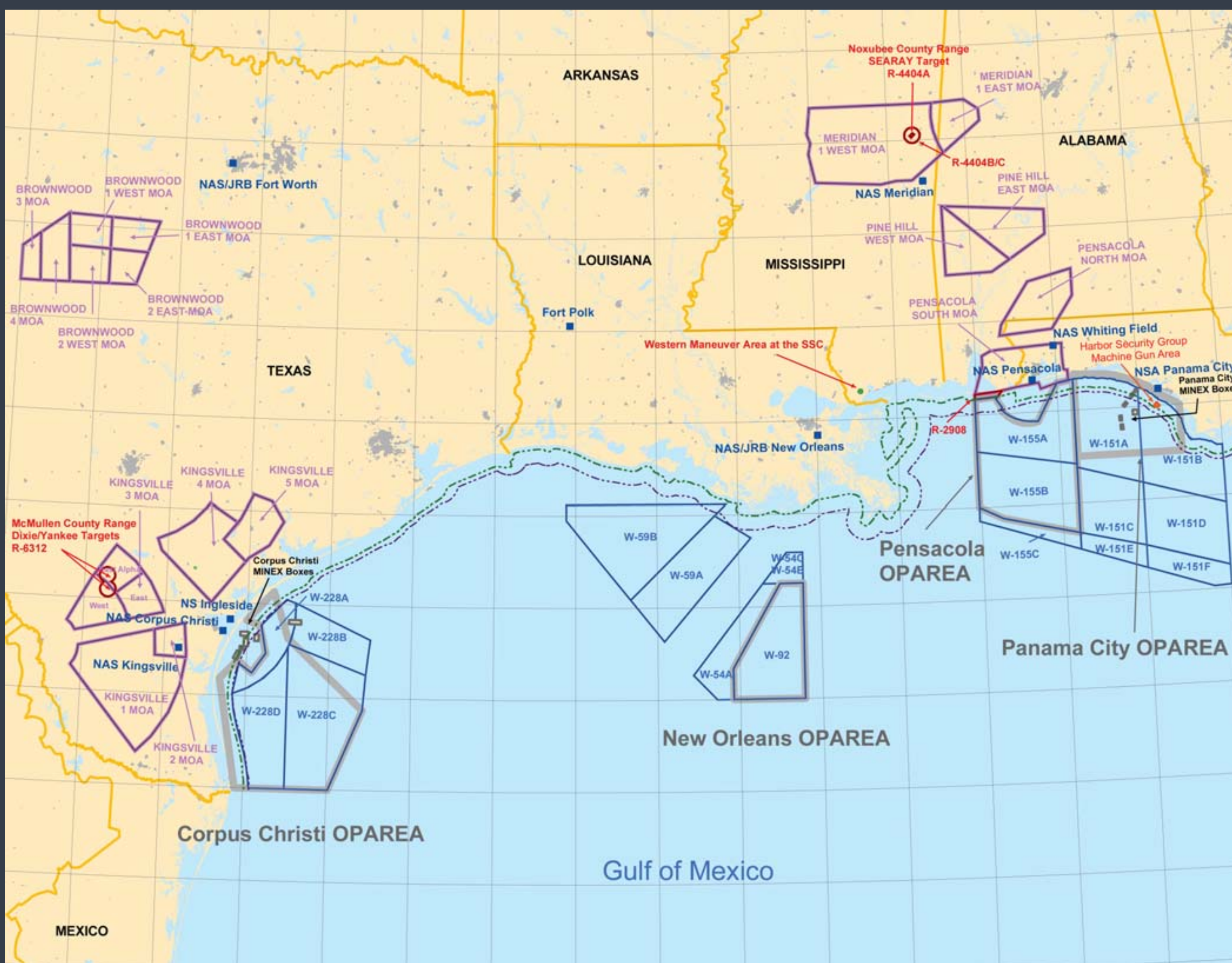
Gulf of Mexico Range Complex Final Environmental Impact Statement/ Overseas Environmental Impact Statement (EIS/OEIS) Volume 2 Appendices



Prepared by:

United States Fleet Forces

December 2010

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GULF OF MEXICO RANGE COMPLEX FINAL ENVIRONMENTAL IMPACT STATEMENT/ OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 2, Appendices

Lead Agency
Department of the Navy

Action Proponent:
United States Fleet Forces

For Additional Information:
NAVFAC Atlantic
6506 Hampton Boulevard, Norfolk, VA 23508-1278

Cooperating Agency
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, Silver Spring, Maryland 20910-3226

Published December 2010

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APPENDIX A
COOPERATING AGENCIES AND ACCEPTANCE LETTERS

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DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456F/8U158025
15 February 2008

Mr. John Oliver
Assistant Administrator (Acting)
National Oceanic and Atmospheric Administration (NOAA) Fisheries
1315 East West Highway
Silver Spring, MD 20910

Dear Mr. Oliver:

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) is initiating the preparation of an Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) to evaluate potential environmental effects of using the Gulf of Mexico (GOMEX) Range Complex to support current, emerging, and future training operations and Research, Development, Test, and Evaluation (RDT&E) activities. The proposed action will further ensure that we can meet our statutory obligations under Title 10 of the United States Code governing the roles and responsibilities of the Navy.

The proposed action for the GOMEX Range Complex EIS/OEIS is to:

- Maintain current levels of military readiness by training and conducting RDT&E in the GOMEX Range Complex;

- Accommodate future increases in operational training tempo and RDT&E in the GOMEX Range Complex to support the rapid deployment of naval units or strike groups;

- Achieve and sustain readiness so that the Navy can quickly surge significant combat power in the event of national crisis or contingency operation, and as is consistent with the Fleet Readiness Training Plan;

- Support the acquisition and implementation into the Fleet of advanced military technology and testing and training needed for new platforms (vessels, aircraft and weapons systems); and

- Maintain the long-term viability of the GOMEX Range Complex while protecting human health and the environment, and enhancing the quality, communication capability, and safety of the GOMEX Range Complex.

In order to adequately evaluate the potential environmental effects of this proposed action, the Navy and National Marine Fisheries Service (NMFS) will benefit from working together on assessing potential acoustic effects to marine species protected under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). It is anticipated that the effects will predominantly be related to acoustic effects associated with explosive ordnance use. As you are aware, effects associated with active sonar are being analyzed in the Atlantic Fleet Active Sonar Training (AFAST) EIS/OEIS. The AFAST EIS/OEIS addresses active sonar use as a whole by the Atlantic Fleet in the western Atlantic Ocean and in the GOMEX. The analysis of the AFAST EIS/OEIS will be incorporated by reference into the GOMEX Range Complex EIS/OEIS to account for active sonar effects that could occur within the geographic area of the GOMEX Range Complex.

To assist in the GOMEX Range Complex planning, and in accordance with 40 CFR Part 1501 and the Council on Environmental Quality Cooperating Agency guidance issued 30 January 2002, the Navy requests NMFS serve as a cooperating agency for the development of this EIS/OEIS. As defined in 40 CFR 1501.5, the Navy is the lead agency for the GOMEX Range Complex EIS/OEIS. As NMFS has jurisdiction by law and special expertise over protected marine species potentially affected by the proposed action, the Navy is requesting that NMFS be a cooperating agency as defined in 40 CFR 1501.6.

As the lead agency, the Navy will be responsible for the following:

- Gathering all necessary background information and preparing the EIS/OEIS and all necessary permit applications associated with explosive acoustic issues on the underwater ranges.

- Working with NMFS personnel to develop and refine the method of estimating potential effects to protected marine species, including threatened and endangered species.

- Determining the scope of the EIS/OEIS, including the alternatives evaluated.

- Circulating the appropriate NEPA documentation to the general public and any other interested parties.

- Scheduling and supervising public meetings held in support of the NEPA process, and compiling and responding to any comments received.

- Participating, as appropriate, in public meetings hosted by NMFS for receipt of public comment on protected species permit applications. This shall also include assistance in NMFS' response to comments.

- Maintaining an administrative record and responding to any Freedom of Information Act (FOIA) requests relating to the EIS/OEIS.

As the cooperating agency, NMFS would be asked to support the Navy in the following manner:

- Provide timely comments after the Agency Information Meeting (which will be held at the onset of the NEPA process) and on working drafts of the EIS/OEIS documents. The Navy requests that comments on draft EIS/OEIS documents be provided within 30 calendar days.

- Respond to Navy requests for information.

- Coordinate, to the maximum extent practicable, any public comment periods necessary in the MMPA permitting process with the Navy's NEPA public comment periods.

- Participate, as appropriate, in public meetings hosted by the Navy for receipt of public comment on the EIS/OEIS and the environmental analysis.

- Schedule meetings requested by Navy in a timely manner and adhere to the overall schedule set forth by the Navy.

The Navy views this agreement as important to the successful completion of the NEPA process for the GOMEX Range Complex EIS/OEIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available. NMFS' assistance will be invaluable in that endeavor.

My point of contact for this action is Ms. Karen M. Foskey, (703) 602-2859, email: Karen.foskey@navy.mil.

Sincerely,

RDML L. S. RICE
Director, Environmental Readiness
Division (OPNAV N45)

Copy to:
ASN (I&E)
DASN (E), (I&F)
OAGC (I&E)
USFLTFORCOM N4/7
Commander, Naval Installations Command
Commander, Navy Region Mid-Atlantic
Commander, Navy Region Southeast

APPENDIX B
FEDERAL REGISTER NOTICES

This appendix contains the following:

1. Notice of Intent dated August 31, 2007
2. Notice of Public Hearing dated January 2, 2009
3. EPA's Notice of Availability dated February 27, 2009
4. NMFS' Request for public comments on Request for Incidental Take, dated April 28, 2009
5. NMFS' Proposed Rule, date July 14, 2009

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June 2006, the Corps of Engineers, New England District completed a Preliminary Assessment (PA) to document the need for a comprehensive DMMP for the LIS region. The PA concluded that successful completion of a LIS DMMP is critical to the Corps' ability to maintain the region's civil works navigation projects, and to provide future navigation improvements to the system of Federal waterways in the LIS region. Appropriate future cost-effective management methods and future dredged material capacities must be identified to serve both Federal and non-Federal project needs in this region for the long-term health of the region's economy, including its navigation-dependent industries and activities. The Corps prepares NEPA documents to evaluate the environmental impacts of the actions and alternatives analyzed in dredged material management plans. In preparing the current DPEIS, the Corps expects this document to be used as part of the NEPA analysis for both Corps and non-Corps future dredging projects through tiering and incorporation by reference. Issues to be analyzed in the DPEIS may include potential impacts to: shipping and navigation; commercial and recreational fisheries and shellfisheries; water quality; sediment quality; biological resources, including threatened and endangered species; bioavailability of contaminants; cultural resources; recreational activities such as use of beaches, refuges, and natural areas; wetlands; and other potential habitat restoration opportunities. The DPEIS will be prepared in coordination with other environmental review and consultation requirements under the Clean Water Act, National Historic Preservation Act, Endangered Species Act, Coastal Zone Management Act, and other relevant and appropriate statutes and Executive Orders.

There are many harbors, channels and navigation-dependent facilities in Connecticut and New York within Long Island Sound that must undergo periodic maintenance dredging to ensure safe navigation. Some harbors occasionally must be deepened beyond historical depths to meet changing economic and safety needs. In order to manage all of the dredged material from harbors in the LIS region generated by both Federal and non-Federal interests in the next twenty years, the DMMP and DPEIS will be identifying the potential volume of material and identifying and evaluating alternatives that could be used to manage such a volume of dredged material. Thus, future Federal and non-Federal projects can use the DMMP and its associated PEIS to help satisfy legal requirements of NEPA, the Clean Water Act, and the Marine Protection, Research, and Sanctuaries Act (MPRSA).

The LIS DMMP will include an in-depth planning analysis of reasonable potential dredged material placement/disposal alternatives, including open-water disposal, beneficial use, upland disposal, and treatment technologies, and this analysis will be used as a basis for future individual permit and project approval decisions related to alternatives analysis for dredging in the LIS region. To accomplish this, the LIS DMMP will examine dredging needs, sediment and water quality, disposal alternatives and environmental impacts on a harbor-by-harbor basis. Consistent with the Designation Rule for the Western and Central Long Island Sound Dredged Material Disposal Sites, 40 CFR 228.14(b)(4), the DMMP will be identifying potential procedures and standards for the use of practicable alternatives for dredged material disposal in Long Island Sound. The various alternatives and the information associated with such plans will provide the Corps and other navigation users with an array of feasible options that will meet their dredged material management needs.

The LIS DMMP and DPEIS will identify a practicable, comprehensive and coordinated regional practicable strategy for technically feasible and environmentally sound management of material dredged from Long Island Sound. These documents will identify potential environmentally acceptable, practicable management alternatives that can be utilized by various dredging proponents in their analysis of options to manage dredging projects. These alternatives will likely include, but not be limited to:

- Open-water placement.
- Alternative management strategies for treating or reusing dredged materials, including the use of decontamination and sediment processing technologies.
- Beneficial reuse of dredged material such as:
  - Open and closed landfills;
  - Existing upland dredged material disposal areas;
  - Current or proposed transportation improvements;
  - Temporary dredged material storage;
  - Asphalt, cement and other aggregate use;
  - Large scale development use;
  - Brownfield remediation;
  - Use at closed mines and quarries;
  - Placement at beaches for beneficial use;
  - Agricultural use;
  - Habitat restoration projects.

Full public participation of affected Federal, state, and local agencies, affected Indian tribes, and other interested private organizations and parties is invited. All interested parties are encouraged to submit their names and addresses to (see **ADDRESSES**), to be placed on the project mailing list to receive fact sheets, newsletters and related public notices. The Corps will hold public scoping meetings later this year or in 2008 at different locations around the LIS region. Topics and issues to be addressed in the DPEIS, identified in part from responses to this Notice of Intent, will be summarized. The public is invited to attend the scoping meetings and identify additional issues that should be addressed in the DPEIS. The actual date, place and time of the scoping meetings will be announced in respective local newspapers and on the Corps New England District Web page.

It is estimated that the Draft PEIS will be made available to the public in the Fall of 2012.

Dated: 22 August 2007.

Lieutenant Colonel Andrew B. Nelson,

Deputy District Commander, U.S. Army Corps of Engineers, New England.

[FR Doc. 07–4274 Filed 8–30–07; 8:45 am]

BILLING CODE 3710–24–M

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement/Overseas Environmental Impact Statement for Navy Atlantic Fleet Training in the Gulf of Mexico Range Complex and To Announce Public Scoping Meetings

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR parts 1500–1508), and Executive Order 12114 (Environmental Effects Abroad of Major Federal Actions), the Department of the Navy (Navy) announces its intent to prepare an Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) to evaluate the potential environmental effects associated with naval training in the Gulf of Mexico (GOMEX) Range Complex. The Navy proposes to support current and emerging training

operations and Research, Development, Testing, and Evaluation (RDT&E) activities at the GOMEX Range Complex by: (1) Maintaining baseline training and RDT&E operations at current levels; (2) increasing training and RDT&E operations from current levels as necessary to support the Fleet Readiness Training Plan (FRTP); (3) accommodating mission requirements associated with force structure changes, including those resulting from the introduction of new platforms (vessels, aircraft and weapons systems); and (4) implementing enhanced range complex capabilities.

The EIS/OEIS study area is the GOMEX Range Complex, which encompasses portions of the Gulf, as well as portions of the southeastern states of Florida, Alabama, Mississippi, Louisiana, and Texas. The GOMEX Range Complex consists of targets and instrumented areas, airspace, surface and subsurface operations areas (OPAREAs), and land range facilities. Together the GOMEX Range Complex encompasses: 15 square nautical miles (nm^2) of land area; 43,390 nm^2 of special use airspace (SUA); 17,520 nm^2 of off-shore surface and subsurface OPAREA; and 12,072 nm^2 of shallow ocean area less than 100 fathoms (600 feet).

The scope of actions to be analyzed in this EIS/OEIS includes current and proposed future Navy training and RDT&E activities within Navy-controlled operating areas, airspace, and ranges. It also includes proposed Navy-funded range capabilities enhancements, including infrastructure improvements supporting range complex training and RDT&E activities. Training activities involving use of active sonar are conducted in the GOMEX Range Complex; however, those potential effects are being analyzed in detail in a separate document, the Atlantic Fleet Active Sonar Training (AFAST) EIS/OEIS. This separate sonar EIS/OEIS addresses active sonar use as a whole by the Atlantic Fleet in the western Atlantic Ocean and in the Gulf of Mexico. The analysis of the AFAST EIS/OEIS will be incorporated into the GOMEX Range Complex EIS/OEIS to account for active sonar effects that could occur within the geographic area of the GOMEX Range Complex.

DATES: Four public scoping meetings will be held. The meeting dates are:

1. Monday, September 24, 2007, 5 p.m.–8 p.m., Panama City, FL.

2. Tuesday, September 25, 2007, 5 p.m.–8 p.m., Pensacola, FL.

3. Wednesday, September 26, 2007, 5 p.m.–8 p.m., Kenner, LA.

4. Friday, September 28, 2007, 5 p.m.–8 p.m., Corpus Christi, TX 78401.

ADDRESSES: Four public scoping meetings will be held in Florida, Louisiana, and Texas to receive oral and/or written comments on environmental concerns that should be addressed in the EIS/OEIS. These public scoping open houses will be held at the following locations:

1. Monday, September 24, 2007, 5 p.m.–8 p.m., Gulf Coast Community College, 5230 West Highway 98, Panama City, FL 32401.

2. Tuesday, September 25, 2007, 5 p.m.–8 p.m., Pensacola Junior College (Warrington Campus), 5555 Highway 98 West, Pensacola, FL 32507.

3. Wednesday, September 26, 2007, 5 p.m.–8 p.m., Alfred Bonnabel High School, 2801 Bruin Drive, Kenner, LA 70065.

4. Friday, September 28, 2007, 5 p.m.–8 p.m., Holiday Inn-Emerald Beach Hotel, 1102 South Shoreline Boulevard, Corpus Christi, TX 78401.

FOR FURTHER INFORMATION CONTACT: Naval Facilities Engineering Command Southeast, Post Office Box 30 (Building 135 North, Ajax Street), Naval Air Station Jacksonville, Jacksonville, FL, 32212–0030, ATTN: Mr. Bob Riley (Code OPC5), telephone: 904–542–6125.

SUPPLEMENTARY INFORMATION: The Navy's mission is to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas. For that reason, Title 10 U.S.C. Section 5062 directs the Chief of Naval Operations to train all naval forces for combat. The Chief of Naval Operations meets that direction, in part, by conducting at-sea training exercises and ensuring naval forces have access to ranges, OPAREAs and airspace where they can develop and maintain skills for wartime missions and conduct RDT&E of naval weapons systems. As such, Navy ranges, OPAREAs, and airspace must be maintained and/or enhanced to accommodate necessary training and testing activities in support of national security objectives. The purpose of the proposed action is to achieve and maintain Fleet readiness using the GOMEX Range Complex to support current, emerging, and future training operations; RDT&E operations; expand warfare missions; and upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E.

The need for the proposed action is to provide range facilities for the training and equipping of combat capable naval forces ready to deploy worldwide. In this regard, the GOMEX Range Complex furthers the Navy's execution of roles and responsibilities under U.S.C Title 10, Section 5062. To implement this mandate, the Navy needs to: Maintain current levels of military readiness by training in the GOMEX Range Complex; accommodate future increases in operational training tempo in the GOMEX Range Complex and support rapid deployment of naval units or strike groups; achieve and sustain readiness of ships and squadrons so the Navy can quickly surge significant combat power in the event of a national crisis or contingency operation, and as is consistent with the FRTP; support acquisition and implementation into the Fleet of advanced military technology and testing and training needed for new platforms (vessels, aircraft and weapons systems); and maintain long-term viability of the GOMEX Range Complex while protecting human health and the environment, and enhancing the quality, communication capability, and safety of the GOMEX range complex.

Three alternatives will be evaluated in this EIS/OEIS: (1) The No Action Alternative is the continuation of current operations and support of existing range capabilities; (2) Alternative 1 consists of all elements of the No Action Alternative plus increased operational training, expanded warfare missions, accommodation of force structure changes, and implementation of enhancements, to the minimal extent possible to meet the components of the proposed action; and (3) Alternative 2 consists of all elements of Alternative 1 plus an additional increase in operational tempo and frequency of training events optimizing training in the GOMEX Range Complex in support of future contingencies, and better exploitation of the Joint National Training Capability (JNTC). Exploitation of the JNTC includes an increase in post Base Realignment and Closure Gulf-based F–18 and E–2 aircraft, and transient Navy participation in Navy and joint training opportunities afforded by proximity to DoD installations in the southeastern United States.

This EIS/OEIS will evaluate the environmental effects associated with: airspace; noise; range safety; natural land resources; water resources; air quality; biological resources, including threatened and endangered species; land use; socioeconomic resources; infrastructure; and cultural resources. The analysis will include an evaluation of direct and indirect impacts, and will account for cumulative impacts from other Navy activities in the GOMEX

Range Complex. No decision will be made to implement any alternative until the EIS/OEIS process is completed and a Record of Decision is signed by the Assistant Secretary of the Navy (Installations and Environment).

The Navy is initiating the scoping process to identify community concerns and local issues to be addressed in this EIS/OEIS. Federal agencies, state agencies, local agencies, and interested persons are encouraged to provide oral and/or written comments to the Navy to identify specific issues or topics of environmental concern that should be addressed in the EIS/OEIS. Written comments must be postmarked by November 5, 2007 and should be mailed to: Naval Facilities Engineering Command Southeast, Post Office Box 30 (Building 135 North, Ajax Street), Naval Air Station Jacksonville, Jacksonville, FL 32212–0030, Attention: Mr. Bob Riley (Code OPC5), telephone: 904–542–6125. Comments can also be submitted no later than November 5, 2007 via the project Web site: *http://www.GOMEXRangeComplexEIS.com.*

Dated: August 23, 2007.

T. M. Cruz,

Lieutenant, Judge Advocate General's Corps, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. E7–17360 Filed 8–30–07; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Submission for OMB Review; Comment Request

AGENCY: Department of Education.

SUMMARY: The IC Clearance Official, Regulatory Information Management Services, Office of Management invites comments on the submission for OMB review as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before October 1, 2007.

ADDRESSES: Written comments should be addressed to the Office of Information and Regulatory Affairs, Attention: Education Desk Officer, Office of Management and Budget, 725 17th Street, NW., Room 10222, Washington, DC 20503. Commenters are encouraged to submit responses electronically by e-mail to *oira_submission@omb.eop.gov* or via fax to (202) 395–6974. Commenters should include the following subject line in their response "Comment: [insert OMB number], [insert abbreviated collection name, *e.g.*, "Upward Bound Evaluation"]. Persons submitting comments electronically should not submit paper copies.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The IC Clearance Official, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, *e.g.* new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6) Reporting and/or Recordkeeping burden. OMB invites public comment.

Dated: August 27, 2007.

Angela C. Arrington,

IC Clearance Official, Regulatory Information Management Services, Office of Management.

Office of Elementary and Secondary Education

Type of Review: New.

Title: High School Equivalency Program (HEP) Annual Performance Report.

Frequency: Annually.

Affected Public: Not-for-profit institutions; State, Local, or Tribal Gov't, SEAs or LEAs.

Reporting and Recordkeeping Hour Burden:

Responses: 61.

Burden Hours: 2,440.

Abstract: For the Migrant HEP program, a customized Annual Performance Report (APR) that goes beyond the generic 524B is requested to facilitate the collection of more standardized and comprehensive data to inform Government Performance and Results Act (GPRA), to improve the overall quality of data collected, and to increase the quality and quantity of data that can be used to inform policy decisions.

Requests for copies of the information collection submission for OMB review may be accessed from *http://edicsweb.ed.gov*, by selecting the "Browse Pending Collections" link and by clicking on link number 3379. When you access the information collection, click on "Download Attachments " to view. Written requests for information should be addressed to U.S. Department of Education, 400 Maryland Avenue, SW., Potomac Center, 9th Floor, Washington, DC 20202–4700. Requests may also be electronically mailed to *ICDocketMgr@ed.gov* or faxed to 202–245–6623. Please specify the complete title of the information collection when making your request.

Comments regarding burden and/or the collection activity requirements should be electronically mailed to *ICDocketMgr@ed.gov.* Individuals who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–800–877–8339.

[FR Doc. E7–17338 Filed 8–30–07; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF EDUCATION

Office of Postsecondary Education; Overview Information; Fulbright-Hays Faculty Research Abroad (FRA) Fellowship Program; Notice Inviting Applications for New Awards for Fiscal Year (FY) 2008

Catalog of Federal Domestic Assistance (CFDA) Number: 84.019A.

Dates:

Applications Available: August 31, 2007. Deadline for Transmittal of Applications: October 30, 2007.

Full Text of Announcement

I. Funding Opportunity Description

Purpose of Program: The Fulbright-Hays Faculty Research Abroad Fellowship Program offers opportunities to faculty of Institutions of Higher Education (IHEs) to engage in research abroad in modern foreign languages and area studies.

Priorities: In accordance with 34 CFR 75.105(b)(2)(ii), this priority is from the regulations for this program (34 CFR 663.21(d)).

Absolute Priority: For FY 2008 this priority is an absolute priority. Under 34 CFR 75.105(c)(3) we consider only applications that meet this priority.

This priority is:

A research project that focuses on one or more of the following geographic areas: Africa, East Asia, Southeast Asia and the Pacific Islands, South Asia, the Near East, East Central Europe and Eurasia, and the Western Hemisphere

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 Mexico Range Complex

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section 102(2)(c) of the National Environmental Policy Act (NEPA) as implemented by the Council on Environmental Quality Regulations (40 CFR Parts 1500–1508) and Executive Order 12114 Environmental Effects Abroad of Major Federal Actions, the Department of the Navy (Navy) has prepared and filed with the U.S. Environmental Protection Agency a Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for public release on January 2, 2009. The National Marine Fisheries Service (NMFS) is a cooperating agency for the EIS/OEIS. The Draft EIS/OEIS evaluates the potential environmental impacts over a 10-year planning horizon associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E) activities; and associated range capabilities enhancements (including infrastructure improvements) within the existing Gulf of Mexico (GOMEX) Range Complex.

The GOMEX Range Complex geographically encompasses offshore, near-shore, and onshore Operating Areas (OPAREAs), ranges, and special use airspace (SUA). *Components of the GOMEX Range Complex encompass:* 17,440 square nautical miles (nm^2) of OPAREA sea space; 20,810 nm^2 of SUA off the coasts of Florida, Alabama, Mississippi, Louisiana, and Texas; 12,000 nm^2 of military operating areas over Florida, Alabama, Mississippi, and Texas; as well as 15 nm^2 of inland range areas in east-central Mississippi and east-central Texas.

The Navy will conduct four public hearings to receive oral and written comments on the Draft EIS/OEIS. Federal, state, and local agencies and interested individuals are invited to be present or represented at the public hearings. This notice announces the dates and locations of the public hearings for this Draft EIS/OEIS.

DATES AND ADDRESSES: Public hearings will be held on the following dates and locations:

1. February 2, 2009 at the Bay Point Marriott, 4200 Marriott Drive, Panama City Beach, FL 32408;

2. February 3, 2009 at the New World Inn, 600 South Palafox Street, Pensacola, FL 23502;

3. February 4, 2009 at the New Orleans Marriott, 555 Canal Street, New Orleans, LA 70130; and

4. February 6, 2009 at the Holiday Inn-Emerald Beach Hotel, 1102 South Shoreline Boulevard, Corpus Christi, TX 78401.

All meetings will start with an open house session from 5 p.m. to 7 p.m. followed by a formal public hearing presentation and public comment period from 7 p.m. to 9 p.m. The open house sessions will allow individuals to review the information presented in the GOMEX Range Complex Draft EIS/OEIS. Navy representatives will be available during the open house sessions to clarify information related to the Draft EIS/OEIS.

FOR FURTHER INFORMATION CONTACT: Naval Facilities Engineering Command, Atlantic, 6506 Hampton Boulevard, Norfolk, VA 23508–1278, Attn: Code EV22TW (GOMEX EIS/OEIS PM), Fax: 757–322–4894 or *http://www.GOMEXRangeComplexEIS.com.*

SUPPLEMENTARY INFORMATION: A Notice of Intent to prepare the GOMEX Range Complex Draft EIS/OEIS was published in the **Federal Register** on August 31, 2007 (72 FR 50333–50335). Four public scoping meetings were held at the following dates and locations:

1. September 24, 2007 at the Gulf Coast Community College, Panama City, FL;

2. September 25, 2007 at the Pensacola Junior College (Warrington Campus), Pensacola, FL;

3. September 26, 2007 at the Alfred Bonnabel High School, Metairie, LA; and

4. September 28, 2007 at the Holiday Inn-Emerald Beach Hotel, Corpus Christi, TX.

The proposed action is to support and conduct current, emerging, and future training and RDT&E operations in the GOMEX Range Complex by maintaining baseline training and testing operations at current levels; modifying training and testing as necessary in support of the Fleet Readiness Training Plan (FRTP); and implementing enhanced range complex capabilities. The FRTP implements the Fleet Response Plan, which ensures continuous availability of agile, flexible, trained, and ready surge-capable (rapid response) forces. No major changes to GOMEX Range Complex facilities, operations, training, or RDT&E capacities over the 10-year planning period are expected from the proposed action. Rather, the proposed action will result in relatively small-scale but critical range enhancements and changes to training and testing operations in the GOMEX Range Complex necessary for the Navy to maintain a state of military readiness commensurate with its national defense mission. The primary focus of the Draft EIS/OEIS is to address the recommended range enhancements and changes to current and future training and testing operations that have the potential to impact the environment.

The purpose for the proposed action is to: Achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; expand warfare missions supported by the GOMEX Range Complex; and upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E. The need for the proposed action is to provide range capabilities for the training and equipping of combat-capable naval forces ready to deploy worldwide. In this regard, the GOMEX Range Complex furthers the Navy's execution of its Congressionally-mandated roles and responsibilities under Title 10 U.S.C. § 5062 by:

- Maintaining current levels of military readiness by training in the GOMEX Range Complex;
- Accommodating future increases in operational training tempo in the GOMEX Range Complex and supporting the rapid deployment of naval units or strike groups;
- Achieving and sustaining readiness of ships and squadrons so the Navy can quickly surge significant combat power in the event of a national crisis or contingency operation consistent with the FRTP;
- Supporting the acquisition and implementation into the Fleet of advanced military technology. The GOMEX Range Complex must adequately support the testing and training needed for new vessels, aircraft, and weapons systems; and
- Maintaining the long-term viability of the GOMEX Range Complex while protecting human health and the environment and enhancing the quality and communication capability and safety of the range complex.

Alternatives in this Draft EIS/OEIS were evaluated to ensure that they meet the purpose and the need of the proposed action, giving due consideration to range complex attributes such as the capability to support current and emerging Fleet tactical training and RDT&E requirements; the capability to support realistic, essential training at the level and frequency sufficient to support the FRTP and the Tactical Training Theater Assessment and Planning Program; and the capability to support training requirements while following Navy Personnel Tempo of Operations guidelines. Reasonable alternatives were carried through the Draft EIS/OEIS analysis.

The Draft EIS/OEIS considers three alternatives as summarized below:

(1) *No Action Alternative*—maintains current operations to include surge consistent with the FRTP.

(2) *Alternative 1*—includes No Action Alternative plus eliminates Mine Warfare training (mine countermeasures and mine neutralization) within the GOMEX Range Complex, conducts new training associated with air-to-surface bomb training, and uses more Commercial Air Services aircraft for support of Air Intercept Control Exercise oppositional forces.

(3) *Alternative 2*—includes most elements of Alternative 1 but would implement additional enhancements to enable the GOMEX Range Complex to meet foreseeable needs. These include implementation of the Joint National Training Capability, elimination of High Explosive (HE) bomb use during major exercise air-to-surface bombing events, decreasing HE bomb use during unit level training, and increasing Non-Explosive Practice Munition (NEPM) bomb use during major exercises. Alternative 2 is considered the Preferred Alternative.

The decision to be made by the Assistant Secretary of the Navy (Installations & Environment) is to determine which alternatives analyzed in the Draft EIS/OEIS satisfy both the level and mix of training and RDT&E to be conducted and the range capabilities enhancements to be made within the GOMEX Range Complex that best meet the needs of the Navy given that all reasonably foreseeable environmental impacts have been considered.

This Draft EIS/OEIS evaluates the potential environmental effects of GOMEX Range Complex Navy Atlantic Fleet training, RDT&E activities, and associated range capabilities enhancements over a 10-year planning horizon. Alternatives are evaluated within twenty environmental resource areas according to identified stressors. The twenty environmental resource areas include, but are not limited to, water, air quality, marine communities, marine mammals, sea turtles, fish, essential fish habitat, seabirds, migratory birds, cultural, regional economy, and public health and safety. Identified stressors include, but are not limited to, vessel movements, aircraft over flights, NEPMs, underwater detonations, and HE ordnance. The analysis includes an evaluation of the short term, long term, direct, indirect, and cumulative impacts as well as addresses methods to reduce or minimize impacts to affected resources. The analysis indicates that implementation of the No Action Alternative, Alternative 1, or Alternative 2 would not result in unavoidable significant adverse effects to resources analyzed. The analysis indicates no significant impact to resources in U.S. territorial waters and no significant harm to resources in non-territorial waters.

In accordance with 50 CFR 401.12, the Navy will prepare a biological evaluation to assess the potential effects of the proposed action on marine resources and anadromous fish protected under the Endangered Species Act (ESA). In accordance with the Marine Mammal Protection Act (16 U.S.C. 1371[a][5]), the Navy submitted a request for a Letter of Authorization for the incidental taking of marine mammals due to the proposed action. The Navy will submit a consultation package in accordance with legal requirements set forth under regulations implementing Section 7 of the ESA (50 CFR 402; 16 U.S.C 1536 (c)) for listed species under jurisdiction of the U.S. Fish and Wildlife Service and the NMFS.

The GOMEX Draft EIS/OEIS was distributed to Federal, State, and local agencies, elected officials, and other interested individuals and organizations on January 2, 2009. The public comment period will end on February 16, 2009. Copies of the GOMEX Draft EIS/OEIS are available for public review at the following libraries:

1. Bay County Public Library, 898 West 11th Street, Panama City, FL 32401;
2. Pensacola Public Library, 200 West Gregory Street, Pensacola, FL 32501;
3. West Florida Public Library—Southwest Branch, 12248 Gulf Beach Highway, Pensacola, Pensacola, FL 32507;
4. Walton County Coastal Library, 437 Greenway Trail, Santa Rosa Beach, FL 32459;
5. Meridian-Lauderdale County Public Library, 2517 Seventh Street, Meridian, MS 39301;
6. Ben May Main Library, 701 Government Street, Mobile, AL 36602;
7. East Bank Regional Library, 4747 West Napoleon Avenue, Metairie, LA 70001;
8. New Orleans Public Library—Main Library, 219 Loyola Avenue, New Orleans, LA 70112;
9. Central Library, 805 Comanche, Corpus Christi, TX 78401; and
10. Southmost Branch Library, 4320 Southmost Blvd, Southmost, TX 78522.

The GOMEX Draft EIS/OEIS is also available for electronic public viewing at *http://www.GOMEXRangeComplexEIS.com.* A paper copy of the executive summary or a single CD with the GOMEX Draft EIS/OEIS will be made available upon written request by contacting Naval Facilities Engineering Command, Atlantic Division; 6506 Hampton Blvd; Norfolk, VA 23508–1278; Attn: Code EV22TW (GOMEX EIS/OEIS PM); Fax: 757–322–4894.

Federal, State, and local agencies and interested parties are invited to be present or represented at the public hearing. Written comments can also be submitted during the open house sessions preceding the public hearings. Oral statements will be heard and transcribed by a stenographer; however, to ensure the accuracy of the record, all statements should be submitted in writing. All statements, both oral and written, will become part of the public record on the Draft EIS/OEIS and will be responded to in the Final EIS/OEIS. Equal weight will be given to both oral and written statements. In the interest of available time, and to ensure all who wish to give an oral statement have the opportunity to do so, each speaker's comments will be limited to three (3) minutes. If a long statement is to be presented, it should be summarized at the public hearing with the full text submitted either in writing at the hearing, or mailed or faxed to Naval Facilities Engineering Command, Atlantic Division; 6506 Hampton Blvd; Norfolk, VA 23508–1278; Attn: Code EV22TW (GOMEX EIS/OEIS PM), Fax: 757–322–4894. Comments may also be submitted on-line at *http://www.GOMEXRangeComplexEIS.com* during the comment period. All comments must be postmarked by February 16, 2009 to ensure they become part of the official record. All comments will be addressed in the Final EIS/OEIS.

Dated: December 22, 2008.

T. M. Cruz,

Lieutenant Commander, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. E8–31232 Filed 12–31–08; 8:45 am]

BILLING CODE 3810–FF–P

What Is the Next Step in the Process for this ICR?

EPA will consider the comments received and amend the ICR as appropriate. The final ICR package will then be submitted to OMB for review and approval pursuant to 5 CFR 1320.12. At that time, EPA will issue another **Federal Register** notice pursuant to 5 CFR 1320.5(a)(1)(iv) to announce the submission of the ICR to OMB and the opportunity to submit additional comments to OMB. If you have any questions about this ICR or the approval process, please contact the technical person listed under **FOR FURTHER INFORMATION CONTACT**.

Dated: February 23, 2009.

Deborah Y. Dietrich,

Director, Office of Emergency Management.

[FR Doc. E9–4230 Filed 2–26–09; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–8590–9]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared pursuant to the Environmental Review Process (ERP), under section 309 of the Clean Air Act and Section 102(2) (c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities at 202–564–7146.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 6, 2008 (73 FR 19833).

Draft EISs

EIS No. 20080375, ERP No. D–NOA–B91005–00, Amendment 3 to the Northeast Skate Complex Fishery Management Plan, Implementation of New Management Measures to Rebuild Overfished Skate Stocks, End Overfishing of Skate Fisheries, Gulf of Maine (GOM), Georges Bank (GB), South New England and Mid-Atlantic Regions.

Summary: EPA does not object to the proposed project. Rating LO.

EIS No. 20080414, ERP No. D–COE–D39038–00, PROGRAMMATIC—Oyster Restoration in Chesapeake Bay Including the Use of a Native and/or Nonnative Oyster, Implementation, Chesapeake Bay, MD and VA.

Summary: EPA believes that the introduction of non-native oyster species to the Chesapeake Bay, could be environmentally unsatisfactory to public health and the Bay ecosystem. Rating EU2.

EIS No. 20080508, ERP No. D–COE–F35047–OH, Lorain Harbor. Ohio Federal Navigation Project, Dredged Material Management Plan, Implementation, Lorain Harbor, Lorain County, Ohio.

Summary: EPA does not object to the proposed action. Rating LO.

EIS No. 20080519, ERP No. D–NPS–D61062–PA, White-tailed Deer Management Plan, Develop a Deer Management Strategy that Support Protection, Preservation and Restoration of Native Vegetation, Implementation, Valley Forge National Historical Park, King of Prussia, PA.

Summary: EPA does not object to the proposed action. Rating LO.

EIS No. 20080520, ERP No. D–CGD–A11082–00, USCG Pacific Operations: Districts 11 Area, California and Districts 13 Area, Oregon and Washington, Improve the Protection and Conservation of Marine Protected Species and Marine Protected Areas, CA, OR and WA.

Summary: EPA does not object to the proposed project. Rating LO.

EIS No. 20080527, ERP No. D–AFS–K65350–CA, Modoc National Forest Motorized Travel Management Plan, Implementation, National Forest Transportation System (NFTS), Modoc, Lassen and Siskiyou Counties, CA.

Summary: EPA expressed environmental concerns about impacts from continued use of roads and trails within or adjacent to fens, wet meadows, riparian habitat, and vernal pools. Rating EC2.

EIS No. 20080539, ERP No. D–USA–A10078–00, Gulf of Mexico Range Complex (GOMEX), Proposed Action is to Support and Conduct Current and Emerging Training and RDT&E Operations, TX, MS, AL and FL.

Summary: EPA does not object to the proposed project. Rating LO.

EIS No. 20080143, ERP No. DA–COE–B32009–MA, Boston Harbor Federal Deep Draft Navigation Improvement Project, To Evaluate the Feasibility of Channel Deepening and Related Berth Improvements at the Port of Boston, Chelsea and Revere, Boston, MA.

Summary: EPA expressed environmental objections because of the lack of information relative to the extent and impacts of blasting and the proposal to create rock reefs. Rating EO2.

Final EISs

EIS No. 20080433, ERP No. F–COE–C35013–00, PROGRAMMATIC—Port of New York and New Jersey Dredged Material Management Plan, Updated Information on 1999 Final EIS, Implementation, NY and NJ.

Summary: EPA expressed environmental concerns because some of the information in the Final EIS is outdated and is not consistent with the current Dredged Material Management Plan.

EIS No. 20080491, ERP No. F–SFW–B64005–00, Lake Umbagog National Wildlife Refuge, Comprehensive Conservation Plan, 15 Year Guidance for Management of Refuge Operations, Habitat and Visitor Services, Implementation, Coos County, NH and Oxford County, ME.

Summary: EPA does not object to the proposed project.

EIS No. 20080536, ERP No. F–COE–K39099–CA, Berth 97–109 (China Shipping) Container Terminal Project, Construction and Operation, Issuance of Section 404 (CWA) and Section 10 Rivers and Harbor Act Permits, Port of Los Angeles, Los Angeles County, CA.

Summary: EPA continues to have environmental concerns about significant and unavoidable impacts to air quality and environmental justice communities, and impacts to aquatic resources. EPA recommended commitments to mitigate air emissions to meet health risk reduction targets, implementation of a health impact assessment to identify appropriate mitigations for disproportionately affected neighboring communities and avoidance of fill.

Dated: February 24, 2009.

Robert W. Hargrove,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. E9–4226 Filed 2–26–09; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–8590–8]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–1399 or *http://www.epa.gov/compliance/nepa/*.

Weekly receipt of Environmental Impact Statements

Filed 02/16/2009 through 02/20/2009 Pursuant to 40 CFR 1506.9.

NIST will accept the submission of proposals containing research activities involving human subjects. The human subjects research activities in a proposal will require approval by Institutional Review Boards (IRBs) possessing a current registration filed with DHHS and to be performed by institutions possessing a current, valid Federal-wide Assurance (FWA) from DHHS that is linked to the cognizant IRB. In addition, NIST as an institution requires that IRB approval documentation go through a NIST administrative review; therefore, research activities involving human subjects are not authorized to start within an award until approval for the activity is issued in writing from the NIST Grants Officer. NIST will not issue a single project assurance (SPA) for any IRB reviewing any human subjects protocol proposed to NIST.

President Obama has issued Exec. Order No. 13,505, 74 FR 10667 (March 9, 2009), revoking previous executive orders and Presidential statements regarding the use of human embryonic stem cells in research. NIST will follow any guidance issued by the National Institutes of Health (NIH) pursuant to the executive order and will develop its own procedures based on the NIH guidance before funding research using human embryonic stem cells. NIST will follow any additional polices or guidance issued by the current Administration on this topic.

Research Projects Involving Vertebrate Animals: Any proposal that includes research involving vertebrate animals must be in compliance with the National Research Council's ''Guide for the Care and Use of Laboratory Animals'' which can be obtained from National Academy Press, 2101 Constitution Avenue, NW., Washington, DC 20055. In addition, such proposals must meet the requirements of the Animal Welfare Act (7 U.S.C. 2131 *et seq.*), 9 CFR parts 1, 2, and 3, and if appropriate, 21 CFR part 58. These regulations do not apply to proposed research using pre-existing images of animals or to research plans that do not include live animals that are being cared for, euthanized, or used by the project participants to accomplish research goals, teaching, or testing. These regulations also do not apply to obtaining animal materials from commercial processors of animal products or to animal cell lines or tissues from tissue banks.

Reporting Requirements: Reporting requirements are described in the Department of Commerce Financial Assistance Standard Terms and Conditions dated March, 2008, found on the Internet at: *http://oamweb.osec.doc.gov/docs/GRANTS/DOC%20STCsMAR08Rev.pdf.*

The references in Sections A.01 and B.01 of the Department of Commerce Financial Assistance Standard Terms and Conditions, dated March, 2008, to ''Federal Financial Report (SF–269)'' and ''SF–269'' are hereby replaced with ''Federal Financial Report (SF–425)'' and ''SF–425,'' respectively, as required by the Office of Management and Budget (OMB) (73 FR 61175, October 15, 2008). As authorized under 15 CFR 14.52 and 24.41, the OMB approved SF–425 shall be used in the place of the SF–269 and SF–272 under the uniform administrative requirements and elsewhere under awards in this program where such forms are referenced.

Limitation of Liability: NIST anticipates making awards for the program listed in this notice. In no event will NIST or the Department of Commerce be responsible for proposal preparation cost if these programs(s) fail to receive funding or are cancelled because of other agency priorities. Publication of this announcement does not obligate NIST or the Department of Commerce to award any specific project or to obligate any available funds.

Executive Order 12866: This funding notice was determined to be not significant for purposes of Executive Order 12866.

Executive Order 13132 (Federalism): It has been determined that this notice does not contain policies with federalism implications as that term is defined in Executive Order 13132.

Executive Order 12372: Applications under this program are not subject to Executive Order 12372, ''Intergovernmental Review of Federal Programs.''

Paperwork Reduction Act: The standard forms in the application kit involve a collection of information subject to the Paperwork Reduction Act. The use of Standard Forms 424, 424A, 424B, SF–LLL, and CD–346 has been approved by OMB under the respective Control Numbers 0348–0043, 0348–0044, 0348–0040, 0348–0046, and 0605–0001.

Administrative Procedure Act/Regulatory Flexibility Act: Notice and comment are not required under the Administrative Procedure Act (5 U.S.C. 553) or any other law, for rules relating to public property, loans, grants, benefits or contracts (5 U.S.C. 553(a)). Because notice and comment are not required under 5 U.S.C. 553, or any other law, for rules relating to public property, loans, grants, benefits or contracts (5 U.S.C. 553(a)), a Regulatory Flexibility Analysis is not required and has not been prepared for this notice, 5 U.S.C. 601 *et seq.*

Dated: April 21, 2009.

Patrick Gallagher,

Deputy Director, NIST.

[FR Doc. E9–9650 Filed 4–27–09; 8:45 am]

BILLING CODE 3510–13–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XO87

Taking of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Training Operations Conducted within the Gulf of Mexico Range Complex

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of an application for regulations and a letter of authorization; request for comments and information.

SUMMARY: NMFS has received a request from the U.S. Navy (Navy) for authorizations for the take of marine mammals incidental to training and operational activities conducted by the Navy Atlantic Fleet within Gulf of Mexico (GOMEX) Range Complex for the period beginning December 3, 2009 and ending December 2, 2014. Pursuant to the implementing regulations of the Marine Mammal Protection Act (MMPA), NMFS is announcing our receipt of the Navy request for the development and implementation of regulations governing the incidental taking of marine mammals and inviting information, suggestions, and comments on the Navy application and request.

DATES: Comments and information must be received no later than May 28, 2009.

ADDRESSES: Comments on the applications should be addressed to P. 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. The mailbox address for providing email comments is *PR1.0648–XO87@noaa.gov*. NMFS is not responsible for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 10–megabyte file size. Copies of the Navy application may be obtained by writing to the address specified above (See **ADDRESSES**), telephoning the contact listed below (see **FOR FURTHER INFORMATION CONTACT**), or visiting the internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm*.

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 713–2289, ext. 137.

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth.

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as:

> an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

With respect to military readiness activities, the MMPA defines arassment as:

> (i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

Summary of Request

On October 2, 2008, NMFS received an application from the Navy requesting an authorization for the take of marine mammal species/stocks incidental to the proposed training operations within the GOMEX Range Complex over the course of 5 years. These training activities are classified as military readiness activities. The Navy states that these training activities may cause various impacts to marine mammal species in the proposed GOMEX Range Complex Study Area. The Navy requests an authorization to take 9 species of cetaceans annually by Level B harassment, and 1 individual each of pantropical spotted dolphin and spinner dolphin by Level A harassment (injury). Please refer to the take table on page 6–17 of the LOA application for detailed information of the potential exposures from explosive ordnance (per year) for marine mammals in the GOMEX Range Complex.

Description of the Specified Activities

The GOMEX Study Area encompasses areas at sea, undersea, and Special Use Airspace (SUA) in the northern Gulf of Mexico off the coast of the U.S. (Figures 1 and 2 of the LOA application). The portions of the GOMEX Study Area to be considered for the proposed action consist of the BOMBEX Hotbox (surface and subsurface waters) located within the Pensacola Operation Area (OPAREA), SUA warning areas W–151A/B/C and W–155A/B (surface waters), and underwater detonation (UNDET) Area E3 (surface and subsurface waters), located within the territorial waters off Padre Island, Texas, near Corpus Christi NAS. The portions of the GOMEX Study Area addressed in the Navy LOA application encompass:

• 1,496 nm^2 (5,131 km^2) of sea space (BOMBEX Hotbox, where high explosives occur, and UNDET Area E3 where underwater detonations occur); and

• 11,714 nm^2 (40,178 km^2) of SUA warning areas (vessel movements only)

The BOMBEX Hotbox is an in-water operating and maneuvers area with defined air, ocean surface, and subsurface areas. The BOMBEX Hotbox is located in the offshore waters of the northeastern Gulf of Mexico (GOM) adjacent to Florida and Alabama. The northernmost boundary of the BOMBEX Hotbox is located 23 nm (42.6 km) from the coast of the Florida panhandle at latitude 30 N, the eastern boundary is approximately 200 nm (370.4 km) from the coast of the Florida peninsula at longitude 86° 8 W.

The SUA warning areas, W–151A/B/C and W–155A/B, are in-water operating and maneuver areas with defined air and ocean surface. W–151A/B/C and W–155A/B are located in and above the offshore waters of the northeastern GOM adjacent to Florida and Alabama.

The UNDET Area E3 is a defined surface and subsurface area located in the waters south of Corpus Christi NAS and offshore of Padre Island, Texas. The westernmost boundary is located 7.5 nm (13.9 km) from the coast of Padre Island at 97° 9′33″ W and 27° 24′26″ N at the Western most corner. It lies entirely within the territorial waters (0 to 12 nm, or 0 to 22.2 km) of the U.S. and the majority of it lies within Texas state waters (0 to 9 nm, or 0 to 16.7 km). It is a very shallow water training area with depths ranging from 20 to 26 m.

In the application submitted to NMFS, the Navy requests an authorization to take marine mammals incidental to conducting training operations within the GOMEX Range Complex. These training activities consist of surface warfare. Although vessel movement is also a component of the proposed GOMEX Range Complex training activities, the Navy concludes that it is unlikely marine mammals would be taken by vessel movement with the implementation of mitigation and monitoring measures described in the LOA application.

Surface Warfare

Surface Warfare (SUW) supports defense of a geographical area (e.g., a zone or barrier) in cooperation with surface, subsurface, and air forces. SUW operations detect, localize, and track surface targets, primarily ships. Detected ships are monitored visually and with radar. Operations include identifying surface contacts, engaging with weapons, disengaging, evasion, and avoiding attack, including implementation of radio silence and deceptive measures. For the proposed GOMEX Range Complex training operations, SUW events involving the use of explosive ordnance include air-to-surface Bombing Exercises [BOMBEX (A–S)] and surface-to-surface Gunnery Exercises (GUNEX) that occur at sea.

(A) Bombing Exercise (Air-to-Surface) [BOMBEX (A–S)]

Strike fighter aircraft, such as F/A–18s, deliver explosive bombs against at-sea surface targets with the goal of destroying the target. BOMBEX (A–S) training in the GOMEX Study Area occurs only during daylight hours in the BOMBEX Hotbox area.

For the proposed BOMBEX (A–S), two aircraft will approach an at-sea target from an altitude of between 15,000 ft (4,572 m) to less than 3,000 ft (914.4 m) and release a high explosive (HE) 1,000-pound (lb) bomb on the target. MK–83 bombs would be used. MK–83 bombs have a net explosive weight (NEW) of 415.8 lbs. The typical bomb release altitude is below 3,000 ft (914.4 m) and the target is usually a flare. The time in between bomb drops is approximately 3 minutes.

(B)Gunnery Exercise (Surface-to-Surface) [GUNEX (S–S)] Boat

Gunnery Exercise (S–S) is a part of quarterly reservist training and operational activities for the Mobile Expeditionary Security Group (MESG) that operates out of Corpus Christi Naval Air Station (NAS). The MESG trains with M3A2 (0.5-lb NEW) anti-swimmer concussion grenades. The M3A2 grenades are small and contain high explosives in an inert metal or plastic shell. They detonate at about 3 m (9.8 ft) under the water surface within 4 to 5 seconds of being deployed. The detonation depth may be shallower depending upon the speed of the boat at the time the grenade is deployed. GUNNERY (S–S) training in the GOMEX Study Area may occur during day or evening hours in the UNDET Area E3.

Table 1 below summarizes the level of Surface Warfare training activities planned in the GOMEX Range Complex for the proposed action.

TABLE 1. LEVEL OF SURFACE WARFARE TRAINING ACTIVITIES PLANNED IN THE GOMEX RANGE COMPLEX PER YEAR

Operation	Platform	System/ Ordnance	Number of Events	Training Area	Potential Time of Day
Bombing Exercise (BOMBEX) (Air-to-Surface, At-Sea)	F/A–18	MK–83 [1,000-lb High Explosive (HE) bomb] 415.8 lbs NEW	1 event (4 bombs)	BOMBEX Hotbox	Daytime only
Gunnery Exercise (GUNEX) (Surface-to-Surface) - Boat	Vessels such as combat rubber raiding craft, rigid hull inflatable boats, and patrol craft	M3A2 concussion grenades (8-oz HE grenade) 0.5 lbs NEW	4 events (20 grenades)	UNDET Area E3	Day or night

Vessel Movement

Vessel movements are associated with most training and operational activities in the GOMEX Study Area. Currently, the number of Navy vessels operating in the GOMEX Study Area varies based on training schedules and can range from 0 to about 10 vessels at any given time. Vessel sizes range from small boats (<35 ft, or 10.7 m) for a harbor security boat to 1,092 ft (332.8 m) for a CVN (carrier vessel nuclear) and speeds generally range from 10 to 14 knots, but may be considerably faster, for example an aircraft carrier aking wind while launching and recovering aircraft, and for small boat operations. Operations involving vessel movements occur intermittently and are variable in duration, ranging from a few hours up to 2 weeks. These operations are widely dispersed throughout the GOMEX Study Area, which is an area encompassing 11,714 nm^2 (40,178 km^2). Most vessel movements occur in the offshore OPAREAs, but vessel movements associated with MESG training in the UNDET Area E3 and Commander Naval Installations Command (CNIC) harbor security group training in the Panama City OPAREA occur between shore and 12 nm (22.2 km), including the nearshore zone (<3 nm, or 5.6 km). The Navy logs about 180 total vessel days within the GOMEX Study Area during a typical year. Consequently, the density of Navy vessels within the GOMEX Study Area at any given time is low (i.e., less than 0.0113 ships/nm^2 (0.0386 km^2)).

