts will be. NEPA requires that agencies provide quantified and detailed information about past, present and reasonably foreseeable projects that support an analysis of the impacts associated with those other projects. Table 4-1 fails to provide the requisite detail or an analysis of how these other projects cumulative impact the environment.

5. The DEIS/OEIS range of alternatives is inadequate.

The Navy's range of alternatives is far too narrow in scope and has improperly failed to consider other reasonable alternatives. The Navy only considers three alternatives: the no-action alternative (maintain the status quo); increase training activities to include the use of active sonar, and; increase training activities to include the use of active sonar, conduct one additional summertime CSG exercise annually beyond that in Alternative 1, and sink up to two ships with a variety of ordnance. In other words, the DEIS/OEIS considers no action, increased training with sonar, and even more training with sonar and exercises that involve sinking vessels. The DEIS/OEIS fails to consider any other alternatives such as training measures that do not include MFA. Alternatives that include increased training with sonar and even more increased training with sonar do not amount to a "reasonable range of alternatives," as required by NEPA.

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The stated purpose of the Proposed Action is to achieve and maintain fleet readiness using the ATA to support and conduct current, emerging, and future training activities. DEIS/OEIS at 1-2. The need for the Proposed Action is to enable the Navy to meet its statutory responsibility to organize, train, equip, and maintain combat-ready naval forces and to successfully fulfill its current and future global mission of winning wars, deterring aggression, and maintaining freedom of the seas. *Id.* Nothing within the purpose and need statement asserts that all action alternatives must include mid-frequency sonar use. Training exercises without the use of mid-frequency sonar could take place and still meet the purpose and need and the set of criteria used to identify whether a possible alternative meets the purpose of and need for the Proposed Action. *See* DEIS/OEIS at 2-14 to 2-14; *see also* Letter from Nova Blazej, Manager, Environmental Review Office, EPA to Tom Clements, Public Affairs Officer, Pacific Missile Range Facility, Re: FEIS/OEIS for the Hawaiian Range Complex, June 10, 2008 (EPA recommended additional alternatives be evaluated and a more precautionary approach be taken regarding the use of mid-frequency active (MFA) sonar in training exercises due to the substantial uncertainty of these impacts on marine resources). As a result, the current two action alternatives do not represent an adequate range of reasonable alternatives.

6. The DEIS/OEIS fails to take the requisite "hard look" analysis at the impacts associated with expended materials.

The Navy estimates an extraordinary amount of spent material will result from its Preferred Alternative (Alternative 2) in the GOA. The weight of expended materials under Alternative 2 would increase to 352,000 lb (160,000 kg) per year (360-percent increase over the No Action Alternative), with the largest percentage increase from expended sonobuoys. DEIS/OEIS at 3.2-34. Navy training under Alternative 2 would deposit approximately 41 lb of expended material per nm2 (5.4 kg per km2) per year over 20 percent of the TMAA. *Id.* The Navy bases its analysis on an assumption that training under Alternative 2 would remain consistent for a 20 year period. *Id.* Under this assumption, the Navy would expend approximately 3,520 tons, for a total concentration of approximately 835 lb per nm2 (110 kg per km2). *Id.* Breaking down total tons of expended material per nm in the TMAA is inappropriate because these materials are not "diluted" or spread across the entire TMAA. The Navy must identify and assess the likely levels of contaminants associated with the expended materials where those materials are to be found.

According to the DEIS/OEIS, expended bombs would account for most of the weight of expended materials, but the Navy asserts that the majority of this weight would be relatively inert material used as filler for practice bombs, such as concrete or sand. *Id.* However the DEIS/OEIS fails to provide any detail with regards to what percentage is inert.

Under Alternative 2, approximately 10,300 lb (4,680 kg) per year of hazardous material would be expended (Table 3.2-19). *Id.* The DEIS/OEIS fails to provide a full list of the amount of each hazardous material. While the DEIS/OEIS identifies elements

associated with "heavy metals," "propellants," "batteries," "explosives," and "pyrotechnics", it is unclear how much of each hazardous substance is released into the environment from the training activities. Specifically, the DEIS/OEIS identifies the following hazardous substances: lead, cadmium, mercury, chromium, zinc, copper, manganese, aromatic hydrocarbons(such as benzene, toluene, and xylene), polycyclic aromatic hydrocarbons (such as naphthalene, acenaphthene, and fluoranthene), aluminum and ammonia propellant grain, arcite propellant grain, potassium hydroxide, lithium chloride, ammonium perchlorate, plastic-bonded explosives (PBX), high-explosive (HE) components, PBX-106 explosive, PBX (AF)-108 explosive, plastic or other polymer binders, Royal Demolition Explosive (RDX, cyclotrimethylene trinitramine), High Melting Explosive (HMX, cyclotetramethylene tetranitramine), pentaerythritoltetranitrate (PETN), barium chromate, potassium perchlorate, phosphorus, titanium compounds, lead oxide, lead chromate, lead azide, fulminate of mercury, molybdenum, vanadium, columbium, sodium, and nickel. The DEIS/OEIS fails to demonstrate whether the release of these materials, in these concentrations complies with the Clean Water Act, the Ocean Dumping Act, and the London Convention.

Trustees for Alaska highlights the following materials and lacking analysis in the DEIS/OEIS as examples of the insufficient analysis of expended materials upon the marine environment.

RDX (cyclotrimethylene trinitramine), HMX (cyclotetramethylene tetranitramine) and PETN (Pentaerythritoltetranitrate) are used in bomb, missiles, blasting caps, detonation cords, etc. Most new military explosive are a mixture of RDX, HMX and plastic polymers. DEIS/OEIS at 3.3-14. However, explosives used in the training exercises (e.g. MK-82, MK-83, MK84) are older ordnances and their explosive component contain approximately 80% 2-4-6 trinitrotoluene (TNT) by mass. The toxicity of TNT in marine environments is well documented, and most studies suggest that TNT interferes with reproduction of primary producers. In high concentrations, such as those that could result from unexploded ordnances, TNT profoundly affects the reproduction capabilities of primary producers found in marine sediment. Darrar et el. "Chronic toxicity of 2,4,6-trinitrotoluene to a marine polychaete and an estuarine amphipod", Environmental Toxicology and Chemistry. August 1999. The DEIS/OEIS fails to adequately assess the potential impact of TNT and quantify possible concentrations of TNT that would be deposited in the ocean.

The DEIS/OEIS dismisses impacts associated with ammonium perchlorate on the grounds that the missiles would sink to the bottom of the ocean, where the deleterious effects would be minimized. Because of the large number of missiles being used in SINKEX (up to 28 missiles will be used), further analysis of ammonium perchlorate levels around a SINKEX area are warranted.

The DEIS/OEIS states that copper thiocynate, a component of the batteries found in sonobuoys, "would also release cyanide, a material often toxic to marine organisms, thiocynate is tightly bound, and will form a salt or bind to bottom sediments. Therefore, the risk from thiocynate is very low." DEIS/OEIS at 3.2-14. The DEIS/OEIS

insufficiently addresses the environmental impact of copper thiocynate. The DEIS/OEIS contains only two sentences that address the toxicity of thiocynate. Furthermore, the DEIS/OEIS fails to cite any research that substantiates the claim that "the risk of thiocynate is very low." While the DEIS/OEIS acknowledges that cyanide would leech from batteries containing thiocynate, it fails to provide any information about expected concentrations. This is problematic, as cyanide is extremely harmful, even in low concentrations.

Flourocarbons are a component of sonobuoys. The DEIS/OEIS assert that there will be no adverse effects. DEIS/OEIS at 3.2-32. Fluorocarbons are persistent organic pollutants (POPs), and are resistant to degradation. Therefore, bioaccumulation may occur, and at high concentrations fluorocarbons can interfere with biological processes. Fluorocarbons come in all varieties, some more reactive and harmful than others. The EIS fails to quantify the specific type of fluorocarbons present in sonobouys. While a small amount of fluorocarbons would be released, the DEIS/OEIS must consider the impact of fluorocarbons as POPs, which means they will remain in the marine environment for a long time. The DEIS/OEIS fails to take this into account.