Proposed Monitoring and Mitigation Measures

The Navy is developing an Integrated Comprehensive Monitoring Program (ICMP) for marine species to assess the effects of training activities on marine species and investigate population trends in marine species distribution and abundance in various range complexes and geographic locations where Navy training occurs. The primary tools available for monitoring include visual observations, acoustic monitoring, photo identification and tagging, and oceanographic and environmental data collection.

A list of proposed mitigation measures and standard operating procedures is described in the application for the proposed training operations. These mitigation measures include personnel training for watchstanders and lookouts in marine mammal monitoring, operating procedures for collision avoidance and a series of measures for specific at-sea training events including surface-to-surface gunnery, etc. A detailed description of the monitoring and mitigation measures is provided in the application.

Information Solicited

Interested persons may submit information, suggestions, and comments concerning the Navy request (see ADDRESSES). All information, suggestions, and comments related to the Navy GOMEX Range Complex request and NMFS potential development and implementation of regulations governing the incidental taking of marine mammals by the Navy training activities will be considered by NMFS in developing, if appropriate, the most effective regulations governing the issuance of letters of authorization.

Dated: April 22, 2009.

James H. Lecky,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E9–9647 Filed 4–27–09; 8:45 am]

BILLING CODE 3510–22–S

COMMODITY FUTURES TRADING COMMISSION

Sunshine Act Meetings

TIME AND DATE: 11:00 a.m., Friday, May 1, 2009.

PLACE: 1155 21st St., NW., Washington, DC, 9th Floor Commission Conference Room.

STATUS: Closed.

MATTERS TO BE CONSIDERED: Surveillance Matters.

CONTACT PERSON FOR MORE INFORMATION: Sauntia S. Warfield, 202–418–5084.

Sauntia S. Warfield,

Assistant Secretary of the Commission.

[FR Doc. E9–9696 Filed 4–24–09; 11:15 am]

BILLING CODE 6351–01–P

down the entire tree, in order to collect nestlings, leading to the loss of nest sites and site abandonment. Furthermore, the petition asserts that the remaining habitat of the species has been reduced due to the clearing of many gallery forests for agriculture and pasture land use.

The scarlet macaw is found throughout Central and South America, with an estimated range of approximately 2,586,885 square miles (m^2) (6,700,000 square kilometers (km^2)) (IUCN 2008e). The species prefers humid lowland evergreen forests and gallery woodland savannas, primarily near exposed river banks and clearings with large trees (del Hoyo *et al*. 1997, p. 421). The petition asserts that habitat destruction and captures for the pet trade are the greatest threats to the species. The petition claims that habitat destruction, as a result of forest clearing, settlement, and agriculture, is common throughout the species' range. The petition also states that anti-poaching enforcement is not keeping up with the demand for this species in the pet trade, where one bird can sell for over $1,000 (U.S.).

The white cockatoo is endemic to several islands in North Maluku, Indonesia, and inhabits primary, logged, and secondary forests up to 2,953 ft (900 m) (IUCN 2008h). The species also occurs in mangroves, on plantations, and on agricultural land (IUCN 2008h). The petition claims that the greatest threats to the species are habitat destruction and the pet trade. The petition states that an increase in logging activity has decreased the availability of large trees suitable for nest sites throughout the species' range. In addition, the petition asserts that trapping of this species for the pet trade far exceeds the catch quota issued by the Indonesian government.

The yellow-billed parrot is primarily found in the wet areas of Jamaica, inhabiting wet limestone forests at elevations up to 3,937 ft (1,200 m) (IUCN 2008a). The petition lists two primary threats to the species: habitat destruction and the pet trade. The petition claims that the species' habitat, as well as nest sites, has been reduced due to logging and mining activities, and that trapping of this species for the pet trade is common.

The yellow-crested cockatoo is native to Timor-Leste and Indonesia, and inhabits forest, forest edge, scrub, and agricultural land (IUCN 2008j). The petition asserts that the significant decline in the population of the species is directly attributable to trapping for the pet trade. The petition cites evidence that suggests that the international pet trade has placed the highest pressure on the wild population of the species. In addition, the petition claims that habitat loss, due to logging and agricultural conversion of forested lands, and the persecution of the species as a crop pest, has placed additional pressure on the remaining wild population.

Finding

On the basis of our review, which focused on the threats facing these parrot species, we find that the petition presents substantial scientific or commercial information indicating that listing may be warranted for the following 12 species of parrots: Blue-headed macaw, crimson shining parrot, great green macaw, grey-cheeked parakeet, hyacinth macaw, military macaw, Philippine cockatoo, red-crowned parrot, scarlet macaw, white cockatoo, yellow-billed parrot, and yellow-crested cockatoo. Therefore, we are initiating a status review to determine if listing any of these 12 species under the Act is warranted. To ensure that the status review is comprehensive, we are soliciting scientific and commercial information regarding these 12 species. Under section 4(b)(3)(B) of the Act, within 12 months after receiving a petition that is found to present substantial information indicating that the petitioned action may be warranted, we are required to make a finding as to whether listing the species is warranted, not warranted, or warranted but precluded by other pending listing proposals.

References Cited

A complete list of all references cited herein is available upon request from the U.S. Fish and Wildlife Service, Branch of Listing (see **FOR FURTHER INFORMATION CONTACT** section).

Author

The primary authors of this notice are staff members of the Division of Scientific Authority, U.S. Fish and Wildlife Service.

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: June 16, 2009.

Marvin E. Moriarty,

Acting Director, U.S. Fish and Wildlife Service.

[FR Doc. E9–16354 Filed 7–13– 09; 8:45 am]

BILLING CODE 4310–55–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 218

RIN 0648–AX86

Taking of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Training Operations Conducted Within the Gulf of Mexico Range Complex

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has received requests from the U.S. Navy (Navy) for authorizations for the take of marine mammals incidental to training and operational activities conducted by the Navy's Atlantic Fleet within the Gulf of Mexico (GOMEX) Range Complex for the period beginning December 3, 2009 and ending December 2, 2014. Pursuant to the implementing regulations of the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take and requesting information, suggestions, and comments on these proposed regulations.

DATES: Comments and information must be received no later than August 13, 2009.

ADDRESSES: You may submit comments, identified by 0648–AX86, by any one of the following methods:

- Electronic Submissions: Submit all electronic public comments via the Federal eRulemaking Portal *http://www.regulations.gov*.
- Hand delivery or mailing of paper, disk, or CD–ROM comments should be addressed to 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.

Instructions: All comments received are part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (for example, name, address, *etc.*) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

NMFS will accept anonymous comments (enter NA in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Shane Guan, Office of Protected Resources, NMFS, (301) 713–2289, ext. 137.

SUPPLEMENTARY INFORMATION:

Availability

A copy of the Navy's application may be obtained by writing to the address specified above (See **ADDRESSES**), telephoning the contact listed above (see **FOR FURTHER INFORMATION CONTACT**), or visiting the Internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm#applications.* The Navy's Draft Environmental Impact Statement (DEIS) for the GOMEX Range Complex was published in November 2008, and may be viewed at *http://www.gomexrangecomplexeis.com/*. NMFS participated in the development of the Navy's DEIS as a cooperating agency under the National Environmental Policy Act (NEPA).

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth.

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as:

> An impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

With respect to military readiness activities, the MMPA defines ''harassment'' as:

> (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

Summary of Request

On October 2, 2008, NMFS received an application from the Navy requesting an authorization for the take of marine mammal species/stocks incidental to the proposed training operations within the GOMEX Range Complex over the course of 5 years. These training activities are classified as military readiness activities. The Navy states that these training activities may cause various impacts to marine mammal species in the proposed GOMEX Range Complex Study Area. The Navy requests an authorization to take 8 species of cetaceans annually by Level B harassment, and 1 individual each of pantropical spotted dolphin and spinner dolphin by Level A harassment (injury). Please refer to the take table on page 6–17 of the LOA application for detailed information of the potential exposures from explosive ordnance (per year) for marine mammals in the GOMEX Range Complex. However, due to the implementation of the proposed mitigation and monitoring measures, NMFS believes that the actual take would be less than estimated.

Description of the Specified Activities

The GOMEX Study Area encompasses areas at sea, undersea, and Special Use Airspace (SUA) in the northern Gulf of Mexico off the coast of the U.S. (Figures 1 and 2 of the LOA application). The portions of the GOMEX Study Area to be considered for the proposed action consist of the BOMBEX Hotbox (surface and subsurface waters) located within the Pensacola Operation Area (OPAREA), SUA warning areas W–151A/B/C and W–155A/B (surface waters), and underwater detonation (UNDET) Area E3 (surface and subsurface waters), located within the territorial waters off Padre Island, Texas, near Corpus Christi NAS. The portions of the GOMEX Study Area addressed in the Navy's LOA application encompass:

- 1,496 nm^2 (5,131 km^2) of sea space (BOMBEX Hotbox, where high explosives occur, and UNDET Area E3 where underwater detonations occur); and
- 11,714 nm^2 (40,178 km^2) of SUA warning areas (vessel movements only)

The BOMBEX Hotbox is an in-water operating and maneuvers area with defined air, ocean surface, and subsurface areas. The BOMBEX Hotbox is located in the offshore waters of the northeastern Gulf of Mexico (GOM) adjacent to Florida and Alabama. The northernmost boundary of the BOMBEX Hotbox is located 23 nm (42.6 km) from the coast of the Florida panhandle at latitude 30 °N, the eastern boundary is approximately 200 nm (370.4 km) from the coast of the Florida peninsula at longitude 86°48′ W.

The SUA warning areas, W–151A/B/C and W–155A/B, are in-water operating and maneuver areas with defined air and ocean surface. W–151A/B/C and W–155A/B are located in and above the offshore waters of the northeastern GOM adjacent to Florida and Alabama.

The UNDET Area E3 is a defined surface and subsurface area located in the waters south of Corpus Christi NAS and offshore of Padre Island, Texas. The westernmost boundary is located 7.5 nm (13.9 km) from the coast of Padre Island at 97°9′33″ W and 27°24′26″ N at the Western most corner. It lies entirely within the territorial waters (0 to 12 nm, or 0 to 22.2 km) of the U.S. and the majority of it lies within Texas state waters (0 to 9 nm, or 0 to 16.7 km). It is a very shallow water training area with depths ranging from 20 to 26 m.

In the application submitted to NMFS, the Navy requests an authorization to take marine mammals incidental to conducting training operations within the GOMEX Range Complex. These training activities consist of surface warfare. Although vessel movement is also a component of the proposed GOMEX Range Complex training activities, the Navy concludes that it is unlikely marine mammals would be taken by vessel movement with the implementation of mitigation and monitoring measures described in the Mitigation Measures and Monitoring Measures sections.

Surface Warfare

Surface Warfare (SUW) supports defense of a geographical area (*e.g.*, a zone or barrier) in cooperation with surface, subsurface, and air forces. SUW operations detect, localize, and track surface targets, primarily ships. Detected ships are monitored visually and with radar. Operations include identifying surface contacts, engaging with weapons, disengaging, evasion, and avoiding attack, including implementation of radio silence and deceptive measures. For the proposed GOMEX Range Complex training operations, SUW events involving the use of explosive ordnance include air-to-surface Bombing Exercises [BOMEX (A–S)] and small arms training (involving explosive hand grenades) that occur at sea.

(A) Bombing Exercise (Air-to-Surface) [BOMEX (A–S)]

Strike fighter aircraft, such as F/A–18s, deliver explosive bombs against at-sea surface targets with the goal of destroying the target. BOMBEX (A–S) training in the GOMEX Study Area occurs only during daylight hours in the BOMBEX Hotbox area.

For the proposed BOMBEX (A–S), two aircraft will approach an at-sea target from an altitude of between 15,000 ft (4,572 m) to less than 3,000 ft (914.4 m) and release a high explosive (HE) 1,000-pound (lb) bomb on the target. MK–83 bombs would be used. MK–83 bombs have a net explosive weight (NEW) of 415.8 lbs. The typical bomb release altitude is below 3,000 ft (914.4 m) and the target is usually a flare. The time in between bomb drops is approximately 3 minutes.

(B) Small Arms Training (Explosive Hand Grenades)

Small arms training is a part of quarterly reservist training and operational activities for the Mobile Expeditionary Security Group (MESG) that operates out of Corpus Christi Naval Air Station (NAS). The MESG trains with MK3A2 (0.5-lb NEW) anti-swimmer concussion grenades. The MK3A2 grenades are small and contain high explosives in an inert metal or plastic shell. They detonate at about 3 m under the water's surface within 4 to 5 seconds of being deployed. The detonation depth may be shallower depending upon the speed of the boat at the time the grenade is deployed.

A number of different types of boats will be used depending on the unit using the boat and their mission. Boats are mostly used by naval special warfare (NSW) teams and Navy Expeditionary Combat Command (NECC) units (Naval Coastal Warfare, Inshore Boat Units, Mobile Security Detachments, Explosive Ordnance Disposal, and Riverine Forces). These units are used to protect ships in harbors and high value units, such as aircraft carriers, nuclear submarines, liquid natural gas tankers, etc., while entering and leaving ports, as well as to conduct riverine operations, insertion and extractions, and various NSW operations.

The boats used by these units include: Small Unit River Craft (SURC), Combat Rubber Raiding Craft (CRRC), Rigid Hull Inflatable Boats (RHIB), Patrol Craft, and many other versions of these types of boats. These boats use inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion.

This exercise is usually a live-fire exercise with M3A2 Anti-swimmer Concussion Grenades, but at times blanks may be used so boat crews can practice their ship-handling skills for the employment of weapons without being concerned with the safety requirements involved with HE weapons. Boat crews may use high or low speeds to approach and engage targets simulating swimmers with anti-swimmer concussion grenades. The purpose of this exercise is to develop marksmanship skills and small boat ship-handling tactics skills required to employ these weapons. Training usually lasts 1–2 hours. Small arms training in the GOMEX Study Area will occur during day or evening hours in the UNDET Area E3.

Table 1 summarizes the level of Surface Warfare training activities planned in the GOMEX Range Complex for the proposed action.

TABLE 1—LEVEL OF SURFACE WARFARE TRAINING ACTIVITIES PLANNED IN THE GOMEX RANGE COMPLEX PER YEAR

Operation	Platform	System/ordnance	Number of events	Training area	Potential time of day	Event duration
Bombing Exercise (BOMBEX) (Air-to-Surface, At-Sea).	F/A–18	MK–831,000-lb High Explosive (HE) bomb] 415.8 lbs NEW.	1 event (4 bombs in succession).	BOMBEX Hotbox	Daytime only.	1 hour.
Small Arms Training	Maritime Expeditionary Support Group (Various Small Boats).	MK3A2 anti-swimmer grenades (8-oz HE grenade) 0.5 lb NEW.	6 events* (20 live grenades).	UNDET Area E3	Day or night.	1 hour.

*An individual event can include detonation of up to 10 live grenades, but no more than 20 live grenades will be used per year.

Vessel Movement

Vessel movements are associated with most training and operational activities in the GOMEX Study Area. Currently, the number of Navy vessels operating in the GOMEX Study Area varies based on training schedules and can range from 0 to about 10 vessels at any given time. Vessel sizes range from small boats (<35 ft, or 10.7 m) for a harbor security boat to 1,092 ft (332.8 m) for a CVN (carrier vessel nuclear) and speeds generally range from 10 to 14 knots, but may be considerably faster, for example an aircraft carrier ''making wind'' while launching and recovering aircraft, and for small boat operations. Operations involving vessel movements occur intermittently and are variable in duration, ranging from a few hours up to 2 weeks. These operations are widely dispersed throughout the GOMEX Study Area, which is an area encompassing 11,714 nm^2 (40,178 km^2). Most vessel movements occur in the offshore OPAREAs, but vessel movements associated with MESG training in the UNDET Area E3 and Commander Naval Installations Command (CNIC) harbor security group training in the Panama City OPAREA occur between shore and 12 nm (22.2 km), including the nearshore zone (<3 nm, or 5.6 km). The Navy logs about 180 total vessel days within the GOMEX Study Area during a typical year. Consequently, the density of Navy vessels within the GOMEX Study Area at any given time is low (*i.e.*, less than 0.0113 ships/nm^2 (0.0386 km^2)).

Description of Marine Mammals in the Area of the Specified Activities

Twenty-nine marine mammal species have confirmed or potential occurrence in the GOMEX Study Area. These include 28 cetacean species and 1 sirenian species (DoN, 2007a), which can be found in Table 2. Although it is possible that any of the 29 species of marine mammals may occur in the Study Area, only 21 of those species are expected to occur regularly in the region. Most cetacean species are in the Study Area year-round (*e.g.*, sperm whales and bottlenose dolphins), while a few (*e.g.*, fin whales and killer whales) have accidental or transient occurrence in the area.

TABLE 2—MARINE MAMMAL SPECIES FOUND IN THE GOMEX RANGE COMPLEX

Family and scientific name	Common name	Federal status
Order Cetacea		
Suborder Mysticeti (baleen whales)		
Eubalaena glacialis	North Atlantic right whale	Endangered.
Megaptera novaeangliae	Humpback whale	Endangered.
Balaenoptera acutorostrata	Minke whale.	
B. brydei	Bryde's whale.	
B. borealis	Sei whale	Endangered.
B. physalus	Fin whale	Endangered.
B. musculus	Blue whale	Endangered.
Suborder Odontoceti (toothed whales)		
Physeter macrocephalus	Sperm whale	Endangered.
Kogia breviceps	Pygmy sperm whale.	
K. sima	Dwarf sperm whale.	
Ziphius cavirostris	Cuvier's beaked whale.	
M. europaeus	Gervais' beaked whale.	
M. bidens	Sowerby's beaked whale.	
M. densirostris	Blainville's beaked whale.	
Steno bredanensis	Rough-toothed dolphin.	
Tursiops truncatus	Bottlenose dolphin.	
Stenella attenuata	Pantropical spotted dolphin.	
S. frontalis	Atlantic spotted dolphin.	
S. longirostris	Spinner dolphin.	
S. clymene	Clymene dolphin.	
S. coeruleoalba	Striped dolphin.	
Lagenodephis hosei	Fraser's dolphin.	
Grampus griseus	Risso's dolphin.	
Peponocephala electra	Melon-headed whale.	
Feresa attenuata	Pygmy killer whale.	
Pseudorca crassidens	False killer whale.	
Orcinus orca	Killer whale.	
G. macrorhynchus	Short-finned pilot whale.	
Order Sirenia		
Trichechus manatus	West Indian manatee	Endangered.

The information contained in this section relies heavily on the data gathered in the Marine Resources Assessments (MRAs). The Navy MRA Program was implemented by the Commander, Fleet Forces Command, to initiate collection of data and information concerning the protected and commercial marine resources found in the Navy's OPAREAs. Specifically, the goal of the MRA program is to describe and document the marine resources present in each of the Navy's OPAREAs. The MRA for the GOMEX OPAREA was published in 2007 (DoN, 2007a). The MRA data were used to provide a regional context for each species. The MRA represents a compilation and synthesis of available scientific literature (*e.g.*, journals, periodicals, theses, dissertations, project reports, and other technical reports published by government agencies, private businesses, or consulting firms), and NMFS reports including stock assessment reports (SARs), recovery plans, and survey reports. This information was used to evaluate the potential for occurrence of marine mammal species in the GOMEX Study Area.

The density estimates that were used in previous Navy environmental documents have been recently updated to provide a compilation of the most recent data and information on the occurrence, distribution, and density of marine mammals. The updated density estimates presented in this LOA application are derived from the Navy OPAREA Density Estimates (NODEs) for the GOMEX OPAREA report (DoN, 2007b).

Density estimates for cetaceans were either modeled using available line-transect survey data or derived using cetacean abundance estimates found in the 2006 NOAA stock assessment reports (SARs) (Waring *et al.*, 2007), which can be viewed at *http://www.nmfs.noaa.gov/pr/sars/species.htm*. The abundance estimates in the stock assessment reports are from Mullin and Fulling (2004).

For the model-based approach, density estimates were calculated for each species within areas containing survey effort. A relationship between these density estimates and the associated environmental parameters such as depth, slope, distance from the shelf break, sea surface temperature (SST), and chlorophyll a (chl *a*) concentration was formulated using generalized additive models (GAMs). This relationship was then used to generate a two-dimensional density surface for the region by predicting densities in areas where no survey data exist.

The analyses for cetaceans were based on sighting data collected through shipboard surveys conducted by NMFS SEFSC between 1996 and 2004. Species-specific density estimates derived through spatial modeling were compared with abundance estimates found in the 2006 NOAA SARs to ensure consistency. All spatial models and density estimates were reviewed by and coordinated with NMFS Science

Center technical staff and scientists with the University of St. Andrews, Scotland, Centre for Environmental and Ecological Modeling (CREEM). For a more detailed description of the methods involved in calculating the density estimates provided in this LOA request, please refer to the NODE report for the GOMEX OPAREA (DoN, 2007b). The following lists how density estimates were derived for each species:

Model-Derived Density Estimates—Line Transect Survey Data

Sperm whale, dwarf and pygmy sperm whales, beaked whales, rough-toothed dolphin, bottlenose dolphin (Tursiops truncatus), pantropical spotted dolphin, Atlantic spotted dolphin, striped dolphin, spinner dolphin, and Risso's dolphin.

Stock Assessment Report or Literature-Derived Density Estimates

Bryde's whale, Clymene dolphin, Fraser's dolphin, killer whale, false killer whale, pygmy killer whale, melon-headed whale, short-finned pilot whale.

Potential Impacts to Marine Mammal Species

The Navy considers that explosions associated with BOMBEX (A–S) and small arms training are the activities with the potential to result in Level A or Level B harassment of marine mammals. Vessel strikes were also analyzed for potential effect to marine mammals.

Vessel Strikes

Collisions with commercial and Navy ships can result in serious injury and may occasionally cause fatalities to cetaceans and manatees. Although the most vulnerable marine mammals may be assumed to be slow-moving cetaceans or those that spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (*e.g.*, sperm whale), fin whales are actually struck most frequently (Laist *et al.*, 2001). Manatees are also particularly susceptible to vessel interactions and collisions with watercraft constitute the leading cause of mortality (USFWS, 2007). Smaller marine mammals such as bottlenose and Atlantic spotted dolphins move more quickly throughout the water column and are often seen riding the bow wave of large ships. Marine mammal responses to vessels may include avoidance and changes in dive patterns (NRC, 2003).

After reviewing historical records and computerized stranding databases for evidence of ship strikes involving baleen and sperm whales, Laist *et al.* (2001) found that accounts of large whale ship strikes involving motorized boats in the area date back to at least the late 1800s. Ship collisions remained infrequent until the 1950s, after which point they increased. Laist *et al.* (2001) report that both the number and speed of motorized vessels have increased over time for trans-Atlantic passenger services, which transit through the area. They concluded that most strikes occur over or near the continental shelf, that ship strikes likely have a negligible effect on the status of most whale populations, but that for small populations or segments of populations the impact of ship strikes may be significant.

Although ship strikes may result in the mortality of a limited number of whales within a population or stock, Laist *et al.* (2001) also concluded that, when considered in combination with other human-related mortalities in the area (*e.g.*, entanglement in fishing gear), these ship strikes may present a concern for whale populations.

Of 11 species known to be hit by ships, fin whales are struck most frequently; followed by right whales, humpback whales, sperm whales, and gray whales (Laist *et al.*, 2001). In some areas, one-third of all fin whale and right whale strandings appear to involve ship strikes. Sperm whales spend long periods (typically up to 10 minutes; Jacquet *et al.*, 1996) ‘‘rafting’’ at the surface between deep dives. This could make them exceptionally vulnerable to ship strikes. Berzin (1972) noted that there were ‘‘many’’ reports of sperm whales of different age classes being struck by vessels, including passenger ships and tug boats. There were also instances in which sperm whales approached vessels too closely and were cut by the propellers (NMFS, 2006).

In the Gulf of Mexico, sperm whales are of particular concern. Sperm whales spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives. In addition, some baleen whales such as the North Atlantic right whale seem generally unresponsive to vessel sound, making them more susceptible to vessel collisions (Nowacek *et al.*, 2004a). In comparison with other regions of the U.S., the Gulf of Mexico is the least common area for ship strikes of large whales (Jensen and Silber, 2003). Between 1972 and 1999, eight confirmed or possible large whale ship strikes were recorded in the Gulf of Mexico, including two that collided with Navy vessels; four of these resulted in mortality of the animal (Jensen and Silber, 2003) and one resulted in extensive damage to a Navy vessel (Laist *et al.*, 2001). It is not known whether the shipstrikes involving Navy vessels resulted in the mortality of the animal (Laist *et al.*, 2001; Jensen and Silber, 2003).

Accordingly, the Navy has proposed mitigation measures to reduce the potential for collisions with surfaced marine mammals (for more details refer to Proposed Mitigation Measures below). Based on the implementation of Navy mitigation measures and the relatively low density of Navy ships in the Study Area the likelihood that a vessel collision would occur is very low.

Vessel Movement

There are limited data concerning marine mammal behavioral responses to vessel traffic and vessel noise, and a lack of consensus among scientists with respect to what these responses mean or whether they result in short-term or long-term adverse effects. In those cases where there is a busy shipping lane or where there is large amount of vessel traffic, marine mammals may experience acoustic masking (Hildebrand, 2005) if they are present in the area (*e.g.*, killer whales in Puget Sound; Foote *et al.*, 2004; Holt *et al.*, 2008). In cases where vessels actively approach marine mammals (*e.g.*, whale watching or dolphin watching boats), scientists have documented that animals exhibit altered behavior such as increased swimming speed, erratic movement, and active avoidance behavior (Bursk, 1983; Acevedo, 1991; Baker and MacGibbon, 1991; Trites and Bain, 2000; Williams *et al.*, 2002; Constantine *et al.*, 2003), reduced blow interval (Ritcher *et al.*, 2003), disruption of normal social behaviors (Lusseau, 2003; 2006), and the shift of behavioral activities which may increase energetic costs (Constantine *et al.*, 2003; 2004)). A detailed review of marine mammal reactions to ships and boats is available in Richardson *et al.* (1995). For each of the marine mammals taxonomy groups, Richardson *et al.* (1995) provided the following assessment regarding cetacean reactions to vessel traffic:

Toothed whales: ‘‘In summary, toothed whales sometimes show no avoidance reaction to vessels, or even approach them. However, avoidance can occur, especially in response to vessels of types used to chase or hunt the animals. This may cause temporary displacement, but we know of no clear evidence that toothed whales have abandoned significant parts of their range because of vessel traffic.’’

Baleen whales: ‘‘When baleen whales receive low-level sounds from distant or stationary vessels, the sounds often seem to be ignored. Some whales approach the sources of these sounds. When vessels approach whales slowly and nonaggressively, whales often exhibit slow and inconspicuous avoidance maneuvers. In response to strong or rapidly changing vessel noise, baleen whales often interrupt their normal behavior and swim rapidly away. Avoidance is especially strong when a boat heads directly toward the whale.''

It is important to recognize that behavioral responses to stimuli are complex and influenced to varying degrees by a number of factors such as species, behavioral contexts, geographical regions, source characteristics (moving or stationary, speed, direction, *etc.*), prior experience of the animal, and physical status of the animal. For example, studies have shown that beluga whales reacted differently when exposed to vessel noise and traffic. In some cases, naive beluga whales exhibited rapid swimming from ice-breaking vessels up to 80 km away, and showed changes in surfacing, breathing, diving, and group composition in the Canadian high Arctic where vessel traffic is rare (Finley *et al.*, 1990). In other cases, beluga whales were more tolerant of vessels, but differentially responsive by reducing their calling rates, to certain vessels and operating characteristics (especially older animals) in the St. Lawrence River where vessel traffic is common (Blane and Jaakson, 1994). In Bristol Bay, Alaska, beluga whales continued to feed when surrounded by fishing vessels and resisted dispersal even when purposefully harassed (Fish and Vania, 1971).

In reviewing more than 25 years of whale observation data, Watkins (1986) concluded that whale reactions to vessel traffic were ''modified by their previous experience and current activity: habituation often occurred rapidly, attention to other stimuli or preoccupation with other activities sometimes overcame their interest or wariness of stimuli.'' Watkins noticed that over the years of exposure to ships in the Cape Cod area, minke whales (*Balaenoptera acutorostrata*) changed from frequent positive (such as approaching vessels) interest to generally uninterested reactions; finback whales (*B. physalus*) changed from mostly negative (such as avoidance) to uninterested reactions; right whales (*Eubalaena glacialis*) apparently continued the same variety of responses (negative, uninterested, and positive responses) with little change; and humpbacks (*Megaptera novaeangliae*) dramatically changed from mixed responses that were often negative to often strongly positive reactions. Watkins (1986) summarized that ''whales near shore, even in regions with low vessel traffic, generally have become less wary of boats and their noises, and they have appeared to be less easily disturbed than previously. In particular locations with intense shipping and repeated approaches by boats (such as the whale-watching areas of Stellwagen Bank), more and more whales had P [positive] reactions to familiar vessels, and they also occasionally approached other boats and yachts in the same ways.''

In the case of the GOMEX Range Complex, naval vessel traffic is expected to be much lower than in areas where there are large shipping lanes and large numbers of fishing vessels and/or recreational vessels. Nevertheless, the proposed action area is well traveled by a variety of commercial and recreational vessels, so marine mammals in the area are expected to be habituated to vessel noise.

As described earlier in this document, operations involving vessel movements occur intermittently and are variable in duration, ranging from a few hours up to 2 weeks. These operations are widely dispersed throughout the GOMEX Range Complex OPAREA, which is a vast area encompassing 11,714 nm^2. The Navy logs about 180 total vessel days within the Study Area during a typical year. Consequently, the density of ships within the Study Area at any given time is extremely low (*i.e.*, less than 0.0113 ships/nm^2).

Moreover, naval vessels transiting the study area or engaging in the training exercises will not actively or intentionally approach a marine mammal or change speed drastically. All vessels transiting to, from, and within the range complexes will be traveling at speeds generally ranging from 10 to 14 knots. In addition, mitigation measures described below require Navy vessels to keep at least 500 yards (460 m) away from any observed whale and at least 200 yards (183 m) from marine mammals other than whales, and avoid approaching animals head-on. Although the radiated sound from the vessels will be audible to marine mammals over a large distance, it is unlikely that animals will respond behaviorally to low-level distant shipping noise as the animals in the area are likely to be habituated to such noises (Nowacek *et al.*, 2004). In light of these facts, NMFS does not expect the Navy's vessel movements to result in Level B harassment.

Assessment of Marine Mammal Response to Anthropogenic Sound

Marine mammals respond to various types of anthropogenic sounds introduced in the ocean environment. Responses are typically subtle and can include shorter surfacings, shorter dives, fewer blows per surfacing, longer intervals between blows (breaths), ceasing or increasing vocalizations, shortening or lengthening vocalizations, and changing frequency or intensity of vocalizations (NRC, 2005). However, it is not known how these responses relate to significant effects (*e.g.*, long-term effects or population consequences). The following is an assessment of marine mammal responses and disturbances when exposed to anthropogenic sound.

I. Physiology

Potential impacts to the auditory system are assessed by considering the characteristics of the received sound (*e.g.*, amplitude, frequency, duration) and the sensitivity of the exposed animals. Some of these assessments can be numerically based (*e.g.*, temporary threshold shift [TTS] of hearing sensitivity, permanent threshold shift [PTS] of hearing sensitivity, perception). Others will be necessarily qualitative, due to a lack of information, or will need to be extrapolated from other species for which information exists.

Potential physiological responses to the sound exposure are ranked in descending order, with the most severe impact (auditory trauma) occurring at the top and the least severe impact occurring at the bottom (the sound is not perceived).

Auditory trauma represents direct mechanical injury to hearing related structures, including tympanic membrane rupture, disarticulation of the middle ear ossicles, and trauma to the inner ear structures such as the organ of Corti and the associated hair cells. Auditory trauma is always injurious that could result in PTS and is always assumed to result in a stress response.

Auditory fatigue refers to a loss of hearing sensitivity after sound stimulation. The loss of sensitivity persists after, sometimes long after, the cessation of the sound. The mechanisms responsible for auditory fatigue differ from auditory trauma and would primarily consist of metabolic exhaustion of the hair cells and cochlear tissues. The features of the exposure (*e.g.*, amplitude, frequency, duration, temporal pattern) and the individual animal's susceptibility would determine the severity of fatigue and whether the effects were temporary (TTS) or permanent (PTS). Auditory fatigue (PTS or TTS) is always assumed to result in a stress response.

Sounds with sufficient amplitude and duration to be detected among the background ambient noise are considered to be perceived. This category includes sounds from the threshold of audibility through the normal dynamic range of hearing (*i.e.*, not capable of producing fatigue).

To determine whether an animal perceives the sound, the received level, frequency, and duration of the sound are compared to what is known of the species' hearing sensitivity.

Since audible sounds may interfere with an animal's ability to detect other sounds at the same time, perceived sounds have the potential to result in auditory masking. Unlike auditory fatigue, which always results in a stress response because the sensory tissues are being stimulated beyond their normal physiological range, masking may or may not result in a stress response, depending on the degree and duration of the masking effect. Masking may also result in a unique circumstance where an animal's ability to detect other sounds is compromised without the animal's knowledge. This could conceivably result in sensory impairment and subsequent behavior change; in this case, the change in behavior is the lack of a response that would normally be made if sensory impairment did not occur. For this reason, masking also may lead directly to behavior change without first causing a stress response.

The features of perceived sound (*e.g.*, amplitude, duration, temporal pattern) are also used to judge whether the sound exposure is capable of producing a stress response. Factors to consider in this decision include the probability of the animal being naive or experienced with the sound (*i.e.*, what are the known/unknown consequences of the exposure).

If the received level is not of sufficient amplitude, frequency, and duration to be perceptible by the animal, by extension, this does not result in a stress response (not perceived). Potential impacts to tissues other than those related to the auditory system are assessed by considering the characteristics of the sound (*e.g.*, amplitude, frequency, duration) and the known or estimated response characteristics of non-auditory tissues. Some of these assessments can be numerically based (*e.g.*, exposure required for rectified diffusion). Others will be necessarily qualitative, due to lack of information. Each of the potential responses may or may not result in a stress response.

Direct tissue effects—Direct tissue responses to sound stimulation may range from tissue shearing (injury) to mechanical vibration with no resulting injury.

No tissue effects—The received sound is insufficient to cause either direct (mechanical) or indirect effects to tissues. No stress response occurs.

II. The Stress Response

The acoustic source is considered a potential stressor if, by its action on the animal, via auditory or non-auditory means, it may produce a stress response in the animal. The term ''stress'' has taken on an ambiguous meaning in the scientific literature, but with respect to the later discussions of allostasis and allostatic loading, the stress response will refer to an increase in energetic expenditure that results from exposure to the stressor and which is predominantly characterized by either the stimulation of the sympathetic nervous system (SNS) or the hypothalamic-pituitary-adrenal (HPA) axis (Reeder and Kramer, 2005). The SNS response to a stressor is immediate and acute and is characterized by the release of the catecholamine neurohormones norepinephrine and epinephrine (*i.e.*, adrenaline). These hormones produce elevations in the heart and respiration rate, increase awareness, and increase the availability of glucose and lipids for energy. The HPA response is ultimately defined by increases in the secretion of the glucocorticoid steroid hormones, predominantly cortisol in mammals. The amount of increase in circulating glucocorticoids above baseline may be an indicator of the overall severity of a stress response (Hennessy *et al.*, 1979). Each component of the stress response is variable in time; *e.g.*, adrenalines are released nearly immediately and are used or cleared by the system quickly, whereas cortisol levels may take long periods of time to return to baseline.

The presence and magnitude of a stress response in an animal depends on a number of factors. These include the animal's life history stage (*e.g.*, neonate, juvenile, adult), the environmental conditions, reproductive or developmental state, and experience with the stressor. Not only will these factors be subject to individual variation, but they will also vary within an individual over time. In considering potential stress responses of marine mammals to acoustic stressors, each of these should be considered. For example, is the acoustic stressor in an area where animals engage in breeding activity? Are animals in the region resident and likely to have experience with the stressor (*i.e.*, repeated exposures)? Is the region a foraging ground or are the animals passing through as transients? What is the ratio of young (naive) to old (experienced) animals in the population? It is unlikely that all such questions can be answered from empirical data; however, they should be addressed in any qualitative assessment of a potential stress response as based on the available literature.

The stress response may or may not result in a behavioral change, depending on the characteristics of the exposed animal. However, provided a stress response occurs, we assume that some contribution is made to the animal's allostatic load. Allostasis is the ability of an animal to maintain stability through change by adjusting its physiology in response to both predictable and unpredictable events (McEwen and Wingfield, 2003). The same hormones associated with the stress response vary naturally throughout an animal's life, providing support for particular life history events (*e.g.*, pregnancy) and predictable environmental conditions (*e.g.*, seasonal changes). The allostatic load is the cumulative cost of allostasis incurred by an animal and is generally characterized with respect to an animal's energetic expenditure. Perturbations to an animal that may occur with the presence of a stressor, either biological (*e.g.*, predator) or anthropogenic (*e.g.*, construction), can contribute to the allostatic load (Wingfield, 2003). Additional costs are cumulative and additions to the allostatic load over time may contribute to reductions in the probability of achieving ultimate life history functions (*e.g.*, survival, maturation, reproductive effort and success) by producing pathophysiological states (the conditions of disease or injury). The contribution to the allostatic load from a stressor requires estimating the magnitude and duration of the stress response, as well as any secondary contributions that might result from a change in behavior.

If the acoustic source does not produce tissue effects, is not perceived by the animal, or does not produce a stress response by any other means, we assume that the exposure does not contribute to the allostatic load. Additionally, without a stress response or auditory masking, it is assumed that there can be no behavioral change. Conversely, any immediate effect of exposure that produces an injury is assumed to also produce a stress response and contribute to the allostatic load.

III. Behavior

Changes in marine mammal behavior are expected to result from an acute stress response. This expectation is based on the idea that some sort of physiological trigger must exist to change any behavior that is already being performed. The exception to this rule is the case of auditory masking. The presence of a masking sound may not produce a stress response, but may interfere with the animal's ability to detect and discriminate biologically relevant signals. The inability to detect and discriminate biologically relevant signals hinders the potential for normal behavioral responses to auditory cues and is thus considered a behavioral change.

Impulsive sounds from explosions have very short durations as compared to other sounds like sonar or ship noise, which are more likely to produce auditory masking. Additionally the explosive sources analyzed in this document are used infrequently and the training events are typically of short duration. Therefore, the potential for auditory masking is unlikely.

Numerous behavioral changes can occur as a result of stress response. For each potential behavioral change, the magnitude in the change and the severity of the response needs to be estimated. Certain conditions, such as stampeding (*i.e.,* flight response) or a response to a predator, might have a probability of resulting in injury. For example, a flight response, if significant enough, could produce a stranding event. Each disruption to a natural behavioral pattern (*e.g.*, breeding or nursing) may need to be classified as Level B harassment. All behavioral disruptions have the potential to contribute to the allostatic load. This secondary potential is signified by the feedback from the collective behaviors to allostatic loading.

IV. Life Function

IV.1. Proximate Life Functions

Proximate life history functions are the functions that the animal is engaged in at the time of acoustic exposure. The disruption of these functions, and the magnitude of the disruption, is something that must be considered in determining how the ultimate life history functions are affected. Consideration of the magnitude of the effect to each of the proximate life history functions is dependent upon the life stage of the animal. For example, an animal on a breeding ground which is sexually immature will suffer relatively little consequence to disruption of breeding behavior when compared to an actively displaying adult of prime reproductive age.

IV.2. Ultimate Life Functions

The ultimate life functions are those that enable an animal to contribute to the population (or stock, or species, *etc.*). The impact to ultimate life functions will depend on the nature and magnitude of the perturbation to proximate life history functions. Depending on the severity of the response to the stressor, acute perturbations may have nominal to profound impacts on ultimate life functions. For example, unit-level use of sonar by a vessel transiting through an area that is utilized for foraging, but not for breeding, may disrupt feeding by exposed animals for a brief period of time. Because of the brevity of the perturbation, the impact to ultimate life functions may be negligible. By contrast, weekly training over a period of years may have a more substantial impact because the stressor is chronic. Assessment of the magnitude of the stress response from the chronic perturbation would require an understanding of how and whether animals acclimate to a specific, repeated stressor and whether chronic elevations in the stress response (*e.g.*, cortisol levels) produce fitness deficits.

The proximate life functions are loosely ordered in decreasing severity of impact. Mortality (survival) has an immediate effect, in that no future reproductive success is feasible and there is no further addition to the population resulting from reproduction. Severe injuries may also lead to reduced survivorship (longevity) and prolonged alterations in behavior. The latter may further affect an animal's overall reproductive success and reproductive effort. Disruptions of breeding have an immediate impact on reproductive effort and may impact reproductive success. The magnitude of the effect will depend on the duration of the disruption and the type of behavior change that was provoked. Disruptions to feeding and migration can affect all of the ultimate life functions; however, the impacts to reproductive effort and success are not likely to be as severe or immediate as those incurred by mortality and breeding disruptions.

Explosive Ordnance Exposure Analysis

The underwater explosion from a weapon would send a shock wave and blast noise through the water, release gaseous by-products, create an oscillating bubble, and cause a plume of water to shoot up from the water surface. The shock wave and blast noise are of most concern to marine animals. The effects of an underwater explosion on a marine mammal depends on many factors, including the size, type, and depth of both the animal and the explosive charge; the depth of the water column; and the standoff distance between the charge and the animal, as well as the sound propagation properties of the environment. Potential impacts can range from brief effects (such as behavioral disturbance), tactile perception, physical discomfort, slight injury of the internal organs and the auditory system, to death of the animal (Yelverton *et al.*, 1973; O'Keeffe and Young, 1984; DoN, 2001). Non-lethal injury includes slight injury to internal organs and the auditory system; however, delayed lethality can be a result of individual or cumulative sublethal injuries (DoN, 2001). Immediate lethal injury would be a result of massive combined trauma to internal organs as a direct result of proximity to the point of detonation (DoN, 2001). Generally, the higher the level of impulse and pressure level exposure, the more severe the impact to an individual.

Injuries resulting from a shock wave take place at boundaries between tissues of different density. Different velocities are imparted to tissues of different densities, and this can lead to their physical disruption. Blast effects are greatest at the gas-liquid interface (Landsberg, 2000). Gas-containing organs, particularly the lungs and gastrointestinal tract, are especially susceptible (Goertner, 1982; Hill, 1978; Yelverton *et al.*, 1973). In addition, gas-containing organs including the nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble (Reidenberg and Laitman, 2003). Intestinal walls can bruise or rupture, with subsequent hemorrhage and escape of gut contents into the body cavity. Less severe gastrointestinal tract injuries include contusions, petechiae (small red or purple spots caused by bleeding in the skin), and slight hemorrhaging (Yelverton *et al.*, 1973).

Because the ears are the most sensitive to pressure, they are the organs most sensitive to injury (Ketten, 2000). Sound-related damage associated with blast noise can be theoretically distinct from injury from the shock wave, particularly farther from the explosion. If an animal is able to hear a noise, at some level it can damage its hearing by causing decreased sensitivity (Ketten, 1995) (See *Assessment of Marine Mammal Response to Anthropogenic Sound* Section above). Sound-related trauma can be lethal or sublethal. Lethal impacts are those that result in immediate death or serious debilitation in or near an intense source and are not, technically, pure acoustic trauma (Ketten, 1995). Sublethal impacts include hearing loss, which is caused by exposures to perceptible sounds. Severe damage (from the shock wave) to the ears includes tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear. Moderate injury implies partial hearing loss due to tympanic membrane rupture and blood in the middle ear. Permanent hearing loss also can occur when the hair cells are damaged by one very loud event, as well as by prolonged exposure to a loud noise or chronic exposure to noise. The level of impact from blasts depends on both an animal's location and, at outer zones, on its sensitivity to the residual noise (Ketten, 1995).

The exercises that use explosives in this request include BOMBEX (A–S) and GUNEX (S–S). Table 1 summarizes the number of events and specific areas where each occurs for each type of explosive ordnance used. There is no difference in how many events take place between the different seasons. Fractional values are a result of evenly distributing the annual totals over the four seasons. For example, there is one BOXEX event per year that can take place in the BOMBEX Hotbox during any season, so there are 0.25 event modeled for each season.

Definition of Harassment

As mentioned previously, with respect to military readiness activities, Section 3(18)(B) of the MMPA defines ''harassment'' as: (i) Any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

I. Level B Harassment

Of the potential effects that were described in the *Assessment of Marine Mammal Response to Anthropogenic Sound* and the *Explosive Ordnance Exposure Analysis* sections, the following are the types of effects that fall into the Level B Harassment category:

(A) *Behavioral Harassment*—Behavioral disturbance that rises to the level described in the definition above, when resulting from exposures to underwater detonations, is considered Level B Harassment. Some of the lower level physiological stress responses discussed in the *Assessment of Marine Mammal Response to Anthropogenic Sound* section will also likely co-occur with the predicted harassments, although these responses are more difficult to detect and fewer data exist relating these responses to specific received levels of sound. When Level B Harassment is predicted based on estimated behavioral responses, those takes may have a stress-related physiological component as well.

(B) *Acoustic Masking and Communication Impairment*—Acoustic masking is considered Level B Harassment as it can disrupt natural behavioral patterns by interrupting or limiting the marine mammal's receipt or transmittal of important information or environmental cues.

(C) *TTS*—As discussed previously, TTS can affect how an animal behaves in response to the environment, including conspecifics, predators, and prey. The following physiological mechanisms are thought to play a role in inducing auditory fatigue: effects to sensory hair cells in the inner ear that reduce their sensitivity, modification of the chemical environment within the sensory cells, residual muscular activity in the middle ear, displacement of certain inner ear membranes, increased blood flow, and post-stimulatory reduction in both efferent and sensory neural output. Ward (1997) suggested that when these effects result in TTS rather than PTS, they are within the normal bounds of physiological variability and tolerance and do not represent a physical injury. Additionally, Southall *et al.* (2007) indicate that although PTS is a tissue injury, TTS is not because the reduced hearing sensitivity following exposure to intense sound results primarily from fatigue, not loss, of cochlear hair cells and supporting structures and is reversible. Accordingly, NMFS classifies TTS (when resulting from exposure to underwater detonations) as Level B Harassment, not Level A Harassment (injury).

II. Level A Harassment

Of the potential effects that were described in the *Assessment of Marine Mammal Response to Anthropogenic Sound* section, the following are the types of effects that fall into the Level A Harassment category:

(A) *PTS*—PTS is irreversible and considered to be an injury. PTS results from exposure to intense sounds that cause a permanent loss of inner or outer cochlear hair cells or exceed the elastic limits of certain tissues and membranes in the middle and inner ears and result in changes in the chemical composition of the inner ear fluids.

(B) *Physical Disruption of Tissues Resulting from Explosive Shock Wave*—Physical damage of tissues resulting from a shock wave (from an explosive detonation) is classified as an injury. Blast effects are greatest at the gas-liquid interface (Landsberg, 2000) and gas-containing organs, particularly the lungs and gastrointestinal tract, are especially susceptible to damage (Goertner, 1982; Hill 1978; Yelverton *et al.*, 1973). Nasal sacs, larynx, pharynx, trachea, and lungs may be damaged by compression/expansion caused by the oscillations of the blast gas bubble (Reidenberg and Laitman, 2003). Severe damage (from the shock wave) to the ears can include tympanic membrane rupture, fracture of the ossicles, damage to the cochlea, hemorrhage, and cerebrospinal fluid leakage into the middle ear.

Acoustic Take Criteria

For the purposes of an MMPA incidental take authorization, three types of take are identified: Level B Harassment; Level A Harassment; and mortality (or serious injury leading to mortality). The categories of marine mammal responses (physiological and behavioral) that fall into the two harassment categories were described in the previous section.

Because the physiological and behavioral responses of the majority of the marine mammals exposed to underwater detonations cannot be detected or measured, a method is needed to estimate the number of individuals that will be taken, pursuant to the MMPA, based on the proposed action. To this end, NMFS uses an acoustic criteria that estimate at what received level (when exposed to explosive detonations) Level B Harassment, Level A Harassment, and mortality (for explosives) of marine mammals would occur. The acoustic criteria for Underwater Detonations are discussed.

Thresholds and Criteria for Impulsive Sound

Criteria and thresholds for estimating the exposures from a single explosive activity on marine mammals were established for the Seawolf Submarine Shock Test Final Environmental Impact Statement (FEIS) (''Seawolf'') and subsequently used in the *USS Winston*

S. Churchill (DDG–81) Ship Shock FEIS (''*Churchill*'') (DoN, 1998 and 2001a). NMFS adopted these criteria and thresholds in its final rule on unintentional taking of marine animals occurring incidental to the shock testing (NMFS, 2001a). Since the ship-shock events involve only one large explosive at a time, additional assumptions were made to extend the approach to cover multiple explosions for BOMBEX (A–S). In addition, this section reflects a revised acoustic criterion for small underwater explosions (*i.e.*, 23 pounds per square inch [psi] instead of previous acoustic criteria of 12 psi for peak pressure), which is based on the final rule issued to the Air Force by NMFS (NMFS, 2005b).

I.1. Thresholds and Criteria for Injurious Physiological Impacts

I.1.a. Single Explosion

For injury, NMFS uses dual criteria: eardrum rupture (*i.e.*, tympanic-membrane injury) and onset of slight lung injury. These criteria are considered indicative of the onset of injury. The threshold for tympanic-membrane (TM) rupture corresponds to a 50 percent rate of rupture (*i.e.*, 50 percent of animals exposed to the level are expected to suffer TM rupture). This value is stated in terms of an Energy Flux Density Level (EL) value of 1.17 inch pounds per square inch (in-lb/in^2), approximately 205 dB re 1 microPa^2-sec.

The threshold for onset of slight lung injury is calculated for a small animal (a dolphin calf weighing 26.9 lbs), and is given in terms of the ''Goertner modified positive impulse,'' indexed to 13 psi-msec (DoN, 2001). This threshold is conservative since the positive impulse needed to cause injury is proportional to animal mass, and therefore, larger animals require a higher impulse to cause the onset of injury. This analysis assumed the marine species populations were 100 percent small animals. The criterion with the largest potential impact range (most conservative), either TM rupture (energy threshold) or onset of slight lung injury (peak pressure), will be used in the analysis to determine Level A exposures for single explosive events.

For mortality, NMFS uses the criterion corresponding to the onset of extensive lung injury. This is conservative in that it corresponds to a 1 percent chance of mortal injury, and yet any animal experiencing onset severe lung injury is counted as a lethal exposure. For small animals, the threshold is given in terms of the Goertner modified positive impulse, indexed to 30.5 psi-msec. Since the Goertner approach depends on propagation, source/animal depths, and animal mass in a complex way, the actual impulse value corresponding to the 30.5 psi-msec index is a complicated calculation. To be conservative, the analysis used the mass of a calf dolphin (at 26.9 lbs) for 100 percent of the populations.

I.1.b. Multiple Explosions

For this analysis, the use of multiple explosions only applies to the MK–83 bombs used in BOMBEX. Since BOMBEX events require multiple explosions, the *Churchill* approach had to be extended to cover multiple sound events at the same training site. For multiple exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot (explosion); this is consistent with the treatment of multiple arrivals in *Churchill*. For positive impulse, it is consistent with *Churchill* to use the maximum value over all impulses received.

I.2. Thresholds and Criteria for Non-Injurious Physiological Effects

The NMFS' criterion for non-injurious harassment is TTS—a slight, recoverable loss of hearing sensitivity (DoN, 2001). For this assessment, there are dual criteria for TTS, an energy threshold and a peak pressure threshold. The criterion with the largest potential impact range (most conservative) either the energy or peak pressure threshold, will be used in the analysis to determine Level B TTS exposures.

I.2.a. Single Explosion—TTS-Energy Threshold

The first threshold is a 182 dB re 1 microPa^2-sec maximum energy flux density level in any 1/3-octave band at frequencies above 100 Hertz (Hz) for toothed whales and in any 1/3-octave band above 10 Hz for baleen whales. For large explosives, as in the case of the *Churchill* FEIS, frequency range cutoffs at 10 and 100 Hz make a difference in the range estimates. For small explosives (<1,500 lb NEW), as what was modeled for this analysis, the spectrum of the shot arrival is broad, and there is essentially no difference in impact ranges for toothed whales or baleen whales.

The TTS energy threshold for explosives is derived from the Space and Naval Warfare Systems Center (SSC) pure-tone tests for TTS (Schlundt *et al.*, 2000; Finneran and Schlundt, 2004). The pure-tone threshold (192 dB as the lowest value) is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3-octave bands, the natural filter band of the ear. The resulting threshold is 182 dB re 1 microPa^2-sec in any 1/3-octave band. The energy threshold usually dominates and is used in the analysis to determine potential Level B exposures for single explosion ordnance.

I.2.b. Single Explosion—TTS-Peak Pressure Threshold

The second threshold applies to all species and is stated in terms of peak pressure at 23 psi (about 225 dB re 1 microPa). This criterion was adopted for Precision Strike Weapons (PSW) Testing and Training by Eglin Air Force Base in the Gulf of Mexico (NMFS, 2005b). It is important to note that for small shots near the surface (such as in this analysis), the 23-psi peak pressure threshold generally will produce longer impact ranges than the 182-dB energy metric. Furthermore, it is not unusual for the TTS impact range for the 23-psi pressure metric to actually exceed the without-TTS (behavioral change without onset of TTS) impact range for the 177-dB energy metric.

I.2.c. Multiple Explosions—TTS

For multiple explosions, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot/detonation. This is consistent with the energy argument in *Churchill*. For peak pressure, it is consistent with *Churchill* to use the maximum value over all impulses received.

I.3. Thresholds and Criteria for Behavioral Effects

I.3.a. Single Explosion

For a single explosion, to be consistent with *Churchill*, TTS is the criterion for Level B harassment. In other words, because behavioral disturbance for a single explosion is likely to be limited to a short-lived startle reaction, use of the TTS criterion is considered sufficient protection and therefore behavioral effects (Level B behavioral harassment without onset of TTS) are not expected for single explosions.

I.3.b. Multiple Explosions—Without TTS

For this analysis, the use of multiple explosions only applies to FIREX (with IMPASS). Because multiple explosions would occur within a discrete time period, a new acoustic criterion—

behavioral disturbance (without TTS)—is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower noise levels than those that may cause TTS.