Copper is also a component of sonobuoys. Like fluorocarbons, copper can come in a variety of forms. Depending on the type of copper compound (copper sulfide, copper oxide, etc.) it is more or less reactive. The EIS fails to give descript examples of the type of copper that is used to house sonobuoys. Copper can be harmful to primary producers, and in high concentrations bioaccumulation will yield high amounts of copper in fish and other marine organisms. Absent this information, the DEIS/OEIS findings cannot be supported.

Tungsten is found in CIWS (Close-in Weapons Systems). The DEIS/OEIS notes that exposure to tungsten through either inhalation or ingestion poses a threat to humans and other biological organisms. DEIS/OEIS at 3.2-11. Tests performed by Mitchell et. al in 2001 determined that tungsten shot ingested by ducks had "[no] deleterious health effects." *Id.* Recent studies by Strigul et. al. in 2005 suggest that even in extremely low concentrations, tungsten can have a measurable impact on terrestrial ecosystems. *See* Strigul et. al, "Effects Of Tungsten On Environmental Systems", Chemosphere, Oct. 2005. Even *extremely low* concentrations, tungsten reduced total peak biomass by as much as 8%. Tungsten primarily impacts primary producers, meaning that tungsten could potentially be toxic to algae and other single-celled organisms. The research cited is irrelevant to impacts associated with the Navy's proposed training exercises because it addresses the effect of tungsten-iron and tungsten-polymer shot in ducks. However, the type of activity the Navy would be practicing would deposit shards of tungsten and tungsten powder directly into the water column, potentially harming primary producers, not larger animals. Research suggests that primary producers are profoundly impacted when tungsten is introduced into an environment, even at low concentrations. The threat to larger animals arises from bioaccumulation, not the type of direct impact assessed by Mitchell et al. This is of special concern for the SINKEX test, which would use large amounts of tungsten rounds in a very small area, potentially yielding a very high concentration of tungsten in the water column. The DEIS/OEIS analysis of tungsten fails

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to provide expected concentrations of tungsten in the waters surrounding training exercises such as the SINKEX. The DEIS/OEIS analysis is also wholly inadequate because it fails to address impacts to primary producers and the indirect impacts to the food chain.

Finally, with regard to specific assessment of hazardous materials, the SINKEX analysis is inadequate for several reasons. Alternative 2 would include two SINKEX training activities. DEIS/OEIS at 3.2-34. This training activity would result in 67,800 lbs of expended material annually. While Table 3.2-23 identifies the types of ordnance used, the DEIS/OEIS fails to quantify the amount of each hazardous waste deposited in the water column. The DEIS/OEIS acknowledges that an area of hazardous materials of relatively high concentration would be created in a SINKEX, however they fail to define what those concentrations are and fail to provide any supportive analysis for the conclusion that there will be "no measurable impact on the environment." Although the DEIS/OEIS acknowledges that the 67,800 lbs of expended material would likely be concentrated within an 8 nm^2 (DEIS/OEIS at 3.2-33) it provides no meaningful assessment of the actual impact to the marine environment in the vicinity of the SINKEX training exercise. As a result, all DEIS/OIES conclusions regarding the SINKEX activity are unsupportable.

The DEIS/OIES also generally diminishes the impacts associated with expended materials by stating that "[a]ssuming deposition of expended materials on 20 percent of the TMAA, the increase in density of deposited hazardous materials would be approximately 1.2 lb per nm2 (0.2 kg per km2) per year." DEIS/OEIS at 3.2-34. The DEIS/OEIS does not explain where the 20 percent assumption comes from. Furthermore, as noted above, averaging out lbs/nm fails to provide a proper assessment of the impact from expended materials.