The threshold is based on test results published in Schlundt *et al.* (2000), with derivation following the approach of the *Churchill* FEIS for the energy-based TTS threshold. The original Schlundt *et al.* (2000) data and the report of Finneran and Schlundt (2004) are the basis for thresholds for behavioral disturbance (without TTS). As reported by Schlundt *et al.* (2000), instances of altered behavior generally began at lower exposures than those causing TTS; however, there were many instances when subjects exhibited no altered behavior at levels above the onset-TTS levels. Regardless of reactions at higher or lower levels, all instances of altered behavior were included in the statistical summary.

The behavioral disturbance (without TTS) threshold for tones is derived from the SSC tests, and is found to be 5 dB below the threshold for TTS, or 177 dB re: 1 microPa^2-s maximum EL in any ⅓-octave band at frequencies above 100 Hz for toothed whales/sea turtles and in any ⅓-octave band above 10 Hz for baleen whales. As stated previously for TTS, for small explosives (<1500-lb NEW), as what was modeled for this analysis, the spectrum of the shot arrival is broad, and there is essentially no difference in impact ranges for toothed whales/sea turtles or baleen whales. For BOMBEX involving MK–83 bombs, behavioral disturbance (without TTS) (177 dB re: 1 microPa^2-s) is the criterion that dominates in the analysis to determine potential behavioral exposures (MMPA-Level B) due to the use of multiple explosions.

II. Summary of Thresholds and Criteria for Impulsive Sounds

Table 3 summarizes the effects, criteria, and thresholds used in the assessment for impulsive sounds. The criteria for behavioral effects without physiological effects used in this analysis are based on use of multiple explosives that only take place during a BOMBEX event.

TABLE 3—EFFECTS, CRITERIA, AND THRESHOLDS FOR IMPULSIVE SOUNDS

Effect	Criteria	Metric	Threshold	Effect
Mortality	Onset of Extensive Lung Injury	Goertner modified positive impulse.	Indexed to 30.5 psi-msec (assumes 100 percent small animal at 26.9 lbs).	Mortality.
Injurious Physiological.	50% Tympanic Membrane Rupture.	Energy flux density	1.17 in-lb/in^2 (about 205 dB re 1 microPa^2-sec).	Level A.
Injurious Physiological.	Onset Slight Lung Injury	Goertner modified positive impulse.	Indexed to 13 psi-msec (assumes 100 percent small animal at 26.9 lbs).	Level A.
Non-injurious Physiological.	TTS	Greatest energy flux density level in any ⅓-octave band (>100 Hz for toothed whales and >10 Hz for baleen whales)—for total energy over all exposures 1.	82 dB re 1 microPa^2-sec	Level B.
Non-injurious Physiological.	TTS	Peak pressure over all exposures	23 psi	Level B.
Non-injurious Behavioral.	Multiple Explosions Without TTS	Greatest energy flux density level in any ⅓-octave (>100 Hz for toothed whales and > 10Hz for baleen whales)—for total energy over all exposures (multiple explosions only).	177 dB re 1 microPa^2-sec	Level B.

The criteria for mortality, Level A Harassment, and Level B Harassment resulting from explosive detonations were initially developed for the Navy's *Sea Wolf* and *Churchill* ship-shock trials and have not changed since other MMPA authorizations issued for explosive detonations. The criteria, which are applied to cetaceans and pinnipeds are summarized in Table 3. Additional information regarding the derivation of these criteria is available in the Navy's FEIS for the GOMEX Range Complex and in the Navy's *Churchill* FEIS (U.S. Department of the Navy, 2001).

III. Acoustic Environment

Sound propagation (the spreading or attenuation of sound) in the oceans of the world is affected by several environmental factors: water depth, variations in sound speed within the water column, surface roughness, and the geo-acoustic properties of the ocean bottom. These parameters can vary widely with location.

Four types of data are used to define the acoustic environment for each analysis site:

Seasonal Sound Velocity Profiles (SVP)—Plots of propagation speed (velocity) as a function of depth, or SVPs, are a fundamental tool used for predicting how sound will travel. Seasonal SVP averages were obtained for each training area.

Seabed Geo-acoustics—The type of sea floor influences how much sound is absorbed and how much sound is reflected back into the water column.

Wind Speeds—Several environmental inputs, such as wind speed and surface roughness, are necessary to model acoustic propagation in the prospective training areas.

Bathymetry Data—Bathymetry data are necessary to model acoustic propagation and were obtained for each of the training areas.

IV. Acoustic Effects Analysis

The acoustic effects analysis presented in the following sections is summarized for each major type of exercise. A more in-depth effects analysis is in Appendix A of the LOA application and the Addendum.

1. BOMBEX

Modeling was completed for four explosive sources (sequential detonation of four bombs per event) involved in BOMBEX with an assumed detonation depth of 1 m. The NEW used in simulations of the MK83 is 415.8 lbs.

Determining the zone of influence (ZOI) for the thresholds in terms of total EFD, impulse, peak pressure and ⅓-octave bands EFD must treat the sequential explosions differently than the single detonations. For the MK–83, two factors are involved for the sequential explosives that deal with the spatial and temporal distribution of the detonations as well as the effective accumulation of the resultant acoustics. In view of the ZOI determinations, the sequential detonations are modeled as a single point event with only the EFD summed incoherently:

$$Total\ EFD\ db = 10\ \log_{10} \sum_{i=1}^{n} 10^{(EFD_i/10)}$$

The multiple explosion energy criterion was used to determine the ZOI for the Level B without TTS exposure analysis. Table 4 shows the ZOI results of the model estimation. The ZOI, when multiplied by the animal densities and total number of events (Table 1), provides the exposure estimates for that animal species for the given bomb source.

BOMBEX is restricted to one location (BOMBEX Hotbox). In addition to other mitigation measures (see Mitigation Measures section below), aircraft will survey the target area for marine mammals before and during the exercise. Ships will not fire on the target until the area is surveyed and determined to be free of marine mammals. The exercise will be suspended if any marine mammals enter the buffer area (5,100-yard or 4,663-m radius around target). The implementation of mitigation measures like these effectively reduce exposures in the ZOI.

TABLE 4—ESTIMATED ZOIS (KM^2) USED IN EXPOSURE CALCULATIONS FOR BOMBEX USING MK–83 (415.8 LBS NEW) IN THE GOMEX RANGE COMPLEX FOR DIFFERENT SEASONS

Estimated ZOI @ 177 dB re 1 µPa²-sec (multiple detonations only)				Estimated ZOI @ 182 dB re 1 µPa²-sec or 23 psi				Estimated ZOI @ 205 dB re 1 µPa²-sec or 13 psi				Mortality ZOI @ 30.5 psi			
Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall
98.93	115.93	161.39	173.27	55.53	76.82	137.33	158.07	4.84	4.84	4.84	4.98	<0.01	<0.01	<0.01	<0.01

Note: ZOIs for the MK–83 bombs are modeled as multiple detonations (4 bombs dropped in succession at same location).

2. Small Arms Training

Modeling was completed for the MK3A2 explosive anti-swimmer grenades, which assumed a 6 ft (1.8 m) detonation depth. The NEW used in simulations of the MK3A2 grenade is 0.5 lb.

Determining the ZOI for the thresholds in terms of total energy flux density (EFD), impulse, peak pressure and ⅓-octave bands EFD must treat the sequential explosions differently than the single detonations. For the MK3A2, two factors are involved for the sequential explosives that deal with the spatial and temporal distribution of the detonations as well as the effective accumulation of the resultant acoustics. In view of the ZOI determinations, the sequential detonations are modeled as a single point event with only the EFD summed incoherently:

$$TotalEFD_{db} = 101\ \log_{10} \sum_{i=1}^{n} 10^{(EFDi/10)}$$

The multiple explosion energy criterion was used to determine the ZOI for the non-injurious behavioral (without TTS) exposure analysis.

Table 5 shows the ZOI results of the model estimation. The ZOI, when multiplied by the animal densities and total number of events, provides the exposure estimates for that animal species. Grenade use is restricted to one location (UNDET Area E3) (see Figure 2 of the Navy's LOA application). In addition to other mitigation measures (see Mitigation Measures section below), lookouts will visually survey the target area for marine mammals. The exercise will not be conducted until the area is clear and will suspend the exercise if any enter the buffer area. Implementation of mitigation measures like these reduce the likelihood of exposure and potential effects in the ZOI.

TABLE 5—ESTIMATED ZOIS (KM^2) USED IN EXPOSURE CALCULATIONS FOR SMALL ARMS TRAINING USING MK3A2 ANTI-SWIMMER GRENADES (0.5 LBS NEW) IN THE GOMEX RANGE COMPLEX FOR DIFFERENT SEASONS

Estimated ZOI @ 177 dB re 1 µPa²-sec (multiple detonations only)				Estimated ZOI @ 182 dB re 1 µPa²-sec or 23 psi				Estimated ZOI @ 205 dB re 1 µPa²-sec or 13 psi				Mortality ZOI @ 30.5 psi			
Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall
4.94	5.45	4.71	5.81	1.80	2.18	1.96	3.27	0.09	0.09	0.09	0.10	<0.01	<0.01	<0.01	<0.01

Note: ZOIs for the MK3A2 bombs are modeled as multiple detonations (4 bombs dropped in succession at same location).

3. Summary of Potential Exposures From Explosive Ordnance Use

Explosions that occur in the GOMEX Study Area with the potential to impact marine mammals are associated with training during BOMBEX and small arms training events. Explosive ordnance use is limited to specific training areas. Within the GOMEX Study Area, explosive use associated with BOMBEX events occur in the BOMBEX Hotbox. The use of MK3A2 anti-swimmer grenades is associated with small arms training events, which are limited to the UNDET Area E3 box.

An explosive analysis was conducted to estimate the number of marine mammals that could be exposed to impacts from explosive ordnance use associated with BOMBEX and small arms training. Table 6 provides a summary of the explosive analysis modeling results.

Exposure estimates could not be calculated for several species (blue whale, fin whale, humpback whale, North Atlantic right whale, sei whale, and minke whale) because density data could not be calculated for the GOMEX Study Area due to the limited available data for these species; however, the likelihood of exposure for species not expected to occur in the GOMEX Study Area should be even lower than for the species with occurrence frequent enough for densities to be calculated. In addition to the low likelihood of exposure, the proposed mitigation measures presented below would be implemented prior to release of ordnance. Since the fin, North Atlantic right, humpback, blue, sei, and minke whale are considered rare in the GOMEX Range Complex, no exposures are expected for these species. In addition, the West Indian manatee is not expected to occur where explosive ordnance is used; therefore no exposures are expected for this species.

Lookouts will monitor the area before ordnance is used. Sperm whales will have high detection rates at the surface because of their large body size and pronounced blows; however, sperm whales are long, deep divers and may be submerged, and thus not visually detectable, for over an hour. It is likely that lookouts would detect Atlantic spotted dolphins, bottlenose dolphins, Clymene dolphins, pantropical spotted dolphins, Risso's dolphins, spinner dolphins and striped dolphins due to their gregarious nature and active surface behavior. Implementation of mitigation measures will reduce the likelihood of exposure and potential effects.

TABLE 6—SUMMARY OF POTENTIAL EXPOSURES FROM EXPLOSIVE ORDNANCE (PER YEAR) FOR MARINE MAMMALS IN THE GOMEX RANGE COMPLEX BY THE NAVY MODELING

Species/training operation	Potential exposures @177 dB re 1 microPa^2-s (multiple detonations only)	Potential exposures @182 dB re 1 microPa^2-s or 23 psi-ms	Potential exposures @205 dB re 1 microPa^2-s or 13 psi-ms	Potential exposures @30.5 psi-ms
Sperm whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Atlantic spotted dolphin:				
BOMBEX training	1	1	0	0
Small Arms training	0	0	0	0
Total Exposures	1	1	0	0
Beaked whales:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Bottlenose dolphin:				
BOMBEX training	6	6	0	0
Small Arms training	4	3	0	0
Total Exposures	10	9	0	0
Bryde's whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Clymene dolphin:				
BOMBEX training	3	3	0	0
Small Arms training	0	0	0	0
Total Exposures	3	3	0	0
False killer whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Fraser's dolphin:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Killer whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Kogia spp.:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0

TABLE 6—SUMMARY OF POTENTIAL EXPOSURES FROM EXPLOSIVE ORDNANCE (PER YEAR) FOR MARINE MAMMALS IN THE GOMEX RANGE COMPLEX BY THE NAVY MODELING—Continued

Species/training operation	Potential exposures @177 dB re 1 microPa²-s (multiple detonations only)	Potential exposures @182 dB re 1 microPa²-s or 23 psi-ms	Potential exposures @205 dB re 1 microPa²-s or 13 psi-ms	Potential exposures @30.5 psi-ms
Melon-headed whale:				
BOMBEX training	1	1	0	0
Small Arms training	0	0	0	0
Total Exposures	1	1	0	0
Pantropical spotted dolphin:				
BOMBEX training	14	12	1	0
Small Arms training	0	0	0	0
Total Exposures	14	12	1	0
Pygmy killer whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Risso's dolphin:				
BOMBEX training	1	1	0	0
Small Arms training	0	0	0	0
Total Exposures	1	1	0	0
Rough-toothed dolphin:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Short-finned pilot whale:				
BOMBEX training	0	0	0	0
Small Arms training	0	0	0	0
Total Exposures	0	0	0	0
Spinner dolphin:				
BOMBEX training	14	13	1	0
Small Arms training	0	0	0	0
Total Exposures	14	13	1	0
Striped dolphin				
BOMBEX training	4	4	0	0
Small Arms training	0	0	0	0
Total Exposures	4	4	0	0

Proposed Mitigation Measures

In order to issue an incidental take authorization (ITA) under Section 101(a)(5)(A) of the MMPA, NMFS must prescribe regulations setting forth the "permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance." The NDAA amended the MMPA as it relates to military readiness activities and the incidental take authorization process such that "least practicable adverse impact" shall include consideration of personnel safety, practicality of implementation, and impact on the effectiveness of the "military readiness activity." The GOMEX Range Complex training activities described in this document are considered military readiness activities.

NMFS reviewed the Navy's proposed GOMEX Range Complex training activities and the proposed GOMEX Range Complex mitigation measures presented in the Navy's application to determine whether the activities and mitigation measures were capable of achieving the least practicable adverse effect on marine mammals.

Any mitigation measure prescribed by NMFS should be known to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

(1) Avoidance or minimization of injury or death of marine mammals wherever possible (goals (2), (3), and (4) may contribute to this goal).

(2) A reduction in the numbers of marine mammals (total number or number at a biologically important time

or location) exposed to underwater detonations or other activities expected to result in the take of marine mammals (this goal may contribute to (1), above, or to reducing harassment takes only).

(3) A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to underwater detonations or other activities expected to result in the take of marine mammals (this goal may contribute to (1), above, or to reducing harassment takes only).

(4) A reduction in the intensity of exposures (either total number or number at biologically important time or location) to underwater detonations or other activities expected to result in the take of marine mammals (this goal may contribute to (1), above, or to reducing the severity of harassment takes only).

(5) A reduction in adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

(6) For monitoring directly related to mitigation—an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation (shut-down zone, *etc.*).

NMFS reviewed the Navy's proposed mitigation measures, which included a careful balancing of the likely benefit of any particular measure to the marine mammals with the likely effect of that measure on personnel safety, practicality of implementation, and impact on the ''military-readiness activity.'' These mitigation measures are listed below.

General Maritime Measures

The mitigation measures presented below would be taken by Navy personnel on a regular and routine basis. These are routine measures and are considered ''Standard Operating Procedures.''

I. Personnel Training—Lookouts

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

For the past few years, the Navy has implemented marine mammal spotter training for its bridge lookout personnel on ships and submarines. This training has been revamped and updated as the Marine Species Awareness Training (MSAT) and is provided to all applicable units. The lookout training program incorporates MSAT, which addresses the lookout's role in environmental protection, laws governing the protection of marine species, Navy stewardship commitments, and general observation information, including more detailed information for spotting marine mammals. MSAT may also be viewed on-line at *https://portal.navfac.navy.mil/go/msat*.

1. All bridge personnel, Commanding Officers, Executive Officers, officers standing watch on the bridge, maritime patrol aircraft aircrews, and Mine Warfare (MIW) helicopter crews will complete MSAT.

2. Navy lookouts would undertake extensive training to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

3. Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, lookouts will complete the Personal Qualification Standard Program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects).

4. Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure to facilitate implementation of protective measures if marine species are spotted.

5. Surface lookouts would scan the water from the ship to the horizon and be responsible for all contacts in their sector. In searching the assigned sector, the lookout would always start at the forward part of the sector and search aft (toward the back). To search and scan, the lookout would hold the binoculars steady so the horizon is in the top third of the field of vision and direct the eyes just below the horizon. The lookout would scan for approximately five seconds in as many small steps as possible across the field seen through the binoculars. They would search the entire sector in approximately five-degree steps, pausing between steps for approximately five seconds to scan the field of view. At the end of the sector search, the glasses would be lowered to allow the eyes to rest for a few seconds, and then the lookout would search back across the sector with the naked eye.

II. Operating Procedures and Collision Avoidance

1. Prior to major exercises, a Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued to further disseminate the personnel training requirement and general marine species mitigation measures.

2. Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship according to the proposed mitigation and monitoring measures.

3. While underway, surface vessels will have at least two lookouts with binoculars; surfaced submarines will have at least one lookout with binoculars. Lookouts already posted for safety of navigation and man-overboard precautions may be used to fill this requirement. As part of their regular duties, lookouts will watch for and report to the OOD the presence of marine mammals.

4. Personnel on lookout will employ visual search procedures employing a scanning method in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

5. After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

6. While in transit, personnel aboard naval vessels will be alert at all times, use extreme caution, and proceed at a ''safe speed'' (the minimum speed at which mission goals or safety will not be compromised) so that the vessel can take proper and effective action to avoid a collision with any marine animal and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

7. When whales have been sighted in the area, Navy vessels will increase vigilance and shall implement measures to avoid collisions with marine mammals and avoid activities that might result in close interaction of naval assets and marine mammals. Actions shall include changing speed and/or direction and are dictated by environmental and other conditions (*e.g.*, safety, weather).

8. Naval vessels will maneuver to keep at least 500 yds (460 m) away from

any observed whale and avoid approaching whales head-on. This requirement does not apply if a vessel's safety is threatened, such as when change of course will create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in their ability to maneuver. Restricted maneuverability includes, but is not limited to, situations when vessels are engaged in dredging, submerged operations, launching and recovering aircraft or landing craft, minesweeping operations, replenishment while underway and towing operations that severely restrict a vessel's ability to deviate course. Vessels will take reasonable steps to alert other vessels in the vicinity of the whale.

9. Where feasible and consistent with mission and safety, vessels will avoid closing to within 200-yd (183 m) of marine mammals other than whales (whales addressed above).

10. Floating weeds, algal mats, Sargassum rafts, clusters of seabirds, and jellyfish are good indicators of marine mammal presence. Therefore, increased vigilance in watching for marine mammals will be taken where these conditions exist.

11. Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties described in the Navy's LOA application. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.

12. All vessels will maintain logs and records documenting training operations should they be required for event reconstruction purposes. Logs and records will be kept for a period of 30 days following completion of a major training exercise.

Coordination and Reporting Requirements

The Navy will coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that may occur at any time during training activities or within 24 hours after completion of training activities. Additionally, the Navy will follow internal chain of command reporting procedures as promulgated through Navy instructions and orders.

Proposed Mitigation Measures for Specific At-Sea Training Events

These measures are standard operating procedures that are in place currently and will be used in the future for all activities being analyzed in this LOA request.

I. Small Arms Training—Explosive Hand Grenades (MK3A2 Grenades)

This activity occurs in the UNDET Area E3 of the GOMEX Study Area. The following mitigation measures are proposed by the Navy for the small arms training.

(A) Lookouts visually survey for floating weeds, algal mats, Sargassum rafts, marine mammals.

(B) A 200-yard (182-m) radius buffer zone will be established around the intended target. The exercises will be conducted only if the buffer is clear of sighted marine mammals and sea turtles.

II. Air-to-Surface At-Sea Bombing Exercises (BOMBEX, 500-lb to 2,000-lb Explosive Bombs)

This activity occurs in W–155A/B (hot box) area of the GOMEX Study Area. The location was established to be within 150 nm from shore-based facilities (the established flight distance restriction for F/A–18 jets during unit level training events). The following mitigation measures are proposed by the Navy for the BOMBEX training.

(A) Aircraft would visually survey the target and buffer zone for marine mammals prior to and during the exercise. The survey of the impact area would be made by flying at 1,500 feet altitude or lower, if safe to do so, and at the slowest safe speed. Release of ordnance through cloud cover is prohibited; aircraft must be able to actually see ordnance impact areas. Survey aircraft should employ most effective search tactics and capabilities.

(B) A buffer zone of a 5,100-yard (4,663-m) radius would be established around the intended target zone. The exercises would be conducted only if the buffer zone is clear of sighted marine mammals and sea turtles.

(C) If surface vessels are involved, lookouts would survey for Sargassum rafts, which may be inhabited by immature sea turtles. Ordnance would not be targeted to impact within 5,100 yards (4,663 m) of known or observed Sargassum rafts or coral reefs.

(D) At-sea BOMBEXs using live ordnance will occur during daylight hours only.

Monitoring Measures

In order to issue an ITA for an activity, Section 101(a)(5)(A) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking''. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for LOAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present.

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

(1) An increase in the probability of detecting marine mammals, both within the safety zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the effects analyses.

(2) An increase in our understanding of how many marine mammals are likely to be exposed to levels of underwater detonations or other stimuli that we associate with specific adverse effects, such as behavioral harassment, TTS, or PTS.

(3) An increase in our understanding of how marine mammals respond (behaviorally or physiologically) to underwater detonations or other stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival).

(4) An increased knowledge of the affected species.

(5) An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

(6) A better understanding and record of the manner in which the authorized entity complies with the incidental take authorization.

Proposed Monitoring Plan for the GOMEX Range Complex

The Navy has provided NMFS with a copy of the draft GOMEX Range Complex Monitoring Plan. Additionally, NMFS and the Navy have incorporated a suggestion from the public, which recommended the Navy hold a peer review workshop to discuss the Navy's Monitoring Plans for the multiple range complexes and training exercises in which the Navy would receive ITAs.

The Navy must notify NMFS immediately (or as soon as clearance procedures allow) if the specified activity is thought to have resulted in the mortality or injury of any marine mammals, or in any take of marine mammals not identified in this document.

The Navy must conduct all monitoring and/or research required under the Letter of Authorization, if issued.

With input from NMFS, a summary of the monitoring methods required for use during training events in the GOMEX Range Complex are described below. These methods include a combination of individual elements that are designed to allow a comprehensive assessment.

I. Vessel or Aerial Surveys

(A) The Navy shall visually survey a minimum of 1 explosive event per year. If possible, the event surveyed will be one involving multiple detonations. One of the vessel or aerial surveys should involve professionally trained marine mammal observers (MMOs).

(B) When operationally feasible, for specified training events, aerial or vessel surveys shall be used 1–2 days prior to, during (if reasonably safe), and 1–5 days post detonation.

(C) Surveys shall include any specified exclusion zone around a particular detonation point plus 2,000 yards beyond the border of the exclusion zone (*i.e.*, the circumference of the area from the border of the exclusion zone extending 2,000 yards outwards). For vessel-based surveys a passive acoustic system (hydrophone or towed array) could be used to determine if marine mammals are in the area before and/or after a detonation event.

(D) When conducting a particular survey, the survey team shall collect:

• Location of sighting;
• Species (if not possible, indicate whale, dolphin or pinniped);
• Number of individuals;
• Whether calves were observed;
• Initial detection sensor;
• Length of time observers maintained visual contact with marine mammal;
• Wave height;
• Visibility;
• Whether sighting was before, during, or after detonations/exercise, and how many minutes before or after;
• Distance of marine mammal from actual detonations (or target spot if not yet detonated);
• Observed behavior—Watchstanders will report, in plain language and without trying to categorize in any way, the observed behavior of the animal(s) (such as animal closing to bow ride, paralleling course/speed, floating on surface and not swimming *etc.*), including speed and direction;
• Resulting mitigation implementation—Indicate whether explosive detonations were delayed, ceased, modified, or not modified due to marine mammal presence and for how long; and
• If observation occurs while explosives are detonating in the water, indicate munitions type in use at time of marine mammal detection (*e.g.*, were the 5-inch guns actually firing when the animals were sighted? Did animals enter an area 2 minutes after a huge explosion went off?).

II. Passive Acoustic Monitoring

The Navy is required to conduct passive acoustic monitoring when operationally feasible.

(A) Any time a towed hydrophone array is employed during shipboard surveys the towed array shall be deployed during daylight hours for each of the days the ship is at sea.

(B) The towed hydrophone array shall be used to supplement the ship-based systematic line-transect surveys (particularly for species such as beaked whales that are rarely seen).

III. Marine Mammal Observers on Navy Platforms

(A) MMOs selected for aerial or vessel surveys shall be placed on a Navy platform during one of the exercises being monitored per year. The remaining designated exercise(s) shall be monitored by the Navy lookouts/watchstanders.

(B) The MMO must possess expertise in species identification of regional marine mammal species and experience collecting behavioral data.

(C) MMOs shall not be placed aboard Navy platforms for every Navy training event or major exercise, but during specifically identified opportunities deemed appropriate for data collection efforts. The events selected for MMO participation shall take into account safety, logistics, and operational concerns.

(D) MMOs shall observe from the same height above water as the lookouts.

(E) The MMOs shall not be part of the Navy's formal reporting chain of command during their data collection efforts; Navy lookouts shall continue to serve as the primary reporting means within the Navy chain of command for marine mammal sightings. The only exception is that if an animal is observed within the shutdown zone that has not been observed by the lookout, the MMO shall inform the lookout of the sighting, and the lookout shall take the appropriate action through the chain of command.

(F) The MMOs shall collect species identification, behavior, direction of travel relative to the Navy platform, and distance first observed. All MMO sightings shall be conducted according to a standard operating procedure. Information collected by MMOs should be the same as those collected by Navy lookout/watchstanders described above.

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

(A) What are the behavioral responses of marine mammals that are exposed to explosives?

(B) Is the Navy's suite of mitigation measures effective at avoiding injury and mortality of marine mammals?

Data gathered in these studies will be collected by qualified, professional marine mammal biologists or trained Navy lookouts/watchstanders that are experts in their field. This monitoring plan has been designed to gather data on all species of marine mammals that are observed in the GOMEX Range Complex study area.

Monitoring Workshop

During the public comment period on past proposed rules for Navy actions (such as the Hawaii Range Complex (HRC) and Southern California Range Complex (SOCAL) proposed rules), NMFS received a recommendation that a workshop or panel be convened to solicit input on the monitoring plan from researchers, experts, and other interested parties. The GOMEX Range Complex proposed rule included an adaptive management component and both NMFS and the Navy believe that a workshop would provide a means for Navy and NMFS to consider input from participants in determining whether (and if so, how) to modify monitoring techniques to more effectively accomplish the goals of monitoring set forth earlier in the document. NMFS and the Navy believe that this workshop concept is valuable in relation to all of the Range Complexes and major training exercise rules and LOAs that NMFS is working on with the Navy at this time. Consequently, NMFS has determined that this single Monitoring Workshop will be included as a component of all of the rules and LOAs that NMFS will be processing for the Navy in the next year or so.

The Navy, with guidance and support from NMFS, will convene a Monitoring Workshop, including marine mammal and acoustic experts as well as other interested parties, in 2011. The Monitoring Workshop participants will review the monitoring results from the previous two years of monitoring pursuant to the GOMEX Range Complex rule as well as monitoring results from other Navy rules and LOAs (*e.g.*, VACAPES, AFAST, SOCAL, HRC, and other rules). The Monitoring Workshop participants would provide their individual recommendations to the Navy and NMFS on the monitoring plan(s) after also considering the current science (including Navy research and development) and working within the framework of available resources and feasibility of implementation. NMFS and the Navy would then analyze the input from the Monitoring Workshop participants and determine the best way forward from a national perspective. Subsequent to the Monitoring Workshop, modifications would be applied to monitoring plans as appropriate.

Integrated Comprehensive Monitoring Program

In addition to the site-specific Monitoring Plan for the GOMEX Range Complex, the Navy will complete the Integrated Comprehensive Monitoring Program (ICMP) Plan by the end of 2009. The ICMP is currently in development by the Navy, with Chief of Naval Operations Environmental Readiness Division (CNO-N45) having the lead. The program does not duplicate the monitoring plans for individual areas (*e.g.*, AFAST, HRC, SOCAL, VACAPES); instead it is intended to provide the overarching coordination that will support compilation of data from both range-specific monitoring plans as well as Navy funded research and development (R&D) studies. The ICMP will coordinate the monitoring programs' progress towards meeting its goals and develop a data management plan. A program review board is also being considered to provide additional guidance. The ICMP will be evaluated annually to provide a matrix for progress and goals for the following year, and will make recommendations on adaptive management for refinement and analysis of the monitoring methods.

The primary objectives of the ICMP are to:

• Monitor and assess the effects of Navy activities on protected species;

• Ensure that data collected at multiple locations is collected in a manner that allows comparison between and among different geographic locations;

• Assess the efficacy and practicality of the monitoring and mitigation techniques;

• Add to the overall knowledge-base of marine species and the effects of Navy activities on marine species.

The ICMP will be used both as: (1) a planning tool to focus Navy monitoring priorities (pursuant to ESA/MMPA requirements) across Navy Range Complexes and Exercises; and (2) an adaptive management tool, through the consolidation and analysis of the Navy's monitoring and watchstander data, as well as new information from other Navy programs (*e.g.*, R&D), and other appropriate newly published information.

In combination with the 2011 Monitoring Workshop and the adaptive management component of the GOMEX Range Complex rule and the other Navy rules (*e.g.* VACAPES Range Complex, Jacksonville Range Complex, *etc.*), the ICMP could potentially provide a framework for restructuring the monitoring plans and allocating monitoring effort based on the value of particular specific monitoring proposals (in terms of the degree to which results would likely contribute to stated monitoring goals, as well the likely technical success of the monitoring based on a review of past monitoring results) that have been developed through the ICMP framework, instead of allocating based on maintaining an equal (or commensurate to effects) distribution of monitoring effort across range complexes. For example, if careful prioritization and planning through the ICMP (which would include a review of both past monitoring results and current scientific developments) were to show that a large, intense monitoring effort in Hawaii would likely provide extensive, robust and much-needed data that could be used to understand the effects of sonar throughout different geographical areas, it may be appropriate to have other range complexes dedicate money, resources, or staff to the specific monitoring proposal identified as ''high priority'' by the Navy and NMFS, in lieu of focusing on smaller, lower priority projects divided throughout their home range complexes.

The ICMP will identify:

• A means by which NMFS and the Navy would jointly consider prior years' monitoring results and advancing science to determine if modifications are needed in mitigation or monitoring measures to better effect the goals laid out in the Mitigation and Monitoring sections of the GOMEX Range Complex rule.

• Guidelines for prioritizing monitoring projects.

• If, as a result of the workshop and similar to the example described in the paragraph above, the Navy and NMFS decide it is appropriate to restructure the monitoring plans for multiple ranges such that they are no longer evenly allocated (by rule), but rather focused on priority monitoring projects that are not necessarily tied to the geographic area addressed in the rule, the ICMP will be modified to include a very clear and unclassified recordkeeping system that will allow NMFS and the public to see how each range complex/project is contributing to all of the ongoing monitoring programs (resources, effort, money, *etc.*).

Adaptive Management

NMFS proposes to include an adaptive management component in the final regulations governing the take of marine mammals incidental to Navy training exercises in the GOMEX Range Complex. The use of adaptive management will give NMFS the ability to consider new data from different sources to determine (in coordination with the Navy) on an annual basis if mitigation or monitoring measures should be modified or added (or deleted) if new data suggests that such modifications are appropriate (or are not appropriate) for subsequent annual LOAs, if issued.

The following are some of the possible sources of applicable data:

• Results from the Navy's monitoring from the previous year (either from GOMEX Range Complex or other locations).

• Findings of the Workshop that the Navy will convene in 2011 to analyze monitoring results to date, review current science, and recommend modifications, as appropriate to the monitoring protocols to increase monitoring effectiveness.

• Compiled results of Navy funded research and development (R&D) studies (presented pursuant to the ICMP, which is discussed elsewhere in this document).

• Results from specific stranding investigations (either from GOMEX Range Complex or other locations).

• Results from general marine mammal and sound research (funded by the Navy or otherwise).

• Any information which reveals that marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent Letters of Authorization.

Mitigation measures could be modified or added (or deleted) if new data suggests that such modifications would have (or do not have) a reasonable likelihood of accomplishing the goals of mitigation laid out in this proposed rule and if the measures are practicable. NMFS would also coordinate with the Navy to modify or add to (or delete) the existing monitoring requirements if the new data suggest that the addition of (or deletion of) a particular measure would more effectively accomplish the goals of monitoring laid out in this proposed rule. The reporting requirements associated with this rule are designed to provide NMFS with monitoring data from the previous year to allow NMFS to consider the data and issue annual LOAs. NMFS and the Navy will meet annually, prior to LOA issuance, to discuss the monitoring reports, Navy R&D developments, and current science and whether mitigation or monitoring modifications are appropriate.

Reporting Measures

In order to issue an ITA for an activity, Section 101(a)(5)(A) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking''. Effective reporting is critical to ensure compliance with the terms and conditions of a LOA, and to provide NMFS and the Navy with data of the highest quality based on the required monitoring. As NMFS noted in its proposed rule, additional detail has been added to the reporting requirements since they were outlined in the proposed rule. The updated reporting requirements are all included below. A subset of the information provided in the monitoring reports may be classified and not releasable to the public.

NMFS will work with the Navy to develop tables that allow for efficient submission of the information required below.

General Notification of Injured or Dead Marine Mammals

Navy personnel will ensure that NMFS (regional stranding coordinator) is notified immediately (or as soon as operational security allows) if an injured or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training exercise utilizing underwater explosive detonations or other activities. The Navy will provide NMFS with species or description of the animal(s), the condition of the animal(s) (including carcass condition if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

Annual GOMEX Range Complex Monitoring Plan Report

The Navy shall submit a report annually on November 1 describing the implementation and results (through September 1 of the same year) of the GOMEX Range Complex Monitoring Plan, described above. Data collection methods will be standardized across range complexes to allow for comparison in different geographic locations. Although additional information will also be gathered, the MMOs collecting marine mammal data pursuant to the GOMEX Range Complex Monitoring Plan shall, at a minimum, provide the same marine mammal observation data required in major range complex training exercises section of the Annual GOMEX Range Complex Exercise Report referenced below.

The GOMEX Range Complex Monitoring Plan Report may be provided to NMFS within a larger report that includes the required Monitoring Plan Reports from multiple Range Complexes.

Annual GOMEX Range Complex Exercise Report

The Navy is in the process of improving the methods used to track explosives used to provide increased granularity. The Navy will provide the information described below for all of their explosive exercises. Until the Navy is able to report in full the information below, they will provide an annual update on the Navy's explosive tracking methods, including improvements from the previous year.

(i) Total annual number of each type of explosive exercise (of those identified as part of the ''specified activity'' in this final rule) conducted in the GOMEX Range Complex.

(ii) Total annual expended/detonated rounds (missiles, bombs, etc.) for each explosive type.

GOMEX Range Complex 5-yr Comprehensive Report

The Navy shall submit to NMFS a draft report that analyzes and summarizes all of the multi-year marine mammal information gathered during the GOMEX Range Complex exercises for which annual reports are required (Annual GOMEX Range Complex Exercise Reports and GOMEX Range Complex Monitoring Plan Reports). This report will be submitted at the end of the fourth year of the rule (March 2014), covering activities that have occurred through September 1, 2013.

Estimated Take of Marine Mammals

With respect to the MMPA, NMFS' effects assessment serves four primary purposes: (1) To prescribe the permissible methods of taking (*i.e.*, Level B Harassment (behavioral harassment), Level A harassment (injury), or mortality, including an identification of the number and types of take that could occur by Level A or B harassment or mortality) and to prescribe other means of affecting the least practicable adverse impact on such species or stock and its habitat (*i.e.*, mitigation); (2) to determine whether the specified activity will have a negligible impact on the affected species or stocks of marine mammals (based on the likelihood that the activity will adversely affect the species or stock through effects on annual rates of recruitment or survival); (3) to determine whether the specified activity will have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (however, there are no subsistence communities that would be affected in the GOMEX Range Complex, so this determination is inapplicable for this rulemaking); and (4) to prescribe requirements pertaining to monitoring and reporting.

In the *Assessment of Marine Mammal Response to Anthropogenic Sound* section, NMFS' analysis identified the lethal responses, physical trauma, sensory impairment (permanent and temporary threshold shifts and acoustic masking), physiological responses (particular stress responses), and behavioral responses that could potentially result from explosive ordnance exposures. In this section, we will relate the potential effects to marine mammals from underwater detonation of explosives to the MMPA regulatory definitions of Level A and Level B Harassment and attempt to quantify the effects that might occur from the specific training activities that the Navy is proposing in the GOMEX Range Complex.

Take Calculations

In estimating the potential for marine mammals to be exposed to an acoustic source, the Navy completed the following actions:

(1) Evaluated potential effects within the context of existing and current regulations, thresholds, and criteria;

(2) Identified all acoustic sources that will be used during Navy training activities;

(3) Identified the location, season, and duration of the action to determine which marine mammal species are likely to be present;

(4) Determined the estimated number of marine mammals (*i.e.*, density) of each species that will likely be present in the respective OPAREAs during the Navy training activities;

(5) Applied the applicable acoustic threshold criteria to the predicted sound exposures from the proposed activity. The results were then evaluated to

determine whether the predicted sound exposures from the acoustic model might be considered harassment; and

(6) Considered potential harassment within the context of the affected marine mammal population, stock, and species to assess potential population viability. Particular focus on recruitment and survival are provided to analyze whether the effects of the action can be considered to have a negligible impact on marine mammal species or stocks.

Starting with a sound source, the attenuation of an emitted sound due to propagation loss is determined. Uniform animal distribution is overlaid onto the calculated sound fields to assess if animals are physically present at sufficient received sound levels to be considered ''exposed'' to the sound. If the animal is determined to be exposed, two possible scenarios must be considered with respect to the animal's physiology—effects on the auditory system and effects on non-auditory system tissues. These are not independent pathways and both must be considered since the same sound could affect both auditory and non-auditory tissues. Note that the model does not account for any animal response; rather the animals are considered stationary, accumulating energy until the threshold is tripped.

These modeling results do not take into account the mitigation measures (detailed in the Mitigation Measure section above) that lower the potential for exposures to occur given standard range clearance procedures and the likelihood that these species can be readily detected (*e.g.*, small animals move quickly throughout the water column and are often seen riding the bow wave of large ships or in large groups). Nevertheless, based on the modeling results, 2 Atlantic spotted dolphins, 19 bottlenose dolphins, 6 Clymene dolphins, 2 melon-headed whales, 26 pantropical spotted dolphins, 2 Risso's dolphins, 27 spinner dolphins, and 8 striped dolphins would be taken by Level B harassment (sub-TTS and TTS) as a result of the Navy training activities in the GOMEX Range Complex. In addition, 1 individual each of pantropical spotted dolphin and spinner dolphin would be taken by Level A harassment (injury). Please refer to Table 6 for a detailed list of marine mammals that would be taken as a result of the proposed Navy training activities within the GOMEX Range Complex. NMFS does not believe that there would be any mortality of any marine mammal resulting from the proposed training activities due to the sparse training activities and the implementation of mitigation and monitoring measures described above. Therefore, mortality of marine mammals would not be authorized. With the mitigation and monitoring measures implemented, the estimated take could be further reduced.

Effects on Marine Mammal Habitat

Marine mammal habitat and prey species could be affected by the explosive ordnance testing and the sound generated by such activities. Based on the analysis contained in the Navy's DEIS and the information below, NMFS has determined that the GOMEX Range Complex training activities will not have adverse or long-term impacts on marine mammal habitat or prey species.

Unless the sound source or explosive detonation is stationary and/or continuous over a long duration in one area, the effects of underwater detonation and its associated sound are generally considered to have a less severe impact on marine mammal habitat than the physical alteration of the habitat. Marine mammals may be temporarily displaced from areas where Navy training is occurring, but the area will be utilized again after the activities have ceased.

Effects on Food Resources

There are currently no well-established thresholds for estimating effects to fish from explosives other than mortality models. Fish that are located in the water column, in proximity to the source of detonation could be injured, killed, or disturbed by the impulsive sound and could leave the area temporarily. Continental Shelf Inc. (2004) summarized a few studies conducted to determine effects associated with removal of offshore structures (*e.g.*, oil rigs) in the Gulf of Mexico. Their findings revealed that at very close range, underwater explosions are lethal to most fish species regardless of size, shape, or internal anatomy. In most situations, cause of death in fish has been massive organ and tissue damage and internal bleeding. At longer range, species with gas-filled swimbladders (*e.g.*, snapper, cod, and striped bass) are more susceptible than those without swimbladders (*e.g.*, flounders, eels).

Studies also suggest that larger fish are generally less susceptible to death or injury than small fish. Moreover, elongated forms that are round in cross section are less at risk than deep-bodied forms. Orientation of fish relative to the shock wave may also affect the extent of injury. Open water pelagic fish (*e.g.*, mackerel) seem to be less affected than reef fishes. The results of most studies are dependent upon specific biological, environmental, explosive, and data recording factors.

The huge variation in fish populations, including numbers, species, sizes, and orientation and range from the detonation point, makes it very difficult to accurately predict mortalities at any specific site of detonation. A total of 7 hours explosive detonation events, with each event lasting for approximately 1 hour, are widely dispersed in two locations within the large GOMEX study area over the seasons for each year. Most fish species experience a large number of natural mortalities, especially during early life-stages, and any small level of mortality caused by the GOMEX Range Complex training exercises involving explosives will likely be insignificant to the population as a whole.

Therefore, potential impacts to marine mammal food resources within the GOMEX Range Complex are expected to be minimal given both the very geographic and spatially limited scope of most Navy at-sea activities including underwater detonations, and the high biological productivity of these resources. No short or long term effects to marine mammal food resources from Navy activities are anticipated within the GOMEX Range Complex.

Analysis and Negligible Impact Determination

Pursuant to NMFS' regulations implementing the MMPA, an applicant is required to estimate the number of animals that will be ''taken'' by the specified activities (*i.e.*, takes by harassment only, or takes by harassment, injury, and/or death). This estimate informs the analysis that NMFS must perform to determine whether the activity will have a ''negligible impact'' on the species or stock. Level B (behavioral) harassment occurs at the level of the individual(s) and does not assume any resulting population-level consequences, though there are known avenues through which behavioral disturbance of individuals can result in population-level effects. A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of Level B harassment takes alone, is not enough information on which to base an impact determination.

In addition to considering estimates of the number of marine mammals that might be ''taken'' through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, *etc.*), the context of any responses (critical reproductive time or location, migration, *etc.*), as well as the number and nature of estimated Level A takes, the number of estimated mortalities, and effects on habitat.

The Navy's specified activities have been described based on best estimates of the planned detonation events the Navy would conduct for the proposed GOMEX Range Complex training activities. The events are generally short in duration, with each of the seven annual events lasting for about 1 hour. Taking the above into account, along with the fact that NMFS anticipates no mortalities (and few injuries) to result from the action, the fact that there are no specific areas of reproductive importance for marine mammals recognized within the GOMEX Range Complex, the sections discussed below, and dependent upon the implementation of the proposed mitigation measures, NMFS has determined that Navy training exercises utilizing underwater detonations will have a negligible impact on the affected marine mammal species and stocks present in the GOMEX Range Complex Study Area.

NMFS' analysis of potential behavioral harassment, temporary threshold shifts, permanent threshold shifts, injury, and mortality to marine mammals as a result of the GOMEX Range Complex training activities was provided earlier in this proposed rule and is analyzed in more detail below.

Behavioral Harassment

The Navy plans a total of 1 BOMBEX training event (with 4 bombs in succession for 1 hour) and 6 small arms training events (with 20 live grenades for each 1-hour event) annually. The total training exercises proposed by the Navy in the GOMEX Range Complex amount to approximately 7 hours per year. These detonation events are widely dispersed in two of the designated sites within the GOMEX Range Complex Study Area. The probability that detonation events will overlap in time and space with marine mammals is low, particularly given the densities of marine mammals in the GOMEX Range Complex Study Area and the implementation of monitoring and mitigation measures. Moreover, NMFS does not expect animals to experience repeat exposures to the same sound source as animals will likely move away from the source after being exposed. In addition, these isolated exposures, when received at distances of Level B behavioral harassment (*i.e.*, 177 dB re 1 microPa^2-sec), are expected to cause brief startle reactions or short-term behavioral modification by the animals. These brief reactions and behavioral changes are expected to disappear when the exposures cease. Therefore, these levels of received impulse noise from detonation are not expected to affect annual rates or recruitment or survival.

TTS

NMFS and the Navy have estimated that individuals of some species of marine mammals may sustain some level of temporarily threshold shift TTS from underwater detonations. TTS can last from a few minutes to days, be of varying degree, and occur across various frequency bandwidths. The TTS sustained by an animal is primarily classified by three characteristics:

- Frequency—Available data (of mid-frequency hearing specialists exposed to mid- to high-frequency sounds—Southall *et al.*, 2007) suggest that most TTS occurs in the frequency range of the source up to one octave higher than the source (with the maximum TTS at ½-octave above).
- Degree of the shift (*i.e.*, how many dB is the sensitivity of the hearing reduced by)—generally, both the degree of TTS and the duration of TTS will be greater if the marine mammal is exposed to a higher level of energy (which would occur when the peak dB level is higher or the duration is longer). Since the impulse from detonation is extremely brief, an animal would have to approach very close to the detonation site to increase the received SEL. The threshold for the onset of TTS for detonations is a dual criteria: 182 dB re 1 microPa^2-sec or 23 psi, which might be received at distances from 345–2,863 m from the centers of detonation based on the types of NEW involved to receive the SEL that causes TTS compared to similar source level with longer durations (such as sonar signals).
- Duration of TTS (Recovery time)—Of all TTS laboratory studies, some using exposures of almost an hour in duration or up to 217 SEL, almost all recovered within 1 day (or less, often in minutes), though in one study (Finneran *et al.*, 2007), recovery took 4 days.
- Although the degree of TTS depends on the received noise levels and exposure time, all studies show that TTS is reversible and animals' sensitivity is expected to recover fully in minutes to hours. Therefore, NMFS expects that TTS would not affect annual rates of recruitment or survival.

Acoustic Masking or Communication Impairment

As discussed above, it is also possible that anthropogenic sound could result in masking of marine mammal communication and navigation signals. However, masking only occurs during the time of the signal (and potential secondary arrivals of indirect rays), versus TTS, which occurs continuously for its duration. Impulse sounds from underwater detonation are extremely brief and the majority of most animals' vocalizations would not be masked. Therefore, masking effects from underwater detonation are expected to be minimal and unlikely. If masking or communication impairment were to occur briefly, it would be in the frequency ranges below 100 Hz, which overlaps with some mysticete vocalizations; however, it would likely not mask the entirety of any particular vocalization or communication series because of the short impulse.

PTS, Injury, or Mortality

The Navy's model estimated that 1 pantropical spotted dolphin and 1 spinner dolphin could experience 50-percent tympanic membrane rupture or slight lung injury (Level A harassment) as a result of the training activities utilizing underwater detonation by BOMBEX in the GOMEX Range Complex Study Area. However, these estimates do not take into consideration the proposed mitigation and monitoring measures. For underwater detonations, the animals have to be within an area between certain injury zones of influence (ZOI) to experience Level A harassment. Such injury ZOI varies from 0.09 km^2 to 4.98 km^2 (or at distances between 169 m to 1,259 m from the center of detonation) depending on the types of munition used and the season of the action. Though it is possible that Navy observers could fail to detect an animal at a distance of more than 1 km (an injury ZOI during BOMBEX, which is planned to have 1 event annually), all injury ZOIs from small arms trainings are smaller than 0.1 km^2 (178 m in radius) and NMFS believes it is unlikely that any marine mammal could be detected by lookouts/watchstanders or MMOs. As discussed previously, the Navy plans to utilize aerial or vessel surveys to detect marine mammals for mitigation implementation and indicated that they are capable of effectively monitoring safety zones.

Based on these assessments, NMFS determined that approximately 2 Atlantic spotted dolphins, 19 bottlenose dolphins, 6 Clymene dolphins, 2 melon-headed whales, 26 pantropical spotted dolphins, 2 Risso's dolphins, 27 spinner dolphins, and 8 striped dolphins could be affected by Level B harassment (TTS and sub-TTS) as a result of the proposed GOMEX Range Complex training activities. These numbers represent approximately 0.01%, 0.51%, 0.09%, 0.09%, 0.08%, 0.13%, 1.36%, and 0.24% of Atlantic spotted dolphins, bottlenose dolphins (Gulf of Mexico oceanic stock), Clymene dolphins, melon-headed whales, pantropical spotted dolphins, Risso's dolphins, spinner dolphins, and striped dolphins, respectively, in the vicinity of the proposed GOMEX Range Complex Study Area (calculation based on NMFS 2007 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment).

In addition, the Level A takes of 1 pantropical spotted dolphin and 1 spinner dolphin represent 0.0029% and 0.0503% of these species, respectively, in the vicinity of the proposed GOMEX Range Complex Study Area (calculation based on NMFS 2007 U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment). Given these very small percentages, NMFS does not expect there to be any long-term adverse effect on the populations of the aforementioned dolphin species. No marine mammals are expected to be killed as a result of these activities.

Additionally, the aforementioned take estimates do not account for the implementation of mitigation measures. With the implementation of mitigation and monitoring measures, NMFS expects that the takes would be reduced further. Coupled with the fact that these impacts will likely not occur in areas and times critical to reproduction, NMFS has preliminarily determined that the total taking over the 5-year period of the regulations and subsequent LOAs from the Navy's GOMEX Range Complex training activities will have a negligible impact on the marine mammal species and stocks present in the GOMEX Range Complex Study Area.

Subsistence Harvest of Marine Mammals

NMFS has preliminarily determined that the issuance of 5-year regulations and subsequent LOAs (as warranted) for Navy training exercises in the GOMEX Range Complex would not have an unmitigable adverse impact on the availability of the affected species or stocks for subsistence use since there are no such uses in the specified area.

ESA

There are six ESA-listed marine mammal species that are listed as endangered under the ESA with confirmed or possible occurrence in the GOMEX Range Complex: humpback whale, North Atlantic right whale, fin whale, blue whale, sei whale, and sperm whale. The Navy has begun consultation with NMFS pursuant to section 7 of the ESA, and NMFS will also consult internally on the issuance of an LOA under section 101(a)(5)(A) of the MMPA for training exercises in the GOMEX Range Complex. Consultation will be concluded prior to a determination on the issuance of the final rule and an LOA.

NEPA

The Navy is preparing an Environmental Impact Statement (EIS) for the proposed GOMEX Range Complex training activities. A draft EIS was released in November 2008 and it is available at *http://www.gomexrangecomplexeis.com/.* NMFS is a cooperating agency (as defined by the Council on Environmental Quality (40 CFR 1501.6)) in the preparation of the EIS. NMFS has reviewed the Draft EIS and will be working with the Navy on the Final EIS (FEIS).

NMFS intends to adopt the Navy's FEIS, if adequate and appropriate, and we believe that the Navy's FEIS will allow NMFS to meet its responsibilities under NEPA for the issuance of the 5-year regulation and LOAs for training activities in the GOMEX Range Complex. If the Navy's FEIS is not adequate, NMFS will supplement the existing analysis and documents to ensure that we comply with NEPA prior to the issuance of the final rule or LOA.

Preliminary Determination

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat and dependent upon the implementation of the mitigation measures, NMFS preliminarily finds that the total taking from Navy training exercises utilizing underwater explosives in the GOMEX Range Complex will have a negligible impact on the affected marine mammal species or stocks. NMFS has proposed regulations for these exercises that prescribe the means of affecting the least practicable adverse impact on marine mammals and their habitat and set forth requirements pertaining to the monitoring and reporting of that taking.

Classification

This action does not contain a collection of information requirement for purposes of the Paperwork Reduction Act.

This proposed rule has been determined to be not significant for purposes of Executive Order 12866.

Pursuant to the Regulatory Flexibility Act, the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this rule, if adopted, would not have a significant economic impact on a substantial number of small entities. The Regulatory Flexibility Act requires Federal agencies to prepare an analysis of a rule's impact on small entities whenever the agency is required to publish a notice of proposed rulemaking. However, a Federal agency may certify, pursuant to 5 U.S.C. Section 605 (b), that the action will not have a significant economic impact on a substantial number of small entities. The Navy is the entity that will be affected by this rulemaking, not a small governmental jurisdiction, small organization or small business, as defined by the Regulatory Flexibility Act. This rulemaking authorizes the take of marine mammals incidental to a specified activity. The specified activity defined in the proposed rule includes the use of underwater detonations during training activities that are only conducted by the U.S. Navy. Additionally, the proposed regulations are specifically written for ''military readiness'' activities, as defined by the NDAA, which means they cannot apply to small businesses. Consequently, any requirements imposed by a Letter of Authorization issued pursuant to these regulations, and any monitoring or reporting requirements imposed by these regulations, will be applicable only to the Navy. Because this action, if adopted, would directly affect the Navy and not a small entity, NMFS concludes the action would not result in a significant economic impact on a substantial number of small entities. As a result, an initial regulatory flexibility analysis is not required and none has been prepared.

List of Subjects in 50 CFR Part 218

Exports, Fish, Imports, Incidental take, Indians, Labeling, Marine mammals, Navy, Penalties, Reporting and recordkeeping requirements, Seafood, Sonar, Transportation.

Dated: July 7, 2009.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 218 is proposed to be amended as follows:

PART 218—REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

1. The authority citation for part 218 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.*

2. Subpart D is added to part 218 to read as follows:

Subpart D—Taking Marine Mammals Incidental to U.S. Navy Training in the Gulf of Mexico Range Complex (GOMEX Range Complex)

Subpart D—Taking Marine Mammals Incidental to U.S. Navy Training in the Gulf of Mexico Range Complex (GOMEX Range Complex)

§ 218.30 Specified activity and specified geographical area.

(a) Regulations in this subpart apply only to the U.S. Navy for the taking of marine mammals that occurs in the area outlined in paragraph (b) of this section and that occur incidental to the activities described in paragraph (c) of this section.

(b) The taking of marine mammals by the Navy is only authorized if it occurs within the GOMEX Range Complex Operation Areas (OPAREAs), which is located along the southern east coast of the U.S. described in Figures 1 and 2 of the LOA application and consist of the BOMBEX Hotbox (surface and subsurface waters) and underwater detonation (UNDET) Area E3 (surface and subsurface waters), located within the territorial waters off Padre Island, Texas, near Corpus Christi NAS.

(1) The northernmost boundary of the BOMBEX Hotbox is located 23 nm (42.6 km) from the coast of the Florida panhandle at latitude 30° N, the eastern boundary is approximately 200 nm (370.4 km) from the coast of the Florida peninsula at longitude 86°48′ W.

(2) The UNDET Area E3 is a defined surface and subsurface area located in the waters south of Corpus Christi NAS and offshore of Padre Island, Texas. The westernmost boundary is located 7.5 nm (13.9 km) from the coast of Padre Island at 97°9′33′ W and 27°24′26″ N at the westernmost corner. It lies entirely within the territorial waters (0 to 12 nm, or 0 to 22.2 km) of the U.S. and the majority of it lies within Texas state waters (0 to 9 nm, or 0 to 16.7 km). It is a very shallow water training area with depths ranging from 20 to 26 m.

(c) The taking of marine mammals by the Navy is only authorized if it occurs incidental to the following activities within the designated amounts of use:

(1) The detonation of the underwater explosives indicated in paragraph (c)(1)(i) of this section conducted as part of the training events indicated in paragraph (c)(1)(ii) of this section:

(i) Underwater Explosives:

(A) MK–83 (1,000 lb High Explosive bomb);

(B) MK3A2 anti-swimmer concussion grenades (0.5 lbs NEW).

(ii) Training Events:

(A) BOMBEX (Air-to-Surface)—up to 5 events over the course of 5 years (an average of 1 event per year, with 4 bombs in succession for each event);

(B) Small Arms Training with MK3A2 anti-swimmer concussion grenade—up to 30 events over the course of 5 years (an average 6 events per year, with 20 live grenades used for each event).

(2) [Reserved]

§ 218.31 Permissible methods of taking.

(a) Under Letters of Authorization issued pursuant to § 216.106 of this chapter and § 218.36, the Holder of the Letter of Authorization may incidentally, but not intentionally, take marine mammals within the area described in § 218.30(b), provided the activity is in compliance with all terms, conditions, and requirements of this subpart and the appropriate Letter of Authorization.

(b) The activities identified in § 218.30(c) must be conducted in a manner that minimizes, to the greatest extent practicable, any adverse impacts on marine mammals and their habitat.

(c) The incidental take of marine mammals under the activities identified in § 218.30(c) is limited to the following species, by the indicated method of take and the indicated number of times:

(1) Level B Harassment:

(i) Bottlenose dolphin (*Tursiops truncatus*)—95 (an average of 19 annually);

(ii) Pantropical spotted dolphin (*Stenella attenuata*)—130 (an average of 26 annually);

(iii) Clymene dolphin (*S. clymene*)—30 (an average of 6 annually);

(iv) Atlantic spotted dolphin (*S. frontalis*)—10 (an average of 2 annually);

(v) Spinner dolphin (*S. longirostris*)—135 (an average of 27 annually);

(vi) Striped dolphin (*S. coeruleoalba*)—40 (an average of 8 annually);

(vii) Risso's dolphin (*Grampus griseus*)—10 (an average of 2 annually);

(viii) Melon-headed whales (*Peponocephala electra*)—10 (an average of 2 annually);

(2) Level A Harassment (injury):

(i) Pantropical spotted dolphin—5 (an average of 1 annually);

(ii) Spinner dolphin—5 (an average of 1 annually);

§ 218.32 Prohibitions.

Notwithstanding takings contemplated in § 218.31 and authorized by a Letter of Authorization issued under § 216.106 of this chapter and § 218.36, no person in connection with the activities described in § 218.30 may:

(a) Take any marine mammal not specified in § 218.31(c);

(b) Take any marine mammal specified in § 218.31(c) other than by incidental take as specified in § 218.31(c)(1) and (2);

(c) Take a marine mammal specified in § 218.31(c) if such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(d) Violate, or fail to comply with, the terms, conditions, and requirements of this Subpart or a Letter of Authorization issued under § 216.106 of this chapter and § 218.36.

§ 218.33 Mitigation.

(a) When conducting training activities identified in § 218.30(c), the mitigation measures contained in the Letter of Authorization issued under § 216.106 of this chapter and § 218.36 must be implemented. These mitigation measures include, but are not limited to:

(1) General Maritime Measures:

(i) Personnel Training—Lookouts:

(A) All bridge personnel, Commanding Officers, Executive Officers, officers standing watch on the bridge, maritime patrol aircraft aircrews, and Mine Warfare (MIW) helicopter crews shall complete Marine Species Awareness Training (MSAT).

(B) Navy lookouts shall undertake extensive training to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

(C) Lookout training shall include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, lookouts shall complete the Personal Qualification Standard Program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects).

(D) Lookouts shall be trained in the most effective means to ensure quick and effective communication within the command structure to facilitate implementation of protective measures if marine species are spotted.

(E) Surface lookouts shall scan the water from the ship to the horizon and be responsible for all contacts in their sector. In searching the assigned sector, the lookout shall always start at the forward part of the sector and search aft (toward the back). To search and scan, the lookout shall hold the binoculars steady so the horizon is in the top third of the field of vision and direct the eyes just below the horizon. The lookout shall scan for approximately five seconds in as many small steps as possible across the field seen through the binoculars. They shall search the entire sector in approximately five-degree steps, pausing between steps for approximately five seconds to scan the field of view. At the end of the sector search, the glasses shall be lowered to allow the eyes to rest for a few seconds, and then the lookout shall search back across the sector with the naked eye.

(F) At night, lookouts shall scan the horizon in a series of movements that would allow their eyes to come to periodic rests as they scan the sector. When visually searching at night, they shall look a little to one side and out of the corners of their eyes, paying attention to the things on the outer edges of their field of vision. Lookouts shall also have night vision devices available for use.

(ii) Operating Procedures & Collision Avoidance:

(A) Prior to major exercises, a Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order shall be issued to further disseminate the personnel training requirement and general marine species mitigation measures.

(B) Commanding Officers shall make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.

(C) While underway, surface vessels shall have at least two lookouts with binoculars; surfaced submarines shall have at least one lookout with binoculars. Lookouts already posted for safety of navigation and man-overboard precautions may be used to fill this requirement. As part of their regular duties, lookouts shall watch for and report to the OOD the presence of marine mammals.

(D) Personnel on lookout shall employ visual search procedures employing a scanning method in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

(E) After sunset and prior to sunrise, lookouts shall employ Night Lookouts Techniques in accordance with the Lookout Training Handbook (NAVEDTRA 12968–D).

(F) While in transit, naval vessels shall be alert at all times, use extreme caution, and proceed at a ''safe speed'' (the minimum speed at which mission goals or safety will not be compromised) so that the vessel can take proper and effective action to avoid a collision with any marine animal and can be stopped within a distance appropriate to the prevailing circumstances and conditions.

(G) When marine mammals have been sighted in the area, Navy vessels shall increase vigilance and implement measures to avoid collisions with marine mammals and avoid activities that might result in close interaction of naval assets and marine mammals. Such measures shall include changing speed and/or course direction and would be dictated by environmental and other conditions (*e.g.*, safety or weather).

(H) Naval vessels shall maneuver to keep at least 500 yds (460 m) away from any observed whale and avoid approaching whales head-on. This requirement does not apply if a vessel's safety is threatened, such as when change of course will create an imminent and serious threat to a person, vessel, or aircraft, and to the extent vessels are restricted in their ability to maneuver. Vessels shall take reasonable steps to alert other vessels in the vicinity of the whale.

(I) Where feasible and consistent with mission and safety, vessels shall avoid closing to within 200-yd (183 m) of marine mammals other than whales (whales addressed above).

(J) Navy aircraft participating in exercises at sea shall conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties. Marine mammal detections shall be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.

(K) All vessels shall maintain logs and records documenting training operations should they be required for event reconstruction purposes. Logs and records shall be kept for a period of 30 days following completion of a major training exercise.

(2) Coordination and Reporting Requirements:

(i) The Navy shall coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead, or floating marine mammals that may occur at any time during or within 24 hours after completion of training activities.

(ii) The Navy shall follow internal chain of command reporting procedures as promulgated through Navy instructions and orders.

(3) Proposed Mitigation Measures for Specific At-sea Training Events—If a marine mammal is injured or killed as a result of the proposed Navy training activities (*e.g.*, instances in which it is clear that munitions explosions caused death), the Navy shall suspend its activities immediately and report such incident to NMFS.

(i) Air-to-Surface At-Sea Bombing Exercises (250-lbs to 2,000-lbs explosive bombs):

(A) This activity shall only occur in W–155A/B (hot box) area of the GOMEX Range Complex OPAREA.

(B) Aircraft shall visually survey the target and buffer zone for marine mammals prior to and during the exercise. The survey of the impact area shall be made by flying at 1,500 ft (457 m) altitude or lower, if safe to do so, and at the slowest safe speed. Release of ordnance through cloud cover is prohibited; aircraft must be able to actually see ordnance impact areas.

(C) A buffer zone of a 5,100-yard (4,663-m) radius shall be established around the intended target zone. The exercises shall be conducted only if the buffer zone is clear of sighted marine mammals.

(D) At-sea BOMBEXs using live ordnance shall occur during daylight hours only.

(ii) Small Arms Training—Explosive hand grenades (such as the MK3A2 grenades):

(A) Lookouts shall visually survey for marine mammals prior to and during exercise.

(B) A 200-yd (182-m) radius buffer zone shall be established around the intended target. The exercises shall be conducted only if the buffer zone is clear of marine mammals.

(b) [Reserved]

§ 218.34 Requirements for monitoring and reporting.

(a) The Holder of the Letter of Authorization issued pursuant to § 216.106 of this chapter and § 218.36 for activities described in § 218.30(c) is required to cooperate with the NMFS when monitoring the impacts of the activity on marine mammals.

(b) The Holder of the Authorization must notify NMFS immediately (or as soon as clearance procedures allow) if the specified activity identified in § 218.30(c) is thought to have resulted in the mortality or serious injury of any marine mammals, or in any take of marine mammals not identified in § 218.31(c).

(c) The Navy must conduct all monitoring and required reporting under the Letter of Authorization, including abiding by the GOMEX Range Complex Monitoring Plan, which is incorporated herein by reference, and which requires the Navy to implement, at a minimum, the monitoring activities summarized below.

(1) Vessel or aerial surveys.

(i) The Holder of this Authorization shall visually survey a minimum of 1 explosive event per year. One of the vessel or aerial surveys should involve NMFS-approved marine mammal observers (MMOs). If it is impossible to conduct the required surveys due to lack of training exercises, the missed annual survey requirement shall roll into the subsequent year to ensure that the appropriate number of surveys (*i.e.*, total of five) occurs over the 5-year period of effectiveness of this subject.

(ii) When operationally feasible, for specified training events, aerial or vessel surveys shall be used 1–2 days prior to, during (if reasonably safe), and 1–5 days post detonation.

(iii) Surveys shall include any specified exclusion zone around a particular detonation point plus 2,000 yards beyond the border of the exclusion zone (*i.e.*, the circumference of the area from the border of the exclusion zone extending 2,000 yards outwards). For vessel based surveys a passive acoustic system (hydrophone or towed array) could be used to determine if marine mammals are in the area before and/or after a detonation event.

(iv) When conducting a particular survey, the survey team shall collect:

(A) Location of sighting;

(B) Species (if not possible, indicate whale, dolphin or pinniped);

(C) Number of individuals;

(D) Whether calves were observed;

(E) Initial detection sensor;

(F) Length of time observers maintained visual contact with marine mammal;

(G) Wave height;

(H) Visibility;

(I) Whether sighting was before, during, or after detonations/exercise, and how many minutes before or after;

(J) Distance of marine mammal from actual detonations (or target spot if not yet detonated);

(K) Observed behavior—Watchstanders shall report, in plain language and without trying to categorize in any way, the observed behavior of the animal(s) (such as animal closing to bow ride, paralleling course/speed, floating on surface and not swimming, *etc.*), including speed and direction;

(L) Resulting mitigation implementation—Indicate whether explosive detonations were delayed, ceased, modified, or not modified due to marine mammal presence and for how long; and

(M) If observation occurs while explosives are detonating in the water, indicate munitions type in use at time of marine mammal detection.

(2) Passive acoustic monitoring—the Navy shall conduct passive acoustic monitoring when operationally feasible.

(i) Any time a towed hydrophone array is employed during shipboard surveys the towed array shall be deployed during daylight hours for each of the days the ship is at sea.

(ii) The towed hydrophone array shall be used to supplement the ship-based systematic line-transect surveys (particularly for species such as beaked whales that are rarely seen).

(iii) The array should have the capability of detecting low frequency vocalizations (<1,000 Hz) for baleen whales and relatively high frequency (up to 30 kHz) for odontocetes. The use of two simultaneously deployed arrays can also allow more accurate localization and determination of diving patterns.

(3) Marine mammal observers on Navy platforms:

(i) As required in § 218.34(c)(1), MMOs who are selected for aerial or vessel surveys shall be placed on a Navy platform during one of the explosive exercises being monitored per year, the other designated exercise shall be monitored by the Navy lookouts/watchstanders.

(ii) The MMO must possess expertise in species identification of regional marine mammal species and experience collecting behavioral data.

(iii) MMOs shall not be placed aboard Navy platforms for every Navy training event or major exercise, but during specifically identified opportunities deemed appropriate for data collection efforts. The events selected for MMO participation shall take into account safety, logistics, and operational concerns.

(iv) MMOs shall observe from the same height above water as the lookouts.

(v) The MMOs shall not be part of the Navy's formal reporting chain of command during their data collection efforts; Navy lookouts shall continue to serve as the primary reporting means within the Navy chain of command for marine mammal sightings. The only exception is that if an animal is observed within the shutdown zone that has not been observed by the lookout, the MMO shall inform the lookout of the sighting and the lookout shall take the appropriate action through the chain of command.

(vi) The MMOs shall collect species identification, behavior, direction of travel relative to the Navy platform, and distance first observed. Information collected by MMOs should be the same as those collected by Navy lookout/watchstanders described in § 218.34(c)(1)(iv).

(d) The Navy shall complete an Integrated Comprehensive Monitoring Program (ICMP) Plan in 2009. This planning and adaptive management tool shall include:

(1) A method for prioritizing monitoring projects that clearly describes the characteristics of a proposal that factor into its priority.

(2) A method for annually reviewing, with NMFS, monitoring results, Navy R&D, and current science to use for potential modification of mitigation or monitoring methods.

(3) A detailed description of the Monitoring Workshop to be convened in 2011 and how and when Navy/NMFS will subsequently utilize the findings of the Monitoring Workshop to potentially modify subsequent monitoring and mitigation.

(4) An adaptive management plan,

(5) A method for standardizing data collection for GOMEX Range Complex and across range complexes,

(e) General Notification of Injured or Dead Marine Mammals—Navy personnel shall ensure that NMFS (regional stranding coordinator) is notified immediately (or as soon as clearance procedures allow) if an injured or dead marine mammal is found during or shortly after, and in the vicinity of, any Navy training exercise utilizing underwater explosive detonations. The Navy shall provide NMFS with species or description of the animal(s), the condition of the animal(s) (including carcass condition if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

(f) Annual GOMEX Range Complex Monitoring Plan Report—The Navy shall submit a report annually on November 1 describing the implementation and results (through September 1 of the same year) of the GOMEX Range Complex Monitoring Plan. Data collection methods shall be standardized across range complexes to allow for comparison in different geographic locations. Although additional information will also be gathered, the MMOs collecting marine mammal data pursuant to the GOMEX Range Complex Monitoring Plan shall, at a minimum, provide the same marine mammal observation data required in the data required in § 218.34(g). The GOMEX Range Complex Monitoring Plan Report may be provided to NMFS within a larger report that includes the required Monitoring Plan Reports from GOMEX Range Complex and multiple range complexes.

(g) Annual GOMEX Range Complex Exercise Report—The Navy shall provide the information described below for all of their explosive exercises. Until the Navy is able to report in full the information below, they shall provide an annual update on the Navy's explosive tracking methods, including improvements from the previous year.

(1) Total annual number of each type of explosive exercise (of those identified as part of the ''specified activity'' in this final rule) conducted in the GOMEX Range Complex.

(2) Total annual expended/detonated rounds (missiles, bombs, etc.) for each explosive type.

(h) GOMEX Range Complex 5-yr Comprehensive Report—The Navy shall submit to NMFS a draft report that analyzes and summarizes all of the multi-year marine mammal information gathered during the GOMEX Range Complex exercises for which annual reports are required (Annual GOMEX Range Complex Exercise Reports and GOMEX Range Complex Monitoring Plan Reports). This report shall be submitted at the end of the fourth year of the rule (March 2014), covering activities that have occurred through September 1, 2013.

(i) The Navy shall respond to NMFS comments and requests for additional information or clarification on the GOMEX Range Complex Comprehensive Report, the Annual GOMEX Range Complex Exercise Report, or the Annual GOMEX Range Complex Monitoring Plan Report (or the multi-Range Complex Annual Monitoring Plan Report, if that is how the Navy chooses to submit the information) if submitted within 3 months of receipt. These reports will be considered final after the Navy has addressed NMFS' comments or provided the requested information, or three months after the submittal of the draft if NMFS does not comment by then.

(j) In 2011, the Navy shall convene a Monitoring Workshop in which the Monitoring Workshop participants will be asked to review the Navy's Monitoring Plans and monitoring results and make individual recommendations (to the Navy and NMFS) of ways of improving the Monitoring Plans. The recommendations shall be reviewed by the Navy, in consultation with NMFS, and modifications to the Monitoring Plan shall be made, as appropriate.

§ 218.35 Applications for Letters of Authorization.

To incidentally take marine mammals pursuant to these regulations, the U.S. citizen (as defined by § 216.103 of this chapter) conducting the activity identified in § 218.30(a) (the U.S. Navy) must apply for and obtain either an initial Letter of Authorization in accordance with § 218.26 or a renewal under § 218.27.

§ 218.36 Letters of Authorization.

(a) A Letter of Authorization, unless suspended or revoked, will be valid for a period of time not to exceed the period of validity of this subpart, but must be renewed annually subject to annual renewal conditions in § 218.37.

(b) Each Letter of Authorization will set forth:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact on the species, its habitat, and on the availability of the species for subsistence uses (*i.e.*, mitigation); and

(3) Requirements for mitigation, monitoring and reporting.

(c) Issuance and renewal of the Letter of Authorization will be based on a determination that the total number of marine mammals taken by the activity as a whole will have no more than a negligible impact on the affected species or stock of marine mammal(s).

§ 218.37 Renewal of Letters of Authorization and adaptive management.

(a) A Letter of Authorization issued under §§ 216.106 and 218.36 of this chapter for the activity identified in § 218.30(c) will be renewed annually upon:

(1) Notification to NMFS that the activity described in the application submitted under § 218.35 shall be undertaken and that there will not be a substantial modification to the described work, mitigation or monitoring undertaken during the upcoming 12 months;

(2) Timely receipt of the monitoring reports required under § 218.34; and

(3) A determination by the NMFS that the mitigation, monitoring and reporting measures required under § 218.33 and the Letter of Authorization issued under §§ 216.106 and 218.36 of this chapter, were undertaken and will be undertaken during the upcoming annual period of validity of a renewed Letter of Authorization.

(b) If a request for a renewal of a Letter of Authorization issued under § 216.106 of this chapter and § 218.37 indicates that a substantial modification to the described work, mitigation or monitoring undertaken during the upcoming season will occur, the NMFS will provide the public a period of 30 days for review and comment on the request. Review and comment on renewals of Letters of Authorization are restricted to:

(1) New cited information and data indicating that the determinations made in this document are in need of reconsideration, and

(2) Proposed changes to the mitigation and monitoring requirements contained in these regulations or in the current Letter of Authorization.

(c) A notice of issuance or denial of a renewal of a Letter of Authorization will be published in the **Federal Register**.

(d) NMFS, in response to new information and in consultation with the Navy, may modify the mitigation or monitoring measures in subsequent LOAs if doing so creates a reasonable likelihood of more effectively accomplishing the goals of mitigation and monitoring set forth in the preamble of these regulations. Below are some of the possible sources of new data that could contribute to the decision to modify the mitigation or monitoring measures:

(1) Results from the Navy's monitoring from the previous year (either from GOMEX Study Area or other locations).

(2) Findings of the Monitoring Workshop that the Navy will convene in 2011 (§ 218.34(j)).

(3) Compiled results of Navy funded research and development (R&D) studies (presented pursuant to the ICMP (§ 218.34(d)).

(4) Results from specific stranding investigations (either from the GOMEX Range Complex Study Area or other locations).

(5) Results from general marine mammal and sound research (funded by the Navy (described below) or otherwise).

(6) Any information which reveals that marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent Letters of Authorization.

§ 218.38 Modifications to Letters of Authorization.

(a) Except as provided in paragraph (b) of this section, no substantive modification (including withdrawal or suspension) to the Letter of Authorization by NMFS, issued pursuant to §§ 216.106 and 218.36 of this chapter and subject to the provisions of this subpart shall be made until after notification and an opportunity for public comment has been provided. For purposes of this paragraph, a renewal of a Letter of Authorization under § 218.37, without modification (except for the period of validity), is not considered a substantive modification.

(b) If the Assistant Administrator determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in § 218.30(b), a Letter of Authorization issued pursuant to §§ 216.106 and 218.36 of this chapter may be substantively modified without prior notification and an opportunity for public comment. Notification will be published in the **Federal Register** within 30 days subsequent to the action.

[FR Doc. E9–16537 Filed 7–13–09; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

RIN 0648–AY00

Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Atlantic Mackerel, Squid, and Butterfish Fisheries; Amendment 10

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of availability of a fishery management plan amendment; request for comments.

SUMMARY: NMFS announces that the Mid-Atlantic Fishery Management Council (Council) has submitted Amendment 10 to the Atlantic Mackerel, Squid, and Butterfish (MSB) Fishery Management Plan (FMP) (Amendment 10), incorporating the public hearing document and the Initial Regulatory Flexibility Analysis (IRFA), for review by the Secretary of Commerce and is requesting comments from the public.

DATES: Comments must be received on or before September 14, 2009.

ADDRESSES: A final supplemental environmental impact statement (FSEIS) was prepared for Amendment 10 that describes the proposed action and other considered alternatives and provides a thorough analysis of the impacts of the proposed measures and alternatives. Copies of Amendment 10, including the FSEIS, the Regulatory Impact Review (RIR), and the Initial Regulatory Flexibility Analysis (IRFA), are available from: Daniel Furlong, Executive Director, Mid-Atlantic Fishery Management Council, Room 2115, Federal Building, 300 South New Street, Dover, DE 19904–6790. The FSEIS/RIR/IRFA is accessible via the Internet at *http://www.nero.nmfs.gov*.

You may submit comments on this notice of availability, identified by ''0648–AY00'', by any one of the following methods:

• Electronic Submissions: Submit all electronic public comments via the Federal e-Rulemaking portal *http://www.regulations.gov*;

• Fax: (978) 281–9135, Attn: Carrie Nordeen;

• Mail to Patricia A. Kurkul, Regional Administrator, NMFS, Northeast Regional Office, 55 Great Republic Drive, Gloucester, MA 01930. Mark the outside of the envelope ''Comments on MSB Amendment 10.''

Instructions: All comments received are a part of the public record and will generally be posted to *http://www.regulations.gov* without change. All Personal Identifying Information (e.g., name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information. NMFS will accept anonymous comments. Attachments to electronic comments will be accepted in Microsoft Word, Excel, WordPerfect, or Adobe PDF formats only.

SUPPLEMENTARY INFORMATION:

Background

In February 2005, NMFS notified the Council that the butterfish stock was overfished, which triggered MSA requirements to implement rebuilding measures for the stock. In response, Amendment 10 to the MSB FMP was initiated by the Council in October 2005. Management measures for rebuilding butterfish are designed to reduce the fishing mortality on butterfish that occurs through discarding, which is the primary source of fishing mortality. Measures that reduce butterfish discards are expected to also reduce the bycatch of other finfish species in MSB fisheries.

The purpose of Amendment 10 is to bring the MSB FMP into compliance with Magnuson-Stevens Fishery Conservation and Management Act (MSA) requirements by: 1) Establishing a rebuilding program that allows the butterfish stock to rebuild and permanently protects the long-term health and stability of the stock; and 2) minimizing bycatch and the fishing mortality of unavoidable bycatch, to the extent practicable, in the MSB fisheries. Amendment 10 would increase the minimum codend mesh requirement for the *Loligo* squid (*Loligo*) fishery; establish a butterfish rebuilding program with a butterfish mortality cap program for the *Loligo* fishery; establish a 72–hr trip notification requirement for the *Loligo* fishery; and require an annual assessment of the butterfish rebuilding program by the Council's Scientific and Statistical Committee (SSC).

Initially, Amendment 9 to the MSB FMP (Amendment 9) was intended to bring the MSB FMP into compliance with MSA bycatch requirements, and contained several management measures intended to address deficiencies in the FMP that relate to discarding, especially as they affect butterfish. Specifically, those management measures would have attempted to reduce finfish discards by MSB small-mesh fisheries through mesh size increases in the directed *Loligo* fishery, removal of mesh size exemptions for the directed Illex squid fishery, and establishment of seasonal Gear Restricted Areas (GRAs). However, those specific management alternatives were developed in 2004, prior to the butterfish stock being declared overfished. On June 13, 2007, the Council recommended that all management measures developed as part of Amendment 9 to correct deficiencies in the FMP related to bycatch of finfish, especially butterfish, be considered in Amendment 10. Accordingly, no action was taken in Amendment 9 (73 FR 37382, July 1, 2008) to address bycatch.

The Council held three public meetings on Amendment 10 during June 2008. Following the public comment period that ended on June 23, 2008, the Council adopted Amendment 10 on October 16, 2008. In Amendment 10, measures recommended by the Council would:

• Establish a minimum mesh increase to 2–1/8 inches (54 mm) (from 1–7/8 inches (48 mm)) for the *Loligo* fishery during Trimesters I (Jan–Apr) and III (Sep–Dec), starting in 2010;

• Establish a butterfish mortality cap program for the *Loligo* fishery, starting in 2011;

APPENDIX C
AGENCY CORRESPONDENCE

This appendix contains the following letters:

1. CNO letter to NMFS dated October 16, 2008 requesting a Letter of Authorization for Incidental Take of Marine Mammals
2. Florida Department of Environmental Protection letter dated November 5, 2007 to the GOMEX EIS/OEIS project manager regarding sovereignty submerged lands
3. U.S. Fleet Forces Command letter dated August 31, 2007 to the Governor of Texas announcing the preparation of the GOMEX EIS/OEIS
4. A list of GOMEX Scoping package letters signed by U.S. Fleet Forces Command (enclosure omitted)
5. CNO letter dated January 8, 2009 to NMFS requesting formal consultation on the Biological Evaluation
6. NAVFAC Atlantic letter dated January 7, 2009 to USFWS requesting concurrence on the Biological Evaluation
7. Department of Interior, Fish and Wildlife Service letter dated March 9, 2009 to NAVFAC Atlantic regarding their concurrence with the Biological Evaluation
8. NAVFAC Atlantic' letter dated July 31, 2009 to NMFS submitting BE Addendum
9. NMFS Biological and Conference Opinions signed November 22, 2010

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DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456P/8U158320
16 October 2008

Mr. P. Michael Payne, Division Chief
Permits, Conservation and Education Division
Office of Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service (NMFS)
B-SSMC3 Room 13822
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Payne:

In accordance with the Marine Mammal Protection Act, as amended and 50 CFR Part 216.106, the U.S. Navy requests a five-year Letter of Authorization (LOA) for the incidental take of marine mammals associated with Atlantic Fleet training operations under Commander, U.S. Fleet Forces, which occur within the established Gulf of Mexico (GOMEX) Range Complex.

The proposed action may expose certain marine mammals that may be present within the GOMEX range complex to sound from explosive sources during training activities. The proposed action will not involve sonar operations. Enclosure (1) focuses on the specific information required by the National Marine Fisheries Service for consideration of an incidental take request.

We appreciate your continued support in helping the Navy to meet its environmental responsibilities. My staff point of contact for this action is Ms. Linda Petitpas at (703) 604-1233 or linda.petitpas@navy.mil. Commander, U.S. Fleet Forces point of contact in this matter is Mr. Gregory Thompson, (757)836-6938, or e-mail gregory.s.thompson2@navy.mil.

Sincerely,

R E Tickle
RONALD E. TICKLE
Head, Operational Environmental
Readiness and Planning Division
(OPNAV N45)

Enclosure:
(1) Request for Letter of Authorization for the Incidental Harassment of Marine Mammals Resulting from Navy Training Operations Conducted within the Gulf of Mexico Study Area (October 2008) delivered via FedEx under separate cover on 2 Oct 08.

Copy to (w/o encl):
DASN (E)
CPF N01CE
OPNAV N43
ASN (I&E)

Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

November 5, 2007

Mr. Robert L. Riley
GOMEX EIS/OEIS Project Manager
Naval Facilities Engineering Command Southeast
P. O. Box 30, Bldg 135 North, Ajax Street
NAS Jacksonville, FL 32212-0030

RE: Department of the Navy – Scoping Notice – Environmental Impact Statement for Atlantic Fleet Training, Testing and Infrastructure Improvements in the Gulf of Mexico (GOMEX) Range Complex.
SAI # FL200709123757C

Dear Mr. Riley:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the scoping notice.

The Florida Department of Environmental Protection's (DEP) Northwest District office in Pensacola advises that any infrastructure improvements proposed within waters of the state and jurisdictional wetlands would require an Environmental Resource Permit from the DEP or Northwest Florida Water Management District in accordance with Chapter 373, *Florida Statutes*, and Rule 62-346, *Florida Administrative Code*. DEP staff also notes recent discussions with Navy personnel on potential sovereignty submerged lands preemption issues resulting from Naval testing and training exercises in St. Andrew Bay. The DEP has suggested that the Navy formally identify and present to the State of Florida's Board of Trustees of the Internal Improvement Trust Fund (Governor and Cabinet) additional information on the range areas over sovereignty submerged lands to minimize conflicts related to preemption of public use within those areas. For further information and assistance, please contact Ms. Barbara Ruth at (850) 595-8300, ext. 1128.

Based on the information contained in the public notice and above state agency comments, the state has determined that, at this stage, the proposed federal action is consistent with the Florida Coastal Management Program (FCMP). The federal agency must, however, address the concerns identified by DEP staff prior to project implementation. All subsequent environmental documents must be reviewed to determine the project's continued consistency with the FCMP. The state's continued concurrence with the project will be based, in part, on the adequate resolution of any issues identified during this and subsequent reviews. The state's final concurrence of the project's consistency with the FCMP will be determined during the environmental permitting stage.

Thank you for the opportunity to review this proposal. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

cc: Darryl Boudreau, DEP, Northwest District

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/7B/708
August 31, 2007

The Honorable Richard Perry
Governor of Texas
P.O. Box 12428
Austin, TX 78711-2428

Dear Governor Perry:

This letter is to inform you that the Department of the Navy is preparing an Environmental Impact Statement/Overseas Environmental Statement (EIS/OEIS) for Navy Atlantic Fleet training and testing, and associated range capabilities enhancements (including infrastructure improvements) in the Gulf of Mexico (GOMEX) Range Complex in accordance with the National Environmental Policy Act and Executive Order 12114.

The Navy's primary mission is to maintain, train, equip, and operate combat-ready naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. Training with the complex operating and weapons systems of submarines, surface ships, and aircraft in realistic combat conditions employing potential threat scenarios is key to maintaining Fleet combat readiness and survival in actual wartime conditions. The Navy will analyze current and emerging training and testing operations, expanded warfare missions, new platforms and weapon systems, and modernization of existing range capabilities to enhance and sustain Navy training and testing in the GOMEX Range Complex.

Details of the GOMEX Range Complex requirements and additional information about the EIS/OEIS, including background information on the proposed action, alternatives, environmental considerations, and public participation, are provided in the attachment and available on the Navy's website at: "www.GOMEXRangeComplexEIS.com". Please call Mr. Robert Riley at (904) 542-6125 if you have any questions. You may submit written comments to: Mr. Robert Riley (Code OPC5), GOMEX EIS/OEIS Project Manager, Naval Facilities Engineering Command Southeast, P.O. Box 30 (Building 135 North, Ajax Street), NAS Jacksonville, FL 32212-0030. If you are interested in obtaining more information or providing public comment, you may also want to participate in one of the open-house public scoping meetings listed in this package.

Sincerely,

M.R. Harrell

M. R. HARRELL
Assistant Deputy Chief of Staff
for Operational Readiness
and Training

Enclosure: 1. Project Scoping Information

8/31/07 GOMEX SCOPING PACKAGE LETTERS SIGNED BY MS. HARRELL

The Honorable Richard Perry
Governor of Texas
P.O. Box 12428
Austin, TX 78711-2428 (708)

The Honorable Kathleen Blanco
Governor of Louisiana
P.O. Box 04994
Baton Rouge, LA 70804-9004 (709)

The Honorable Haley Barbour
Governor of Mississippi
P.O. Box 139
Jackson, MS 39205 (710)

The Honorable Bob Riley
Governor of Alabama
600 Dexter Avenue
Montgomery, AL 36130 (711)

The Honorable Charles Crist
Governor of Florida
Office of the Governor
Tallahassee, FL 32399-0001 (712)

Mr. Alton LeBlanc
Tribal Council Chair
Chitimacha Tribal Council
Chitimacha Tribe of Louisiana
P.O. Box 661, 155 Chitimacha Loop
Charenton, LA 70523 (713)

Chief Framon Weaver
Mowa Band of Choctaw, Choctaw Agency
Route 1 Box 33-A, Reservation Road
Mt. Vernon, AL 36560 (714)

Mr. Buford Rolin
Tribal Council Chair
Poarch Band of Creek Choctaw Agency
HCR69A Box 85-B
5811 Jack Springs Road
Atmore, AL 36502 (715)

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456K/8U158681
8 January 2009

Ms. Angela Somma
Division Chief Endangered Species Division
Office of Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service (NMFS)
B-SSMC3 Room 13821
1315 East-West Highway
Silver Springs, MD 20910-3282

Dear Ms. Somma:

The Commander, U. S. Fleet Forces Command (USFF) is preparing an Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) to assess the potential environmental impacts associated with sustainable range usage and enhancements within the Navy's Gulf of Mexico (GOMEX) training range. Specifically, the proposed action is to support and conduct current and emerging training and Research, Development, Test, and Evaluation (RDT&E) operations in the GOMEX Range Complex. Through our cooperating agency agreement, the Navy and National Marine Fisheries Service (NMFS) worked together to develop the DEISs/OEISs prior to release for public comment in January 2009.

The Navy submitted a Marine Mammal Protection Act request for rulemaking and an application for a Letter of Authorization for non-sonar activities on 18 October 2008. The Navy did not request the NMFS' permit division to initiate early consultation.

In accordance with 50 CFR §401.12(f), the Navy is submitting its Biological Evaluation (BE) [Enclosure (1)] and is requesting formal consultation pursuant to Section 7(a)(2). This BE assesses the potential effects of the proposed actions on species protected under the Endangered Species Act (ESA) that potentially occur within the GOMEX Range Complex, under both NMFS and USFWS jurisdiction.

In accordance with 50 CFR §401.14(c) the attached BE includes: (1) a description of the proposed action; (2) descriptions of the specific areas where the proposed action will occur (also called Study Area); (3) descriptions of the listed species and critical habitat that may be affected by the actions; (4) the potential effects on listed and proposed species or critical habitat; (5) an analysis of cumulative effects; and (6) measures proposed by the Navy to mitigate potential effects of the proposed action. Please direct your attention to those species and critical habitats under the jurisdiction of NMFS.

Additional technical information regarding the process by which the Navy determined the listed species distribution in these geographic areas is detailed in Enclosure 2. These reports are in a draft stage, and would benefit from your staff's input, should any technical errors be identified. We are providing this report as additional relevant technical information for purposes of consultation under the ESA.

My staff point of contact for this matter is Dr. Kelly Brock who can be reached at 703-604-5420 or via email at Kelly.brock@navy.mil; Commander, U. S. Fleet Forces Command's point of contact for this matter is Mr. Greg Thompson, who can be reached at (757)-836-6938 or via email at gregory.s.thompson2@navy.mil.

Sincerely,

R E Tickle

Ronald E. Tickle
Head, Operational Environmental
Readiness and Planning Branch
Environmental Readiness Division
(OPNAV N45)

Enclosures:

(1) Biological Evaluation for Gulf of Mexico Range Complex.
(2) Marine Resources Assessment Update for the Gulf of Mexico Area (Draft Report February 2007 - CD Copy)

Copy to (w/o enclosures):
DASN (E)
OPNAV N43
Commander, U.S. Fleet Forces Command (N4/N7)
Commander, Naval Installations Command (N45)
Commander, Navy Region Southeast (N40)
Commander, Naval Facilities Engineering Command, Southeast (N45)

National Marine Fisheries Service
Southeast Regional Office
Attn: Mr. David Bernhart
263 13th Avenue South
St. Petersburg, FL 33701

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC
6506 HAMPTON BLVD
NORFOLK VA 23508-1278

TELEPHONE NO:
(757) 322-4555

IN REPLY REFER TO:

5090
EV53MS:lfm
January 7, 2009

Mr. Ken Graham
U.S. Fish and Wildlife Service, Region 4 Southeast
Division of Consultations
1875 Century Blvd., NE Suite 400
Atlanta, GA 30345

RE: ENDANGERED SPECIES ACT SECTION 7 BIOLOGICAL EVALUATION FOR THE GULF OF MEXICO RANGE COMPLEX

Dear Mr. Graham:

The Commander, U.S. Fleet Forces is preparing a Draft Environmental Impact Statements/Overseas Environmental Impact Statement (EIS/OEIS) in accordance with the National Environmental Policy Act (NEPA) to increase use and enhance capabilities of the Gulf of Mexico (GOMEX) Range Complex to achieve and maintain Fleet readiness.

In accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (ESA) (50 Code of Federal Regulations 402; 16 U.S. Code 1536 (c)) this biological evaluation includes descriptions of the proposed actions, species accounts and status of the species in the study areas, effects of the actions, conclusions, list of contacts, and references.

The proposed action is described as Alternative 2 (Preferred Alternative) from the EIS/OEIS for the GOMEX Range Complex in the attached biological evaluation. An overview of the proposed action is provided in Chapter 2, and more specific details are provided in appendices A. Mitigation measures which are implemented to reduce the potential impacts to listed species and critical habitat are presented in Chapter 4.

Through our cooperating agency agreement, the Navy and the National Marine Fisheries Service (NMFS) are working together to develop the EIS/OEIS. The Navy has initiated a separate Section 7 consultation with NMFS for species under their jurisdiction, including listed whales, sea turtles in the marine environment, and fish.

The species addressed in this biological evaluation, which are under USFWS jurisdiction, include the West Indian manatee (*Trichechus manatus*) (including designated critical habitat), piping plover (*Charadrius melodus*) (including designated critical habitat), interior least tern (*Sternula antillarum athalassos*), wood stork (*Mycteria americana*), brown pelican (*Pelecanus occidentalis*), whooping crane (*Grus americana*) (including designated critical habitat), red-cockaded woodpecker (*Picoides borealis*), ocelot (*Leopardus (=Felis) pardalis* *albescens*), eastern indigo snake (*Drymarchon corais couperi*), and choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) (including designated critical habitat). The proposed action does not occur in any area where there is sea turtle nesting habitat, so sea turtles are not included in this package. There are no species currently proposed for listing that are expected to occur in the action area.

The Navy has determined that the proposed action would not adversely modify critical habitat and would have no effect on the species listed above, except as indicated below:

GOMEX Study Area. The Proposed Action may affect, but is not likely to adversely affect, the West Indian manatee, piping plover, interior least tern, brown pelican, wood stork, whooping crane, red-cockaded woodpecker, ocelot, and eastern indigo snake.

We look forward to your timely review of the attached biological evaluation, and request your concurrence that the proposed action may affect, but is not likely to adversely affect, listed species under your jurisdiction. My staff point of contact for this matter is Ms. Mandy Shoemaker, who can be reached at (757) 322-4555 or via email at mandy.shoemaker@navy.mil.

Sincerely,

R. David Curfman

R. D. CURFMAN
Environmental Business Line Manager

Attachment 1: Biological Evaluation for the Gulf of Mexico Range Complex, December 2008 (Bound document with CD in PDF format)

Copy to (w/Attachment 1):
Gail Carmody
U.S. Fish and Wildlife Service, Southeast Region
Panama City Ecological Services Field Office
1601 Balboa Avenue
Panama City, Florida 32405-3792
Paul Souza
U.S. Fish and Wildlife Service, Southeast Region
South Florida Ecological Services Field Office
1339 20th Street
Vero Beach, Florida 32960-3559

5090
EV53MS:lfm
January 7, 2009

Copy to (w/Attachment 1):
Dave Hankla
U.S. Fish and Wildlife Service, Southeast Region
Jacksonville Ecological Services Field Office
7915 Baymeadows Way, Suite 200
Jacksonville, Florida 32256-7517
Bill Pearson
U.S. Fish and Wildlife Service, Southeast Region
Daphne Ecological Services Field Office
1208 B Main Street
Daphne, Alabama 36526-4419
Ray Aycock
U.S. Fish and Wildlife Service, Southeast Region
Jackson Ecological Services Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213-7856
Jim Boggs
U.S. Fish and Wildlife Service, Southeast Region
Lafayette Ecological Services Field Office
646 Cajundome Boulevard, Suite 400
Lafayette, Louisiana 70506-4290
Allan Strand (C/O TAMU-CC)
U.S. Fish and Wildlife Service, Southwest Region
Corpus Christi Ecological Services Field Office
6300 Ocean Drive, Unit 5837
Corpus Christi, Texas 78412-5837

Copy to (w/o Attachment 1):
Commander, USFF (Greg Thompson)
Commander, NAVFAC Southeast (Bernice Snyder)
CNO N45 (Kelly Brock, Gloria Kupstas)
DASN (Sue Ann Henderson)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

In Reply Refer To:
FWS/R4/ES

MAR 0 9 2009

Mr. R. D. Curfman
Environmental Business Line Manager
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

Dear Mr. Curfman:

On January 21, 2009, we received your consultation request for increased use and enhanced capabilities at the Navy's Gulf of Mexico Range Complex. Your consultation package addressed the effects of your preferred action alternative (Alternative 2 from the Draft Environmental Impact Statement/Overseas Environmental Impact Statement) on: the West Indian manatee (*Trichechus manatus*) (including designated critical habitat), piping plover (*Charadrius melodus*) (including designated critical habitat), interior least tern (*Sternula antillarum athalossos*), whooping crane (*Grus Americana*) (including designated critical habitat), red-cockaded woodpecker (*Picoides borealis*), ocelot (*Leopardus (=Felis) pardalis albescens*), eastern indigo snake (*Drymarchon corais couperi*), and Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*) (including designated critical habitat). In your consultation request (including the Biological Evaluation (BE) dated December 2008), the Navy concluded that the proposed use and enhancement of the range complex would have no effect or would not be likely to adversely affect all of the federally-listed species and potentially affected critical habitats under the Fish and Wildlife Service's (Service) jurisdiction.

In response to your consultation request, the Service coordinated your consultation package with all of our affected field offices in the Southeast and Southwest Regions. Based on the review by our field office biologists, we wanted to make you aware of the following comments:

(1) On page 3-165, 3rd paragraph - The BE indicates that the Choctawhatchee beach mouse occurs in the vicinity of the Demolition Pond. If so, this would be a new occurrence record for the subspecies, and we request any documentation the Navy might have in support of this occurrence.

(2) On page 3-165, at 3.6.2.4 – The eastern indigo snake is federally-listed as threatened, not endangered.

(3) On page 3-135, at 3.5.2.5 - The Navy should be made aware of the Florida non-essential whooping crane population. This experimental reintroduction of whooping cranes in Florida

was initiated in 1993 to establish a non-migratory population at Kissimmee Prairie. A non-migratory population avoids the hazards of migration, and by inhabiting a more geographically limited area than migratory cranes, individuals can more easily find compatible mates. Annual releases of chicks are expected to continue to augment this new experimental population.

A second experimental non-essential population is currently being reintroduced to eastern North America. The intent is to establish a migratory flock which would summer and breed in central Wisconsin, migrate across the seven states and winter in west-central Florida. The first attempt to lead whooping cranes by ultra-light aircraft was made in 2001. The birds were taught the 1,250-mile migration route from Necedah National Wildlife Refuge in Wisconsin to Chassahowitzka National Wildlife Refuge in Florida. A 2008 migration led cranes to St. Marks National Wildlife Refuge for the first time, to establish an additional migratory population in Florida.

Our response represents both the Southwest and Southeast Regions, and is the result of review by all Service field offices within the area affected by your proposed action. We concur that the proposed action (preferred alternative) for increased operations and enhanced capabilities in the Navy's Gulf of Mexico Range Complex will have no effect on, or is not likely to adversely affect the federally-listed species or designated critical habitat as determined in your consultation request of January 7, 2009.

Please be reminded that it may be necessary for you to contact the Service for reconsideration of the effects of this proposed action if:

(1) New information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in your current determination;

(2) The action is later modified in a manner that causes an effect to the listed species or critical habitat not considered in this informal consultation; or

(3) A new species is listed or critical habitat designated that may be affected by this action.

Please address any questions concerning this response to Ken Graham at 404/679-7358.

Sincerely yours,

Franklin J. Arnold III

Franklin J. Arnold III
Acting Assistant Regional Director
Ecological Services

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456K/9U157935
31 July 2009

Ms. Angela Somma
Division Chief Endangered Species Division
Office of Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service (NMFS)
B-SSMC3 Room 13821
1315 East-West Highway
Silver Springs, MD 20910-3282

Dear Ms. Somma:

On January 8, 2009, the Navy submitted a Biological Evaluation (BE) in support of the Gulf of Mexico Range Complex. The Navy has continued to refine its analysis since this submittal, and has clarified the description of maritime security operations, revised the mitigation chapter, and improved the analysis regarding the use of anti-swimmer grenades.

To assist in your efforts in reviewing these changes, we prepared an addendum to the BE submitted in January. This addendum addresses the changes referenced above. Navy requests that NMFS utilize this updated information when preparing their biological opinion on the proposed action for the Gulf of Mexico Range Complex.

My staff point of contact for this matter is Dr. Kelly Brock who can be reached at 703-604-5420 or via email at Kelly.brock@navy.mil.

Sincerely,

R E Tickle
Ronald E. Tickle
Head, Operational Environmental
Readiness and Planning Branch
Environmental Readiness Division
(OPNAV N45)

Enclosure: (1) Addendum to the Biological Evaluation for Gulf of Mexico Range Complex Copy to (w/Enclosure 1):

Mr. David Bernhart
Assistant Regional Administrator for Protected Resources
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

Copy to (w/o enclosures):
DASN (E)
OPNAV N43
FFC N4/7
CNRSE (N45)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

NOV 22 2010

Dr. Robert C. Gisiner
Head, Marine Science Branch
Chief of Naval Operations, Energy &
Environmental Readiness Division (OPNAV N454)
2000 Navy Pentagon (NC1 Suite 2000)
Washington, DC 20350-2000

Dear Dr. Gisiner:

Enclosed is the National Marine Fisheries Service's (NMFS') programmatic biological and conference opinions (Opinions) on the effects of the U.S. Navy's proposed training exercises and research, development, testing and evaluation (RDT&E) activities in the Gulf of Mexico Range Complex and NMFS' proposed promulgation of regulations authorizing the take of marine mammals incidental to those activities from November 2010 to November, 2015. These Opinions were prepared pursuant to sections 7(a)(2) and 7(a)(4) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*; ESA).

We analyzed the potential for U.S. Navy activities to affect endangered sperm whales, endangered green, kemp's ridley and leatherback sea turtles, threatened and proposed endangered loggerhead sea turtles, endangered smalltooth sawfish, largetooth sawfish and threatened gulf sturgeon. Based on the analyses contained within we conclude that this action is not likely to jeopardize the continued existence of currently listed threatened and endangered species as well as proposed endangered species under NMFS' jurisdiction. Critical habitat designated for these species will not be affected by the proposed actions, and therefore, will not be destroyed or adversely modified.

These Opinions do not exempt the "take" of any listed or proposed endangered or threatened species. The proposed actions are not anticipated to incidentally "take" currently listed or proposed sea turtles species, therefore, no sea turtle takes are exempted from the prohibitions contained in section 9 of the ESA. The "take" of sperm whales, while anticipated to occur incidental to the proposed actions is not currently exempted from the prohibitions contained in the Marine Mammal Protection Act of 1972, as amended. Any biological opinions resulting from section 7 consultation on any Letters of Authorization that NMFS decides to issue to the U.S. Navy would include an incidental take statement for sperm whales.

This concludes formal consultation and conference on the proposed training and RDT&E activities conducted within the GOMEX Range Complex. Normally, reinitiation of formal consultation on the proposed activities would be required where the U.S. Navy and NMFS retains discretionary involvement or control over the action and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, Action Agencies are normally required to reinitiate section 7 consultation immediately. However, because the biological opinion did not exempt the "take" of any endangered or threatened species, any "take" that might result from the proposed training activities will be considered in subsequent biological opinions that accompany any Letters of Authorization NMFS issues on the proposed training activities.

The U.S. Navy in conjunction with NMFS' Permits, Education, and Conservation Division may ask NMFS' Endangered Species Division to confirm the conference opinion as a biological opinion issued through formal consultation if the Northwest Atlantic distinct population segment (DPS) of loggerhead sea turtles is listed. The request must be in writing. If NMFS' Endangered Species Division reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, NMFS' Endangered Species Division will confirm the conference opinion as the biological opinion for GOMEX activities and no further section 7 consultation will be necessary. After any final listing of the Northwest Atlantic DPS of loggerhead sea turtles and any subsequent adoption of this Conference Opinion, the U.S. Navy and NMFS' Permits, Education, and Conservation Division shall reinitiate consultation per the reinitiation criteria listed above for formal consultation.

If you have questions regarding the Opinions, please contact me or Therese Conant, Acting Chief of our Endangered Species Division at (301) 713-1401.

Sincerely,

James H. Lecky
Director,
Office of Protected Resources

Enclosure

APPENDIX D
CURRENT TRAINING OPERATIONS WITHIN THE GOMEX RANGE COMPLEX

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APPENDIX D CURRENT TRAINING OPERATIONS WITHIN THE GOMEX RANGE COMPLEX

This Appendix describes the training and research, development, test, and evaluation (RDT&E) events conducted in the Gulf of Mexico (GOMEX) Range Complex in detail. The training event descriptions include both unit level and major range events. A data strip table is provided for each individual training event, as follows:

- Event or operation title
- Participating platforms
- System or ordnance utilized
- Typical event duration
- Number of events currently[1] conducted on an annual basis in the range complex

Ordnance used during training is defined in this appendix as either:

- High Explosive (HE) – explosive ordnance;
- Non-explosive, practice munition (NEPM) – Non-explosive practice munitions may contain spotting charges or signal cartridges for impact locating purposes; or
- Wholly inert – no explosive, propellant, or pyrotechnic component

1 One exception is the NSA Panama City Demolition Pond, where due to space issues in the main document, detailed information for Alternative 1 and Alternative 2 is also provided in this Appendix D.

MINE WARFARE

MINE COUNTERMEASURES EXERCISE

Acoustic, mechanical, electronic, and optical methods of mine hunting and minesweeping exercises are included in this category.

Operation		Platform	System/ Ordnance	Event Duration	Number of Sorties/Events
Mine Countermeasures (MCM)	Mine Countermeasures – Airborne (AMCM)	MH-53	MK-103 mechanical sweep MD54 NEW [2] (.00514 lb/shot)	1.5 hours	20 sorties
	Mine Countermeasures – Surface (SMCMEX)	MCM	AN/SLQ-38 Mechanical Sweep MD54 NEW (.00514 lb/shot)	1.5 hours	24 sorties

Airborne Mine Countermeasures

Helicopters tow surface sleds and submerged equipment through simulated threat minefields with the goal of clearing a safe channel through the minefield for the passage of friendly ships.

AMCM Platforms

- MH-53E Helicopter

AMCM Sweeping Systems

MK-103 Mechanical Minesweeping System. This system is streamed, towed, and recovered by an MH-53 helicopter. The mechanical minesweeping gear is designed to counter moored mines. The gear consists of a tow wire, sweep wires (with explosive cutters activated by a charge similar to a shotgun shell), floats, a depressor, otters, and float pendants.

AMCM Training Minefields

The use of training minefields, constructed of moored or bottom mines, and of instrumented mines that can record effective minesweeping, enhances feedback to equipment operators and overall quality of training attained.

MH-53E Helicopter with Minesweeping and Mine Hunting Gear

The helicopter may be configured with the MK-103 Mechanical Minesweeping System designed to sweep or locate mines for later neutralization.

Basic Phase (Unit Level Training) Scenario

One helicopter configured for the mine countermeasures mission to be conducted flies from a shore location or a surface ship, such as an amphibious assault ship (LHA), to the selected mine threat area.

The helicopter flies within 50 to 75 feet of the water while towing the appropriate system for the tactical situation. Systems are towed on the surface or down to a depth of 150 feet or less for training and at speeds between 8 and 25 kts depending on the system being used. The typical duration is 1.5 hours.

2 NEW: Net Explosive Weight

The use of training minefields of moored or bottom mines enhances feedback to equipment operators and quality of training attained.

Integrated and Sustainment Phase Training Scenarios
Procedures typically do not differ from the Basic Phase Scenario, but the operation is part of the larger major range event where the process will be coordinated with other events and controlled through a Strike Group Commander.

Training Considerations
The purpose of training is for helicopter crews to practice deployment, employment, and retrieval of the systems. All systems are recovered upon completion of training.

Mine Countermeasures Exercise - Surface

Mine countermeasure surface ships use mechanical, magnetic, and acoustic devices to hunt for and sweep moored and bottom mines from waterways to create safe navigation passages for other ships.

<u>MCM and Mine Hunter Coastal Ships with Mine Hunting and Minesweeping Gear</u>

MCM and Mine Hunter Coastal (MHC) surface ships mine hunting and minesweeping systems, include:

- AN/SLQ-38 Standard Mechanical Minesweep. This system is used to sweep moored mines by cutting the mine mooring cable with cutters attached to a diverted sweep wire. When streamed with 300-fathom long wires at a maximum speed of about eight kts, the sweep depth will be from 5 to 40 fathoms. The swept path for a double sweep will be about 500 yards wide or 250 yards wide for a single sweep

Basic Phase (Unit Level Training) Scenario
MCM and MHC surface ships have both mine hunting and minesweeping capabilities typically used at speeds of five kts and less in the area where mines may have been laid.

Minesweeping may be conducted in an area suspected of containing mines without first conducting mine hunting by sonar. Minesweeping is done with conventional cable cutting systems (AN/SLQ-38) for moored mines and with magnetic and acoustic systems for bottom mines. Once the cable of a moored mine is cut, it will float to the surface where it will be neutralized in the mine neutralization phase. This event may last about 15 hours.