Concerns over expended materials from Navy training exercises elsewhere in the United States have also drawn significant criticism from the EPA. For example, in comments submitted by EPA over the Final EIS/OEIS for the Navy's Proposed Training at the Jacksonville Range Complex in North Carolina, EPA noted that the deposition of expended materials and their accumulation over time was identified as the greatest impact of Navy training activities. April 20, 2009 Letter from Heinz Mueller, Chief NEPA Program Officer, EPA to Kelly Proctor, JAX EIS/OEIS PM; *see also* Oct. 27, 2008 Letter from Heinz Mueller, Chief NEPA Program Officer, EPA to Susan Admire, Naval Facilities Engineering Command, Atlantic Division Re: DEIS/OEIS for the Navy's Proposed Training at the Cherry Point Range Complex in North Carolina. The EPA raised concerns about the direct and cumulative long-term impacts to the aquatic environment associated with the accumulation of these expended materials. *Id.*

The DEIS/OEIS fails to fully identify, discuss and analyze the direct, indirect and cumulative short-term and long-term impacts associated with discarded debris, toxins and hazardous materials. Because the DEIS/OEIS fails to properly assess concentrations of expended materials, including hazardous materials, its subsequent analyses with respect to impacts on marine mammals, fish, marine organisms, etc. is invalid. Additionally, the

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N: DEIS/OEIS analysis is lacking with regards to the impacts all expended material may have upon marine organisms and the aquatic food chain into the future.

If you have any questions about these comments, please do not hesitate to contact me at 276-4244 x 107. Thank you.

Sincerely,

Brian Litmans
Staff Attorney

I.1.42 UNITED STATES DEPARTMENT OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C Street, Room 119
Anchorage, Alaska 99501-5126

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January 25, 2010

Naval Facilities Engineering Command Northwest
ATTN: Mrs. Amy Burt
Gulf of Alaska EIS/OEIS Project Manager
1101 Tautog Circle, Suite 203
Silverdale WA 98315-1101

Dear Mrs. Burt:

The U.S. Department of the Interior has reviewed the December 2009 Draft Environmental Impact Statement for the Gulf of Alaska Navy Training Activities. We have no comments to offer at this time.

Thank you for the opportunity to comment. If you have questions, you may contact me at 907-271-5011.

Sincerely,

Pamela Bergmann

Pamela Bergmann
Regional Environmental Officer – Alaska

I.1.43 LYNN WILBUR

Written comment to the United States Navy's Draft Environmental Impact Statement
For the Gulf of Alaska's Northern Edge Temporary Military Activities Area
Author: Lynn Wilbur, Sitka, Alaska

To: Mrs. Amy Burt
Gulf of Alaska EIS/OES Project Manager
Naval Facilities Engineering Command Northwest
1101 Tautog Circle, Ste. 203
Silverdale, WA 98315-1101

24 January, 2010

The following bulleted notes are highlights of my opposition to the United States Navy's proposal to increase training activities, introduce new training platforms, and introduce the use of mid frequency active sonar as outlined in Alternative 2, the preferred alternative in the Draft Environmental Impact Statement for the Northern Edge Training Range in the Gulf of Alaska. While I am also opposed to Alternative 1, I focus on details described in Alternative 2 for the scope of this letter. I do not believe that the Navy has taken a "Hard Look" at the impacts from its proposed training platforms on the air, water, sediments, and marine life in the Gulf of Alaska in alternatives 1 and 2 as required by the National Environmental Policy Act.

- **Air quality**-Alternative 2 proposes a 123-fold increase in emissions, including greenhouse gas emissions, and it only qualifies emissions below 3000 feet. It is a well-known fact that air-borne pollutants circulate in the atmosphere and sequester in circumpolar regions. The Navy claims that no mitigation is required because "Frequent precipitation probably scavenges from the air any particulates or other pollutants that might be present" (DEIS 3.1-2)-for the Navy to assume that nature will *probably* clean the atmosphere of pollutants discharged during training exercises is neither acceptable mitigation nor responsible stewardship of the environment.