MINE NEUTRALIZATION

Most, but not all exercises considered in the mine neutralization category are those that employ explosives for neutralization of the mine itself.

<table>
<tr><th colspan="2">Operation</th><th>Platform</th><th>System/ Ordnance</th><th>Event Duration</th><th>Number of Events</th></tr>
<tr><td rowspan="4">Mine Neutralization</td><td rowspan="3">Mine Neutralization – Surface – Remotely Operated Vehicle (ROV)</td><td>MCM</td><td>AN/SLQ-48 (MP1)
MD54 NEW (.00514 lb/shot)</td><td>3-6 hours</td><td>28 events</td></tr>
<tr><td>MCM</td><td>AN/SLQ-48 (MP2)
(60 lb charges)</td><td>3-6 hours</td><td>16 events</td></tr>
<tr><td>MCM</td><td>AN/SLQ-48 (MP3)
(60 lb charges)</td><td>3-6 hours</td><td>16 events</td></tr>
<tr><td>Mine Neutralization</td><td>Explosive Ordnance Disposal (EOD)</td><td>5 lb charges
10 lb charges
20 lb charges</td><td>6-8 hours</td><td>27 events (5 lb charges)
34 events (10 lb charges)
4 events (20 lb charges)</td></tr>
</table>

Mine Neutralization - Surface - Remotely Operated Vehicle

Mine countermeasures and mine hunting ships use remotely operated vehicles to locate threat moored or bottom mines and then neutralize the mine to create safe channels for friendly shipping. Charges range in size from .00514 lb/shot to 60 lbs/shot.

MCM and MHC Class Ships with Mine Neutralization Vehicle (AN/SLQ-48)

The mine neutralization vehicle (MNV) weighs 2,700 pounds and is tethered to the ship through a 3,500-foot neutrally buoyant umbilical cable. Electrical power and guidance commands are passed to the vehicle, and real time data from the TV and high-resolution sonar are sent to the operator on the ship. It is not well suited for the neutralization of shallow water mines.

Basic Phase (Unit Level Training) Scenario

MCM and MHC class ships approach the suspected threat mine area at slow speed and locate the threat mines through mine hunting with their onboard sonar. Once the mine locations have been identified, the ship stands off at a safe distance to lower the SLQ-48 into the water. A remote-controlled, tethered, submersible vehicle, the SLQ-48, is guided to the mine by the shipboard operator who receives information from the SLQ-48's TV and high-resolution sonar. Once the vehicle reaches the threat mine, it places an explosive charge on bottom mines or uses an explosive charge to cut the cable of moored mines, which are neutralized by other means when they reach the surface.

Threat mine shapes located within a training range facility are required for effective training, which lasts from three to six hours.

Training Considerations

In most cases, these exercises are not conducted separately from the mine hunting phase of the operation.

Mine Neutralization-Explosive Ordnance Disposal

Explosive ordnance disposal (EOD) personnel use special equipment to evaluate threat mines, then small explosive charges to destroy the mine to create a safe channel for friendly shipping. The charges vary in size from 5 lbs to 20 lbs.

EOD Personnel with Mine Neutralization Charges

Basic Phase (Unit Level Training) Scenario

EOD personnel detect, identify, evaluate, and neutralize mines. The EOD mission is typically to locate and neutralize mines after they are initially located by another source, such as an MCM or MHC class ship or an MH-53 or MH-60 helicopter.

Once the mine shapes are located, EOD divers are deployed from a ship via Combat Rubber Raiding Craft (CRRC) to further evaluate and "neutralize" the mine. The neutralization of mines in the water is normally done with an explosive device and may involve detonation of one or two explosive charges from 10 to 20 pounds, and at times as much as 60 pounds, of TNT equivalent. The initiation of the charge is positively controlled by EOD personnel.

Mine training shapes or other exercise support equipment and a range area that will support the use of HE ordnance is required for a 6 - 8-hour window. These operations are normally conducted during daylight hours for safety reasons.

Training Considerations

In most cases, these exercises are not conducted separately from the mine hunting phase of the operation.

SURFACE WARFARE

BOMBING EXERCISE

Strike fighter and maritime patrol aircraft deliver bombs against surface maritime targets, day or night, with the goal of destroying or disabling enemy ships or boats.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
Bombing Exercise (BOMBEX) Air-to-Surface	F/A-18 during major exercises	MK-82/GBU-30/38 (500 lb HE bomb)[3]	1 hour	5 events (20 bombs)
		MK-83/GBU-32 (1,000 lb HE bomb)[2]	1 hour	4 events (16 bombs)
		MK-82(I), BDU-45 (500 lb NEPM)[2]	1 hour	6 events (24 bombs)
		MK-76 (I) (25 lb NEPM)[4]	1 hour	14 events (140 bombs)
		MK-83 (I) (1,000 lb NEPM)[2]	1 hour	0
	F/A-18 with Laser Targeting: Nighthawk / AT-FLIR Pod (AAS-38A/B & ASQ-228)	MK-82 (500 lb HE bomb)[2]	1 hour	2 events (8 bombs)
		MK-83 (1,000 lb HE bomb)[2]	1 hour	2 events (8 bombs)
		MK-82(I), BDU-45 (500 lb NEPM)[2]	1 hour	4 events (16 bombs)
		MK-83(I) (1,000 lb NEPM)[2]	1 hour	0
	F/A-18 (VFA-204 unit level training)	MK-82 (500 lb HE bomb)[2]	1 hour	0
		MK-83 (1,000 lb HE bomb)[2]	1 hour	0
		MK-84/GBU-31 (2,000 lb HE bomb)[5]	1 hour	0
		MK-82(I), BDU-45 (500 lb NEPM)[2]	1 hour	0
		MK-83(I) (1,000 lb NEPM)[2]	1 hour	0
		MK-84(I) (2,000 lb NEPM)[4]	1 hour	0

F/A-18C/E/F with Unguided or Precision-guided Munitions

Unguided munitions: MK-76 and BDU-45 (NEPM training bombs); MK-80 series (NEPM or HE).

Basic Phase (Unit Level Training) Scenario

A flight of two aircraft will approach the target from an altitude of between 15,000 feet to less than 3,000 feet and, when on an established range, will adhere to designated ingress and egress routes. Typical bomb release altitude is below 3,000 feet and within a range of 1,000 yards for unguided munitions, and above 15,000 feet and in excess of 10 nm for precision-guided munitions. Exercises at night are normally done with captive carry (no drop) weapons because of safety considerations. Laser designators from participating aircraft, support aircraft, or ground support personnel are used to illuminate certified targets for use with lasers when using laser guided weapons. The exercise lasts about 1 hour.

Integrated and Sustainment Phase Training Scenarios

Typically involves an at-sea simulated strike scenario with a flight of four or more aircraft, with or without a designated opposition force (OPFOR).

[3] Event = a flight of 2 F/A-18s, each dropping two bombs
[4] Event = a flight of 2 F/A-18s, each dropping 5five bombs
[5] Event = a flight of 1 F/A-18, dropping one bomb

Training Considerations
Strike fighter pilots can fulfill this training requirement against either a land or water target. Training rarely involves dropping HE ordnance in the open ocean.

Unguided munitions: Usually conducted at land ranges with NEPM or HE ordnance, or water ranges with grounded ship hulks available for targets. MK-76 and BDU-45 NEPM bombs are the most common weapon allocation.

GUNNERY EXERCISE (AIR-TO-SURFACE) (GUNEX (A-S))

Strike fighter aircraft and helicopter crews, including embarked NSW personnel use guns to attack surface maritime targets, day or night, with the goal of destroying or disabling enemy ships, boats, or floating or near-surface mines.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
GUNEX (A-S)	F/A-18	20 mm cannon (NEPM)	1 hour	None

<u>F/A-18C/E/F with Vulcan M61A1/A2 20 mm Cannon</u>

Basic Phase (Unit Level Training) Scenario
A flight of two aircraft will begin its descent to the target from an altitude of about 3,000 ft while still several miles away. Within a distance of 4,000 ft from the target, each aircraft will fire a burst of about 30 rounds before reaching an altitude of 1,000 ft, then break off and reposition for another strafing run until each aircraft expends its exercise ordnance allowance of about 250 rounds.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario.

Training Considerations
Strike fighter pilots can fulfill this training requirement against either land (most often) or water targets, such as grounded ship hulks at water ranges or at specially prepared floating ship hulks during the occasional Sinking Exercise (SINKEX). F/A-18s will only rarely strafe into the ocean.

GUNNERY EXERCISE (SURFACE-TO-SURFACE)-SHIP

Ship gun crews engage surface targets at sea with their main battery 5-inch and 76 mm guns as well as smaller surface targets with 25 mm, .50 cal, or 7.62 mm machine guns with the goal of disabling or destroying the threat ship.

Operation	Platform	System/ Ordnance	Event Duration	Number of Events
GUNEX (Surface to Surface) (Ship)[6]	CG, DDG, FFG[7]	5-inch gun	3 hours	8 events (400 NEPM rounds)
		76 mm gun	3 hours	8 events (40 rounds)
		Close-in Weapon System (CIWS)	3 hours	8 events (6,400 rounds) BLK 1B mounts only
		Crew Served Weapon (CSW) .50 cal machine gun	3 hours	8 events (2,400 rounds)
		25 mm machine gun	3 hours	8 events (1,600 rounds)

<u>CG and DDG with 5-inch and FFG with 76 mm Guns</u>

There are three types of main battery shipboard guns currently in use: 5-inch/54 (CG and DDG), 5-inch/62 (DDG-81 and newer), and 76 mm (FFG). Both 5-inch guns use the same types of 5-inch projectiles for training exercises. The difference between the 5-inch guns is the longer range of the 5-inch/62 because of the larger powder propulsion charge.

Basic Phase (Unit Level Training) Scenario

A slow (5 kts) or high (30 kts) speed simulated enemy ship or boat approaches the CG/DDG/FFG from about 10 nm, is detected by the ship's radar and determined to be hostile. The target is tracked by radar, and when it is within 5 - 9 nm, it is engaged by approximately 60 rounds of 5-inch or 76 mm, fired with an offset so as not to actually hit the targets over a duration of about 3 hours. NEPM training rounds may be used. NEPM rounds will sink to the bottom of the ocean.

The main battery guns have a requirement to attack high-speed, maneuvering, towed or remotely controlled surface targets such as the QST-35 Seaborne Powered Target (SEPTAR), High Speed Maneuverable Surface Target (HSMST), or a remote controlled Jet Ski.

Integrated and Sustainment Phase Training Scenarios

These two scenarios will be similar to each other and the Basic Phase Scenario, but will have more "friendly" ships (three to five) participating. Additional ships will increase the number of rounds fired proportionally.

[6] CG: Cruiser; DDG: Guided Missile Destroyer; FFG Guided Missile Frigate; all rounds are NEPM.

[7] Targets: 1 target used per event. Target towed to range by ship by a range support group like VC-6. Targets include: High Speed Maneuvering Surface Target (HSMST), trimaran or radar reflective surface balloon (Killer Tomato), Floating at-sea target (FAST), 55 gal drum or balloon (weather, Mylar or target). Target varies depending on training event.

GUNNERY EXERCISE (SURFACE-TO-SURFACE)-BOAT

A Navy small boat uses a machine gun or other small ordnance to attack and disable or destroy a surface target that simulates another ship, boat, floating mine, or near shore land targets.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
GUNEX (Surface-to-Surface) (Boat)	Maritime Expeditionary Support Group (Various Small Boats)[8]	.50 cal guns	1-2 hours	4 events (10,000 rounds)
		7.62 mm	1-2 hours	4 events (11,200 rounds)
		40 mm rounds	1-2 hours	4 events (2,880 rounds)
	Harbor Security Group (Various Small Boats)[9]	7.62 mm	1-2 hours	2 events (16,000 rounds)

A number of different types of boats are used depending on the unit using the boat and their mission. Boats are mostly used by NSW teams and Navy Expeditionary Combat Command (NECC) units (Naval Coastal Warfare, Inshore Boat Units, Mobile Security Detachments, Explosive Ordnance Disposal, and Riverine Forces). These units are used to protect ships in harbors and high value units, such as aircraft carriers, nuclear submarines, liquid natural gas tankers, *etc*., while entering and leaving ports, as well as to conduct riverine operations, insertion and extractions, and various naval special warfare operations.

The boats used by these units include: Small Unit River Craft (SURC), Combat Rubber Raiding Craft (CRRC), Rigid Hull Inflatable Boats (RHIB), Patrol Craft, and many other versions of these types of boats. These boats use inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion.

Navy Boats with .50 cal, 7.62 mm or 40 mm Machine Guns

This exercise is usually a live-fire exercise, but at times blanks may be used so boat crews can practice their ship-handling skills for the employment of weapons without being concerned with the safety requirements involved with bullet travel.

Basic Phase (Unit Level Training) Scenario

Boat crews may use high or low speeds to approach and engage targets simulating other boats, floating mines, or near shore land targets with .50 cal, 7.62 mm, or 40 mm machine guns (about 200, 800, and 10 rounds, respectively).

The most common exercise target is a 50-gallon steel drum that is expended during the exercise and not recovered.

Integrated and Sustainment Phase Training Scenarios

8 Training occurs offshore from Corpus Christi in UNDET Box E3.
9 Training occurs in the Panama City OPAREA.

Typically do not differ from the Basic Phase Scenario, except for the additional command and control coordination involved.

Training Considerations

The purpose of this exercise is to develop marksmanship skills and small boat ship-handling tactics skills required to employ these weapons. Training usually lasts 1 - 2 hours.

SMALL ARMS TRAINING (WITH EXPLOSIVE HAND GRENADES)

A Navy small boat uses an anti-swimmer grenade to attack and disable or destroy a swimmer target.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
Small Arms Training (with Explosive Hand Grenades)	Maritime Expeditionary Support Group (Various Small Boats)[10]	MK3A2 anti-swimmer grenades (HE)[11]	1-2 hours	6 events (20 grenades)

A number of different types of boats are used depending on the unit using the boat and their mission. Boats are mostly used by NSW teams and Navy Expeditionary Combat Command (NECC) units (Naval Coastal Warfare, Inshore Boat Units, Mobile Security Detachments, Explosive Ordnance Disposal, and Riverine Forces). These units are used to protect ships in harbors and high value units, such as aircraft carriers, nuclear submarines, liquid natural gas tankers, *etc*., while entering and leaving ports, as well as to conduct riverine operations, insertion and extractions, and various naval special warfare operations.

The boats used by these units include: Small Unit River Craft (SURC), Combat Rubber Raiding Craft (CRRC), Rigid Hull Inflatable Boats (RHIB), Patrol Craft, and many other versions of these types of boats. These boats use inboard or outboard, diesel or gasoline engines with either propeller or water jet propulsion.

<u>Navy Boats with MK3A2 Grenades</u>

Basic Phase (Unit Level Training) Scenario
Boat crews may use high or low speeds to approach and engage targets simulating swimmers with anti-swimmer grenades. Grenade targets simulate an enemy lone diver attempting to disable a Navy ship via explosive charges. After setting the desired detonation depth (if applicable) on the anti-swimmer grenade, the user drops the grenade over the side of the boat. The typical duration is 1 hour.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario, except for the additional command and control coordination involved.

Training Considerations
The purpose of this exercise is to develop marksmanship skills and small boat ship-handling tactics skills required to employ these weapons. Training usually lasts 1 - 2 hours.

10 Training occurs offshore from Corpus Christi in UNDET Box E3.
11 Anti-swimmer grenades.

MARITIME SECURITY OPERATIONS

During Maritime Security Operations events, helicopters and/or surface ships intercept/disrupt potentially illegal activities in littoral areas, or on the high seas. Operations may include the delivery of boarding parties to suspect surface vessels to inspect and examine the vessel's papers or examine it for compliance with applicable resolutions or sanctions. Seizure of the vessel (that is confiscating or taking legal possession of the vessel and contraband (goods or people)) could result, if the vessel is found in violation of any applicable resolutions or sanctions.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
Maritime Security Operations – Ship	Rigid Hull Inflatable Boat (RHIB) or smaller boat and CG, DDG, FFG, LPD, or LSD	N/A – no ordnance is used	2-3 hours	36 events
Maritime Security Operations – Helicopter	MH-60 and CG, DDG, FFG, LPD, or LSD	N/A – no ordnance is used	1.5 hours	18 events

MARITIME SECURITY OPERATIONS – SHIP

<u>CG, DDG, FFG, LPD, LSD with Shipboard or Naval Special Warfare (NSW) Boarding Teams with Small Arms (Non-Firing)</u>

Maritime Security (MS) Operations may include, for example, Maritime Interception Operations (MIO), Expanded Maritime Interception Operations (EMIO), Special Operations Forces (SOF) support, antipiracy operations, theater security cooperation operations, and Information Operations (IO). In response to rapidly changing world events, such as the rise of global terrorism and piracy, variations of a Visit Board Search & Seizure (VBSS)/MIO may be necessary to train our forces to the emergent requirement. Any variation of a VBSS/MIO considered will involve similar environmental stressors, similar environmental effects, and will employ similar mitigation measures.

Basic Phase (Unit Level Training) Scenario

Ships will typically be on patrol in a designated littoral, ocean, or restricted area to watch for vessels that may need to be inspected or seized. When a suspect vessel(s) is sighted, the ship will approach the suspect vessel(s) at a speed of 20 knots or more while preparing to launch its organic helicopter or small boat and/or using its radio or other hailing device to talk to the suspect vessel to get it to assume an assigned course and slow speed. A cooperative boarding will allow the armed boarding party to board and conduct the inspection. An uncooperative boarding is the more typical training scenario and may actually require clandestine approach to the suspect vessel and use of force. An organic helicopter and small boat may be used to board the suspect vessel, but shipboard or NSW boarding teams with armed force may be required to make the boarding. Small arms with inert blanks may be used. The entire exercise may last 2 to 3 hours.

Training Considerations
A range support vessel or other commercial style vessel can be used as the suspect vessel to be intercepted/disrupted/boarded and may be staffed with opposing forces to create a better training environment. To ensure realism, the target vessel/vessels may be traveling at speeds in access of 20 knots.

MARITIME SECURITY OPERATIONS – HELICOPTER

<u>MH-60 with Machine Guns and Shipboard or NSW Boarding Teams with Small Arms (Non-Firing)</u>

Basic Phase (Unit Level Training) Scenario
Helicopters supply the transportation for the boarding party from a surface ship to the suspect vessel to be boarded, as described above, and provide added fire power from onboard 7.62 mm or .50 Cal machine guns if required in an uncooperative mission. The helicopter will approach the suspect vessel, use an appropriate insertion/extraction method for the tactical situation to place the boarding party on the suspect vessel, and then standby in a hover or close proximity flight pattern to provide armed support as required. Despite the notional description provided herein, this is a non-firing event within the complex. The typical event duration is 1.5 hours.

Training Considerations
A range support vessel or other commercial style vessel can be used as the suspect vessel to be boarded and may be staffed with opposing forces to create a better training environment.

ANTI-SUBMARINE WARFARE

NOTE: All anti-submarine warfare descriptions are found in the Atlantic Fleet Active Sonar EIS/OEIS.

AIR WARFARE OPERATIONS

AIR INTERCEPT CONTROL

Surface ships and fixed winged aircraft use their air search radar capability to direct strike fighter aircraft toward threat aircraft where the threat aircraft may be engaged and destroyed by the strike fighter's missiles or guns.

Operation	Platform	System / Ordnance	Event Duration	Number of Sorties/Events
Air Intercept Control[12]	F/A-18, E-2C	Air Search Radar	1-2 hours	40 sorties

E-2C with Air Search Radar

Basic Phase (Unit Level Training) Scenario
The goal of the AIC exercise is the training of both the controllers and the aircraft pilots to intercept and simulate destruction of an opposing aircraft with its own force aircraft using either the aircraft's missile or gun systems.

Air intercept controllers embarked in CVN, CG, DDG, E-2C, and sometimes in Navy school houses, use air search radars to track both the friendly strike fighter interceptor and the threat aircraft at altitudes typically well above 15,000 feet. Friendly and threat aircraft may be 100 nm apart at the start of this exercise. When the threat aircraft is detected by the controller's air search radar, a course and speed is provided to the strike fighter to intercept and engage the threat aircraft. Speeds in excess of 450 kts may be used. No HE ordnance is used, but captive carry missiles may be used when strike fighters participate, and thereby complete MISSILEX (A-A) or GUNEX (A-A) exercises. Several intercepts are usually conducted over 1-2 hours.

Fleet aircraft often are not available for this training, so commercial air services aircraft are often used to provide the level of training required by controllers.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario, except that two to four interceptors may be directed toward larger numbers of threat aircraft.

12 AIC can have 2-6 aircraft per intercept.

STRIKE WARFARE

BOMBING EXERCISE – AIR-TO-GROUND

Fixed-winged strike fighter aircraft deliver bombs and rockets against land targets, day or night, with the goal of destroying or disabling enemy vehicles, infrastructure, and personnel. Within the GOMEX Range Complex, these events occur at the McMullen Range Complex (Yankee Target and Dixie Target) and the SEARAY Target Range.

Operation	Platform	System / Ordnance	Event Duration	Number of Sorties/Events
BOMBEX (A-G)	T-45	MK-76 NEPM bombs BDU-33 NEPM bombs	1 hour	12,800 sorties (17,640 MK-76 bombs) (3,405 BDU-33 bombs)
	T-45, F-16	MK-76 NEPM bombs	1 hour	306 sorties (1,433 MK-76 bombs)
	F-16, F-15, T-38	BDU-33 NEPM bombs MK-82 NEPM bombs	1 hour	489 sorties (2,400 BDU-33 bombs) (236 MK-82 bombs)

<u>F-16, F-15, T-45 with Unguided Bombs and T-38 with No Drop Bomb Scoring System</u>
Unguided munitions: MK-76 and BDU-33 (NEPM training bombs); MK-80 series bomb (NEPM).

Basic Phase (Unit Level Training) Scenario
A flight of two aircraft will approach the target from an altitude of between 15,000 ft to less than 3,000 ft and, when on an established range, will usually establish a racetrack pattern around the target. The pattern is established in a predetermined horizontal and vertical position relative to the target to ensure that all participating aircraft follow the same flight path during their target ingress, ordnance delivery, target egress, and "downwind" profiles. This type of pattern is designed to ensure that only one aircraft will be releasing ordnance at any given time. The typical bomb release altitude is below 3,000 ft and within a range of 1,000 yards for unguided munitions; above 15,000 ft and may be in excess of 10 nm for precision-guided munitions. Exercises at night will normally be done with captive carry (no drop) weapons because of safety considerations. The T-38 is now equipped with a no-drop bomb system (i.e., a simulated bomb run without dropping any ordnance). By using airspeed, altitude and other data, the new computers can accurately determine where a bomb would fall once the button is pushed.

Laser designators from the aircraft dropping the bomb, a support aircraft, or ground support personnel are used to illuminate certified targets for use with lasers when using laser guided weapons. The average time for this exercise is about one hour.

Integrated and Sustainment Phase Training Scenarios
Typically involves a simulated strike scenario with a flight of four or more aircraft, with or without a designated OPFOR. Participating aircraft attack the target using real-world tactics, which may require that several aircraft approach the target and deliver their ordnance, simultaneously, from several different altitudes and/or directions.

Training Considerations
Strike fighter pilots can fulfill this training requirement against either a land or water target, but the land target is most common.

Unguided munitions: Usually conducted at land ranges with NEPM or HE ordnance, or water ranges with grounded ship hulks available for targets. MK-76, BDU-48 and BDU-33 NEPM bombs are the most common weapon allocation.

The major difference between a BOMBEX (A-S) and BOMBEX (A-G) is related to targets. Ground targets may include any combination of fixed and mobile targets. Fixed targets may include a bull's eye of concentric rings and real or simulated wheeled vehicles, convoys, trains, aircraft, buildings, petroleum and oil storage areas, personnel silhouettes, and artillery and missile sites. Mobile targets include remote-controlled wheeled vehicles. Any ashore BOMBEX target may be actively or passively augmented to provide radar, infrared, or electronic signals, or support laser designation.

Feedback to participants is very important for this exercise and can include any combination of real-time and post-mission feedback from a Weapon Impact Scoring System (WISS) or instrumented range, real-time visual sighting by range observers or participating aircrews, and post-mission telephonic or facsimile debrief.

GUNNERY EXERCISE (AIR-TO-GROUND)

Strike fighter aircraft and helicopter crews, including embarked Naval Special Warfare personnel, use guns to attack ground targets, day or night, with the goal of destroying or disabling enemy vehicles, structures, or personnel.

Operation	Platform	System / Ordnance	Event Duration	Number of Sorties/Events
GUNEX (A-G)	F-16, F-15	20 mm	1 hour	163 sorties (25,000 rounds)

F-15 and F-16 with Vulcan M61A1/A2 20 mm Cannon

Basic Phase (Unit Level Training) Scenario
A flight of two aircraft will begin its descent to the target from an altitude of about 3,000 ft while still several miles away. Within a distance of 4,000 ft from the target, each aircraft will fire a burst of about 30 rounds before reaching an altitude of 1,000 ft, then break off and reposition for another strafing run until each aircraft expends its exercise ordnance allowance of about 250 rounds. The exercise lasts about one hour.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario.

Training Considerations
Strike fighter pilots can fulfill this training requirement against either land targets, such as a bull's eye or target vehicles like trucks or tanks, or water targets, such a grounded ship hulks at water ranges or at specially prepared floating ship hulks during an occasional Sinking Exercise (SINKEX).

AMPHIBIOUS WARFARE

FIRING EXERCISE WITH INTEGRATED MARITIME PORTABLE ACOUSTIC SCORING AND SIMULATION SYSTEM

Surface ships use main battery guns to support forces ashore in their battle against threat forces. With the Integrated Maritime Portable Acoustic Scoring and Simulation System (IMPASS) system (discussed below), the shore area is simulated at sea.

Operation	Platform	System / Ordnance	Event Duration	Number of Events
Firing Exercise (FIREX)	CG, DDG	5-inch gun	8 hours	8 events (800 NEPM rounds)

Naval Surface Fire Support (NSFS) normally consists of the bombardment of a target within an impact area, by one or more ships. The ship is often supported by Navy, Marine, or Naval Special Warfare (NSW) spotters ashore, or by spotters embarked in fixed-wing aircraft or helicopters in the air, to call for the fire support from the ship, and to adjust the fall of shot onto the target.

The locations and opportunities for live-fire from a ship at sea to targets ashore are very limited, and often the training range area is not adequate to establish and maintain surface fire support proficiency. A technology solution has been developed to precisely determine the impact of rounds fired at a simulated or virtual land area containing virtual targets located in the ocean, which enables ships to complete Naval Surface Fire Support (NSFS) training in the absence of a land target or impact area.

CG and DDG with 5-inch Guns

FIREX (IMPASS)
This exercise follows the same scenario as a FIREX (Land), except the entire exercise is conducted at sea, and all the spotters are simulated. The scenario is as follows: the ship positions itself about 4 to 5 nm from the target area to receive information concerning the target and the type and exact location of the target from the assigned spotter. One or more rounds are fired at the target. The fall of the round is observed by the spotter, who then tells the ship if the target was hit or if the ship needs to adjust where the next round should fall. More shots are fired, and once the rounds are falling on the target, the spotter will request a larger number of rounds to be fired to effectively destroy the target. Typically five rounds are fired in rapid succession (about one round every 5 - 7 seconds). Ten or more minutes will pass, and then similar missions will be conducted until the allocated number of rounds for the exercise has been expended.

About 70 rounds of 5-inch NEPM are expended by the CG or DDG during a typical exercise. The exercise is conducted during the day a minimum of 12 nm from shore. A ship will normally conduct three FIREXs at different levels of complexity over several months to become fully qualified.

The current training system is supported by the IMPASS system. The training system is an onboard computer system that provides a realistic presentation, such as a land mass with topography, to the ship’s systems. The scoring system is deployed by the firing ship and consists of five sonobuoys set in a pentagon-shaped arrangement at 1.3 km intervals. Within the ship’s combat system, the training system creates a virtual land mass that overlays the array and simulates land targets. The ship fires its ordnance into this target area; the sonobuoys detect the bearing to the acoustic noise resulting from the impact of a high explosive or NEPM round landing in the water, then transmit their GPS position and their bearing information to the ship. From the impact location data collected, the training system computer triangulates the exact point of impact of the round and, from that data, the exercise may be conducted as if the ship were firing at an actual land target. When the training is complete, the IMPASS buoy system is recovered by the ship.

Basic Phase (Unit Level Training) Scenario

The FIREX with IMPASS exercise is conducted very similarly to the FIREX (Land) exercise from the ship perspective, even though the exercise is conducted completely at sea. Approximately five to 70 rounds of 5-inch NEPM are expended per exercise over several hours (approximately 8 hours). All exercises are conducted in daylight and outside of 12 nm from land to have sufficient sea space to maneuver the ship and lay out the IMPASS sonobuoy pattern.

Integrated and Sustainment Phase Training Scenarios

Typically does not differ significantly from the Basic Phase Scenario with respect to the NSFS procedures and ordnance used.

ELECTRONIC COMBAT

CHAFF EXERCISE

Ships, fixed-winged aircraft, and helicopters deploy chaff to disrupt threat targeting and missile guidance radars and to defend against an attack.

Operation	Platform	System / Ordnance	Event Duration	Number of Sorties/Events
CHAFFEX	CG, DDG, FFG	MK-214 (seduction chaff)	1 hour	10 events (60 canisters)
	CG, DDG, FFG	MK-216 (distraction chaff)	1 hour	4 events (24 canisters)
	F/A-18	RR-144A/AL, RR-129A/L chaff	1 hour	368 sorties (3,680 canisters)
	F-18 (USMC), F-16 (USAF)	R-188 chaff	1 hour	980 sorties (5,000 canisters)

The chaff exercise trains aircraft in the use and value of chaff to counter an enemy threat. Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to elicit frequency responses, which deceive enemy radars. Chaff is employed for a number of different tactical reasons, but the end goal is to create a target from the chaff that will lure enemy radar and weapons system away from the actual friendly platform.

Chaff may be employed offensively, such as before a major strike to “hide” inbound striking aircraft or ships, or defensively in reaction to being detected by an enemy targeting radar. Defensive chaff training is the most common exercise used for training both ships and aircraft. In most cases, the chaff exercise is training for the ship or aircraft that actually deploys the chaff, but it is also a very important event to “see” the effect of the chaff from the “enemy” perspective so radar system operators may practice corrective procedures to “see through” the chaff jamming, so exercises are often designed to take advantage of both perspectives.

Chaff exercises are often conducted with flare exercises, as well as other exercises, rather than as a standalone exercise.

F/A-18C/E/F with Defensive Chaff

There are various types of chaff; the type used varies based on the anticipated threat frequencies to be countered. Typical chaff includes:

- RR-129A/AL - used by all naval airframes.
- RR-144A/AL - designed specifically for training and used by all naval airframes.
- R-188 – used by the USAF and USMC aircraft within the Brownwood MOAs

Basic Phase (Unit Level Training) Scenario

Aircraft detect electronic targeting signals from threat radars or missiles, dispense chaff, and immediately maneuver to defeat the threat. The chaff cloud deceives the inbound missile, and the aircraft clears away from the threat.

The chaff disperses with the winds over a wide area and eventually settles in limited concentrations over the surrounding land or sea areas where it was dispensed. The typical event duration is 1 hour for aircraft.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario.

CG, DDG, FFG with MK-214 or MK-216 Super Rapid Bloom Off-board Chaff Defensive Chaff
Defensive chaff deployed from ships is typically MK-214 (Seduction Chaff) or MK-216 (Distraction Chaff) from the MK-36 Super Rapid Bloom Off-board Countermeasures (SRBOC) launcher. The specific type and amount of chaff deployed depends on the specific tactical situation.

Basic Phase (Unit Level Training) Scenario
A surface ship detects an electronic targeting signal or the ship's search radar detects an inbound threat missile. Chaff rounds are fired automatically or manually, depending on the setting selected for the tactical situation, from the MK-36 SRBOC Chaff and Decoy Launching System, or other similar systems. The chaff forms a cloud that presents a ship size "target," forcing the inbound missile to make a choice between the chaff and the real ship. With the employment of additional countermeasure tactics, the ship may maneuver away from the cloud and cause the missile to choose the chaff "target."

The chaff disperses with the winds over a wide area and will eventually settle in limited concentrations over the surrounding sea areas where it was dispensed. The typical duration is 3 hours for ships.

Integrated and Sustainment Phase Training Scenarios
Typically do not differ from the Basic Phase Scenario.

Training Considerations
The chaff exercise trains shipboard personnel in the use and value of chaff to counter an enemy threat. Chaff is a radar reflector material made of thin, narrow, metallic strips cut in various lengths to elicit frequency responses, which will deceive enemy radars. Chaff is employed for a number of different tactical reasons, but the end goal is to create a target from the chaff that will lure enemy radar and weapons system away from the actual friendly ship.

FLARE EXERCISE

Fixed-winged aircraft and helicopters deploy flares to disrupt threat infra-red (IR) missile guidance systems to defend against an attack.

Operation	Platform	System / Ordnance	Event Duration	Number of Sorties/Events
Flare Exercise (FLAREX)	F/A-18	MJU-8A/B, MJU-27A/B, MJU-32B, MJU-53B, SM-875/ALE	1 hour	368 sorties (1,840 flares)
	F-18 (USMC), F-16 (USAF)	M-206, MJU-7	1 hour	980 sorties (11,930 flare canisters)

Flare exercises principally train aircraft personnel in the use of defensive flares designed to confuse infrared sensors or infrared homing missiles, thereby causing the sensor or missile to lock onto the flares instead of the real aircraft. Aircraft decoy flares use a magnesium extruded flare grain.

Flare exercises are often conducted with chaff exercises, as well as other exercises, rather than as a standalone exercise.

F/A-18C/E/F with Defensive Flares

Types of flares used by aircraft include:

- MJU-8A/B
- MJU-27A/B
- MJU-32B
- MJU-53B
- SM-875/ALE
- M-206 – used by USMC and USAF in Brownwood MOAs
- MJU-7 – used by USMC and USAF in Brownwood MOAs

Basic Phase (Unit Level Training) Scenario

Aircraft detect electronic targeting signals from threat radars or missiles or see a threat missile plume when it is launched, then dispense flares and immediately maneuver to defeat the threat. Typically an aircraft will expend five flares in an exercise while operating above 3,000 ft. Each flare is completely consumed while it is in the air. The typical event duration is 1 hour.

Integrated and Sustainment Phase Training Scenarios

Typically do not differ from the Basic Phase Scenario.

MISSION AREA TRAINING

BASIC FLIGHT INSTRUCTION AND MISSION AREA FLIGHT TRAINING

Although not one of the primary warfare areas (*i.e.*, MIW, NSW, SUW, ASW, AW, EC), mission area training in the GOMEX Range Complex involves aircraft used to train entry-level students in the fundamentals of flying. Graduates advance along training paths leading to qualification as military pilots in helicopters and fixed-wing aircraft. A number of flight training locations are found throughout the GOMEX Range Complex, including: at Naval Air Station (NAS) Pensacola, Florida, NAS Whiting Field, Florida, NAS Meridian, Mississippi, NAS Corpus Christi and NAS Kingsville, Texas. The flight training takes place in the MOAs and offshore Warning Areas. Training activities conducted include air combat maneuvers, air intercept control, aerial refueling, student pilot training, and reconnaissance.

<table>
<tr><th>Operation</th><th>Platform</th><th>System / Ordnance</th><th>Number of Sorties</th><th>Location</th></tr>
<tr><td>Mission Area Training</td><td>F-15/16/18, E-2/3, (K)C-5/130/135, P-3</td><td>N/A</td><td>328</td><td>W-92/W-54</td></tr>
<tr><td rowspan="11">Basic Flight Instruction</td><td>T-34, T-6, T-45, T-39</td><td>N/A</td><td>3865</td><td>W-228</td></tr>
<tr><td>T-6, T-45, T-39</td><td>N/A</td><td>1737</td><td>R-4404</td></tr>
<tr><td>T-34, T-6, T-45, T-39</td><td>N/A</td><td>5498</td><td>Meridian 1 East MOA</td></tr>
<tr><td>T-6, T-45, T-39</td><td>N/A</td><td>3783</td><td>Meridian 1 West MOA</td></tr>
<tr><td>T-6, T-45, T-39</td><td>N/A</td><td>3092</td><td>Pine Hill East MOA</td></tr>
<tr><td>T-6, T-45, T-39</td><td>N/A</td><td>3091</td><td>Pine Hill West MOA</td></tr>
<tr><td>T-34, T-6, T-39</td><td>N/A</td><td>243</td><td>Pensacola North MOA</td></tr>
<tr><td>T-34, T-6, T-45, T-39</td><td>N/A</td><td>2580</td><td>Pensacola South MOA</td></tr>
<tr><td>T-34, T-6, T-45, T-39</td><td>N/A</td><td>180</td><td>R-2908</td></tr>
<tr><td>T-34, T-6, T-45, T-44, TC-12
AF: F-16, T-1</td><td>N/A</td><td>20684</td><td>Kingsville MOA 1-5</td></tr>
<tr><td>T-34, T-6, T-45, T-44, TC-12
AF: F-16, T-1</td><td>N/A</td><td>1008</td><td>R-6312</td></tr>
<tr><td rowspan="3">Mission Area Training</td><td>KC-135, F-18/16, B-1/52, C-12/130, E-2, T-1/6/45, G200</td><td>N/A</td><td>329</td><td>Brownwood 1 MOA</td></tr>
<tr><td>KC-135, F-18/16, B-1/52, C-12/130, E-2, T-1/6/45, G200</td><td>N/A</td><td>325</td><td>Brownwood 2 MOA</td></tr>
<tr><td>KC-135, F-18/16, B-1/52, C-12/130, E-2, T-1/6/45, G200</td><td>N/A</td><td>326</td><td>Brownwood 3/4 MOA</td></tr>
</table>

UNDERWATER DEMOLITIONS

Navy Divers, Security Forces, Salvage Divers, and EOD personnel use small explosive charges to destroy obstacles or other structures in an underwater area that could cause interference with friendly or neutral forces and planned operations.

Navy Divers, Security Forces, Salvage Divers, and EOD Personnel with Explosive Charges

Basic Phase (Unit Level Training) Scenario
Security Forces, Navy Salvage Divers, and EOD personnel locate barriers or obstacles designed to block access to beach areas, then use small explosive charges to destroy them. All this type of training in the GOMEX Range Complex occurs at the NSA Panama City Demolition Pond Area. Training can involve 20 to 25 personnel assembled on or near the shore. A low student to instructor ratio is used for safety purposes. After extensive safety briefings and perimeter clearance, students work up various charges and caps and detonate the charges underwater. During training, no targets are used.

Training Considerations
Range operations use less than 5 lbs of C-4 or other explosives, which are detonated in shallow water. This training provides personnel with experience in placing and detonating underwater explosives to achieve best results.

Table D-1: Underwater Demolitions at the NSA Panama City Demolition Pond

Training Group	System / Ordnance	Description	Explosive	NEW	Units Per Year – No Action	Units Per Year -Alt 1 & 2	Training Days Per Year
Salvage Diver Training	Signal, Illum., Red	Red signal flare	No	0.0049	1	9	60 days
	CHG,DML,C-4,1.25	Demolition charge, C-4	Yes	1.25	561	458	
	CHG,DML,TNT,1/2LB	Demolition charge, TNT	Yes	0.5	402	435	
	CAP,BLASTING,ELEC,M6	Electric blasting cap	Yes	0.003	771	646	
	CAP,NON-ELEC, M7	Non-electric blasting cap	Yes	0.003	660	536	
	CORD,DET,PRIMACORD	Primacord - explosive in the form of a cord	Yes	0.007	17150	17800	
	CORD,DET,REINFORCED	Primacord reinforced (additional layering of non-explosive material for strength)	Yes	0.007	1030	750	
	FUSE,BLASTING,TIME	Time fuse (contains small explosive charge)	No	0.0027	7200	7000	
	IGNITER,TIME FUSE	Time fuse (contains 'match' to initiate detonation)	No	0.0001	830	730	
	CHG,EXPL ROLL, 25FT	Explosives in sheet form	Yes	1	80	75	
	DET,NONEL,1000FT	Explosives initiator in form of tube containing explosive material	Yes	0.03	80	60	
	INIT,PYRO LEAD MK24	Explosives initiator ignition device	Yes	0.0003	90	60	
	CHG,DML,TNT 1LB	Demolition charge, TNT	Yes	1	144	144	
	DET,NON-ELEC MK123	Explosives initiator in form of tube containing explosive material	Yes	0.01	53	53	
	SHOCK TUBE 1000FT	Explosives initiator in form of tube containing explosive material	Yes	0.01	140	140	

Table D-1 (Continued): Underwater Demolition Training

Training Group	System / Ordnance	Description	Explosive	NEW	Units Per Year – No Action	Units Per Year -Alt 1 & 2	Training Days Per Year
EOD Tech Training	WATER GEL EXP.COM	Semi-solid explosive gel	Yes	0.5	1	0	12 days
	GRENADE, HAND SMK	Smoke marker (grenade)	No	0.72	3	0	
	DEVICE,RECALL,MK137	Diver's signaling device (small explosive charge)	Yes	0.007	2	2	
	CHG,DML,C-4,1.25	Demolition charge, C-4	Yes	1.25	10	10	
	CHG,DML,SHEET M118	Explosives in sheet form	Yes	2	6	6	
	CAP,BLASTING,ELEC,M6	Electric blasting cap	Yes	0.003	64	30	
	CAP,NON-ELEC, M7	Non-electric blasting cap	Yes	0.003	10	30	
	CORD,DET,PRIMACORD	Primacord - explosive in the form of a cord	Yes	0.007	2300	1000	
	FUSE,BLASTING,TIME	Time fuse (contains small explosive charge)	No	0.0027	100	150	
	CHG,DML,M183	Demolition charge, C-4	Yes	1.25	3	3	
	IGNITER,TIME FUSE	Time fuse (contains 'match' to initiate detonation)	No	0.0001	13	30	
	CHG,EXPL ROLL, 25FT	Explosives in sheet form	Yes	0.8	1	2	
	CHG,DML,ORD DISPL	Demolition charge, C-4	Yes	0.05	2	2	
	CHG,DML,ORD DISPL	Demolition charge, C-4	Yes	0.17	12	2	
	CHG,DML,ORD DISPL	Demolition charge, C-4	Yes	0.002	2	2	
	CHG,DML,ORD DISPL	Demolition charge, C-4	Yes	0.4	2	2	
	CORD,DET,HEAVY LOAD	Primacord - explosive in the form of a cord, reinforced (additional layering of non-explosive material for strength)	Yes	0.02	4	4	

Table D-1 (Continued): Underwater Demolition Training

Training Group	System / Ordnance	Description	Explosive	NEW	Units Per Year – No Action	Units Per Year -Alt 1 & 2	Training Days Per Year
Security Force Training	DIVER, RECALL	Diver's signaling device (small explosive charge)	Yes	0.007	60	60	10 days
	CTG.,40MM BLK	40mm cartridge - no explosive fill in projectile	Yes	0.12	6	108	
	CTG.,40MM BLK	40mm cartridge - no explosive fill in projectile	Yes	0.5	0	108	
	FUSE, DELAY,M228	Practice grenade fuse	Yes	0.005	144	144	
	SIG,SMK,MARINE,MK131	Smoke marker	No	0.15	2	0	
	FLARE, SIG,MK132	Signal flare	No	0.49	1	0	
	MARKER,MARINE MK58	Smoke marker	No	4.5	2	2	
Diver Training	CHG,DML,C-4,1.25	Demolition charge, C-4	Yes	1.25	10	10	8 days
	CHG,DML,SHEET M118	Explosives in sheet form	Yes	3	4	4	
	CAP,BLASTING,ELEC,M6	Electric blasting cap	Yes	0.003	20	50	
	CAP,NON-ELEC, M7	Non-electric blasting cap	Yes	0.003	20	50	
	CORD,DET,PRIMACORD	Primacord - explosive in the form of a cord	Yes	0.007	500	600	
	FUSE,BLASTING,TIME	Time fuse (contains small explosive charge)	No	0.0027	200	500	
	IGNITER,TIME FUSE	Time fuse (contains 'match' to initiate detonation)	No	0.0001	24	32	

RESEARCH, DEVELOPMENT, TESTING AND EVALUATION (RDT&E)

RDT&E is conducted principally by Naval Air Systems Command (NAVAIR), Space and Naval Warfare Systems Command (SPAWAR), Naval Sea Systems Command (NAVSEA), and the various commands that report to them. NAVAIR conducts testing of aircraft, aircraft weapons, and the "Integration Testing" of all subsystems (including weapons) with the aircraft. SPAWAR focuses on engineering and fleet support for command, control and communications systems and ocean surveillance. NAVSEA conducts RDT&E on various surface and subsurface systems. In addition to the NAVSEA RDT&E events generally described herein, NAVSEA conducts those RDT&E events specifically described in the Final Environmental Impact Statement/Overseas Environmental Impact Statement for Naval Surface Warfare Center Panama City Division Mission Activities (September 2009).

RDT&E operations can be further categorized within at least three subcategories:

- Operational Test & Evaluation (OT&E)
- Developmental Test & Evaluation (DT&E)
- Production Acceptance Test & Evaluation.

The principal output of RDT&E range operations are data. All Operational T&E and live-fire T&E activities require some method for data collection/capture/recording and debrief, and therefore require sophisticated range instrumentation and advanced range communications. In many cases, this equipment can be used for both RDT&E and unit training by providing more detailed feedback to the units being trained.

Tests include a wide variety of aircraft, ships, ocean engineering, missile firings, torpedo testing, manned and unmanned submersibles, unmanned aerial and underwater vehicles, electronic warfare and other Navy weapons systems. Tests are used principally for equipment maintenance and to ensure that various types of equipment within a unit works well together. Table D-2 describes RDT&E events in greater detail.

Table D-2. Baseline RDT&E Operations

Mission Area	Operation	Operation Description
Planned Testing & Evaluation Operations	Testing and Evaluation Operations	Chief of Naval Operations (CNO) designated activities, torpedo, torpedo defense, submarine and periscope detection, ship-defense systems, missile defense, and other miscellaneous programs (such as gunnery/special weapons tests). These programs involve the testing and evaluation of enhancements on systems already used in exercises conducted in the range complex.
	Ocean Engineering	Ocean Engineering research and development testing involves ocean deployment of hardware, cabling, mine countermeasures equipment (including HE ordnance testing), underwater tools and equipment and related components. Test items are placed in appropriate locations in the water and/or on the sea floor to measure long-term effects of exposure to the marine environment, with test durations running from days to decades depending on the item being tested. Items undergoing testing can be continuously monitored via underwater video, electronics, or other passive means. Monitoring is also periodically performed with SCUBA divers or with remotely operated vehicles piloted from the pier or a small boat. Removal of marine growth from the items being tested is required periodically.
	Anti-Air Warfare RDT&E	Testing and training on Aegis capable ships after refurbishment or overhaul.
	Aircraft Flight Tests	These flights involve similar tasks and maneuvers that are part of the AIC mission; *i.e.*, maneuvering flight, use of radar, navigation, data links, sensors, fire control systems, *etc*. Flights can involve various fixed wing and rotary wing aircraft, including UAVs. Speeds are typically between 50 and 500 kts, but can reach supersonic (Mach 1.4) on occasion.
	Surface Ship Radiated Noise Measurements	Surface Ship Radiated Noise Measurements (SSRNM) are assessments conducted on surface ships at a specified periodicity to determine a ships radiated noise in the water while operating underway. The data collected in the SSRNM can be used to reduce a ship's radiated noise and thereby increase the ship's threat detection capability, reduce mutual ship interference, reduce the ability of a passive torpedo to acquire the ship, and reduce the chance of the ship detonating an acoustically-activated mine.
	Anti-Submarine Warfare (ASW)	ASW typically involves the use of sonobuoys deployed from aircraft to detect submerged threats. Other equipment used can include explosives (SUS MK-61, SUS MK-64, Marine markers, and dipping sonars. Typical aircraft involved include helicopters, P-3s, and Multi-mission Maritime Aircraft.
	Sonobuoy Quality Assurance/Quality Control	Sonobuoys are expendable devices used for the detection of underwater acoustic sources and for conducting vertical water column temperature measurements. The Navy's sonobuoy QA/QC program is a test and evaluation effort to ensure manufacturer compliance with operational and technical specifications. Four types of sonobuoys are tested: passive, active, bathythermograph and explosive. Those sonobuoys that perform satisfactorily are scuttled and not recovered. Those that fail testing are recovered for analysis and rework. A boat in the vicinity of the impact area monitors the area for safety and recovers malfunctioning sonobuoys.
	Combat System Ship Qualification Trial	Conducted for new ships and for ships that have undergone modification and/or overhaul of their combat systems, can include operating any or all of a ship's combat systems.
	RDT&E Bombing Exercises (BOMBEX)	BOMBEX involves aircraft employing bombs (98% NEPM) and the release of other inert stores such as empty fuel tanks, launch rails, mass models, and other similar objects on various types of stationary and mobile targets.
	Electronic Combat/Electronic Warfare	Tests designed to assess how well EC/EW training exercises are performed. Includes signal identification, electronic systems operations, and the deployment of chaff, flares, and decoys.
	Acoustic Trials	Acoustic testing, meant to increase ship survivability in threat environments, identifies a ship's quiet operating speeds, defines the ship's radiated acoustic signature, outlines noise problems and isolates sources of classifying tones.
	High Frequency	Use of high frequency radio signals and the evaluation of their effectiveness.

Table D-2. Baseline RDT&E Operations

Mission Area	Operation	Operation Description
Planned Testing & Evaluation Operations	At Sea Bearing Accuracy Tests (ASBAT)	ASBAT determines the accuracy of submarine radio direction finding equipment, and provides test signal generation or Radio Direction Finding signals for electronic surveillance measures shipboard sensors as well as underwater tracking, communications, and surveillance radar.
	Missile and Gunfire RDT&E	General air-to-air, air-to-surface, surface-to-air, and surface-to-surface missile exercises. Various missiles may be tested including AIM-120 AMRAAM, AIM-9 Sidewinder, AIM-132 ASRAAM, and AIM-7 Sparrow. Various targets may be employed, and chaff and flares may also be incorporated into the missile tests. In Air-to-Surface missile events, the following missiles may be used: AGM-45 Shrike; AGM-114 Hellfire; AGM-88 HARM; AGM-65 LSR Maverick; AGM-119 Penguin; BQM 34/74 Firebee/Chukar; GQM-163 Coyote; AGM-62 Walleye; AGM-84 Harpoon. Gunfire events at sea can include expenditure of predominantly 20mm projectiles; however, .50 cal, 7.62 mm, 25mm, 30mm and 40mm are used on occasion.
	Weapon System Accuracy Trials	WSAT are conducted aboard Anti-Submarine Warfare (ASW) capable ships to demonstrate their performance after construction, conversion, or overhaul. The WSAT is a comprehensive test of the complete ASW combat system and is the final examination before Combat System Certification. Functions tested include target acquisition and tracking, fire control solution, weapons launch, and weapons delivery accuracy. WSATs dynamically evaluate the accuracy of ship ASW, navigation, and weapon system errors; determine system adequacy, and are used to align systems and to improve design. The WSAT uses differential Global Positioning System (GPS), microwave underwater tracking, and/or optical theodolites to determine the ship's position and heading accurately. Data are collected on each of the ship's sensors and merged with tracking data to computer range and bearing errors and to evaluate alignment.
	Airborne Mine Countermeasures RDT&E	These events involve deployment and operation of mine detection equipment from helicopters at sea. Mine detection equipment can include: AN/ASQ-20A, Airborne Laser Mine Detection System (ALMDS), Airborne Mine Neutralization System (AMNS), and Rapid Airborne Mine Clearance System (RAMICS) may also be included.
	Joint Task Force Wide Area Relay Network	Demonstration of advanced Command, Control and Communications technologies in a highly mobile, wireless, wide-area relay network in support of tactical forces.
	Test Unmanned Surface Vehicles	Remote-controlled boats equipped with modular packages to potentially support surveillance and reconnaissance activities, mine warfare, anti-terrorism/force protection, port protection, Special Forces operations, and possibly anti-submarine warfare.

Table D-2. Baseline RDT&E Operations

Mission Area	Operation	Operation Description
Planned Testing & Evaluation Operations	Test Unmanned Aerial Vehicles	Remotely piloted or self-piloted aircraft that include fixed-wing, rotary-wing, and other vertical takeoff vehicles. Can carry cameras, sensors, communications equipment, weapons, or other payloads. Could support: intelligence, surveillance, and reconnaissance; suppression of enemy air defenses; electronic attack; anti-surface ship and anti-submarine warfare; mine warfare; communications relay; and derivations of these themes.
	NAVAIR Events in Support of NAVSEA	The NAVSEA RDT&E operations that NAVAIR supports include test operations such as Ship Self Defense Systems (SSDS), Combat Surface Ship Qualification Trials (CSSQT), Cooperative Engagement Capability (CEC), Theater High Altitude Air Defense, Ship Survivability Tests, Electronic Warfare, Littoral Combat Ship (LCS) and DDX Trials, and similar scenarios. These support operations include target presentation, support aircraft flights, data collection, analysis, range safety, electronic warfare support, reconnaissance, ship ground station interface, and other aviation related support to MISSILEX and TRACKEX events. BQMs, Coyotes and AQMs are launched from surface vessels. Aerial Target Presentations in support of Live MISSILEX Events. BQM-34/74 (subsonic) aerial targets. BQM denotes surface launched, AQM denotes air-launched. Coyote is a supersonic aerial target. Several other types of missiles may be launched from the NAVSEA platform under test. They could include SM-1, SM-2, Rolling Airframe Missile, Sea Sparrow, Tomahawk, or other types of surface launched weapons. The Phalanx weapons systems may also be deployed during certain exercises.
Naval Undersea Warfare Center Ranges	Shipboard Electronic Systems Evaluation Facility (SESEF) Quick Look Tests	Evaluate ship, shore, and aircraft systems that emit or detect electronic emissions. These systems include those used for radio communications, data transfer, navigation, radar, and identification of friend and foe.
	SESEF System Performance Tests	Provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship's radar
	Fleet Operational Readiness Accuracy Check Site (FORACS) Tests	Provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship's radar.
Future RDT&E Operations	Directed Energy	Develop the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated with future high energy laser tests.

MAJOR RANGE EVENTS

A Major Range Event is a significant operational employment of live forces during which live training is accomplished.

- It is a major field and/or at-sea exercise with multiple training objectives.
- It usually occurs over an extended period of days or weeks.
- It is typically composed of multiple range operations, each with its own mission, objective, and time period.
- The composition and timing of range operations may be driven by a scenario to create an anticipated real-world situation.

Major range events, typically include:

- Carrier Strike Group Composite Training Unit Exercise (CSG COMPTUEX)
- Expeditionary Strike Group Composite Training Unit Exercise (ESG COMPTUEX)
- Joint Task Force Exercise (JTFEX).

Major range events:

- Are significant operational employments during which range operations are conducted involving multiple Navy Tactical Tasks (NTA)/Marine Corps Tasks (MCT), units, and capabilities.
- Normally involve a large number of personnel and air, surface, subsurface and ground assets in multi-dimensional exercises designed to train a force for deployment.
- Typically occur across a broad area of a range complex or in multiple range complexes.

Participants typically include as many as:

- Ten surface ships (CVN or LHA/LHD, LPD, and LSD, and CGs, DDGs, and FFGs)
- Three submarines (SSN)
- One hundred aircraft, both fixed winged and helicopters
- Eight thousand personnel embarked in the ships and aircraft.

A major range event is essentially a number of “unit level” range operations conducted by several units operating together and directed by a centralized command and control commander, such as a Strike Group commander. For example, a Carrier Strike Group could conduct a coordinated antisubmarine operation in which several units (FFG, CG, DDG, SH-60B/F, MH-60R, MPA, SSN) work together to find and “destroy” an “enemy” submarine within a larger scenario where other units conduct an air strike against a target ashore.

Any of the range operations included in this publication could feasibly be included in a major range event. Range operations are chosen to be included in the major range event based on the anticipated operational missions that will be performed during the Strike Group’s deployment and the state of readiness already achieved by the participating units.

CSG COMPTUEX

The CSG COMPTUEX is an Integrated Phase, at-sea, major range event that integrates the aircraft carrier and carrier air wing with surface and submarine units in a challenging environment. Commander Strike Force Training Atlantic schedules and conducts the CSG COMPTUEX in accordance with a schedule of events plan. It is nominally 26 days long with two scenario-driven “mini” multi-threat battle problems, one about 24 hours long and the other about 18 hours long.

The operations included in the scenario are specifically tailored for the operational training needed by the Strike Group prior to their deployment, and they are held at various times of the year depending on the rotational nature of the Strike Group's deployment. Typically, live-fire operations that take place during COMPTUEX include long-range air strikes, NSFS, and other surface gunnery and missile exercises.

JOINT TASK FORCE EXERCISE (JTFEX)

JTFEX is a scenario-driven, sea control, power projection exercise with the purpose of evaluating the readiness of naval forces and testing the interoperability and proficiency of these forces in realistic scenarios ranging from military operations other than war to armed conflict. JTFEX typically encompasses operations from in port to sea-air-land combat, to special warfare, to humanitarian assistance operations.

JTFEX is a dynamic and complex major range event that is the culminating exercise in the Sustainment Phase training for the Carrier Strike Group (CSG) or Expeditionary Strike Group (ESG). Commander Third Fleet and Commander Second Fleet have specified hundreds of Sustainment Phase training objectives contained within most warfare mission areas for CSGs and ESGs to accomplish through the range operations included in their tailored JTFEX. JTFEX may be conducted simultaneously with CSGs and ESGs working together, but this opportunity is infrequent because of their differing schedules.

JTFEX emphasizes mission planning and effective execution by all primary and support mission elements, including command and control, surveillance, intelligence, logistics support, and the integration of tactical fires. JTFEXs are complex and evaluate a strike group in all warfare skills. JTFEX is nominally 10 days long, not including a 3-day in port Force Protection Exercise, and can be the last at-sea exercise for the CSG prior to deployment.

JTFEXs usually involve one CSG or ESG made up of the following participants:

- CSG: 1 CVN with Carrier Air Wing, 1 CG, 1-2 DDG, 1-2 FFG, 1 AOE, 1 SSN or SSGN
- ESG: 1 LHA or LHD with Air Wing, 1 CG, 1-2 DDG, 1-2 FFG, 1 LPD, 1 LSD, 1 AOE, 1 SSN or SSGN, Embarked Marines.

The vast majority of range operations specified for a JTFEX can be completed within the training areas of a single range complex, but depending on the exercise scenario, they may expand to include the use of other nearby ranges.

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APPENDIX E
TARGETS AND WEAPON SYSTEMS

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APPENDIX E
WEAPON SYSTEMS

Table E-1. Typical Existing Target Systems Used in the GOMEX Range Complex

Type	Category	Name	Propellant Type
Subsurface			
		Inert Mine Shape	N/A
Surface			
		MK-58 Marine Marker	N/A
		High Speed Maneuvering Surface Target	Liquid
		MK-33 Seaborne Powered Target (SEPTAR)	Liquid
		Floating-at-Sea Target	N/A
		Trimaran	N/A
		Radar Reflective Surface Balloon (Killer Tomato)	N/A
Land			
		Simulated Objects (Convoys, Gun Emplacements, Missile Launchers, Bridge, Airfields) and Strafing Banner	N/A

Source: U.S. Department of the Navy, 1988a.

Table E-2. Typical Existing Weapons Used in the GOMEX Range Complex

Type	Category	Name	Propellant Type (Liquid/Solid)
Guns			
	Ship	Large Caliber Naval Guns (5-inch and 76 mm)	N/A
	Ship	Phalanx/Vulcan (20 mm)	N/A
	Ship	25 mm machine gun	N/A
	Ship/Boat	.50 cal, CIWS, 7.62 mm, 25mm, 40 mm machine gun	N/A
	Air	20mm (F/A-18); 25mm (AV-8B) 7.62mm and .50 Cal (rotary wing)	N/A
Underwater Detonations			
	EOD Diver	5-, 10-, 20-lb Underwater Detonation Charge	N/A
	Boat	MK3A2 grenades	N/A
Bombs			
	Air	BDU-33	N/A
	Air	BDU-45	N/A
	Air	MK-76	N/A
	Air	MK-82	N/A
	Air	MK-83	N/A
	Air	MK-84	N/A

NA=Not Applicable; Source: Adapted from U.S. Department of the Navy, 1998a

Table E-3. Typical Electronic Warfare Assets Used in the GOMEX Range Complex

TYPE	CHARACTERISTICS	
	Frequency Bands	**Power Output (Maximum)**
Air and Seaborne Electronic Warfare Assets		
Expendable Radar Transmitter Sets		
AN/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	80 kW
AN/DPT-2(V)	9.375 GHz	20 kW
Threat Simulators (Airborne)		
AN/AST6DPT-1(V)	Version V10 7.8-8.5 GHZ	15 MW
	Version V20 8.5-9.6 GHZ	20 MW
	Version V30 14-15.2 GHZ	25 MW
	Version V42 15.5-17.5 GHZ	30 MW
AN/AST 9	Version India (M) 8.5-9.6 GHZ	20 MW
	Version India (T) 8.5-9.6 GHZ	115 kW
	Version Juliet (M) 14-15.2 GHZ	25 MW
	Version Juliet (T) 14-15.2 GHZ	115 kW
Radar Jamming Systems (Airborne)		
AN/ALQ 167	Version V38 425 to 445 MHZ	800 W
	Version V39 902-928 MHZ	800 W
	Version V46 2.9-3.5 GHZ	800 W
	Version V15a/6X 9-10.2 GHZ	800 W
Communications Jamming System (Airborne)		
AN/USQ-113	Version V1 20-500 MHZ	400 W

Table E-3 (continued). Typical Electronic Warfare Assets Used in the GOMEX Range Complex

TYPE	CHARACTERISTICS	
	Frequency Bands	**Power Output (Maximum)**
Air and Seaborne Electronic Warfare Assets		
Chaff (Passive system)		
R-144	N/A	N/A
R-129	N/A	N/A
RR-181/AL	N/A	N/A
R-188	N/A	N/A
MK-214	N/A	N/A
MK-216	N/A	N/A
Flares (Infrared Countermeasures)		
MK-46 MOD 1C	N/A	N/A
M-206	N/A	N/A
MJU-7	N/A	N/A
MJU-8A/B	N/A	N/A
MJU-27A/B	N/A	N/A
MJU-32B	N/A	N/A
MJU-53B	N/A	N/A
SM-875/ALE	N/A	N/A

Source: Adapted from U.S. Department of the Navy, 1998a.

Notes:

ft	feet	MW	megawatts
kW	kilowatts	GHz	gigahertz
mm	millimeters	W	watts
lb	pounds		
MHz	megahertz		

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TYPICAL EXISTING TARGET SYSTEMS USED IN THE GOMEX RANGE COMPLEX

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AIR TARGETS

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AIRCRAFT

Propeller Aircraft

Description	Physical Characteristics
Mission Support • Air Intercept Control training • Internal Large Area Tracking Range • Low Slow Flyer • ASTAC	**Aircraft Specifications** • Max Speed at 30,000 ft. 295 kts • Min Air Speed at 30,000 ft. 230 kts • Max Air Speed at 200 ft. 250 IAS • Min Air Speed at 200 ft. 100 IAS • Endurance: 7.0 hours

Lear Jets	
	
Description	**Physical Characteristics**
Mission Support • **Air Intercept Control training** • **Electronic Warfare** • **Detect to Engage** • **Target Tow (IR and TLX)** • **Banner Tow** • **Tracking Exercises**	**Aircraft Specifications** • **Max Speed at 30,000 ft. 460 kts** • **Min Air Speed at 30,000 ft. 300 kts** • **Max Air Speed at 200 ft. 300 IAS** • **Min Air Speed at 200 ft. 200 IAS** • **Endurance: 4.0 hours**

Subsonic Aircraft	
	
Description	**Physical Characteristics**
Mission Support **Complex, high subsonic speed threat simulation of sea-skimming cruise missiles, or highly maneuverable threat fighter/bomber aircraft.** • **Air Intercept Control training** • **Electronic Warfare** • **Detect to Engage** • **Target Tow (IR and TLX)** • **Banner Tow** • **Tracking**	**Aircraft Specifications** • **Type: Hawker Hunters** • **Max Speed: 620 KIAS** • **Max Rng: 1000 NM** • **G-limits: +7.0g / -3.0g** • **Ceiling: 50,000 ft** • **Max Climb Rate: 16,000+ fpm** • **Endurance: 2.5 hours**

Supersonic Jets

Description	Physical Characteristics
Mission Support **Complex, supersonic speed threat simulation of cruise missiles, or highly maneuverable threat fighter/bomber aircraft.** • **Air Intercept Control training** • **Electronic Warfare** • **Detect to Engage** • **SFARP** • **NSAWC** • **Tracking**	**Aircraft Specifications** • **Type:** **KFIR** • **Max Speed:** **1100 KIAS** • **Max Rng:** **1300 NM** • **G-limits:** **+7.0g / -3.0g** • **Ceiling:** **55,000 ft** • **Max Climb Rate:** **35,000+ fpm** • **Endurance:** **2.5+ hours**

Refueling Tanker Aircraft

Description	Physical Characteristics
Mission Support **Complex Multiple scenario Jammer including Radar, Comm Jamming and CHAFF dispensing Pods.** • **Airborne Refueling** • **Exercise Support** • **Cross Country Drags**	**Aircraft Specifications** • **Type: KC-707** • **Max Speed: 480 KIAS** • **Refuel Speed: 220-290 KIAS** • **Give limits: 70-90k** • **Endurance: 3-4 hours based on give** • **Turn around time: 2-3 hours** • **Crew day: 14-16 hours**

EW Aircraft	
	
Description	**Physical Characteristics**
Mission Support **Complex Multiple scenario Jammer including Radar, Communication Jamming and CHAFF dispensing Pods.** • **Electronic Warfare** • **Tracking** • **Stand Off Jammer** • **ASMD Record/Playback**	**Aircraft Specifications** • **Type: G-1 Gulfstream** • **Max Speed: 225 KIAS** • **Max Rng: 1300 NM** • **G-limits: +2.5g** • **Ceiling: 25,000 ft** • **Endurance: 5.0+ hours**

WATER TARGETS

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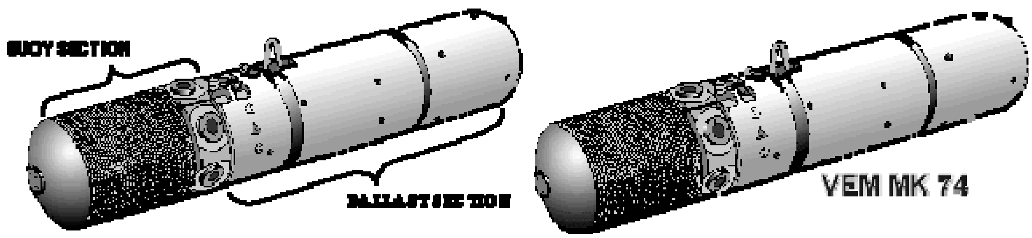
VERSATILE EXERCISE MINE (VEM) MK 74



The VEM MK 74 is a specially constructed interactive mine simulator training device that represents a typical bottom mine. Cylindrical in shape, it is 9 feet long, 21 inches in diameter, and weighs a little over 1,200 pounds. It is used to assess the effectiveness of mine countermeasures (MCM) operations as well as providing realistic training for MCM forces. The VEM MK 74 is designed to be representative of foreign threat mines and does not possess a U.S. Navy Service mine counterpart.

The VEM MK 74 contains multiple sensors and programmable electronics housed in a mine case that presents a realistic sonar profile of a bottom mine. Each VEM MK 74 can be programmed to emulate the target detection capabilities of various known bottom mines by emulating their mine-fire logic. In addition to emulating the logic, each VEM MK 74 collects data from its sensors and provides it to exercise participants in either real-time or as stored data for later analysis. By exercising against such a device, mine hunting and sweeping forces can obtain a quantitative assessment of their effectiveness and vulnerability.

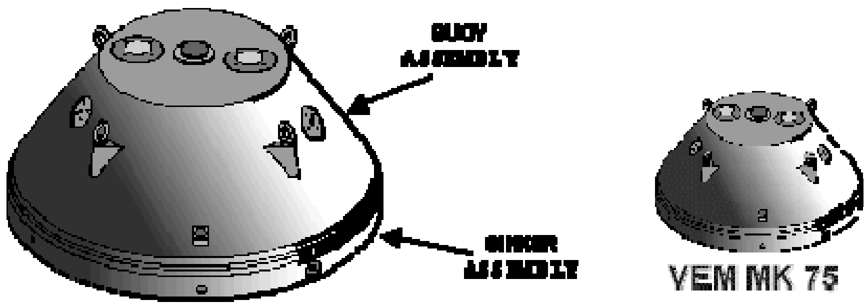
The VEM MK 74 comprises two subassemblies: a three-foot buoy section is connected in line with a six-foot ballast section. The buoy section is watertight and houses the VEM's sensors and microprocessor-based electronics. The sensors include three passive acoustic sensors located along the buoy section's circumference at the 4, 8, and 12 O'clock positions. A triple-axis magnetometer, a seismic sensor, and a pressure sensor are also permanently installed. The buoy section is painted orange and the ballast section is painted white.

Other buoy section components include three active communication transducers interspersed between the passive sensors for the acoustic link. An inclinometer determines the VEM's roll angle on the bottom. A pressure transducer measures the depth and adjusts the communication transducer's output power accordingly. Two depth switches awaken the VEM upon water entry and also activate safety and security features that (1) prevent inadvertent release of the buoy assembly near the surface when an unseparated VEM MK 74 is being recovered, and (2) erase the emulation programming (but not the recorded data) during recovery to prevent unauthorized access to classified mine emulations.

The ballast section anchors the VEM MK 74 via a free-flooding case weighted with lead along its bottom to orient the VEM upright as it lands and to stabilize itself on the seabed. A release mechanism in the ballast section uses a cable cutter driven by pressurized air stored in a tank. Upon command via acoustic link or at a preprogrammed time, the cutter severs an internal wire rope, freeing the buoy section to surface.

Source: Commander Mobile Mine Assembly Group (http://www.comomag.navy.mil/default.aspx)

VERSATILE EXERCISE MINE (VEM) MK 75



The VEM MK 75 is a specially constructed interactive mine simulator training device that represents a stealth type of shallow water mine. Shaped like a truncated cone, it is 18 inches tall, 38 inches in diameter, and weighs a little over 800 pounds. It is used to assess the effectiveness of mine countermeasures (MCM) operations as well as providing realistic training for MCM forces. The shape, in combination with an anechoic coating, results in a low target strength and a realistically small sonar shadow. The VEM MK 75 is designed to be representative of foreign threat mines and does not possess a U.S. Navy Service mine counterpart.

The VEM MK 75 contains multiple sensors and programmable electronics. Each VEM MK 75 can be programmed to emulate the target detection capabilities of various known bottom mines by emulating their mine-fire logic. In addition to emulating the logic, each VEM MK 75 collects data from its sensors and provides it to exercise participants in either real-time or as stored data for later analysis. By exercising against such a device, mine hunting and sweeping forces can obtain a quantitative assessment of their effectiveness and vulnerability.

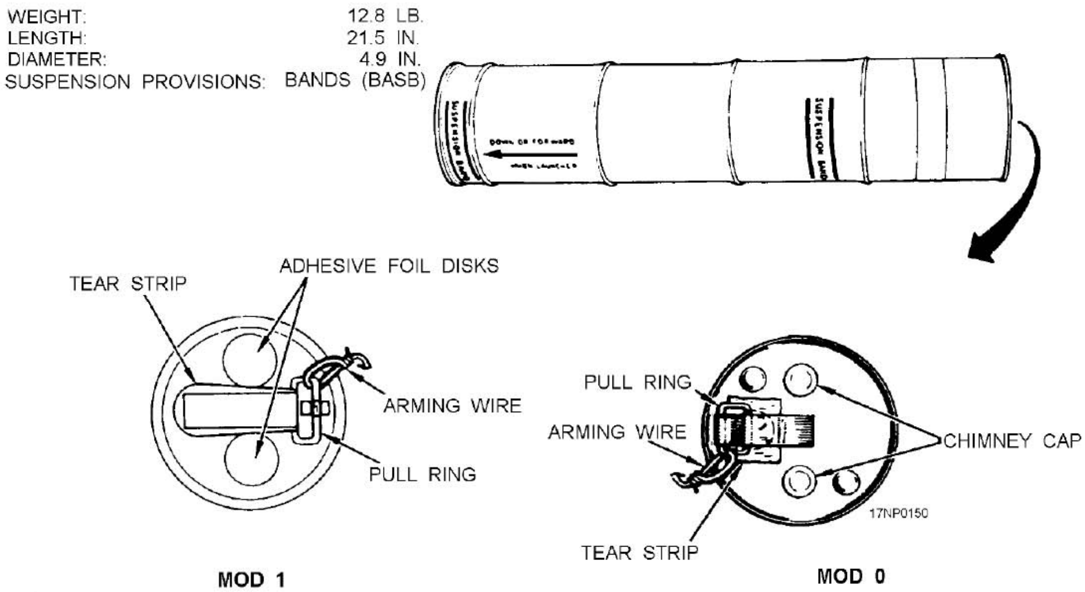
The VEM MK 75 comprises two subassemblies: a buoy assembly (with the truncated cone shape) sits atop a flat sinker assembly. The buoy assembly is watertight and houses the VEM's sensors and microprocessor-based electronics. Both of these subassemblies are painted orange. The sensors include a passive acoustic sensor located atop the buoy assembly and a triple-axis magnetometer housed within it.

Other buoy assembly components include an active communication transducer, also facing upward atop the VEM. An inclinometer determines the VEM's roll angle on the bottom. A pressure transducer measures depth and adjusts the communication transducer's output power accordingly. Two depth switches awaken the VEM upon water entry and also activate safety and security features that (1) prevent inadvertent release of the buoy assembly near the surface when an unseparated VEM MK 75 is being recovered, and (2) erase the emulation programming (but not the recorded data) during recovery to prevent unauthorized access to classified mine emulations.

The buoy assembly also houses a pair of spring-loaded release mechanisms. Upon command by acoustic link or at a preprogrammed time, they release their grip on a corresponding pair of sinker assembly attachments, freeing the buoy assembly to surface. The lead-weighted sinker assembly attaches underneath the buoy assembly to orient the VEM MK 75 upright as it lands. It has a flat bottom to stabilize itself on the seabed.

Source: Commander Mobile Mine Assembly Group (http://www.comomag.navy.mil/default.aspx)

Ordnance Technical Data Sheet
MARKER LOCATION MARINE, MK58 MOD1



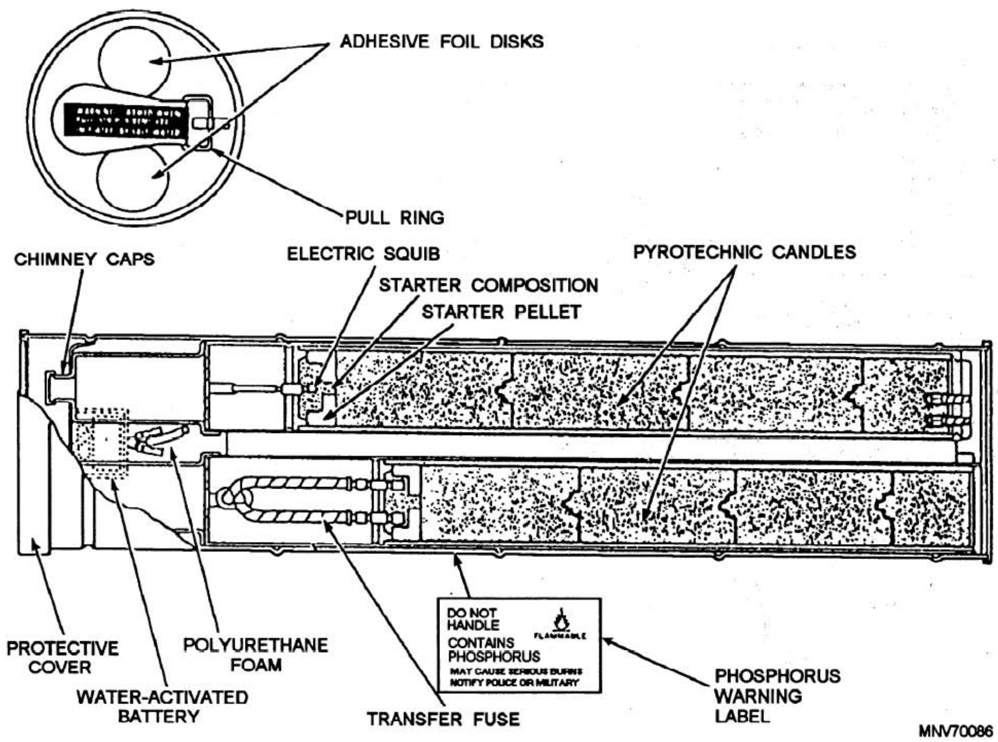
Nomenclature:	MARKER LOCATION MARINE, MK58 MOD1
Ordnance Family:	CSGX
DODIC:	L580
Explosive:	None
Item weight:	12.8 lbs
Diameter:	4.9 in
Length:	21.5 in
Frag Range:	None
Hazard:	Ejection; intense light; Smoke/Incendiary
Explosive Weight:	0 gm
Component Materials:	Primarily aluminum, iron, manganese dioxide, and RP.

Usage: The MK 58 Mod 1 marine location marker is designed for day or night use in any condition calling for long-burning, smoke and flame reference-point marking on the ocean's surface. In addition to being used for anti-submarine warfare, it is used for search-and-rescue operations, man-overboard markings, and as a target for practice bombing at sea. The marker produces a yellow flame and white smoke for a minimum of 40 minutes and a maximum of 60 minutes. It is visible for at least 3 miles under normal operating conditions.

Description:
The MK 58 Mod 1 marine location marker consists of a cylindrical tin can approximately 21.5 inches long and 4.9 inches in diameter. The can contains two pyrotechnic candles of a red phosphorus composition. The ignition end of the marker has three holes—two for smoke and flame emission and one for water to enter the MK 72 Mod 1 seawater-activated battery. Adhesive foil disks hermetically seal the two emission holes. A reinforced adhesive foil strip with a

rectangular pull ring hermetically seals the battery cavity hole. The adhesive foil seals are protected during handling and shipping by a replaceable polyethylene protective cover.

The Mk 58 Mod 1 marker may be hand launched, externally launched from suitable aircraft bomb racks by using breakaway suspension bands, or launched from sonobuoy launchers by using a sonobuoy launcher container (SLC) and the appropriate foam spacer. No matter how the marker is launched, the protective cover, the pull ring, and reinforced adhesive foil strip over the battery's cavity is removed. When launching the marker from a sonobuoy launcher, you remove the protective cover and pull ring and reinforced adhesive foil strip. Then, load the marker onto the bomb rack. After securing the marker to the bomb rack, attach the pull ring to an arming wire, which is attached to the bomb rack. When the marker is released from the bomb rack, the arming wire retains the pull ring and removes the foil strip covering the battery's cavity. When submerged, the MK 72 Mod 1 battery is activated by seawater. Current from the battery initiates a MK 13 electric squib, which ignites the starter composition of the first pyrotechnic candle. The composition ignites the starter pellet, which, in turn, ignites the first candle. When the first candle is nearly burned out, its heat ignites the transfer time fuze, which carries ignition to the second candle starter composition. This starter composition initiates the second pyrotechnic candle.



Toxic Hazards of Pyrotechnics:
Many chemicals used in pyrotechnics, screening equipment, and dye-marking devices are poisonous if taken internally. This also applies to the residue of burned pyrotechnics. From the inhalation standpoint, the products of pyrotechnic devices and smoke generators often present a serious problem. Many of the smokes and fumes given off by pyrotechnics and screening devices are considered non-toxic and are only mildly irritating to the eyes and nasal passages when encountered in relatively light concentrations out-of-doors. Heavy concentrations in closely confined spaces, however, are dangerous and may be lethal because they reduce the amount of

oxygen in the air. Avoid anything more than a brief exposure to the gases of combustion or to screening smokes. If you must, spend more than a brief time in the gases or smokes, protect yourself by using an appropriate breathing apparatus.

Handling: As a general rule, any pyrotechnic device that is armed and otherwise prepared for launching or activating, but hasn't been used may be de-armed, restored to its original packing, and returned to stowage. The exceptions to this rule are MK 25 and MK 58 marine location markers, MK 46 decoy flares, and aircraft parachute flares. If such devices can't be made safe beyond question, they must be stowed in lockers or disposed of according to current directives.

All pyrotechnics and smoke-screening devices are designed to withstand normal handling. They should, however, be handled as little as possible to lessen the chances of damage, which might cause accidental ignition or leakage. Many devices contain materials of a dangerous nature and are therefore designed with safety features, which should be maintained in good operating condition. Dents, deformations, or cracks in the outer body may interfere with the proper functioning of these safety features or might cause ignition during handling or stowage. It is therefore imperative that extreme care be taken to prevent damage to containers of pyrotechnics and screening devices and to the devices themselves.

References: Navy Non-Resident Training Course Manual: Pyrotechnics; MIDAS.

High-Speed Maneuverable Seaborne Target (HSMST)

Description

The High-Speed Maneuverable Seaborne Target has an aluminum hull and a foam-filled collar that surrounds the deck area. The target has replaced the QST-33 SEPTAR (2) and the Interim HSMST to represent high speed maneuvering threats in normal sea states (up to Sea State 3), providing up to 46 knots in calm seas. The propulsion system consists of two 200 HP outboard engines.

The target may be transported to the operations area on the deck of a ship. Remote control equipment can be located ashore, or on seaborne or airborne platforms.

HSMST can accommodate augmentation systems that include passive radar return enhancement, location and navigation systems and visual enhancement. Direct live fire on HSMST is authorized for large caliber surface ship guns only. All other direct live fire requires formal TYCOM/claimant authority. HSMST's can be utilized for multiple, independent target presentations in numbers greater than 10.

Physical Characteristics

Length:	26 ft.
Beam:	9 ft.
Freeboard:	1.7 ft.
Draft:	2.7 ft.
Hull Construction:	Aluminum, Foam Filled Collar, or Non-Foamed for High Explosive

Performance Data

Maximum Speed:	46 kts. Sea State 1
	25 kts. Sea State 3

Improved Surface Tow Target (ISTT)

Description

The Improved Surface Tow Target (ISTT) is a medium weight tow target designed to be towed behind a QST-35. It was designed to provide the user with a tow target capable of simulating various threat scenarios. The ISTT allows the user to conduct direct fire and/or bomb drop operations. Additionally, the ISTT can be configured to accomplish RCS and IR signature enhancements.

It supports requirements associated with the following weapons and/or weapons systems: Mk-86 Gun Fire Control System, rockets, fleet surface gunnery exercises, IR Maverick Missile System, Hellfire, and armed helicopter for aerial gunnery.

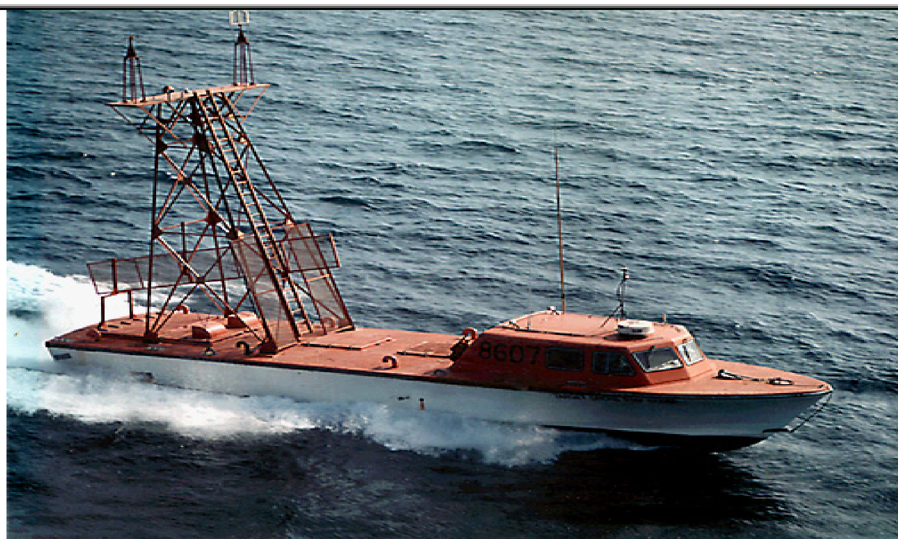
Physical Characteristics

Length:	28 ft.
Beam:	8 ft.
Freeboard:	2 ft.
Draft:	1 ft. (keel)
Hull Construction:	Fiberglass Reinforced Plastic

Performance Data

Maximum Speed:	25 kts. Sea State 1
	10 kts. Sea State 3

QST-35A Seaborne Powered Target (SEPTAR)



Description

The QST-35A Seaborne Powered Target (SEPTAR) is a high speed, remote controllable surface target designed to simulate the threat posed by patrol boats having a surface launch missile firing capability.

The QST-35A consists of a fiberglass planning hull powered by four Mercury Marine engines which produce up to 300 horsepower each. The maximum safe speed of the QST-35A is 30 knots in a very smooth sea state and declines to about 8 to 10 knots as the sea state builds to 3 or 4.

Target Augmentation Systems installed on the QST-35A are generally tailored to the particular operation it is supporting, such as radars, threat emitters, rocket launchers and scoring. There are currently 26 operational QST-35As.

Physical Characteristics

Length:	56 ft.
Beam:	14 ft.
Freeboard:	3 ft.
Draft:	2.4 ft.
Hull Construction:	Fiberglass Reinforced Plastic

Performance Data

Maximum Speed:	30 kts. Sea State 1

Ship Deployable Surface Target (SDST)

Description	Physical Characteristics	
The Ship Deployable Seaborne Target (SDST) is a high-speed commercial personnel watercraft. It is designed to provide a remotely controlled target, which can be augmented to present various threat scenarios. SDST is unique in that it can be launched from Navy ships as well as any standard boat launch ramp. It can operate in at approximately 40 knots in sea state 1 and in a sea state 2 at approximately 20 knots.	Length:	10.8 ft.
	Beam:	4 ft.
	Freeboard:	N/A
	Draft (when static):	1.7 ft.
	Hull Construction:	Fiberglass Reinforced Plastic
	Performance Data	
	Maximum Speed:	40 kts. Sea State 1 20 kts. Sea State 2

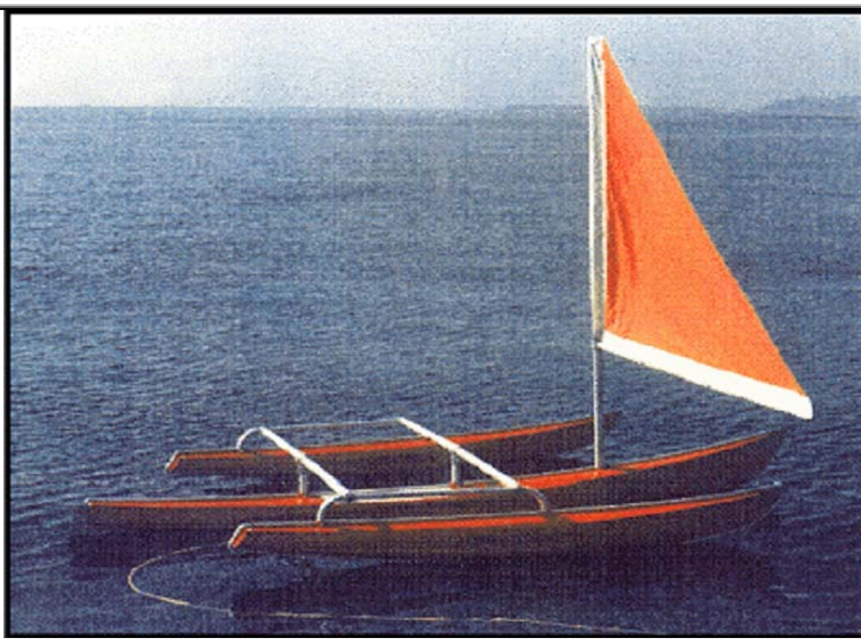
Williams Sled

Description	Physical Characteristics	
The Williams Sled Tow Target is a surface gunnery target consisting of a tubular framework mounted on two pontoons. The target is towed by approximately 5,000 feet of double-braided nylon line by a seagoing tug at approximately 10 knots or utilized as a freely drifting target. Wire fabric screens are mounted on both sides of the upper quarter of the framework to provide radar augmentation.	Length:	27.8 ft.
	Beam:	14 ft.
	Freeboard:	10 in. to top of pontoon
	Draft:	1.0 ft.
	Hull Construction:	Steel

Performance Data

Maximum Tow Speed:	10 kts. Sea State 2

Trimaran Surface Towed Target



Description

- Can be towed behind the QST-35 or HSMST
- Can be deployed as a free floating target
- Myriad of mountable target augmentation systems

Physical Characteristics

- Fiberglass hull
- 14 ft long
- 7 ft 10 in wide
- 500 lbs

Low Cost Tow Target (LCTT)

Description

The Low Cost Tow Target (LCTT) was designed to be towed behind other remote seaborne targets. It was intended to support a variety of surface warfare (SUW) training events. Among other requirements were: able to be towed by the HSMST and larger platforms, to be self-righting, able to support missions at tow speeds from 4 to 30 knots, to be reasonably priced and survivable from small caliber impacts.

The LCTT can be towed behind any of the powered Surface Targets, but is intended primarily for use with the HSMST and the SDST.

Physical Characteristics

Length:	16 ft.
Beam:	4 ft.
Freeboard:	1.5 ft.
Draft:	0.3 ft.
Hull Construction:	Fiberglass Reinforced Plastic

Performance Data

Maximum Speed:	45 kts. Sea State 1

<table>
<tr><th colspan="2">Radar Reflective Surface Balloon (Killer Tomato™)</th></tr>
<tr><td colspan="2"></td></tr>
<tr><th>Description</th><th>Physical Characteristics</th></tr>
<tr><td>Killer Tomato™ Naval Gunnery Target balloon is an adrift target designed to stand upright on the wave surface without tumbling over in moderate sea states. Yields a radar signature to ship borne radar equipment from corner reflectors mounted in top corners of target. Can be detected 10+ miles away depending on radar equipment and sea state.</td><td>This target has a self filling integrated drogue chute / skirt secure bottom of target to sea surface. It is air inflated, bright orange, 3 m^3 (10 x 10 x 10 feet) in size. Made with 12 mil PVC. Stainless steel metal “D-rings” for tie down, handling, minor towing, or floating trip line for recovery purposes. Integrated, self-deploying, drogue chute (no external sea anchor to buy and rig) reduces target wind drift and keeps target useful in more demanding sea state situations. Can be towed once chute is disabled or water ballast is tipped out using tie line. Radar reflective.

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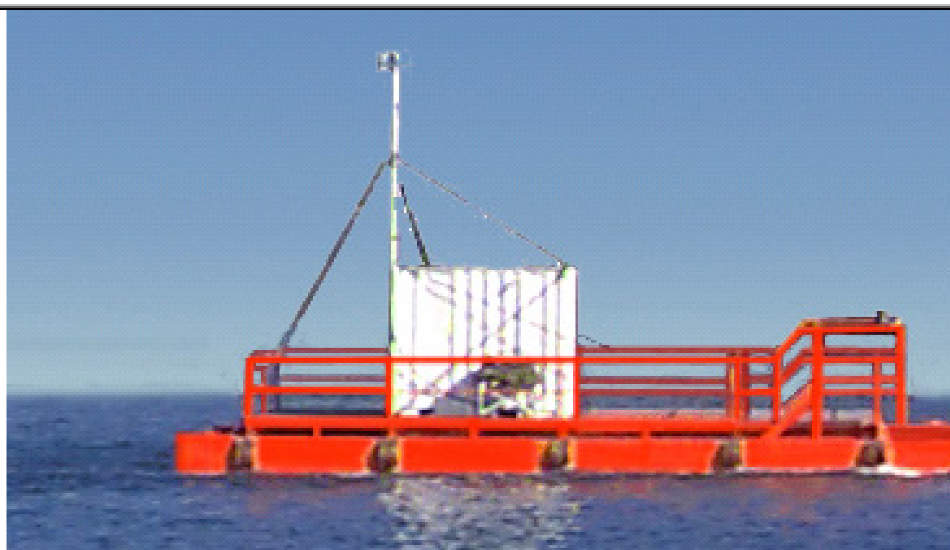
High-Speed Anti-Radiation Missile/Infrared Radiation (HARM/IR) Barge



Description

The HARM/IR Missile Target provides a highly survivable target for accurate missile systems. The development of this target is based on a twin pontoon or catamaran design in which each of the hulls is of welded steel construction with integral foam to improve buoyancy in the event of a breach. The enclosure contains a diesel generator electrical power source, the electronics for the Anti-Radiation Missile Emitter (ARME), and a large compartment that is heated by internal sources or by the sun. The temperature can be thermostatically controlled to provide the appropriate IR emissions.

This platform can support a wide variety of augmentation to satisfy any anti-ship or anti-radiation weapon system.

The enclosure with its vertical mast and the ARME antenna is removable for use as a HARM/IR Missile Target Augmentation Kit. This enclosure is suitable for use on any target platform large enough and with deck space to support it.

The heated enclosure can be used as an IR missile target without the ARME. This augmentation kit can be remotely activated and secured.

Physical Characteristics

Length:	45 ft.
Beam:	20 ft.
Freeboard:	1 ft.
Draft:	2 ft.
Hull Construction:	Welded Steel

Performance Data

Maximum Sea State:	3 (in tow)
	5 (when deployed)

Mk 42 Floating At-Sea-Target (FAST)

Description

The Floating At-Sea-Target (FAST) MK42 Mod 0 is a polygon (isodecahedron) shape of 20 sides approximately 6 feet in diameter. It consists of 20 equilateral triangular panels, which are reflector panels. Each reflector panel has nine integral corner reflectors which are coated with conductive paint that provides a radar reflective characteristic simulating the size of a destroyer or frigate-type vessel.

FAST is a reusable shipboard assembled target, deployable and recoverable from any Navy ship in weather conditions up to Sea State 3. FAST uses a Sea anchor to maintain stability. Once deployed, FAST can be used as a target in weather conditions of Sea State 4 or 5. In calm seas, the FAST has a visible range of up to 3.5 miles and can be used for surface to surface gunnery training.

Physical Characteristics

Height:	5.4 ft.
Width:	5.4 ft.
Hull Construction:	Aluminum/Plastic

Performance Data

N/A

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LAND TARGETS

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<tr><td>

CONEX Boxes


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Tank Convoy


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Airborne Laser Accuracy Scoring Target


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Surface-to-Air Missile Target


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<tr><td>

Strafe Banner


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Radar Reflector


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TYPICAL EXISTING WEAPONS USED IN THE GOMEX RANGE COMPLEX

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GUNS

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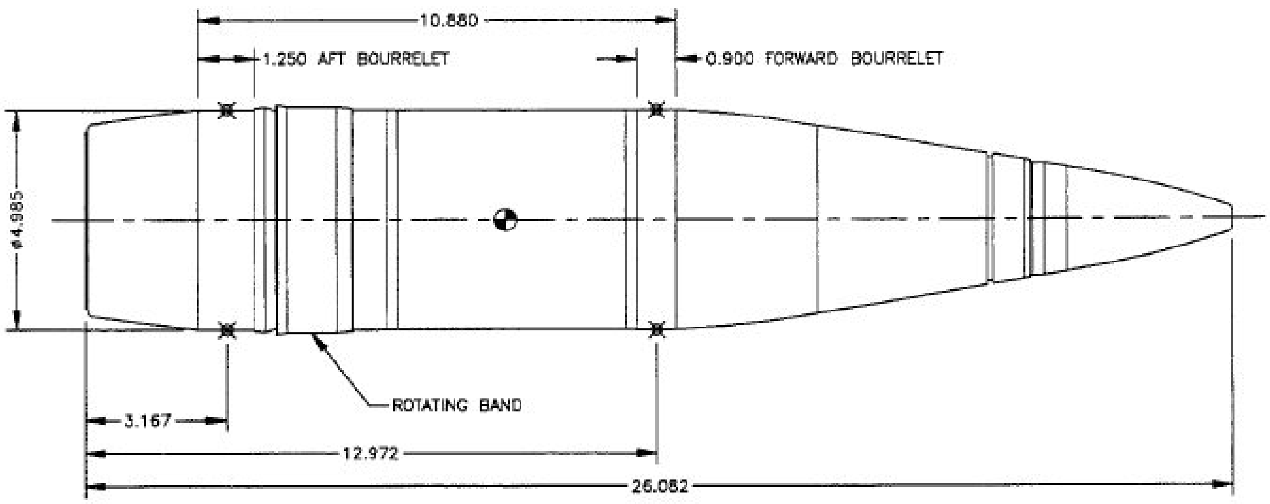
Mk-64 5” / 54 Caliber Blind, Loaded, & Plugged Naval Projectile



Description	Physical Characteristics
The MK64 5 inch 54 caliber naval projectile is the basic round of ammunition for the U.S. Navy's main armament systems. The forged steel projectiles have a long and streamlined outline, especially the ogive, together with a distinctive boat tail and flat base. The single, wide rotating band is made of copper. The 5"/54 MK64-2 Projectile Body (MPTS) is a component of the 5"/54 Caliber Blind, Loaded and Plugged (BL&P) MK92-1 Projectile which is a training round that lacks a fuse and is filled with sand.	

Reference: www.navweaps.com, www.globalsecurity.com

76mm

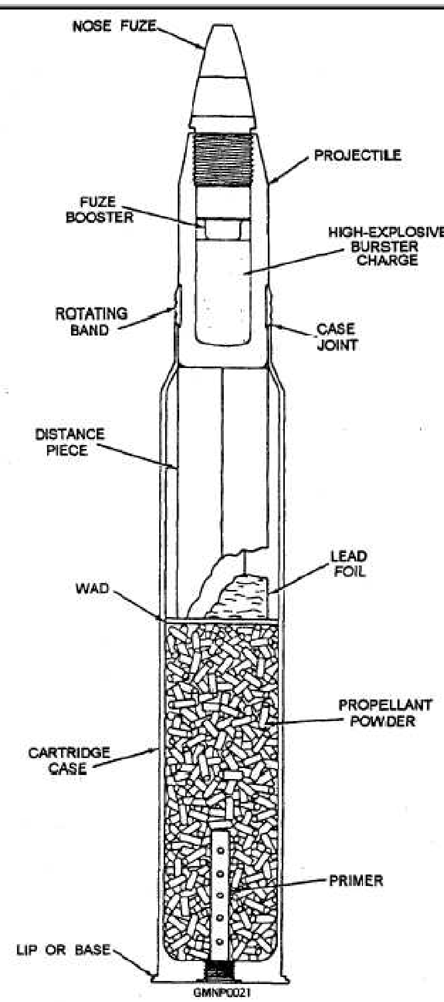
Description

All 76mm round are essentially the same in that they are made of approx. 10 lbs of iron casing with approx. 4 lbs of filler material. The current training allocation show that mostly BL-P (blind load and plug) rounds are used, MK201. As such, the 4 lbs of inert filler in the MK201 rounds is usually sand or cement. Some of the training rounds may contain spotting charges. These rounds are put together as a full up cartridge meaning they are all one piece (Projectile + Casing). The casing has approx. 4 lbs of nitrocellulose propellant.

*Note: the diagram at right shows a live round and not a BL&P round.

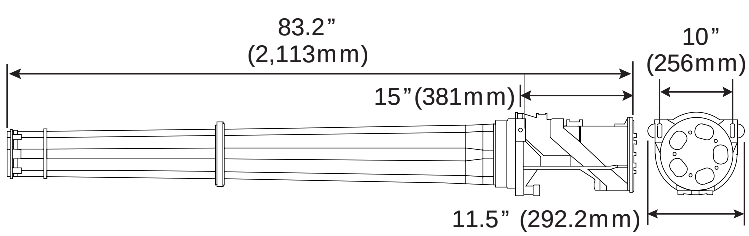
Reference: www.navweaps.com, www.globalsecurity.com, www.diehl-bgt-defence.de

Physical Characteristics



GAU-12/U

25mm gatling gun



Specifications	
Gun type	Five-barrel, 25mm, externally powered Gatling gun
Weight	270 pounds (123 kg)
Rate of fire	Up to 4,200 shots per minute
Dispersion	5 milliradians diameter, 80 percent circle
Muzzle velocity	
(TP, HEI ammunition)	3,560 feet (1,085m) per second
(API ammunition)	3,400 feet (1,036m) per second
Average recoil force	5,000 pounds (22 kN)
Drive system	Hydraulic, electric, pneumatic
Feed system	Linked or linkless

The 25mm GAU-12/U produced by General Dynamics Armament and Technical Products is an externally powered Gatling gun adaptable for air, land and sea platforms.

The GAU-12/U has significant muzzle energy and combat lethality. These factors, when combined with a maximum firing rate of 4,200 shots per minute, provide an effective weapon for a variety of combat missions.

Each of the GAU-12/U’s five barrels contain its own breech bolt assembly, which fires once per gun revolution. This ensures extended barrel life by distributing firing loads over all five barrels.

Continuous rotary motion reduces impact loads on gun components, providing extended parts life and high reliability.

The GAU-12/U provides air-to-air, ground-to-air and air-to-ground firepower for the U.S. Marine Corps AV-8B Harrier II aircraft, the Light Armored Vehicle - Air Defense (LAV-AD) and the U.S. Air Force AC-130U Gunship.

A derivative of the GAU-12/U known as the GAU-22/A is currently being developed for application on the U.S. Military's Joint Strike Fighter.

GENERAL DYNAMICS
Armament and Technical Products

Four LakePointe Plaza, 2118 Water Ridge Parkway, Charlotte, NC 28217 ■ www.gdatp.com
Tel 704 714 8000 ■ Fax 704 714 8232 ■ E-mail GDBusDev@gdatp.com

Approved for Public Release 07/2003 (DFOISR 04-S-0144)

MK19

40mm grenade machine gun

General Dynamics Armament and Technical Products produces the MK19 MOD 3 air-cooled system, a blow-back operated, belt-fed, crew-served 40mm grenade machine gun. Highly portable within small soldier units, the weapon's high lethality and broad versatility make it the prime choice of the U.S. Armed Forces as an essential weapon in both offensive and defensive operations.

Firing M430 High Explosive Dual Purpose grenades, the MK19 provides lethal fire against a variety of targets, including lightly armored vehicles and dismounted infantry. It will penetrate 75mm rolled homogenous armor at a maximum range of 2,050 meters. Dismounted personnel, within a radius of 15 meters from impact, will be immobilized by blast and fragmentation.

Features:
- Sustained automatic or single-shot firing
- Dual spade grips for stable control
- Removable barrel
- No headspace or timing adjustments required
- Open-bolt firing eliminates cook off, enhances cooling between bursts and allows sustained firing at three- to five-round bursts
- Simple design for easy maintenance
- Mean rounds between failure exceeds 20,000 rounds

Specifications

Caliber	40mm
Weight	72.5 pounds (33 kg)
Length	43.1 inches (1,095mm)
Width	13.4 inches (340mm)
Rate of fire	300-400 rounds per minute
Ammunition	M430 high explosive dual purpose (anti-armor and anti-personnel); MK281 MOD 0 TP Cartridge (TP-training); CS/OC (non-lethal); M918 (flashbang, training)
Maximum effective range	1,650 yards (1,500m)
Maximum range	2,242 yards (2,050m)
Muzzle velocity	790 feet (241m) per second

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Ordnance Technical Data Sheet
U.S. PROJECTILE, 20 MM

Nomenclature: 20 MM Projectile
Ordnance Family: Small Arms
DODIC: A773
Propellant: Nitrocellulose/Nitroglycerin
Propellant weight: 585 grains
Item weight: 3,900 grains (case weight is 1,855 grains and the projectile weighs 1,580 grains)
Diameter: .79 in for projectile
Length: 6.62 in
Maximum Range: N/A

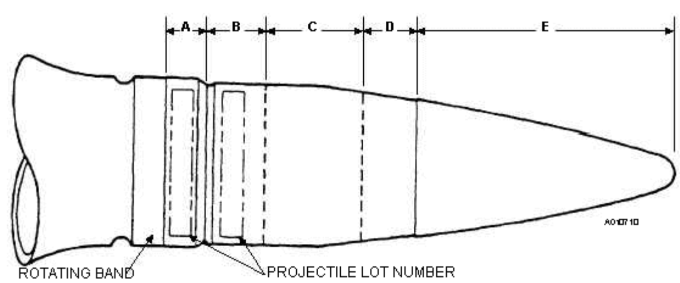
Usage: The PGU-28/B is the only projectile currently used by the Air Force and Navy for fixed wing air-to-air combat. This projectile is fired from the M61A1 gun system that is utilized by the F-14, F-15, F-16, and F/A-18 aircraft.

Description: The improved 20-mm (PGU) configuration ammunition for the M61A1/A2 aircraft guns is issued in the form of cartridges. All service cartridges have matched ballistics and are electrically primed. Initially procured ammunition is not graded, and all accepted lots are serviceable for issue and use in applicable weapons. The M103 brass cartridge cases are marked longitudinally or circumferentially with the caliber/case designation on the first line. The manufacturer symbol is on the second line. The interfix number, lot serial number, and year of manufacture are on the third line. All projectiles have essentially the same external configuration. The rotating band is copper alloy swaged into a circumferential groove near the aft end of the steel body. Ammunition type is identified by the color the projectile is painted and by the lettering on the body of the projectile.

PGU-27/B Target Practice (TP)
The PGU-27/B projectile consists of a steel body with a solid aluminum nosepiece swaged or crimped to the steel body. This cartridge has no explosive filler in the projectile. The cartridge is used in practice firing, for boresighting of weapons, and testing of new guns. The projectile shape and ballistic properties are similar to those of other PGU configuration ammunition.

PGU-28/B Semi-Armor Piercing High Explosive Incendiary (SAPHEI)
The PGU-28/B projectile consists of a steel body with an internal cavity filled with a sponge Zirconium pallet, composition A-4 and RS 40 incendiary mix. The aluminum nose contains RS 41 incendiary mix and is swaged to the steel body. This cartridge is for use against aircraft and light material targets, and functions with semi-armor piercing, high explosive, and incendiary effect.

PGU-30/B Target Practice-Tracer (TP-T)
The PGU-30/B consists of a steel body with an aft cavity containing the tracer pellet. The aluminum nose is swaged or crimped to the steel body. Tracer A tracer pellet is loaded into a cavity machined in the base of the TP-T projectile used in the assembling of the PGU-30/B cartridge. The heat and pressure of the propelling charge ignite the tracer pellet. The tracer is visible for approximately 3.2 seconds during projectile flight. This cartridge is virtually the same as the PGU-27/B projectile, except it incorporates a tracer in the base of the projectile.



Projectile Type	Color of Painting Locations (See Figure 7-10)					Color of Marking
	A	B	C	D	E	
Target Practice (TP) PGU-27/B	No paint (copper)	Blue	Blue	Blue	Blue	White
Semi-Armor Piercing High Explosive Incendiary (SAPHEI) PGU-28/B	No paint (copper)	Black	Yellow	Red	No paint (chromate)	White
Target Practice Tracer (TP-T) PGU-30/B	No paint (copper)	Blue	Blue	Blue	Blue	White with Orange T's (location D)

References: The Aviation Ordnanceman; TRI-DDS website; MIDAS; Global Security.org.