- **Expended materials**-Alternative 2 proposes to release hazardous propellants, chaff, tungsten (which is toxic to marine life), fluoride compounds, 150 x the "safe" levels of hydrogen cyanide and heavy metals from missiles, bombs, sonobuoys, unmanned aircraft, etc. into the marine environment. Propellants containing PAH, benzenes, metals, and synthetic materials including PVC plastics will be released into the water column and sediments. The proposal states that these materials will "lodge in oxygen poor sediments, corrode, or become encrusted". The Navy uses environmental impact statements from other Naval training ranges, and letters written from Navy personnel to the National Marine Fisheries Service (*e.g.* DoN 2008c) to make this assumption; the Navy also refers to its own studies in other geographical regions of the U.S. (*e.g.* Wilson *et al.* 2002). I do not see how the Navy can correlate oxygen poor environments in the Gulf of Mexico with the marine environment in the Gulf of Alaska, especially in the absence of any references to meaningful studies undertaken in the GOA. It is also disturbing that the Navy plans to increase its deployment of sonobuoys by 6000%; PVC and other plastic materials are part of the expendable materials list for sonobuoys.

  Plastic compounds and other "flotsam" from the sonobuoys will be left in the ocean as well as more than 5,000 pounds of materials expended yearly from bombing and other exercises. With plastics accumulating in the North Pacific Ocean at an increasing rate, and coupled with the harmful effects that are being seen in seabirds and in the food chain, why is the Navy proposing to add to this problem? Navy personnel on hand to answer questions at the public meeting in

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Author: Lynn Wilbur, Sitka, Alaska

Juneau were completely unaware that plastic pollution is a current and enormous threat to our oceans. Even if the amount of expended materials proposed in Alternative 2 is a fraction of the total amount of garbage in the oceans today, discarding more hazardous debris and plastics in our oceans and leaving them to accumulate on the bottom or become flotsam is not responsible stewardship.

- **Fish**-the Navy admits that the TMAA encompasses highly productive areas for demersal, pelagic, groundfish, and shellfish stocks. The DEIS references a dated publication (see p. 3.6-16) to make a case for dismissing the effects of sound and pressure on the lateral line of fish, yet a more recent review by the same author (Hastings *et al.* 2005 from p. 8-1) suggests that the effects of sound and pressure on the lateral line requires more research and cannot be dismissed. The proposal criticizes the "gray literature" (wording used in Hastings *et al.* 2005, page 4), yet relies on its own final environmental impact statements, letters, and reviews from Navy biologists to provide the basis for its stock assessments and lack of mitigation effort. Contained in Hastings *et al.* 2005 is a recommendation for guidelines and criteria for studying the effects of different sound sources on fish. There exist well-referenced, peer-reviewed studies using controls that clearly show the detrimental impact of high intensity sound on the sensory organs of various commercial fish species.

  Is the same mitigation that is used fort sea turtles and marine mammals, *i.e.* using on board spotters, adequate measures for protecting our fish in the Gulf of Alaska? Do we have to rely on fish declines in order to understand the effects of sonar and missile blasts of over 200 decibels on fish, as has happened in the Baltic Sea? Neither a lack of a clear understanding of impacts of sounds on fish before proceeding with the activities as put forth in Alternative 2, nor an adequate mitigation plan is good stewardship.

- **Marine mammals**-Beaked whales have become a case study for effects of sonar on marine mammals, which was catalyzed by the Bahamas incident in 2000. There are three species of beaked whales in the GOA mentioned in the DEIS, as well as the critically endangered north Pacific right whale and the blue whale. In the DEIS the Navy is using abundance estimates based on one 10-day survey, and generalizes results from a comprehensive and well-coordinated study of several years duration of cetacean abundance off the coasts of California, Oregon, and Washington (see Appendix E-2) in order to make abundance estimates in the GOA. It is also using depth distribution measurements against the advice of the very author that it cites (see DEIS E-12). The Navy will rely on the use of up to three onboard spotters before commencing shipboard active sonar as part of its mitigation plan; these spotters will be expected to identify and count whales by reading Navy handbooks, watching DVDs, and using a paper wheel yet the DEIS does not indicate that they will receive essential training from qualified, seasoned, and experienced marine mammal biologists. The proposal indicates that the Navy *may* use aerial spotters, *if they are participating in the activity, if it is safe for them to*

  do the survey, and if they have time. The Navy does not identify or exclude critical cetacean habitat within the TMAA and will potentially be practicing with active sonar less than 25 km