20MM MK 149 (APDS)

PHALANX CIWS (CLOSE-IN WEAPON SYSTEM)

- General Dynamics Ordnance and Tactical Systems is the Sole Developer and Qualified Producer of the MK149 20mm Armor-Piercing, Discarding Sabot Cartridge
- General Dynamics Ordnance and Tactical Systems has Produced in Excess of 20 Million Rounds of Ammunition for the U.S. NAVY's PHALANX Anti-Ship Missile Defense System
- Compatible with all M61 And M197 Gun Systems
- Compatible with all MK15 PHALANX Systems and Block MOD Upgrades
- Increased Impact and Residual Energy at Target over the M50 Series
- Approved for Export

GENERAL DYNAMICS
Ordnance and Tactical Systems

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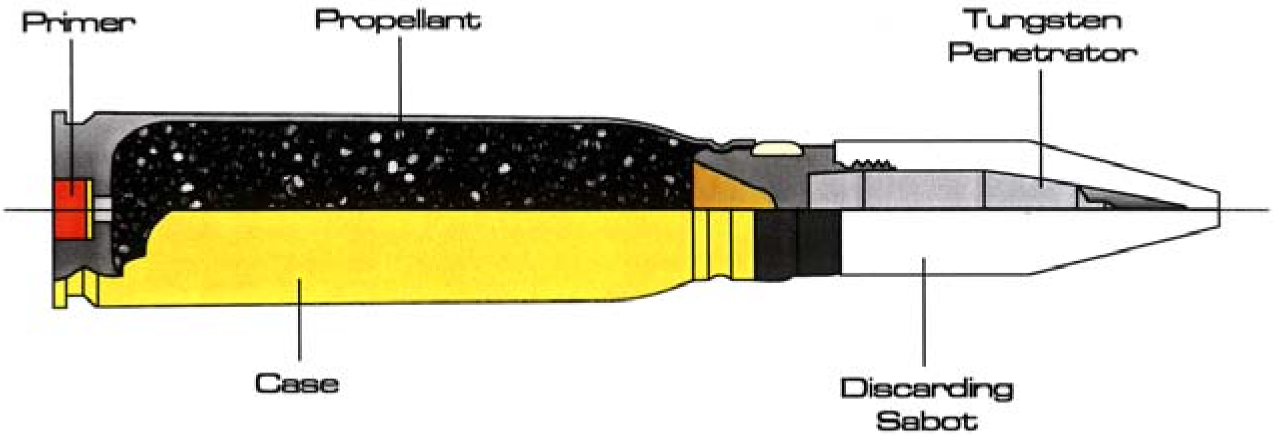
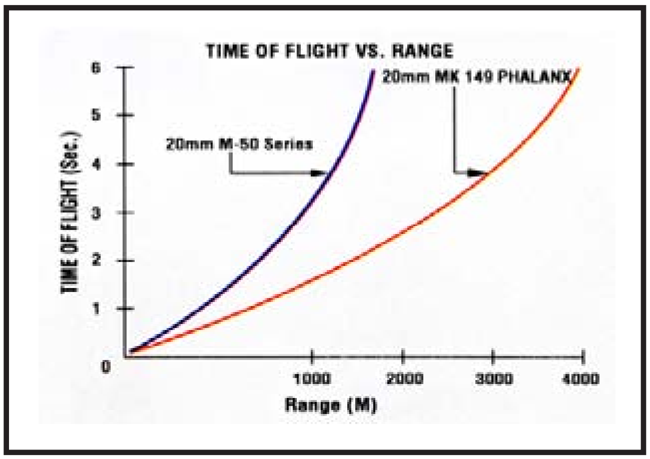
Approved for Public Release 09/30/05

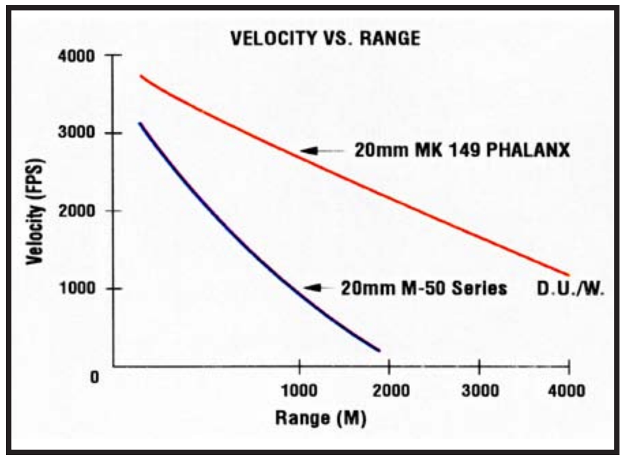
U.S. NAVY PHALANX AMMUNITION

20MM APDS-MK149

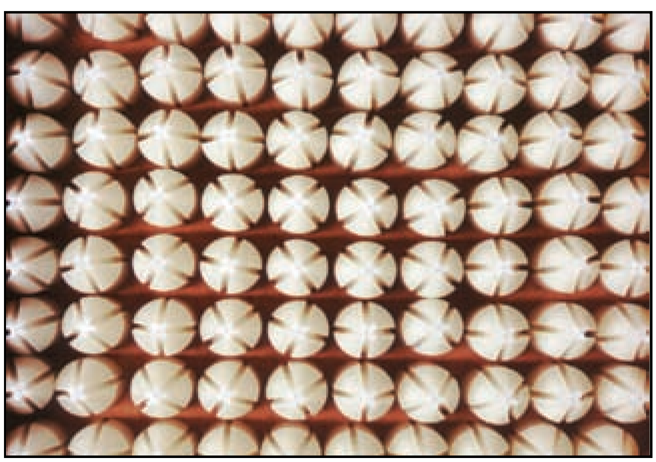




Short Time of Flight to Target



Optimized Exterior Ballistic Performance



Over 20,000,000 Rounds Produced by
General Dynamcis Ordnance and Tactical Systems

GENERAL DYNAMICS
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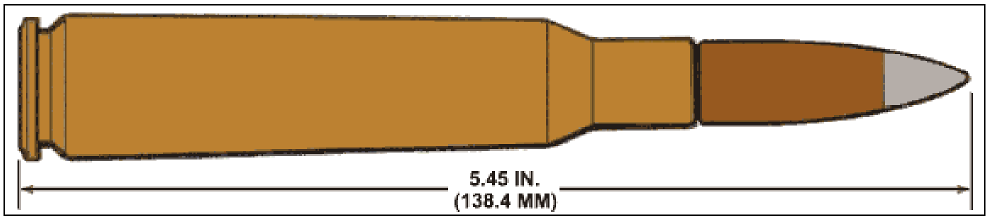
<u>Ordnance Technical Data Sheet</u>
U.S. Cartridge, .50 Caliber, Ball M8



Nomenclature: M8, Cartridge, .50 Caliber, Ball
Ordnance Family: Small Arms
DODIC: A576
Propellant: WC860 **-** Single or Double Base Powder*
Filler: Lead, Steel and/or Copper cladding
Filler weight: ± various
Cartridge weight: 1764 grams
Diameter: 12.70 mm (.50 in)
Length: 138.40 mm (5.45 in.)
Projectile Weight: 622.5 grams
Velocity: 2,910 fps (887 mps)

Usage: Machine Guns, Caliber .50, M2 and M85. The cartridge is intended for use against personnel or unarmored targets. Used by M2 and M85 machine guns, and the M107 Long Range Sniper Rifle. The cartridge combines the functions of the M2 armor piercing bullet and the incendiary bullet, and is used against flammable targets and light-armored or unarmored targets, concrete shelters, and similar bullet-resisting targets.

Description: Ball Cartridge. The cartridge is identified by an aluminum bullet tip.

Single Base Propellant: Single base propellants contain nitro cellulose as their chief ingredient. Single-base compositions are used as low-pressure propellants, such as those used in small arms ammunition. They may contain a stabilizer, inorganic nitrates, nitro compounds, metallic salts, metals, carbohydrates and dyes.
Double Base Propellant: Double base propellants contain nitrocellulose and a liquid organic nitrate, such as nitroglycerine. As with single base, stabilizers and additives may be present. Double base propellants are used in cannon, small arms, mortars, rockets, and jet propulsion units.

Reference: Army Technical Manual TM 43-0001-27; Midas; navy.mil

<u>Ordnance Technical Data Sheet</u>
U.S. Cartridge, 7.62 mm, Ball M80

Nomenclature: U.S. Cartridge, 7.62 mm, Ball M80
Ordnance Family: Small Arms
DODIC: A130
Propellant: 46 grams **–** WC846 **-** Nitrocellulose/Nitroglycerin
Cartridge weight: 392 grams
Projectile weight: 146 grams
Diameter: 7.62 mm
Cartridge Length: 2.8 in (71.1 mm)
Velocity: 2,750 fps (838 mps)

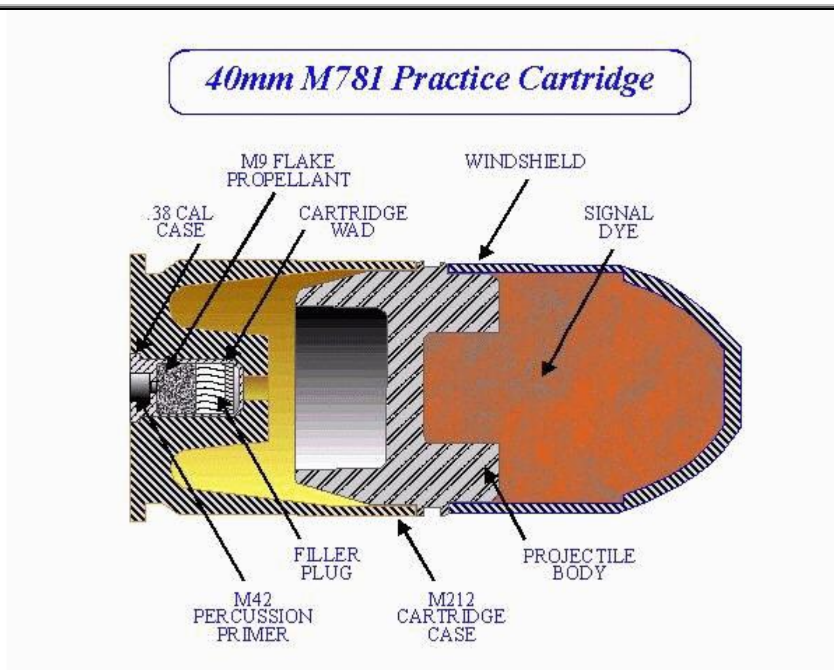
Usage: This cartridge is intended for use against personnel and unarmored targets.

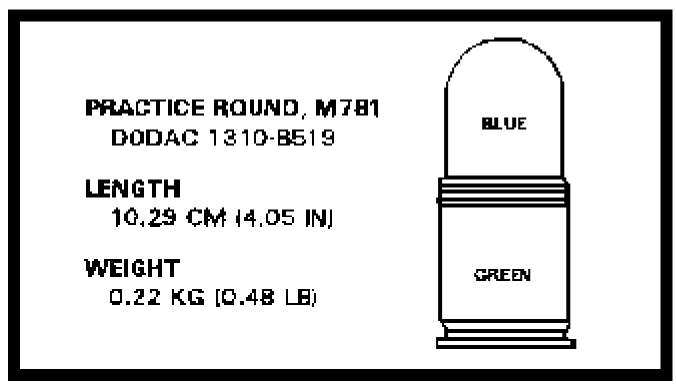
Description: Full metal jacketed bullet and brass cartridge case, center-fired NATO standard small arms.

Single Base Propellant: Single base propellants contain nitro cellulose as their chief ingredient. Single-base compositions are used as low-pressure propellants, such as those used in small arms ammunition. They may contain a stabilizer, inorganic nitrates, nitro-compounds, metallic salts, metals, carbohydrates and dyes.
Double Base Propellant: Double base propellants contain nitrocellulose and a liquid organic nitrate, such as nitroglycerine. As with single base, stabilizers and additives may be present. Double base propellants are used in cannon, small arms, mortars, rockets, and jet propulsion units.

References: ORDATA Online, MIDAS, Army Technical Manuel TM 9-1306-200, Navy.mil

M781 40mm Practice round



Description	Physical Characteristics
This round is blue zinc or aluminum with white markings. It is used for practice and produces a yellow or orange signature on impact	 Figure 3-13. Practice round.

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EOD DIVER DEPLOYED UNDERWATER CHARGES

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M112 Composition C4 Block Demolition Charge

Description

M112 composition C-4 block demolition charge is used primarily for cutting and breaching all types of demolition work. Because of its moldability and high brisance, the charge is ideally suited for cutting irregularly shaped targets such as steel. The adhesive backing allows the charge to be attached to any relatively flat, clean, dry surface that is above freezing point.

Physical Characteristics

The M112 block demolition charge consists of 1.25-pounds of Composition C4 packed in a Mylar-film container with a pressure-sensitive adhesive tape on one surface. The tape is protected by a peelable paper cover. In blocks of recent manufacture, Composition C4 is white and packed in an olive-drab, Mylar-film container. Relative effectiveness factor is 1.34.

Reference: www.globalsecurity.com, www.omniexplosives.com

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BOMBS

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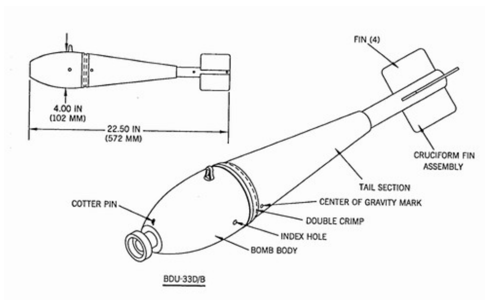
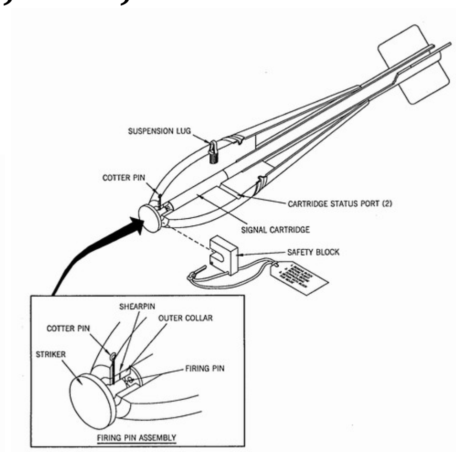
Ordnance Technical Data Sheet

U.S. Bomb, Practice, 25 lb, BDU 33D/B





Nomenclature: BDU-33D/B Practice Bomb
Ordnance Family: Bomb
DODIC: Not Provided
Filler: Signal Cartridge (see MK 4 Signal Cartridge)
Filler weight: 14.00 g (.49 oz)
Item weight: 11.00 kg (24.25 lbs)
Diameter: 102.00 mm (4.01 in)
Length: 527.00 mm (20.75 in)
Maximum Range: Not Provided
Fuze: Impact

Usage: These bombs are signal-generating; impact- or impact-inertia-fired practice/simulated bombs.

Description: The BDU-33D/B bombs are painted light blue; additionally, the BDU-33D/B has white stenciled markings only.

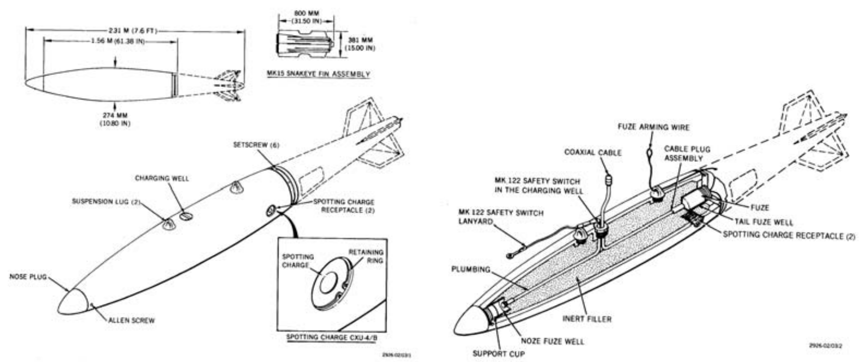
Reference: ORDATA Online.

***Titanium tetrachloride** is a colorless to pale yellow liquid that has fumes with a strong odor. If it comes in contact with water, it rapidly forms hydrochloric acid, as well as titanium compounds.

Titanium tetrachloride is not found naturally in the environment and is made from minerals that contain titanium. It is used to make titanium metal and other titanium-containing compounds, such as titanium dioxide, which is used as a white pigment in

Ordnance Technical Data Sheet

U.S. Bomb Unit, 500 lb, Simulated, BDU-45/B, Quiet Bomb



Nomenclature:	BDU-45/B, Bomb Unit, 500 lb, Simulated, Quite Bomb
Ordnance Family:	Bomb
DODIC:	Not Provided
Filler:	None
Filler weight:	Not Provided
Item Weight:	239.00 kg (500 lbs)
Diameter:	274.00 mm (10.79 in)
Length:	1.54 m (5.05 ft)
Maximum Range:	Not Provided
Fuze:	None

Usage: The bomb is a low drag type of the same size and shape as a Mk 82 bomb container. This is a signal generating simulated bomb used for pilot proficiency training with provisions for visual spotting of bombing accuracy. The bomb is loaded with an inert filler and contains no hazardous components. For the hazards of the fuze(s), TDD or sensing element, spotting charge adapter, and spotting charges refer to the appropriate reference.

Description: The bomb is painted blue with the designation BDU-45/B stenciled in white on the forward end of the bomb. Early models of the bomb are stamped with Mk 82 designations between the suspension lugs and with Mk 82 designation, ordnance drawing number, and loading data stenciled in white on the side of the bomb. The bomb fin assembly is painted olive drab.

Reference: ORDATA Online.

Ordnance Technical Data Sheet
U.S. BOMB, PRACTICE BDU-48/B

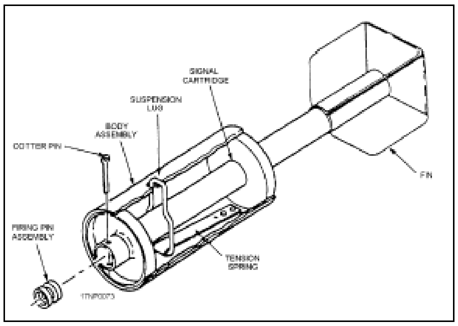
Photography by John Pitcher, 2007.

Nomenclature:	U.S. Bomb, Practice, BDU-48/B
Ordnance Family:	Bomb
DODIC:	E962
Filler:	Signal Cartridge, MK-4 MOD 3 or CXU-3A/B
Filler weight:	Not Provided
Item weight:	9.8 lbs
Diameter:	98.00 mm (3.86 in)
Length:	562.00 mm (22.13 in)
Maximum Range:	Not Provided
Fuze:	Impact or impact-inertia fired

Usage: These are air-dropped, impact or impact-inertia-fired signal-generating practice bombs used to train aircrews in the bombing of surface targets.

Description: The BDU-48/B is a 10-pound practice bomb. It is a thin-cased cylindrical bomb used to simulate retarded weapon delivery. The bomb is composed of the bomb body, a retractable suspension lug, a firing assembly, and box-type conical fins. The firing device consists of a firing pin assembly and a cotter pin. The BDU-48/B is painted blue. Identification nomenclature is stenciled in white letters on the bomb body. The bomb can use signal cartridge MK-4 Mod 3, or CXU-3A/B. While handling or transporting bombs, loaders should avoid placing their bodies in line with either end of the bomb.

***Titanium tetrachloride** is a colorless to pale yellow liquid that has fumes with a strong odor. If it comes in contact with water, it rapidly forms hydrochloric acid, as well as titanium compounds. Titanium tetrachloride is not found naturally in the environment and is made from minerals that contain titanium. It is used to make titanium metal and other titanium-containing compounds, such as titanium dioxide, which is used as a white pigment in paints and other products and to produce other chemicals. Military use it as a component of spotting charges. Titanium tetrachloride is very irritating to the eyes, skin, mucous membranes, and the lungs. Breathing in large amounts can cause serious injury to the lungs. Contact with the liquid can burn the eyes and skin.



HAZARDS:

- Explosive
- Red phosphorus or Titanium tetrachloride
- Smoke/incendiary

References: ATSDR; The Aviation Ordnanceman; TRI-DDS website; MIDAS; Global Security.org.

<u>Ordnance Technical Data Sheet</u>
U.S. BOMB, 500-LB, PRACTICE, MK-82

Nomenclature:	MK-82, 500-lb, Practice Bomb
Ordnance Family:	Bomb
DODIC:	E9an or F243
Filler:	None (maybe fitted with spotting charge/signals)*
Filler weight:	Not Provided
Item weight:	226.80 kg (500 lbs)
Diameter:	274.00 mm (10.79 in)
Length:	1.67 m (65.90 in)
Fuze:	Impact
Hazards:	Ejection; EMR: Explosive; Frag; Movement; Proximity; Smoke/Incendiary

Usage: The MK-81 through MK-84 concrete or sand-filled practice bombs are used to train pilots in delivery techniques. These bombs normally do not contain an explosive filler or spotting charge. Explosive-loaded practice bombs have been found; therefore, all MK-81 through MK-84 concrete and sand-filled bombs should be treated as suspect. These bombs may contain live internal fuzes with boosters, live external fuzes and adapter-boosters, or a spotting charge adapter with a signal cartridge installed. They are all designed to function on impact, producing blast and fragmentation or a puff of white smoke.

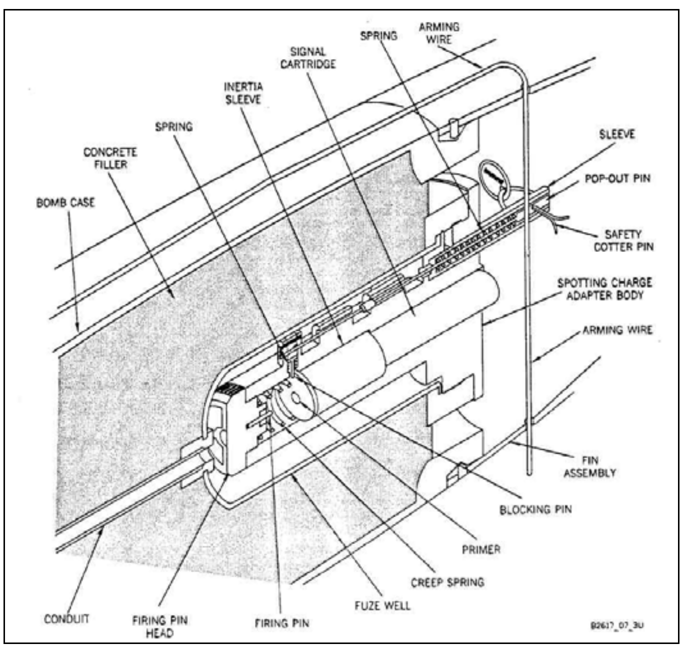
Description: The MK-82 (modified) bomb has a welded nose plate and the BDU-50/B bomb has a threaded nose with a plastic plug installed. The aft end of the MK-82 (modified) bomb is closed with a removable tail plate for filling operations and the BDU-50/B bomb is closed with a base plate, neither of which contain a threaded fuze well. The bomb body, conical fin assembly, and closure plugs are steel.

The MK-82 inert bomb is painted olive drab with a 38-millimeter (1.50-inch)-wide yellow band followed by a 51-millimeter (2.00-inch)-wide blue band on the nose. The markings SPOTTING CHARGE INSTALLED, (the date), and 6.25 POUNDS COMPOSITION C4, are stenciled in white on each side of the bomb next to the suspension lugs.

***Titanium tetrachloride** is a colorless to pale yellow liquid that has fumes with a strong odor. If it comes in contact with water, it rapidly forms hydrochloric acid, as well as titanium compounds. Titanium tetrachloride is not found naturally in the environment and is made from minerals that contain titanium. It is used to make titanium metal and other titanium-containing compounds, such as titanium dioxide, which is used as a white pigment in paints and other products and to produce other chemicals. Military use it as a component of spotting charges. Titanium tetrachloride is very irritating to the eyes, skin, mucous membranes, and the lungs. Breathing in large amounts can cause serious injury to the lungs. Contact with the liquid can burn the eyes and skin.

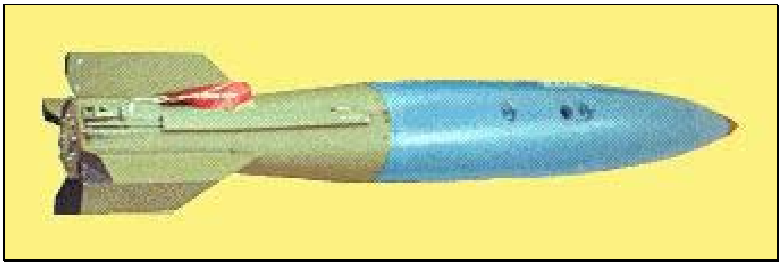
****Pyrotechnic** and screening devices contain combustible chemicals which, when ignited, rapidly generate a flame of intense heat, flash, infrared radiation, smoke or sound display (or combinations of these effects) for a variety of purposes. Compared to other explosive substances, pyrotechnics are more adversely affected by moisture, temperature, and rough handling. Some compositions may become more sensitive, and even ignite, when exposed to moisture or air. Mixtures which contain chlorates and sulfur are susceptible to spontaneous combustion. Most pyrotechnics produce a very hot fire that is difficult to extinguish and most burn without serious explosions. Many chemicals used in pyrotechnics produce toxic effects when ignited. Other pyrotechnics, which contain propelling charges, create an extremely hazardous missile hazard if accidentally ignited.

*** **Composition C-4**: This is a (91/9) RDX and plastic explosive composition. It is semi-plastic putty-like material, dirty white to light brown in color, less sensitive, more stable, less volatile and more brisant than composition C-3. It is a non-hydroscopic material that has found application in demolition blocks and specialized uses.



Reference: ORDATA Online, MIDIAS.

Ordnance Technical Data Sheet
U.S. BOMB, 1,000-LB, PRACTICE, MK-83

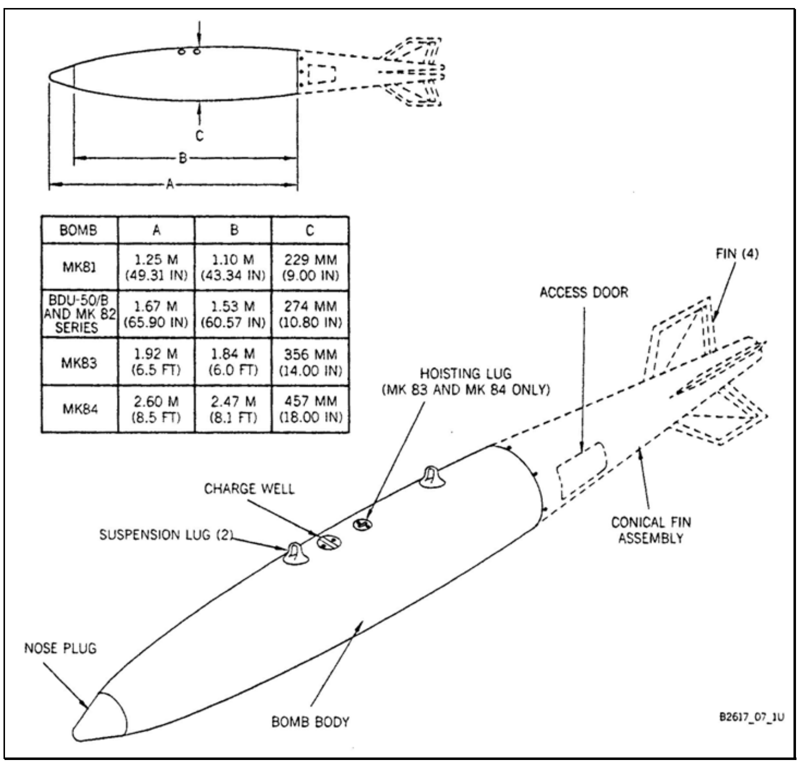


Nomenclature:	U.S. BOMB, 1,000-LB, PRACTICE, MK-83
Ordnance Family:	Bombs
DODIC:	E511
Explosive:	None
Item weight:	1,054 lbs
Diameter:	14 in (356 mm)
Length:	6.5 ft (1.92 m) nose to end of bomb body (does not include fin)
Frag Range:	20 m
Hazard:	Ejection; EMR; Frag; Explosive (HE); Movement; Proximity (VT); Smoke/Incendiary
Explosive Weight:	0 gm
Component Materials:	The bomb body, conical fin assembly, and closure plugs are steel.

Usage: The MK-81 through MK-84 concrete or sand-filled practice bombs are used to train pilots in delivery techniques. These bombs normally do not contain an explosive filler or spotting charge. Explosive-loaded practice bombs have been found; therefore, all MK-81 through MK-84 concrete and sand-filled bombs should be treated as suspect. These bombs may contain live internal fuzes with boosters, live external fuzes and adapter-boosters, or a spotting charge adapter with a signal cartridge installed. They are all designed to function on impact, producing blast and fragmentation or a puff of white smoke.

Description: The tail fuze cavity will be closed with a closure plug, spotting charge adapter, fuze, or conical plug. The nose fuze cavity will be closed with a fuze or nose plug. The nose plug will be either conical with two wrench flats, or streamlined with a spanner hole. Depending on the fuzing, the bombs may have an arming wire assembly, a lanyard, a cable, or an electrical charging receptacle installed. The charging well between the suspension lugs may be closed by a plug or may be fitted with an electrical charging receptacle, a lanyard lock, a fuze initiator, or an arming safety switch. The suspension lugs are 356 millimeters (14.00 inches) apart, except on the MK-84 they are 762 millimeters (30.00 inches) apart. The bombs may be fitted with conical or retarding fin assemblies. The bombs can be internally or externally fuzed. The arming assembly for a mechanical tail fuze may extend through the base or the side of the conical fin assembly, depending on the arming assembly used. An empty fuze cavity may be closed by a closure plug; however, the presence of a closure plug in a fuze cavity does not indicate the absence of a fuze. Bombs with certain fuzes have a closure plug screwed into the fuze cavity, making direct identification of the fuze impossible. When the fuze is not exposed, identification may be aided by observation of certain fuze-related features such as the type of closure plug in the fuze cavities and the components installed in the charging well. Other features such as the presence of arming vanes and reach rods may also aid in determining the type of fuze used.

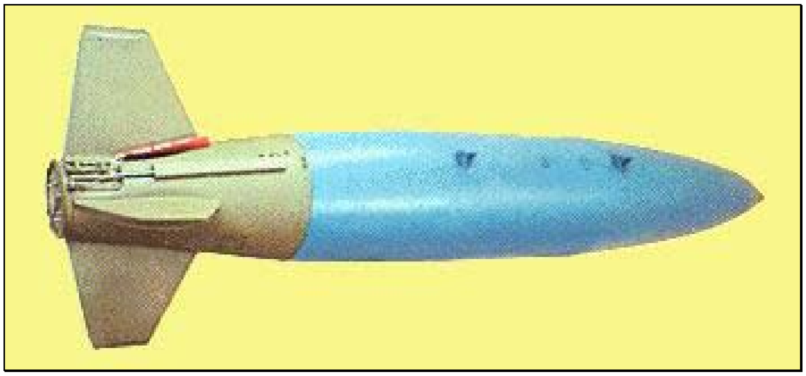
The MK-81 through MK-84 concrete- or sand-filled bombs are painted blue or olive drab, with white or black markings. Bombs fitted with a signal charge will have a brown or yellow band no wider than 76 millimeters (3.00 inches) circumscribed near the nose of the bomb. However, explosive-loaded practice bombs may be found without markings or color band indicating the explosive content. Inert-loaded MK-82 Mod 2 practice bombs may be found with an olive drab thermal coating and a 76-millimeter (3.00-inch)-wide blue nose band. Loading information is stenciled on the thermal coating. Thermally protected practice bombs are also die-stamped on the base plate to indicate their inert filler.



BOMB	A	B	C
MK81	1.25 M (49.31 IN)	1.10 M (43.34 IN)	229 MM (9.00 IN)
BDU-50/B AND MK 82 SERIES	1.67 M (65.90 IN)	1.53 M (60.57 IN)	274 MM (10.80 IN)
MK83	1.92 M (6.5 FT)	1.84 M (6.0 FT)	356 MM (14.00 IN)
MK84	2.60 M (8.5 FT)	2.47 M (8.1 FT)	457 MM (18.00 IN)

References: ORDATA Online; MIDAS.

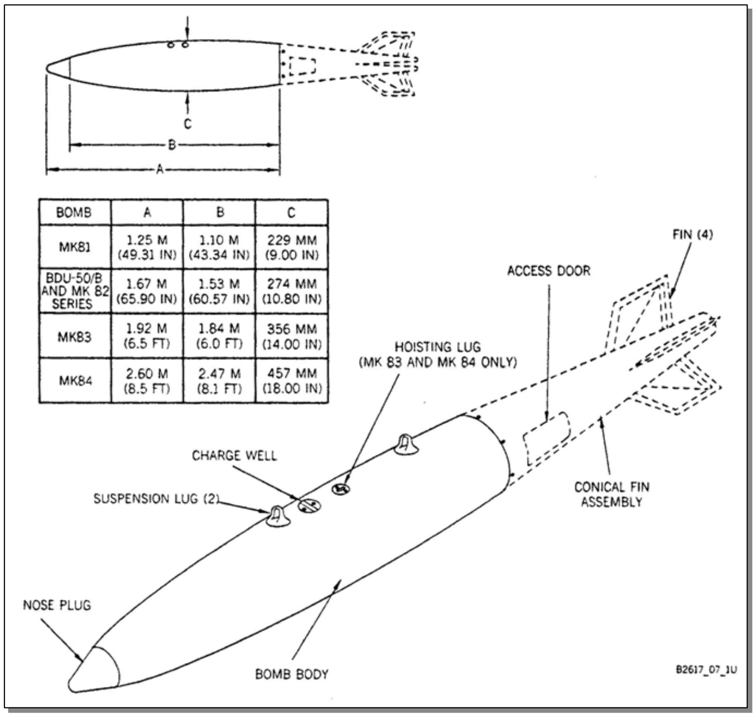
Ordnance Technical Data Sheet
U.S. BOMB, 2,000-LB, PRACTICE, MK 84



Nomenclature:	U.S. BOMB, 2,000-LB, PRACTICE, MK 84
Ordnance Family:	Bombs
DODIC:	E9bd
Filler:	Signal cartridge MK-4 Mod 3 (red phosphorus)
Item weight:	2,039 lbs
Diameter:	18 in (457 mm)
Length:	8.5 feet (2.6 m) without fin
Frag Range:	20 m
Hazard:	Ejection; EMR; Frag; Explosive (HE); Movement; Proximity (VT); Smoke/Incendiary

Usage: The MKs 81 through 84 concrete or sand-filled practice bombs are used to train pilots in delivery techniques. These bombs normally do not contain an explosive filler or spotting charge. Explosive-loaded practice bombs have been found; therefore, all MK-81 through MK-84 concrete and sand-filled bombs should be treated as suspect. These bombs may contain live internal fuzes with boosters, live external fuzes and adapter-boosters, or a spotting charge adapter with a signal cartridge installed. They are all designed to function on impact, producing blast and fragmentation or a puff of white smoke.

Description: MK-81 through MK-84 and MK-82 inert bombs. The tail fuze cavity will be closed with a closure plug, spotting charge adapter, fuze, or conical plug. The nose fuze cavity will be closed with a fuze or nose plug. The nose plug will be either conical with two wrench flats, or streamlined with a spanner hole. Depending on the fuzing, the bombs may have an arming wire assembly, a lanyard, a cable, or an electrical charging receptacle installed. The charging well between the suspension lugs may be closed by a plug or may be fitted with an electrical charging receptacle, a lanyard lock, a fuze initiator, or an arming safety switch. The suspension lugs are 356 millimeters (14.00 inches) apart, except on the MK-84 they are 762 millimeters (30.00 inches) apart. The bombs may be fitted with conical or retarding fin assemblies. The bombs can be internally or externally fuzed. The arming assembly for a mechanical tail fuze may extend through the base or the side of the conical fin assembly, depending on the arming assembly used. An empty fuze cavity may be closed by a closure plug; however, the presence of a closure plug in a fuze cavity does not indicate the absence of a fuze. Bombs with certain fuzes have a closure plug screwed into the fuze cavity, making direct identification of the fuze impossible. When the fuze is not exposed, identification may be aided by observation of certain fuze-related features such as the type of closure plug in the fuze cavities and the components installed in the charging well. Other features such as the presence of arming vanes and reach rods may also aid in determining the type of fuze used.



BOMB	A	B	C
MK81	1.25 M (49.31 IN)	1.10 M (43.34 IN)	229 MM (9.00 IN)
BDU-50/B AND MK 82 SERIES	1.67 M (65.90 IN)	1.53 M (60.57 IN)	274 MM (10.80 IN)
MK83	1.92 M (6.5 FT)	1.84 M (6.0 FT)	356 MM (14.00 IN)
MK84	2.60 M (8.5 FT)	2.47 M (8.1 FT)	457 MM (18.00 IN)

The MK-81 through MK-84 concrete- or sand-filled bombs are painted blue or olive drab, with white or black markings. Bombs fitted with a signal charge will have a brown or yellow band no wider than 76 millimeters (3.00 inches) circumscribed near the nose of the bomb. However, explosive-loaded practice bombs may be found without markings or color band indicating the explosive content. Inert-loaded MK-82 Mod 2 practice bombs may be found with an olive drab thermal coating and a 76-millimeter (3.00-inch)-wide blue nose band. Loading information is stenciled on the thermal coating. Thermally protected practice bombs are also die-stamped on the base plate to indicate their inert filler.

APPENDIX F
PUBLIC INVOLVEMENT

F1: CORRESPONDENCE FROM GOVERNMENTAL AGENCIES, ORGANIZATIONS, AND PRIVATE ENTITIES AND INDIVIDUALS

During the public review process for the DEIS/OEIS, 22 comments were received; 13 from federal agencies, 2 from state agencies, 5 from a non-governmental organization, and 2 from individuals or private entities.

F2: PUBLIC HEARINGS

Four public hearings were held 2-6 February 2009 to receive public comments on the Gulf of Mexico Range Complex Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS). The hearings were held in Panama City and Pensacola, FL, New Orleans, LA, and Corpus Christi, TX.

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Correspondence from Government Agencies, Organizations, and Private Entities and Individuals on GOMEX Draft EIS/OEIS

Comment Tracking Code	Date	Affiliation	Author
Federal Agencies			
F1	Feb 3, 2009	US Department of the Army New Orleans District, Corps of Engineers	Alvin B. Lee
F2	Feb 10, 2009	US Department of the Interior Office of Environmental Policy and Compliance	Gregory Hogue
F3	Feb 16, 2009	Marine Mammal Commission	Timothy Ragen
F4	Feb 17, 2009	US Environmental Protection Agency	Susan Bromm
F5	Feb 19, 2009	US Department of the Army Jacksonville District, Corps of Engineers	Paul Grosskruger
State Agencies			
S1	Jan 9, 2009	Florida Department of State Division of Historical Resources	Frederick Gaske
S2	Feb 16, 2009	Florida Department of Environmental Protection	Sally Mann
Organizations			
O1	Feb 13, 2009	Natural Resources Defense Council	Taryn Kiekow
Private Entities/Individuals			
P1	No date	Private	Anonymous
P2	Jan 17, 2009	Private	Carolyn Kinch

COMMENT LETTERS
GOMEX Draft EIS/OEIS
Comment Period 2 January 2009 through 16 February 2009

Comment #F1

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

FEB - 3 2009

Planning, Programs, and
Project Management Division
Environmental Planning and
Compliance Branch

Mr. G. L. Edwards
Naval Facilities Engineering Command
Atlantic, Code EV22TW
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

Dear Mr. Edwards:

F1-1 The New Orleans District staff has reviewed the Draft Environmental Impact Statement (DEIS)/Overseas EIS (OEIS) for the Gulf of Mexico Range Complex prepared by the US Fleet Forces Command. The alternatives evaluated in the DEIS/OEIS do not appear to have the potential to impact any of the projects of the US Army Corps of Engineers within the boundaries of the New Orleans District. Further, it appears that there would be no deposition of dredged or fill material into waters of the United States as regulated under Section 404 of the Clean Water Act, nor would there be any structures placed in navigable waters as regulated under Section 10 of the Rivers and Harbors Act of 1899. Since there appears to be no connection between your proposed action and our projects or regulatory program, we have no further comments on the DEIS/OEIS.

Sincerely,

Alvin B. Lee

Alvin B. Lee
Colonel, US Army
District Commander

Comment #F2

United States Department of the Interior

TAKE PRIDE IN AMERICA

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Richard B. Russell Federal Building
75 Spring Street, S.W.
Atlanta, Georgia 30303

ER 09/33
9043.1

February 10, 2009

Naval Facilities Engineering Command, Atlantic Division
Attention Code: EV22TW (GOMEX EIS/OEIS PM)
6808 Hampton Boulevard
Norfolk, Virginia 23508-1278

Re: Review of the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS), for the Gulf of Mexico (GOMEX) Range Complex, Florida, Alabama, Mississippi, Louisiana, and Texas

The United States Department of the Interior (Department) has reviewed the referenced document.

F2-1

The draft biological evaluation (DBE) and the DEIS/OEIS adequately describe fish and wildlife resources in the project area and adjacent areas on the Louisiana coast, as well as the purpose and need for the proposed action, and potential impacts associated with each alternative. Federally listed species under the jurisdiction of the Department addressed in this evaluation which are known to occur in Louisiana and adjacent waters are the West Indian manatee (*Trichechus manatus*), piping plover (*Charadrius melodus*), interior least tern (*Sternula antillarum athalassos)*, brown pelican (*Pelecanus occidentalis*), and the red-cockaded woodpecker (*Picoides borealis*). The interior least tern, piping plover and red-cockaded woodpecker do not occur within the project area associated with Louisiana, and would therefore not be impacted by this project.

Federally listed as an endangered species, West Indian manatees occasionally enter Lakes Pontchartrain and Maurepas, and associated coastal waters and streams during the summer months (i.e., June through September). Manatee occurrences appear to be increasing, and they have been regularly reported in the Amite, Blind, Tchefuncte, and Tickfaw Rivers, and in canals within the adjacent coastal marshes of Louisiana. They have also been occasionally observed elsewhere near-shore along the Louisiana Gulf coast. The manatee has declined in numbers due to collisions with boats and barges, entrapment in flood control structures, poaching, habitat loss, and pollution. Cold weather and outbreaks of red tide may also adversely affect these animals.

Federally listed as an endangered species, brown pelicans (*Pelecanus occidentalis*) are currently known to nest on Raccoon Point on Isles Dernieres, as well as Queen Bess Island, Plover Island

(Baptiste Collette), Wine Island, Rabbit Island in Calcasieu Lake, and islands in the Chandeleur chain. Pelicans change nesting sites as habitat changes occur; thus, they may also be found nesting on mud lumps at the mouth of South Pass (Mississippi River Delta) and on small islands in St. Bernard Parish. In spring and summer, nests are built in mangrove trees or other shrubby vegetation, although ground nesting may also occur. Brown pelicans feed along the Louisiana coast in shallow estuarine waters, using sand spits and offshore sand bars as rest and roost areas. Major threats to this species include chemical pollutants, colony site erosion, disease, and human disturbance.

F2-2 Operating Areas (OPAREA) W-92 and W-54 are located approximately 70 kilometers offshore of Louisiana, which is outside the range of preferred foraging habitat for brown pelicans (20 to 30 kilometers). Therefore, we concur that activities in OPAREAs W-92 and W-54 are not likely to adversely affect the brown pelican. Additionally, these OPAREAs are considerably waterward of where any manatees would be expected to be encountered, therefore, we concur that operations are not likely to adversely affect the West Indian manatee.

We appreciate the opportunity to provide these comments. If you have questions concerning these comments, please contact Richard Warner at (404) 679-7110. I can be reached on (404) 331-4524 or by email at gregory_hogue@ios.doi.gov.

Sincerely,

Gregory Hogue
Regional Environmental Officer

cc:
FWS – Region 4
OEPC - WASH

Comment #F3

MARINE MAMMAL COMMISSION
4340 EAST-WEST HWY., RM. 700
BETHESDA, MD 20814

Telephone: (301) 504-0087
Facsimile: (301) 504-0099

FACSIMILE TRANSMISSION

Date: 16 Feb. 2009

Total pages including cover: 6

To: Naval Facilities Engineering Command - Atlantic

Fax #: 757-322-4894

Phone #:

From: Timothy Ragen

Subject:

Comments:

MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 700
BETHESDA, MD 20814-4447

16 February 2009

Naval Facilities Engineering Command, Atlantic
Attention: Code EV22TW (GOMEX EIS/OEIS PM)
6506 Hampton Blvd.
Norfolk VA 23508-1278

To Whom It May Concern:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) evaluating proposed activities in the Gulf of Mexico Range Complex. The complex includes approximately 17,440 nmi^2 of offshore surface and subsurface ocean operating areas and 12,072 nmi^2 of shallow ocean area less than 100 fathoms (600 feet) deep located both inside and outside U.S. waters off the coasts of Florida, Alabama, Mississippi, Louisiana, and Texas. It also includes additional inland ranges and certain air spaces limited to special use by the Navy. The analyzed activities include vessel transits, aircraft overflights, bombing and gunnery exercises, amphibious warfare firing exercises, electronic combat, chaff and flare exercises, underwater detonations, and mine warfare. The Navy analyzed active sonar use within the Gulf of Mexico Range Complex in a separate environmental impact statement prepared for Atlantic Fleet Active Sonar Training activities.

The Navy considered three alternatives in the DEIS for the Gulf of Mexico Range Complex: one purportedly consistent with the levels of activity in prior years (the "No Action" alternative), another with an anticipated increase in activities except mine warfare training, which is eliminated (alternative 1), and the last with a further increase in all activity (alternative 2). The Navy prefers alternative 2.

RECOMMENDATIONS

<u>The Marine Mammal Commission recommends</u> that the Navy—

F3-1
- revise its Gulf of Mexico Range Complex DEIS to include a description of past and current activity levels to verify that the activity level proposed under the no-action alternative is indeed consistent with the current level;

F3-2
- revise its DEIS by incorporating a set of explicit and clear metrics that the public and decision-makers can use to make more informed judgments about the benefits and costs of various types and levels of activity;

F3-3
- revise its DEIS to include an alternative involving a reduction in activity to ensure that decision-makers are both well informed and presented with a full range of alternatives;

F3-4
- revise its DEIS by limiting its scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs;

F3-5
- subject its reviews of marine mammal density, distribution, behavior, and habitat use to scientific peer review;

PHONE: (301) 504-0087
FAX: (301) 504-0099

F3-6
- develop and implement a plan to validate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the National Marine Fisheries Service of an incidental harassment authorization; and

F3-7
- implement a minimum 60-minute waiting period when deep-diving species (e.g., sperm and beaked whales) or species that cannot be identified by watchstanders are observed within or are about to enter a safety zone.

RATIONALE

The Commission's rationale for its recommendations is as follows.

Selection of Alternatives

In an environmental analysis, the no-action alternative provides an essential baseline to ensure that the full effects of a proposed action are described to the public and decision-makers. At its most basic level, "no action" means just that—the action agency does not undertake the proposed action in any form. An action agency also can use the no action alternative to represent its current level of activity. However, it should do so only if the effects of the current level of activity have been described in a previous analysis (the preferred approach) or are described in the current analysis. However, in this instance, the types and levels of activity in previous years have not been documented, and it is therefore not possible for the public or decision-makers to verify that the assertion is true. For that reason, the Marine Mammal Commission recommends that the Navy revise its Gulf of Mexico Range Complex DEIS to include a description of past and current activity types and levels to verify that those proposed under the no-action alternative are indeed consistent with those that have prevailed in the past.

The Navy's Range Complex Management Plan indicates that current training levels are not sufficient and result in severe-to-moderate shortfalls in readiness (page ES-2). Not surprisingly, this statement implies that the amount of training in any given year is a function of desired readiness, as well as other factors, presumably related to the availability of resources or competing objectives. Because this is the first environmental impact statement prepared for this range, past tradeoffs between level of readiness and environmental protection have not been described. In this DEIS, the Navy simply asserts that certain levels of activity are necessary to achieve readiness, but it does not substantiate that claim or provide a clear explanation of the tradeoffs. Consistent with guidance in the National Environmental Policy Act, the Commission believes that the public and decision-makers can make informed decisions about the appropriate activities only if they have clear, detailed descriptions of benefits and costs over a suitable range of activity types and levels. To that end, the Marine Mammal Commission recommends that the Navy revise its DEIS by incorporating a set of explicit and clear metrics that the Navy, the public, and decision-makers all can use to make more informed judgments about the benefits and costs of various types and levels of activity.

To balance the level of training and readiness against other considerations (e.g., resources available, competing demands, environmental protection), decision-makers must be informed about and able to weigh the respective benefits and costs of alternative courses of action. If the DEIS provides decision-makers only with alternatives that maintain or increase training levels, then the document fails to inform decision-makers and provide them with a full set of options. A restricted set of alternatives unnecessarily constrains the choices available to decision-makers and, for that reason, is inconsistent with the intent of the National Environmental Policy Act. Therefore, the Marine Mammal Commission recommends that the Navy revise its DEIS to include an alternative involving a reduction in activity to ensure that decision-makers are both well informed and presented with a full range of alternatives.

Finally, the Navy prefers alternative 2, which involves the highest level of activity requested by the Navy under its Future Training Requirements Plan. However, this alternative depends on factors not yet determined or reliably predicted (e.g., congressional authorizations and appropriations, changes to internal Department of Defense strategic plans, acquisition of new equipment, and associated changes to training protocols). It therefore seems premature, and out of keeping with the intent of the National Environmental Policy Act, to request what amounts to a blank check for speculative increases in future activity. If those future activities cannot be described in detail, then their environmental costs also cannot be described and decision-makers cannot make informed decisions about them. To comply with the National Environmental Policy Act, the Navy should base its alternatives only on those types and levels of activity that can be described with sufficient detail to inform decision-makers about the potential costs and benefits of alternative actions. History tells us that many of the factors that should be considered in determining the effects of future Navy actions change over time. Therefore, the Marine Mammal Commission recommends that the Navy revise its DEIS by limiting its scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs.

Scientific Peer Review of Marine Mammal Density and Distribution Estimates

The Navy has done a commendable job of reviewing the existing literature on marine mammal density, distribution, behavior, and habitat use in this and similar documents. The resulting reviews are used to estimate animal density and distribution and, therefore, are an important element of the risk estimation procedure. However, the manner in which the literature is used to form conclusions about density, distribution, behavior, and habitat use has not been subject to peer review, which is an integral part of the scientific process. In the subject DEIS, the numbers used in the risk estimates are derived mainly from two Navy-contracted reports that have not been so reviewed; these are the Navy OPAREA Density Estimates (NODES) and Marine Resources Assessment for the Gulf of Mexico Operating Area. Because the Navy bases its training decisions, in part, on perceived risks to marine mammals, and the Navy's use of existing data to estimate those risks has not been subjected to scientific peer review, the reliability of the Navy's decisions is called into question. To address that concern, the Marine Mammal Commission recommends that the Navy subject its estimates of marine mammal density, distribution, behavior, and habitat use to scientific peer review.

Monitoring and Mitigation

Monitoring and mitigation measures determine, at least in part, the extent to which anticipated risks are detected and managed effectively. The Navy has established an Integrated Comprehensive Monitoring Plan to monitor, mitigate, and assess the effects of its activities over time. The DEIS indicates that this plan will "establish structure and coordination that will facilitate collection and synthesis of monitoring data" (page 5-3). The Marine Mammal Commission strongly supports the development and implementation of this plan, which is indicative of the Navy's appreciation for the value of determining and minimizing its impacts.

However, the Integrated Comprehensive Monitoring Plan and mitigation measures are only useful for determining and minimizing impacts if the various monitoring and mitigation measures incorporated in the plan are, in fact, effective. During the course of preparing its environmental analyses over the past year, the Navy has not responded to repeated Commission recommendations that it evaluate the effectiveness of its proposed monitoring and mitigation measures. Until the Navy has conducted such an evaluation, it simply cannot describe its actual impacts with a reasonable degree of confidence. The resulting uncertainty means that the Navy, and in turn readers and decision-makers, may misunderstand both the risks of proposed activities and the effects of completed activities. Furthermore, until the Navy evaluates the efficacy of its monitoring and mitigation measures, the public and decision-makers, including Navy personnel, cannot make informed decisions about where to direct efforts to make the necessary improvements. Because (1) the failure to evaluate monitoring and mitigation measures perpetuates an unnecessary level of uncertainty about the effects of Navy activities, (2) the Navy is fully capable of conducting the required tests, and (3) the Commission continues to believe that the implied efficacy of these measures is over-estimated, <u>the Marine Mammal Commission again recommends</u> that the Navy develop and implement a plan to validate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the National Marine Fisheries Service of an incidental harassment authorization.

Shutdowns and source reductions

The Commission notes an apparent change in the waiting period following shutdowns or source reductions after a marine mammal has been detected within the safety zone (or zone of influence) around certain training exercises (DEIS page 5-9). For those exercises, the Navy has extended the waiting period from 30 to 45 minutes. The Navy did not explain the rationale for the extension, but the Commission acknowledges that it is a useful change in the right direction. That being said, the <u>Marine Mammal Commission continues to recommend</u> that the Navy implement a minimum 60-minute waiting period when deep-diving species (e.g., sperm and beaked whales) or species that cannot be identified by watchstanders are observed within or are about to enter a safety zone.

F3-8 As a final note, on page 5-4 of the DEIS the Navy describes the value of M3R and HARP passive acoustic listening systems as monitoring and mitigation tools. However, the Navy does not clarify whether it intends to install and use either an M3R or HARP system in the Gulf of Mexico Range Complex. If the Navy is not going to use those systems, this should be noted in the DEIS. Otherwise, readers may be misinformed about the efficacy of monitoring systems.

Please contact me if you have questions about any of our recommendations or comments.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

Cc: Craig Johnson, NOAA/NMFS OPR
RADM Larry Rice, CNO N45
Hon. Donald Schregardus, DASN E

Comment #F4

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 17 2009

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

NAVFAC Atlantic
Attention: Code EV22TW (GOMEX EIS/OEIS PM)
6506 Hampton Boulevard
Norfolk, VA 23508-1278

Dear Sir/Madam:

In accordance with our responsibilities under Section 309 of the Clean Air Act and the National Environmental Policy Act (NEPA), the Environmental Protection Agency (EPA) has reviewed the U.S. Navy's draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Gulf of Mexico Range Complex (CEQ# 20080539).

The Gulf of Mexico (GOMEX) Range Complex is a combination of sea and airspace where Navy and Marine Corps training is conducted. The EIS/OEIS assessed the potential environmental impacts associated with the Navy Fleet and Chief of Naval Education training, Navy research, development, testing, and evaluation (RDT&E) activities, and associated range capabilities enhancements. The Navy's preferred alternative is Alternative 2, which eliminates Mine Warfare training; increases or modifies training and RDT&E operations from current levels; implements Joint National Capability (JNTC) within the GOMEX Range Complex; uses commercial air services range training enhancement; and eliminates the use of High Explosive (HE) bombs during major exercise air-to-surface bombing events. Non-explosive Practice Munition (NEPM) bombs will continue to be used during major exercises.

F4-1 EPA believes that this draft EIS/OEIS provides an adequate discussion of the potential environmental impacts. Moreover, the draft EIS/OEIS does not identify any significant environmental effects that will result in this action. Therefore, EPA has no environmental concerns about the preferred alternative and has rated it as LO – "Lack of Objections".

We appreciate the opportunity to review this draft EIS/OEIS, and look forward to reviewing the final EIS/OEIS related to this project. The staff contact for the review is Candi Schaedle and she can be reached at (202) 564-6121.

Sincerely,

Susan E Bromm

Susan E. Bromm
Director
Office of Federal Activities

Comment #F5

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P.O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

CESAJ-PD-EC

FEB 19 2009

MEMORANDUM FOR Commander, U.S. Naval Facilities Engineering Command, Atlantic Division; Attn: Code EV22TW (GOMEX EIS/OEIS PM), 6506 Hampton Boulevard, Norfolk, Virginia 23508-1278

SUBJECT: Comments on the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Mexico Range Complex

1. I am providing comments on the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Mexico Range Complex. There would be no requirement for a regulatory permit from this office if the proposed activity does not involve ocean disposal, dredging, building of structures in the water, or the discharge of dredged or fill material. In accordance with part 334 of Title 33 of the Code of Federal Regulations, the Navy may request the U.S. Army Corps of Engineers to establish a "danger zone" or a "restricted area" to "provide security for Government property and/or protection to the public from the risks of damage or injury arising from the Government's use of that area". The point of contact for regulatory matters is Mr. Jon Griffin at 904 232-1680.