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from the north Pacific right whale critical habitat. If, in the event of an unusual marine mammal stranding and/or death (USE), there will be no immediate correlation made between the sonar activity and the USE, despite scientific evidence that high intensity active sonar is harmful to whales. This means that if the National Marine Fisheries Service investigators decide that the USE has been resolved, the active sonar exercises may resume. The NMFS cannot even commit to what degree that they will be able to investigate USEs (see DEIS 5-25) and the Navy has yet to develop monitoring, unusual stranding event, or operational/communication response plans (see DEIS 5-20:24). In the SOCAL training range, three blue whales were struck by ships in the spring of 2009, yet the Navy has yet to clarify or provide details of the event, what actions were taken, and what mitigation measures were in place at the time of the ship strikes. I find the lack of study, lack of mitigation, and lack of planning highly disturbing.

I also find it disturbing that the DEIS dismisses a recommended mitigation to avoid training in the TMAA during seasonally productive times of the year, because it must "operate at any time or place to meet their training needs pursuant to Title 10"-yet it claims that it can't train in the winter. What if the "enemy" attacks Alaska during the winter months? Why does the "any time/place" policy require that they have to train near rich and biologically productive areas, critical habitats, and marine sanctuaries, and during seasonal migrations? Other recommended mitigations the DEIS dismisses are as follows:

- **Third party observers (TPO)**-The DEIS cites security reasons and a lack of military reflexes of TPOs, and the capability of its own spotters as reasons not to allow third party observers or spotters on its vessels. However, the Navy has used NOAA observers for other training projects, and has manned its own sonar-equipped vessels (*i.e.* the *Impeccable*) with contract employees. If the Navy believes that it can provide its own spotters with the same training and skill that is required of seasoned cetacean abundance surveyors, why can't the Navy provide third party observers with response training? The DEIS goes on to contradict its claims that it can provide adequate training for its spotters by admitting that personnel are not likely to be able to differentiate cetaceans species (see DEIS 5-30)-if spotters are incapable of identifying cetaceans to species, how is the Navy supposed to implement any type of monitoring protocol, especially in the event of a marine mammal take?
- **Halting activities after an USE**-The DEIS makes the claim that training exercises in the TMAA cannot be held up by investigations of cetacean mortalities, as they take months or years. This is not so according to scientists and experts who have investigated stranding events following military sonar exercises. In fact, experts have testified that timely autopsies and tissue necropsies are critical in determining whether or not active sonar is linked to cetacean strandings and deaths. Nevertheless, timely investigations should not be a means for the Navy to deflect its responsibilities under NEPA.
- **Ramping up sonar**-"ramping up" the intensification of active sonar so that animals have a chance to flee a sonar training event is a NMFS recommended mitigation plan

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(see DEIS 5-38). The Navy should be following this recommendation irrespective of their "train as they fight" policy. It seems plausible that "ramping up" can be integrated into the Navy's sonar training exercises and still allow the Navy to retain its "train as they fight" policy. The Navy must assuredly have a history of adapting and integrating other policies in their training regimes.

- **Enlargement of powerdown/shutdown zones**-Cetacean survey experts say that it is difficult, if not impossible, to spot cetaceans or identify them to species at distances greater than 1000 yards or in anything higher than a calm sea state of Beaufort 0-1. In the absence of proper mitigation measures, such as identifying and avoiding critical habitat, avoiding seasonal migration routes, and employing more sophisticated methods of identifying marine mammals in the vicinity of an active sonar exercise, the Navy should respect the recommended 2000-yard buffer zone.

- **Implementing vessel speed reduction**-Ship strikes are an increasing cause of cetacean deaths. The Navy must evaluate and reduce the speed of its vessels, especially following active sonar exercises in order to ensure the safety and protection of marine mammals and to ensure its mission of good environmental stewardship.

- **Adopting mitigation measures of foreign Navies**-NATO members have taken the negative impact of active sonar on cetaceans very seriously, and NATO and the European Union have implemented treaties, exclusion zones, and restrictions on the use of sonar during military training exercises. Protecting marine life must be a priority for the US Navy if it wishes to be respected to by its allies and consider itself a world leader in good environmental stewardship.

Lynn Wilbur
Sitka, Alaska

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