F5-1

2. The proposed activity apparently has no direct impact on any of our civil works projects. This office will continue to work with the Navy with respect to common issues such as impacts to sea turtles, marine mammals, essential fish habitat, and other protected resources.

3. As always, we are available to provide the Navy technical support with respect to environmental, engineering, and permitting matters. The point of contact for technical support is Mr. Michael Ornella at 904-232-1600.

PAUL L. GROSSKRUGER
Colonel, Corps of Engineers
Commanding

Comment #S1

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Naval Facilities Engineering Command, Atlantic
Code EV22TW
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

January 9, 2009

RE: DHR Project File Number: 2008-7970
5090 Ser N45/845240
Draft Environmental Impact Statement/Overseas Environmental Statement for the Navy Atlantic Fleet Training and Research, Development, Testing, and Evaluation Activities, and Associated Range Capabilities Enhancements in the Gulf of Mexico Range Complex (GOMEX)

To Whom It May Concern:

Our office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties*, the *National Environmental Policy Act of 1969, as amended* and the implementing state regulations.

S1-1 We reviewed Sections 3.13 and 6.4.13, which deal with Cultural Resources of the above referenced draft environmental impact statement. Based on the information provided, it is the opinion of this office that the Department of the Navy has adequately addressed cultural resources.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *sedwards@dos.state.fl.us*, or at 850-245-6333 or 800-847-7278.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • http://www.flheritage.com

☐ Director's Office (850) 245-6300 • FAX: 245-6436
☐ Archaeological Research (850) 245-6444 • FAX: 245-6452
☑ Historic Preservation (850) 245-6333 • FAX: 245-6437

Comment #S2

Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

February 16, 2009

Naval Facilities Engineering Command, Atlantic
Attention: Code EV22TW (GOMEX EIS/OEIS PM)
6506 Hampton Boulevard
Norfolk, VA 23508-1278

RE: Department of the Navy – Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for the Gulf of Mexico (GOMEX) Range Complex.
SAI # FL200812314538C (Reference SAI # FL200709123757C)

Dear Project Manager:

The Florida State Clearinghouse has coordinated a review of the Draft Environmental Impact Statement/ Overseas Environmental Impact Statement (DEIS/OEIS) under the following authorities: Presidential Executive Order 12372; Section 403.061(40), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended.

S2-1 Based on the information contained in the DEIS/OEIS and comments provided by our reviewing agencies, the state has no objections to the proposal and has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program.

Thank you for the opportunity to review this proposal. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

Comment #O1

NRDC

THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

By Regular Mail

February 13, 2009

Naval Facilities Engineering Command, Atlantic Division
Attention Code: EV22TW (GOMEX EIS/OEIS PM)
6506 Hampton Blvd.
Norfolk, VA 23508-1278

Re: Navy GOMEX Range Complex Draft Environmental Impact Statement /Overseas Environmental Impact Statement

Dear Sir or Madam:

On behalf of the Natural Resources Defense Council ("NRDC"), The Humane Society of the United States, International Fund for Animal Welfare, Whale and Dolphin Conservation Society, Cetacean Society International, Ocean Futures Society, League for Coastal Protection, and Jean-Michel Cousteau, and on behalf of our millions of members and activists, thousands of whom reside along the Gulf of Mexico, I am writing to submit comments on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Gulf of Mexico ("GOMEX") Range Complex ("DEIS"). See 74 Fed. Reg. 96 (Jan. 2, 2009). Please include these comments and the enclosure in the administrative record.[1]

O1-1 We believe that the DEIS fails to meet the environmental review standards prescribed by the National Environmental Policy Act ("NEPA"), 42 U.S.C. § 4321 et seq. 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 incorporates by reference the Atlantic Fleet Active Sonar Training Environmental Impact Statement/Overseas Environmental Impact Statement ("AFAST EIS"). DEIS at 3-473. As discussed in detail in our comments responding to the Draft AFAST EIS (see enclosed NRDC comment letter dated March 31, 2008), the Navy's environmental review falls well short of the rigorous standards prescribed by NEPA.

---

[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. The comments that follow do not constitute a waiver of any factual or legal issue raised by any of these organizations or individuals and not specifically discussed herein.

www.nrdc.org

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O1-2 The Navy does not properly analyze environmental impacts. The Navy's analysis substantially understates the potential effects of sonar on marine wildlife in the Gulf of Mexico and concludes that no animals would die and only a negligible number would suffer serious injury during the many thousands of hours of sonar training.[2] The Navy reaches this astounding 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 our enclosed comment letter, the Navy's assessment of acoustic impacts – and harassment – are highly problematic. For example, the Navy uses a faulty risk function to determine "Level B" harassment under the Marine Mammal Protection Act, 16 U.S.C. § 1361 et seq., that places great weight on flawed SPAWAR data, misuses data from the Haro Strait event, and excludes other relevant data. Even more glaringly, the Navy's analysis entirely fails to account for cumulative impacts for the years of anticipated activity. The Navy's usual platitude that all of its impacts are short-term in nature and thus would not combine to produce cumulative effects not only has no scientific validity, but also grossly misapprehends the definition of cumulative impacts under NEPA. 40 C.F.R. § 1508.7.

O1-3 Nor is the Navy's analysis of alternatives or mitigation any more credible. The Navy fails to consider a variety of other options, alternatives, and common sense mitigation measures – some employed by the Navy in previous training exercises – that would reduce the impacts. What the Navy presents instead is an alternatives analysis and mitigation strategy so narrowly defined that it disregards the environment all together.

O1-4 For the following reasons, and as described more fully in our enclosed comment letter, we urge the Navy to revise its analysis consistent with federal law and to produce a mitigation plan that truly maximizes environmental protection. We also urge the Navy to make available to the public the data and modeling upon which its analysis is based.

Sincerely,

Taryn Kiekow
Staff Attorney

Encl.: NRDC comments on the AFAST DEIS

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[2] It is difficult to estimate the impacts to marine mammals in the Gulf of Mexico as the Navy
O1-5 refuses to disclose the data and modeling upon which its analysis is based and provides contradictory estimates in the DEIS – listing 127,853 total takes in Table 3.20-4 on page 3-491 and 190,231 total takes in Table 6.4-1 on page 6-41. The marine mammals impacted are also different, with Table 3.20-4 showing no takes of Humpback whales, while Table 6.4-1 shows 872 takes.

NRDC

THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

By Regular Mail

March 31, 2008

Naval Facilities Engineering Command, Atlantic
Attention: Code EV22 (Atlantic Fleet Sonar Project Manager)
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278
Fax: 888-875-6781

O1-4 (Repeated)

Re: Draft Atlantic Fleet Active Sonar Training Environmental Impact Statement/ Overseas Environmental Impact Statement

Dear Sir or Madam:

On behalf of the Natural Resources Defense Council ("NRDC"), the Humane Society of the United States, the International Fund for Animal Welfare, PenderWatch & Conservancy, Cetacean Society International, the International Ocean Noise Coalition, Ocean Mammal Institute, and Ocean Futures Society and its founder Jean-Michel Cousteau, and on behalf of our millions of members, many thousands of whom reside along the eastern seaboard and the Gulf of Mexico, we are writing to submit comments on the Navy's Draft Atlantic Fleet Active Sonar Training Environmental Impact Statement/ Overseas Environmental Impact Statement ("DEIS"). See 73 Fed. Reg. 8856 (Feb. 15, 2008).[1]

It is undisputed that sound is a fundamental element of the marine environment. Whales, fish, and other wildlife depend on it for breeding, feeding, navigating, and avoiding predators—in short, for their survival. Many of the exercises proposed for the east coast and Gulf of Mexico would employ the same hull-mounted sonar systems that have 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, inducing panic responses, displacing animals, and disrupting crucial behavior such as foraging.

By any measure, the sonar training contemplated in this DEIS is extensive. Even using the Navy's analysis, which we believe substantially understates the potential effects, the alternative allegedly preferred by Atlantic Fleet would cause 2.75 million biologically

[1] NRDC is 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. The comments that follow do not constitute a waiver of any factual or legal issue raised by any of these organizations or individuals and not specifically discussed herein.

significant impacts on marine mammals along the U.S. east coast and in the Gulf of Mexico each year—or 13.75 million "takes" during the 5-year life of a Marine Mammal Protection Act permit. Under these circumstances, the Navy's exercises must be undertaken with particular care, dictated not by assertions of convenience or of history, but by a recognition that protection of the marine environment and safeguarding of our national defense are mutually dependent national interests that can and must be achieved through compliance with our federal environmental laws.

To that end, Congress has dictated through NEPA that, in planning exercises, the Navy must employ rigorous standards of environmental review, including a fair and objective description of potential impacts of the range, a comprehensive analysis of all reasonable alternatives, and a thorough delineation of measures to mitigate harm. Unfortunately, the DEIS released by the Navy falls far short of these standards. To cite just a few examples:

- The Navy throws out nearly the entire literature on behavioral impacts on marine mammals, in support of an abstract standard that contradicts the actual evidence of harm.

- It assumes that no marine mammals would be seriously injured or killed, despite a growing, peer-reviewed, scientific record of injuries and mortalities.

- It presumes, entirely without analysis, that all of its impacts are short-term in nature and that none will have cumulative effects, even though the same populations would repeatedly be affected.

- It claims, against generations of field experience, that marine mammals—even cryptic, deep-diving marine mammals like beaked whales—can effectively be spotted from fast-moving ships and avoided.

- It adopts mitigation that a federal court found to be "woefully inadequate and ineffectual," and fails to prescribe measures that have been used repeatedly by the Navy in the past, used by other navies, or required by the courts.

The picture that the Navy paints with such an analysis belies common sense. Although mass mortalities of beaked whales have resulted from the single transit of a sonar ship, the DEIS concludes that no animals would suffer serious injury or die during the many thousands of hours of sonar training. And although the Navy would use sonar extensively in many of the same areas of ocean, the DEIS concludes that no significant cumulative impacts would occur.

Nor is the Navy's analysis of alternatives any more credible. For sonar training, there is no step more crucial to reducing impacts than the careful siting of exercises, avoiding concentrations of vulnerable and endangered species and high abundances of marine life to the greatest extent possible. Yet, after spending what must have been millions of dollars on habitat analysis, the Navy did not establish a single environmental exclusion zone, neither along the eastern seaboard nor in the Gulf of Mexico, nor in any part of the vast AFAST study area, which appears to run more than half the size of the continental United States. No exclusions are made for North Atlantic right whales, the critically endangered species that has been the focus of enormous conservation effort; for harbor porpoises, a strategic stock that even the Navy admits is extremely vulnerable to sonar; for other highly vulnerable species, such as beaked whale that have been associated with severe sonar-related injury, and species listed under the Endangered Species Act; for areas with large concentrations of marine mammals; or even for national marine sanctuaries or other protected areas along the U.S. coast. And this is the case despite the Navy's admission of flexibility in the siting of exercises and a past record of using geographic mitigation to reduce harm. Similarly, other proven and practicable mitigation measures are quickly dismissed.

All of this clearly suggests the sort of post hoc decision-making that NEPA is intended to avoid.

The DEIS is fatally flawed by its inconsistency with the weight of scientific evidence and with the standards of environmental review embodied in NEPA. As a matter of science, it lacks objectivity; as a matter of law, it is insupportable, and the hard-line position that it represents has repeatedly been rejected by the courts. We urge the Navy to revise its analysis consistent with federal law and to produce a mitigation plan that truly maximizes environmental protection given the Navy's actual operational needs. We also urge the Navy to make available to the public the data and modeling on which its analysis is based.

I. IMPACTS OF HIGH-INTENSITY SONAR

Scientists agree, and the publicly available scientific literature confirms, that the intense sound generated by military 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. Associated strandings have occurred in Greece, during the trial of a NATO sonar system; on the islands of Madeira and Porto Santo, during a NATO event involving subs and surface ships; in the U.S. Virgin Islands, during a training exercise for Navy battle groups; in the Bahamas, the Canaries, Japan, Hawaii, Alaska, and other spots around the world.[2] On several occasions, bodies have been recovered in time to give evidence of acoustic trauma. In a 2004 symposium at the International Whaling Commission, more than 100 whale biologists concluded that the association between

[2] A summary of the strandings record appears below at section II(B)(2)(a) ("Strandings and Mortalities Associated with Mid-Frequency Sonar").

sonar and beaked whale deaths "is very convincing and appears overwhelming."[3] In the United States, an expert report commissioned by the Navy said much the same thing.[4]

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 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, and detect and capture prey;
- 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.[5]

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

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[3] International Whaling Commission, 2004 Report of the Scientific Committee, Annex K at § 6.4 (2004).

[4] H. Levine, Active Sonar Waveform 1 (2004) (JASON Group Rep. JSR-03-200) (describing evidence of sonar causation as "completely convincing"). The strandings record is further described infra at section II(B)(2)(a).

[5] 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).

experimental and anecdotal, of catch rates plummeting in the vicinity of noise sources.[6] Sea turtles, most of which are considered threatened or endangered under federal law, have been shown to engage in escape behavior and to experience heightened stress in response to noise. 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.

II. THE NAVY'S COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT

Enacted by Congress in 1969, 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 [NEPA]." 42 U.S.C. § 4332. As the Supreme Court explained,

NEPA's instruction that all federal agencies comply with the impact statement requirement – and with all the requirements of § 102 – "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).

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 environmental impact statement. Steamboaters v. F.E.R.C., 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original). 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). 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 established under NEPA.

A. Impacts on Marine Mammals

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[6] See the discussion below, at section II(C) of "Impacts on Fish and Fisheries."

Fundamental to satisfying NEPA's requirement of fair and objective review, agencies must ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in environmental impact statements. 40 C.F.R. § 1502.24. To this end, they 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. 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 on marine mammals is consistently undermined by its failure to meet these fundamental responsibilities of scientific integrity, methodology, investigation, and disclosure. As with the Navy's initial Draft Environmental Impact Statement for the Undersea Warfare Training Range, the DEIS excludes 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 environmental harm—behavioral, auditory, and physiological—that is at odds with established scientific authority and practice.

1. Thresholds of Injury, Hearing Loss, and Significant Behavioral Change

At the core of the Navy's assessment of acoustic impacts on the training range are the thresholds it has established for physical injury, hearing loss, and significant behavioral harassment, the levels above which meaningful effects on marine mammals are found to occur. There are gross problems with the Navy's thresholds here.

a. Injury Threshold

The Navy fixes its highest threshold of 215 dB re 1 $\mu Pa^2 \cdot s$—which it considers the ground floor for direct physical injury—on the amount of energy necessary to induce permanent hearing loss (or "threshold shift") in marine mammals. DEIS at 4-39. Beneath this decision lies an assumption that the tissues of the ear are "the most susceptible to physiological effects of underwater sound" (DEIS at 4-31, 33), and, indeed, a few paragraphs are spent in an effort to set aside other types of injury that have been identified or observed. Unfortunately, the Navy's position is inconsistent with the scientific literature, with the legal standard of review, and with recent court decisions. See NRDC v. Winter, 527 F.Supp.2d 1216 (C.D. Cal. 2008), aff'd __ F.3d __, 2008 WL 565680 (9th Cir. 2008); Ocean Mammal Institute v. Gates, 2008 WL 564664 (D. Hawaii 2008).

First, the DEIS 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.[7] 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 lower than 140 dB re 1 μPa.[8] (In another context, where it wishes to dismiss evidence of impacts to hearing at lower levels than its standard allows, the Navy refers to the statistical mean as "'the best unbiased estimator.'" DEIS at 4-41.) Factoring in duration, then, evidence of actual sonar-related mortalities would compel a maximum energy level ("EL") threshold for serious injury on the order of 182 dB re 1 $\mu Pa^2 \cdot s$, 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 $\mu Pa^2 \cdot s$.[9] The Navy's claim that no beaked whales would suffer injury, let alone serious injury or mortality, because none would be exposed to levels above 215 dB re 1 μPa is simply not tenable.

Second, the DEIS fails to take proper account of published research on bubble growth in marine mammals, which separately indicates the potential for injury and death at levels far lower than the Navy proposes. 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;[10] in addition, it was singularly and explicitly highlighted as plausible by an expert panel

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[7] 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.

[8] 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).

[9] 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).

[10] 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).

convened by the Marine Mammal Commission, in which the Navy participated.[11] The Navy's argument to the contrary simply misrepresents the available literature. What is more, the default assumption in the DEIS – that whales suffer injury only through the physical act of stranding itself (or through direct tissue injury) – has been soundly rejected in the literature.[12] The Navy's refusal to consider these impacts is insupportable under NEPA. 42 C.F.R. §§ 1502.22, 1502.24.

Third, the numbers do not reflect other non-auditory physiological impacts, as from stress and from chronic exposure during development, which are discussed further among "Other Impacts on Marine Mammals" (below).

Fourth, the Navy's exclusive reliance on energy flux density as its unit of analysis does not take other potentially relevant acoustic characteristics into account. For example, an expert group commissioned by the Office of Naval Research in 2003 to provide recommendations on mitigation suggested that peak power may matter more to beaked whale mortalities than integrated energy.[13] Reflecting this uncertainty, the Navy should establish a dual threshold for marine mammal injury.

Fifth, the Navy's calculation of permanent threshold shift (which it equates to the onset on injury) is based on studies of temporary threshold shift that, as discussed below, have a number of significant limitations.

b. Hearing Loss Threshold

The DEIS sets its threshold for temporary hearing loss, or "threshold shift" ("TTS"), at 195 dB re 1 $\mu Pa^2 \cdot s$. DEIS at 4-39. It bases this 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 4-36.

First, 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. Yet, as noted below at subsection (c) ("Threshold for Significant

[11] 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).

[12] Id.

[13] Levine, Active Sonar Waveform at 27.

Behavioral Change"), 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.[14] 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.[15]

Second, the small size of the data set generated by these studies leads the Navy to some arbitrary interpretations. For example, the Navy effectively excludes the results of one study that found threshold shift originating in a bottlenose dolphin at 190 re 1 $\mu Pa^{2}\bullet s$, which is a full 5 dB re 1 $\mu Pa^{2}\bullet s$ below its proposed standard. DEIS at 4-36. The basis for this exclusion is the equal energy hypothesis: if you assume that the threshold for hearing loss decreases by a constant amount as the duration of a sound increases, you can fit a straight line connecting the data points that the studies have produced. Yet where the line falls can remain somewhat arbitrary given the small number of points on the chart. In this case, the Navy relied heavily for its line-drawing on a single data point, from a single subject, lying at a distance from the main data cluster (Nachtigall et al. 2003b). Alternatively, it might have dropped the line about 5 dB lower, which would have brought it closer to a third cluster, made of multiple data points from multiple subjects, and conformed more exactly to the point above which TTS was consistently found in the main cluster. See DEIS at Fig. 4.1.2.4.6-1. In other words, the Navy's own graphic indicates that a 190 dB re 1 $\mu Pa^{2}\bullet s$ threshold would have fit its data better than the threshold it established and would have had the advantage of being marginally more conservative given the enormous uncertainties—yet there is no justification in the DEIS for the choice it made. The Navy's assumption of a 195 re 1 $\mu Pa^{2}\bullet s$ EL threshold in the present DEIS, as in all documents that depend on the same methodology, is arbitrary and capricious.

c. Threshold for Significant Behavioral Change

The threshold used in the DEIS differs the one used by the Navy to estimate marine mammal take during RIMPAC 2006 and during subsequent major exercises off California and Hawaii. In short, instead of using an EL standard of 173 dB re 1 $\mu Pa^{2}\bullet s$, which NMFS had insisted the Navy adopt, the Navy rather applies a dose-response function that begins at 120 dB re 1 µPa and reaches its mean at 165 dB re 1 µPa.

On the Hawaii Range Complex, the only region for which comparative data are publicly available, the change from the Navy's current standard is significant.

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

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

Under the current standard, the RIMPAC 2006 event was expected to result in slightly less than 33,000 behavioral takes of marine mammals; under the proposed one, RIMPAC events conducted with the same number of hours of sonar use would supposedly cause fewer than 6,000 takes.[16] Under the current standard, the conduct of 6 USWEX events was predicted to cause over 30,000 behavioral takes of marine mammals; under the proposed one, annual takes would not exceed 20,000.[17] In the AFAST study area, the Navy estimates that sonar training will result each year in approximately 2.75 million behavioral takes of marine mammals. The Hawaii data suggests that this take level—while still very large—represents far less than what the Navy would have predicted had it continued to use the previous EL-based standard of 173 re 1 $\mu Pa^2 \cdot s$.

As the Navy should well know, agencies are not entitled to substantial deference under the Administrative Procedure Act when they reverse previously held positions. Among the most significant problems:

First, the Navy again relies on inapposite studies of temporary threshold shift in captive animals for its primary source of data. 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. 42 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.[18] 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.[19] The SPAWAR studies have several other major deficiencies that NMFS, among others, has repeatedly pointed out; and 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 criticize the Navy for putting any serious stock in them.[20]

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[16] Navy, Hawaii Range Complex Draft Supplemental Environmental Impact Statement/ Overseas Environmental Impact Statement at 3-24 (2008).

[17] Id. at 3-36.

[18] 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 truncates, to 1-Second Tones of 141 to 201 dB re 1 μPa (1997) (SPAWAR Tech. Rep. 1751, Rev. 1).

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

[20] 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,

Second, 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 (see discussion below at section A.2). DEIS at 4-51. 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.[21] 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, and also describe precisely how this data set, along with results from the SPAWAR and Nowacek et al. studies, were factored into its development of the behavioral risk function.

Third, the Navy excludes a substantial body of research on wild animals (and some research on other experimental animals as well, within a behavioral experimental protocol). Perhaps most glaringly, while the DEIS appears to acknowledge the strong sensitivity of harbor porpoises by setting an absolute take threshold of 120 dB (SPL)—a sensitivity that, as NMFS has noted, is reflected in numerous wild and captive animal studies—it improperly fails to include any of these studies in its data set. DEIS at 4-48, 4-50-51. The result is clear bias, for even if one assumes (for argument's sake) that the SPAWAR data has value, the Navy has included a relatively insensitive species in setting its general standard for marine mammals while excluding a relatively sensitive one. By placing great weight on the SPAWAR data, excluding other relevant data, and misusing the Haro Strait data, the Navy has produced a risk function that is belied by the existing record: one that clearly demonstrates high risk of significant behavioral impacts from mid-frequency sources, including mid-frequency sonar, on a diverse range of wild species (e.g., right whales, minke whales, killer whales, harbor porpoises, Dall's porpoises) at levels below the function curve.[22]

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and those of the fishermen cited below, 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).

[21] 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).

[22] See, e.g., id.; R.A. Kastelein, H.T. Rippe, N. Vaughan, N.M. Schooneman, W.C. Verboom, and D. de Haan, The Effects of Acoustic Alarms on the Behavior of Harbor Porpoises in a Floating Pen, 16 Marine Mammal Science 46 (2000); P.F. Olesiuk, L.M. Nichol, M.J. Sowden, and J.K.B. Ford, Effect of the Sound Generated by an Acoustic Harassment Device on the Relative Abundance of Harbor Porpoises in Retreat Passage, British Columbia, 18 Marine Mammal Science 843 (2002); NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions

Fourth, any risk function must take account of 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, as described below, 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. 42 C.F.R. § 1502.16(b).

Fifth, 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").

Sixth, as noted below in the discussion of Cumulative Impacts, 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.[23]

For all these reasons, the thresholds of injury, hearing loss, and significant behavioral change utilized by the Navy in this DEIS are fundamentally inconsistent with the scientific literature on acoustic impacts, and, indeed, with marine mammal science in general, and, if used to support a Record of Decision, would violate

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in the Eastern Strait of Juan de Fuca and Haro Strait, Washington, 5 May 2003 at 10 (2005); 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); Statements of D. Bain, K. Balcomb, and R. Osborne (May 28, 2003) (taken by NMFS enforcement on Haro Strait incident); Letter from D. Bain to California Coastal Commission (Jan. 9, 2007); E.C.M. Parsons, I. Birks, P.G.H. Evans, J.C.D. Gordon, J.H. Shrimpton, and S. Pooley, The Possible Impacts of Military Activity on Cetaceans in West Scotland, 14 European Research on Cetaceans 185-190 (2000); P. Kvadsheim, F. Benders, P. Miller, L. Doksaeter, F. Knudsen, P. Tyack, N. Nordlund, F.-P. Lam, F. Samarra, L. Kleivane, and O.R. Godø, Herring (Sild), Killer Whales (Spekkhogger) and Sonar – the 3S-2006 Cruise Report with Preliminary Results (2007).

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

NEPA. Please note that we will forward a more detailed, technical analysis of the Navy's risk function next month.

2. Strandings and Mortalities Associated with Mid-Frequency Sonar

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.

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 (AN/SQS-53C and AN/SQS-56) in those same channels.[24] 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.[25] 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 one of numerous mortality events coincident with military activities and active sonar that have now been documented:[26]

(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.[27] Thirteen beaked whales of two species were killed in the 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.[28] An additional stranding of Cuvier's beaked whales, also coinciding with a naval exercise, occurred in

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

[25] Id.

[26] 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).

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

[28] Id.

1991.[29] It was reported that mass live strandings occurred each time exercises took place in the area.[30]

(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.[31] 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.[32] The following year saw nine additional Cuvier's beaked whales strand off Greece, again coinciding with naval activity.[33]

(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."[34] 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.[35] In January 1998, according to a NMFS biologist, a beaked whale "stranded suspiciously" at Vieques as naval exercises were set to commence offshore.[36]

(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

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[29] 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).

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

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

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

[33] 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).

[34] 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).

[35] 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).

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

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."[37]

(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.[38] 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.[39] 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.[40]

(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, off the coast of Washington. 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.[41] 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 harbor porpoises fleeing the vessel in large numbers.[42] Eleven harbor porpoises—an abnormally high number given the average stranding rate of six per year—were found beached in the area of the exercise.[43]

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[37] 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).

[38] 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.

[39] 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.

[40] 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.

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

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

[43] 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.

(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.[44]

(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 (see below), systematic fat embolisms were found in these animals.[45] The probability that the whales died at sea is extremely high.[46]

(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, 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.[47]

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[44] 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).

[45] 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).

[46] Id.

[47] 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).

(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.[48] A NATO response force was performing exercises within 50 miles at the time of the strandings. DEIS at E-24 to E-25.

Some preliminary 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.[49] 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.[50] 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 marine species are concerned.[51] 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.[52]

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

[49] 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).

[50] 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).

[51] 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).

[52] 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).

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."[53] It has been proposed that the panic led them to surface too rapidly or because it pushed them to dive before they could eliminate the nitrogen accumulated on previous descents, or because the sound itself precipitated the growth of nitrogen bubbles in the blood, which expanded to devastating effect. This finding has since been supported by follow-on papers, by published work in other fields, and by expert reviews.[54] 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 many of these animals.[55]

In this light, the Navy's assessment of the risk of marine mammal injury and mortality is astonishingly poor. Despite the presence of several beaked whale species, including Cuvier's beaked whales, within the exercise area, the DEIS assumes away the potential for strandings and injuries of beaked whales.

In its analysis, the Navy capriciously (1) denies the potential for beaked whale mortalities during the myriad training and testing activities proposed for the AFAST study area; (2) dismisses the potential for sonar to injure whales at sea, grossly mischaracterizing the literature; (3) suggests that beaked whale mortality cannot occur absent five contributory factors present during the Bahamas 2000 mass strandings in the Bahamas; (4) fails to consider the potential for strandings and mortalities in other species of cetaceans; and (5) assumes that the Navy's failure to observe mortalities during past sonar training is probative of a lack of mortalities, despite the lack of any remotely adequate monitoring system. As we have previously noted, NMFS' own analysis is problematic primarily in its conclusions about the injury threshold and in its treatment of the potential for injury at sea (71 Fed. Reg. 20995, 21002), which do not reflect the best available science and violate

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[53] 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.

[54] Cox et al., Understanding the Impacts. For additional papers, see also the studies referenced at section II(B)(1)(a) ("Injury Threshold"). 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.

[55] 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).

NEPA. 42 C.F.R. § 1502.22 (requiring agencies to evaluate all "reasonably foreseeable" impacts).

3. 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 paucity of 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, hearing loss, and significant behavioral change 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 incident),[56] 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, and fails to consider the combined effects of multiple exercises, which, as NMFS indicates, may have played a role in the 2004 Hanalei Bay strandings;[57]

(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;[58]

(5) The Navy's analysis of marine mammal distribution, abundance, population structure, and ecology contains false assumptions that tend to underestimate impacts on species; and

(6) 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.

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[56] 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).

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

[58] 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.

The Navy's main source for information about marine mammal populations in the AFAST study area is its Marine Resource Assessments; but as these are secondary sources, it is generally difficult to assess which primary reference was used to support the Navy's analysis and whether it in fact constitutes the best available scientific evidence. Where references are offered in the DEIS, many appear to be more than 10 years old, predating increased sighting effort and data routinely available to take reduction teams. This sometimes results in inadequate or inaccurate depiction of habitat use and, consequently, inappropriate characterization of risk. For example:

(1) North Atlantic right whale: (a) The Navy appears to understate the degree to which right whales are present in New England waters during the winter months. See DEIS at 3-34. In fact, data from NMFS' right whale sightings advisory system ("SAS") show right whales off New England in virtually every month of the year, with considerable numbers of sightings throughout the winter.[59] Within the past year, passive acoustic monitoring buoys have documented almost daily use of Stellwagen Bank and of waters in and around critical habitat in the Great South Channel, in virtually all areas where buoys have been placed; and SAS data show right whales in both Cape Cod and the Great South Channel throughout the winter months, and significant concentrations around and to the north of Jeffrey's Ledge through late fall and into winter.[60] (b) Contrary to the Navy's assumptions, the SAS reports sightings of right whales in the mid-Atlantic through the spring and even into late summer.[61] (c) The Navy mischaracterizes the waters of George and Florida as the only area in which right whales birth their calves. In fact, with expanded survey effort, sightings in recent years suggest that the calving grounds extend off northern Georgia and South Carolina and possibly as far north as Cape Fear.[62] (d) In general, the sources cited on right whales date largely from the 1980s, and much of the information is outdated and incomplete or incorrect. More recent sources of information, including NMFS' own SAS data and Baumgartner and Mate's tagging study (which indicates a wider summertime use of the Gulf of Maine and the mid-Atlantic than represented in the Navy's

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[59] NMFS, Right Whale Sightings Advisory System (SAS): Sightings/Detections 1997-2008 (undated) (available at whale.wheelock.edu/whalenet-stuff/reportsRW_NE).

[60] Id.; NMFS, Right Whale Sightings Advisory System (SAS): Right Whales Detected during 2008 (2008) (available at www.nefsc.noaa.gov/rwhale).

[61] Id.

[62] Waring et al., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2006 (2007). Given that the Navy cites Waring et al. to document other right whale movements (e.g., to Iceland), it is unclear why the stock assessment was not also used to inform risk from activities that may occur in calving areas outside critical habitat.

modeling), present a more complex picture of habitat use than the DEIS assumes.[63] The risk to right whales are likely to have been underestimated.

(2) Other baleen whale species: For species that are subjects of commercial whale watching, observed concentrations are often merely an artifact of concentrated sightings efforts—a complication that may lead to a mischaracterization of the true distribution. For example, the Navy states that "important habitat for fin whales is located in the western Gulf of Maine, including Jeffreys Ledge and Stellwagen Bank, to the Great South Channel, in waters with a bottom depth of approximately 90 meters." DEIS at 3-54. While fin whales are found in these areas, they are also (and not just coincidentally) the outer reaches of the range of commercial whale-watch boats. By contrast, additional sightings effort also reveals fin whales and other baleen whales using offshore basins and ledges that are not enumerated in the DEIS. For example, a 2008 review of environmental impacts done for the Northeast Gateway LNG project included Cashes Ledge, Platts Bank, and Jeffreys Ledge within high-use summer habitat for fin whales and Jeffreys Ledge, Porpoise Basin, Georges Basin, and northern Georges Bank within "high abundance" winter habitat. 73 Fed. Reg. 16268. There is no reason for the limited presentation of information on distribution of fin whales, minke whales, and other species when information is readily available and used by corporate project proponents.

(3) Beaked whales: By grouping at least four beaked whale species into the single genus of mesoplodon (DEIS at 3-65), the Navy has understated risk to individual populations. Remarkably, the Navy exacerbates the problem by lumping Cuvier's beaked whale in the same group, even though NMFS distinguishes between this species and the mesoplodonts in its Atlantic and Gulf of Mexico stock assessments. Even if abundance estimates are not available for mesoplodonts, the Navy has made no effort to account for smaller populations in assessing the significance of impacts on species whose acute sensitivity to the Navy's activities is acknowledged. Notably, NMFS' most recent stock assessments consider beaked whales in the Atlantic and Gulf of Mexico to be strategic stocks "because of uncertainty regarding stock size and evidence of human induced mortality and serious injury associated with acoustic activities."[64]

(4) Pilot whales: As with beaked whales, the Navy treats the two pilot whale species present in the AFAST study area—long-finned and short-finned

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[63] M. Baumgartner and B. Mate, Summer and Fall Habitats of North Atlantic Right Whales (Eubalaena glacialis) Inferred from Satellite Telemetry, 62 Canadian Journal of Fisheries and Aquatic Science 527-43 (2005).

[64] Waring et al., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2006 at 236, 242, 290, 294. The Gulf of Mexico stock of Cuvier's beaked whales is considered a strategic stock purely on the basis of "evidence of human induced mortality and serious injury associated with acoustic activities." Id. at 290.

pilot whales—as though they were a single species. Apparently, bycatch and genetic data provided to the Atlantic Trawl Gear Take Reduction Team and Atlantic Pelagic Longline Take Reduction Team, which are convened pursuant to the Marine Mammal Protection Act to address bycatch mortality, have not been incorporated in the species summaries, although these data can be used to delineate the distributions of each species.

(5) Other small cetaceans: As with pilot whales, the DEIS does not consider data presented to take reduction teams for various Atlantic stocks of odontocetes, including common dolphins, Rissos dolphins, and white-side dolphins. Again, these data are important for understanding patterns of offshore distribution in the Atlantic. In addition, the Navy has not incorporated the latest information on bycatch and mortality events in its discussion of various marine mammal populations. For example, the Atlantic stock of harbor porpoise—which the Navy recognizes to be a highly sensitive species—is experiencing increasing levels of fishery-related mortality throughout its range, with bycatch exceeding Potential Biological Removal (PBR) each year since 2004.[65] NMFS' draft stock assessment for 2007 lists harbor porpoises as a strategic stock and revises its abundance estimate and Potential Biological Removal downward; and NMFS re-convened its take reduction team as a result of concerns over high and increasing levels of bycatch of this species.[66] It is difficult to see how the estimated take of harbor porpoises under the Navy's no-action alternative can so easily be dismissed as insignificant.

4. Other Impacts on Marine Mammals

As the Navy's conceptual impact model suggests, the training and testing activities proposed for the AFAST study area can have impacts that are not limited to the overt physiological and behavioral effects of ocean noise. Unfortunately, the Navy's analysis of most of these other impacts is cursory and inadequate.

(1) 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.[67] 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."[68] And one might add,

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[65] See, e.g., id. at 100-14

[66] NMFS, Draft 2007 Stock Assessments (2008) (available at www.nmfs.noaa.gov/pr/pdfs/sars/ao2007_draft.pdf).

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

[68] 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.

following studies on terrestrial mammals, that chronic noise can interfere with brain development, increase the risk of myocardial infarctions, depress reproductive rates, cause malformations and other defects in young—all at moderate levels of exposure.[69] Because physiological stress responses are highly conservative across species, it is reasonable to assume that marine mammals would be subject to the same effects, particularly—as appears to be the case here—if they are resident animals exposed repeatedly to a variety of stressors in the AFAST study area. Yet despite the potential for stress in marine mammals and the significant consequences that can flow from it, the Navy assumes that such effects would be minimal. We note that substantial work on noise-related "stress" in marine mammals is shortly to be published, and we encourage the Navy to revise its DEIS accordingly.

(2) The Navy fails to consider the risk of ship collisions with large cetaceans, which is only exacerbated by the use of active acoustics. As noted below, right whales have been shown to engage in dramatic surfacing behavior, increasing their vulnerability to ship strikes, on exposure to mid-frequency alarms 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 range.[70] It should be assumed that other large whales are subject to the same hazard.

(3) In the course of its activities, the Navy would release a host of toxic chemicals into the marine environment that could pose a threat to local wildlife over the life of the range. Nonetheless, while there is some brief discussion of potential impacts on human health and safety, the DEIS generally fails to consider the cumulative impacts of these toxins on marine mammals, from past, current, and proposed exercises. Careful study is needed into the way they might disperse and circulate around the islands and how they may affect marine wildlife. The Navy's analysis of hazardous materials is therefore incomplete.

(4) 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 exercises that would be

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Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, "Do marine mammals experience stress related to anthropogenic noise?" (in press and forthcoming 2008); 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).

[69] 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).

[70] Nowacek et al., North Atlantic Right Whales, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences at 227.

authorized. See id. § 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 at a farther remove. See id. § 1508.8(b). This requirement is particularly critical in the present case given the potential of 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).[71] 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. 42 C.F.R. § 1502.16(b).

B. Impacts on Fish and Fisheries

Though the architecture of their ears may differ, fish are equipped, like all vertebrates, with thousands of sensory hair cells that vibrate with sound; and a number of specialized organs like the abdominal sac, called a "swim bladder," that some species possess can boost hearing. Fish use sound in many of the ways that marine mammals do: to communicate, defend territory, avoid predators, and, in some cases, locate prey.[72]

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."[73] 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.[74] 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.[75] 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

[71] "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.

[72] See, e.g., A.N. Popper, Effects of Anthropogenic Sounds on Fishes, 28(10) Fisheries 26-27 (2003); M.C. Hastings & A.N. Popper, Effects of Sound on Fish 19 (2005) (Report to the California Department of Transportation, Contract No. 43A0139), p., 19; D.A. Croll, Marine Vertebrates and Low Frequency Sound—Technical Report for LFA EIS 1-90 (1999).

[73] 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).

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

[75] Id.

species, including sunfish and tilapia.[76] 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.[77]

Nor is hearing loss the only effect that ocean noise can have on fish. 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.[78] 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, an area three times the size of the proposed USWTR range and larger than the state of Rhode Island; in another experiment, catch rates of rockfish were similarly shown to decline.[79] Drops in catch rates in these experiments range from 40 to 80 percent.[80] 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.[81]

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[76] 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.

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

[78] 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).

[79] 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).

[80] Id.

[81] 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.

In their comments on the Navy's DEIS for the proposed Undersea Warfare Training Range, off 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.[82] These reports are indicative of behavioral changes, such as a spatial redistribution of fish within the water column, that could affect marine mammal foraging as well as human fisheries. In addition, as NMFS itself has observed, 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.[83] The repetitive use of sonar and other active acoustics could have significant adverse behavioral effects on some species of fish and those who depend on them.

Finally, high mortalities from noise exposure are seen in developmental stages of fish. 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.[84] 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.[85] Also, larvae in at least some species are known to use sound in selecting and orienting toward settlement sites.[86] Acoustic disruption at that stage of development could have significant consequences.[87]

The Navy capriciously dismisses the potential for significant adverse impacts on fish. First, while admitting that mid-frequency sonar can cause significant injury at distances of hundreds of feet, and having previously noted (with reference to Norwegian studies) that "some sonar levels have been shown to be powerful enough to cause injury to particular size classes of juvenile herring from the water's surface

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[82] See comments compiled by the Navy and posted on the Undersea Warfare Training Range EIS site.

[83] 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).

[84] 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).

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

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

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

to the seafloor,"[88] and even though the Navy will be operating at higher source levels than those used in the Norwegian studies (DEIS at 4-154), the Navy now claims that Atlantic and Gulf of Mexico populations would not suffer significant impacts. For this conclusion, it notes only that levels of mortality in Norway were considered small relative to natural daily mortality rates (DEIS at 4-157)—a conclusion that fails to take into account the Navy's higher source levels, the specific ecology of Atlantic and Gulf of Mexico fish populations, the potential for cumulative effects, and the differential impacts that activities in spawning areas may have.

Second, while admitting that mid-frequency noise can alter behavior, the DEIS argues that fish are less responsive to mid-frequency than to low- and high-frequency sounds. DEIS at 4-157. For this proposition, it improperly relies entirely on two studies on acoustic deterrent devices, otherwise known as "pingers": a technology used in some American fisheries to ward harbor porpoises and certain other marine mammals away from gillnets. DEIS at 4-156. Not only do the deterrents featured in the two papers differ from the Navy's mid-frequency tactical sonar, presenting a different wave form and operating at a source level literally billions of times less intense (130 dB versus 235 dB re 1 μPa); but, in at least one of the studies, it actually altered the behavior of the fish, drawing them into the gillnet for reasons that are not explored.[89] Further, the Navy dismisses a clearly relevant study of dolphin sounds and their impact on silver perch mating signals—a study that NMFS and state regulators have cited as reason for concern. DEIS at 4-156 to 157.

The Navy must 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. 42 C.F.R. § 1502.22.

Having concluded—without basis—that mid-frequency sonar would have no significant impact on fish and fish habitat, the Navy dismisses the notion that fisheries in the area would suffer economic loss (DEIS at 4-167), even though (judging by the comments from fishermen on the Navy's USWTR range) its activities appear to have disrupted fishing in the past. But, just as with the North Carolina range, the available evidence underscores the need for a more serious and informed analysis than the DEIS currently provides. The Navy must meaningfully

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[88] Navy, Hawaii Range Complex Draft Environmental Impact Statement/ Overseas Environmental Impact Statement at 4-15 (2007).

[89] B.M. Culik, S. Koschinski, N. Tregenza, and G.M. Ellis, Reactions of Harbor Porpoises *Phocoena phocoena* and Herring *Clupea harengus* to Acoustic Alarms, 211 Marine Ecology Progress Series 255, 258 (2001).

assess the economic consequences of reduced catch rates on commercial and recreational fisheries and on marine mammal foraging in the AFAST study area.[90]

C. Other Impacts on Marine Wildlife

The Navy's current and proposed activities pose risks to marine wildlife beyond ocean noise: injury or death from collisions with ships, bioaccumulation of toxins, and the like. Indeed, many of the same concerns that apply to marine mammals (and are discussed above) apply to fish, sea turtles, and other biota as well. The Navy must adequately evaluate impacts and propose mitigation for each category of harm. 42 C.F.R. §§ 1502.14, 1502.16.

D. 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. Thus, for example, it is necessary to consider the impacts of the proposed exercise alongside those of other activities in the region, including industrial and commercial activities such as fishing, shipping, and coastal development.

As it stands, the Navy says little more than that all of the impacts from its thousands of annual hours of activity would necessarily be "short-term" in nature and therefore would not affect vital rates in individuals or populations. DEIS at 4-93 to 4-125, 6-62. The Navy also offers the bromide that mitigation will preclude any significant or long-term impacts on marine mammals and the marine environment. DEIS at 6-61. Not only are both statements factually insupportable given the lack of any population analysis or quantitative assessment of long-term effects in the document (and the

[90] Sea turtles are also effectively excluded from further analysis of acoustic impacts on the grounds that their best hearing range appears to occur below 1 kHz. DEIS at 4-139. But having their best acoustic sensitivity in this range does not mean that sea turtles are oblivious to noise at higher frequencies. Juvenile loggerheads, for example, have their best sensitivity at frequencies 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. S.M. Bartol, J.A. Musick, and M. Lenhardt, Auditory Evoked Potentials of the Loggerhead Sea Turtle (Caretta caretta), 99 Copeia 836 (1999). 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, which receives no discussion in the DEIS. National Research Council, The Decline of Sea Turtles: Causes and Prevention (1990). Given these findings, and given that all of the sea turtles on the proposed sites belong to endangered or threatened populations, a more rigorous and conservative analysis of potential acoustic impacts is necessary, and areas of particular importance to sea turtles should be taken into consideration in the Navy's alternatives analysis.

numerous errors in the Navy's thresholds and modeling, discussed above)—but they misapprehend the definition of "cumulative impact," which, according to NEPA's regulations, "can result from individually minor but collectively significant actions taking place over a period of time." 42 C.F.R. § 1508.7.

More particularly, the Navy assumes—capriciously, for the reasons discussed above—that its thousands of hours of sonar activities will not result in the serious injury or death of even a single animal. DEIS at 6-66. It simply assumes all behavioral impacts are short-term in nature and cannot affect individuals or populations through repeated activity—even though its no-action alternative would produce, by the Navy's own estimates, approximately 2.75 million behavioral "takes" of marine mammals each year (DEIS at ES-23), which amounts to more than 13.75 million takes over a five-year MMPA authorization period.[91] And, while it states that behavioral harassment (aside from those caused by masking effects) involves a stress response that may contribute to an animal's allostatic load (DEIS at 4-23), it again assumes without further analysis that any such impacts would be "incremental, but recoverable." DEIS at 6-62.

Nor does the Navy consider the potential for acute synergistic effects from sonar training. For example, although the DEIS discusses the potential for ship strike in the study area, it does not consider the greater susceptibility to vessel strike of animals that have been temporarily harassed or disoriented by certain AFAST noise sources. The absence of analysis is particularly glaring in light of the 2004 Nowacek et al. study, which indicates that mid-frequency sources provoke surfacing and other behavior in North Atlantic right whales that increases the risk of vessel strike.[92] Nor does the Navy consider (for example) the synergistic effects of noise with other stressors in producing or magnifying a stress-response.[93] In short, the Navy's conclusion that cumulative and synergistic impacts from AFAST sonar training are insignificant cannot plausibly be supported.

All of these failures of analysis are reflected not only in the Navy's unsupported conclusions about the benignity of AFAST standing alone, but in its broader conclusions about human activities along the eastern seaboard and in the Gulf of Mexico. Generally, this chapter makes clear that the AFAST study area is crowded

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[91] In its discussion of cumulative impacts, the Navy states, inter alia, that its acoustic analysis estimates Level B harassment of "4,335,480 total marine mammals (including ESA-listed species)" under the No Action Alternative. DEIS at 6-65 (noting that this number represents takes rather than affected animals). This estimate appears inconsistent with the take estimates provided in Chapter 4 and summarized at ES-23, which indicate annual Level B harassment of approximately 2,750,000 takes under the same alternative. We request that the Navy clarify this seeming discrepancy.

[92] Nowacek et al., North Atlantic Right Whales, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences at 227-31.

[93] 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?" (in press and forthcoming 2008); see also other papers published in same volume.

with human activities, many of which introduce noise, chemical pollution, debris, and vessel traffic into the habitat of protected species. The idea that all of these events, when taken as a whole, are having at most "moderate, but recoverable, adverse effects" (see DEIS at 6-83) is, to say the least, implausible. Indeed, it is not just implausible, but incorrect: scientists generally consider the east coast of North America and the Gulf of Mexico to be degraded habitat for many species and this degradation has been caused by the cumulative impact of human activities. Given the scope of the proposed action, the deficiencies of the Navy's cumulative impacts assessment represent a critical failure of the DEIS.

E. Alternatives Analysis

At bottom, 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 requirement has been described in regulation as "the heart of the environmental impact statement." Id. § 1502.14. 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." Id. § 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.

First, the Navy declines to consider a reduction in the level of current training in the AFAST study area. Yet the Navy's assumption that exercises on the range must continue at their current tempo may well be an artifact of the Navy's Tactical Training Theater Assessment and Planning Program (TAP) process, which, in requiring separate environmental analysis of existing ranges and operating areas, seems to assume a priori that exercises cannot be reapportioned or alternative sites found. Moreover, the DEIS fails to analyze meaningfully whether a different mix of simulators and at-sea exercises would accomplish its aims. Instead, it rules out the increased use of simulators by stating, in a cursory few sentences, that they do not obviate the need for realistic training. But its summary treatment of this issue does not sufficiently justify the precise number of exercises that have been proposed. Alternatives that combine greater use of simulators with fewer open-water exercises—or that develop a plan to maximize use of synthetic training—should have been analyzed, not dismissed out of hand.

Second, Avoiding concentrations of vulnerable and endangered populations and high abundances of marine life is perhaps the most critical step the Navy can take in reducing impacts, and a "hard look" at geographical alternatives is plainly required by NEPA and other laws.[94] We are encouraged to see that the Atlantic Fleet, unlike the

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[94] E.g., NRDC v. Evans, 279 F.Supp.2d at 1664-66; NRDC v. Navy, 857 F.Supp. at 734; T. Agardi, N.A. Soto, A. Cañadas, M. Engel, A. Frantzis, L. Hatch, E. Hoyt, K. Kaschner, E. LaBrecque, V. Martin, G. Notarbartolo di Sciara, G. Pavan, A. Servido, B. Smith, J.Y. Wang, L. Weilgart, B. Wintle, A.J. Wright, A Global Scientific Workshop on Spatio-Temporal Management of Noise 3 (2007).

Pacific, has attempted to develop geographic alternatives for sonar training; but the Navy's analysis is incomplete and the outcome is not justified.

(a) The Navy's refusal to adopt any meaningful geographic mitigation for the AFAST study area is unjustifiable and, indeed, outrageous.

(b) The Navy rules out Alternative 3 because the annual take numbers it implies are roughly comparable to those associated with the no-action alternative; but a closer examination of the numbers strongly suggests that the Navy's would-be "areas of increased awareness" were poorly chosen. For example, even though the Navy treats harbor porpoises as the most acoustically vulnerable of all marine mammal species, and even though the Atlantic stock of harbor porpoises is currently in decline, the DEIS has not identified "increased awareness" areas in such a way as to lower harbor porpoise take. A similar point may be made about North Atlantic right whales, even though many areas of high concentrations are known and critical habitat has been defined. In addition, there is no justification for why some areas along the shelf break and shoreward of the Gulf Stream are included while others are not, given the general productivity of these bathymetric and oceanographic features. The Navy must revisit Alternative 3 to heuristically identify areas whose exclusion would, indeed, effectively lower risks to vulnerable species and/or reduce the amount of overall take.

(c) In addition, Alternative 3 makes exceptions for certain biologically critical areas that it has identified for exclusion. For example, after acknowledging the importance of "reduce[ing] potential exposures of endangered right whales during their critical calving and feeding activities," the Navy goes on to allow certain exercises in established critical habitat, including TORPEX exercises in the foraging grounds in the northeast and tracking activities in the breeding grounds in the southeast. (With respect to North Atlantic right whales, we would also note that critical habitats are not the only areas important to the species and that seasonal concentrations of right whales are also found in nearby waters. <u>See</u> section B.3.) Similarly, the Navy would allow major carrier strike group exercises in DeSoto Canyon in the Gulf of Mexico. Despite the Navy's claims, we believe the Navy has no viable operational justification for use of many of these critical areas.

(d) For somewhat less critical areas, the Navy has not attempted to identify "increased awareness" areas for Alternative 3 (or use areas for Alternatives 1 and 2) by category of exercise. Such an analysis is necessary, since certain exercises presumably would have greater flexibility in their operational requirements than others.

<u>Third</u>, even aside from the omission of reasonable alternative locations, the Navy fails to consider alternatives of any other kind. While the question of proper siting is crucial, it is not the only factor that must be considered in identifying other, less harmful ways to fulfill the Navy's purpose. Indeed, it appears that 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, and as discussed at greater length below, the DEIS fails to include a range of mitigation measures among its alternatives.

Many such measures are employed by other countries in their sonar exercises and even by the U.S. Navy in other contexts; and there are many others that should be considered. Such measures are reasonable means of reducing harm to marine life and other resources within the AFAST study area, and their omission from the alternatives analysis renders that analysis inadequate.

Fourth, 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 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 omits from its analysis reasonable alternatives—with regard to both the siting of the range and other operational choices—that might achieve the Navy's core aim while minimizing environmental harm. These omissions are all the more unreasonable given the long period during which the Navy has worked on this document and its predecessors. For these reasons, we urge the Navy to issue an EIS that adequately informs the public of all reasonable alternatives that would reduce adverse impacts to whales, fish, sea turtles, and other marine resources. 40 C.F.R. § 1502.1.

F. Mitigation Measures

To comply with NEPA, an agency must discuss measures designed to mitigate its project's impact on the environment. See 42 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 navies—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 a cribbed set of measures, falling short even of what other navies have implemented for transient exercises and providing no discussion on a variety of other options.

All of the mitigation that the Navy has proposed for acoustic impacts boils down to the following: a very small safety zone around the sonar vessel, maintained primarily with visual monitoring by onboard lookouts, with aid from non-dedicated aircraft (when in the vicinity) and passive monitoring (though the vessel's generic sonar system). Under the proposed scheme, which is virtually identical to that in the Navy's current national defense exemption under the MMPA, operators would power down the system by 6 dB if a marine mammal is detected within 1000 yards, power it down by 10 dB if the protected species is detected within 500 yards, and shut it down if the animal is detected within 200 yards. DEIS at 5-5. Operators could resume operations at full levels when, inter alia, the vessel has transited 1000 yards, which, given vessel speeds during most ASW exercises, would literally take only a few minutes. It has been the pattern for the Navy to claw back mitigation with each new set of guidelines, and AFAST is no exception, reducing the safe transit distance in the current national defense exemption from 2000 to 1000 yards.[95]

This mitigation scheme disregards the best available science on the significant limits of that technique. Indeed, 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 sighted; as the distance approaches 1 kilometer, that number drops to zero.[96] The Navy's reliance on visual observation as the mainstay of its mitigation plan is therefore profoundly misplaced.

Moreover, the Navy's analysis ignores or improperly discounts an array of options that have been considered and imposed by other active sonar users, including avoidance of coastal waters, high-value habitat, and complex topography; the employment of a safety zone more protective than the 1000-yard power-down and 200-yard shutdown proposed by the Navy; general passive acoustic monitoring for whales; special rules for surfacing ducting and low-visibility conditions; monitoring and shutdown procedures for sea turtles and large schools of fish; and many others.[97] The Navy's conclusions are all the more remarkable given recent court decisions finding that the Navy can and must do more to reduce harm to protected species from sonar training. NRDC v. Winter, 527 F.Supp.2d 1216 (C.D. Cal. 2008), aff'd __ F.3d __, 2008 WL 565680 (9th Cir. 2008); Ocean Mammal Institute v. Gates, 2008 WL 564664 (D. Hawaii 2008).

Measures that the Navy should consider include, inter alia:

(1) Establishment of a coastal exclusion zone for acoustics training and testing, such as one for major exercises that would minimally run at least 25 nm from the 200 meter isobath, or beyond the shelf break and Gulf Stream, whichever is greater;

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[95] DEIS at 5-5; Deputy Secretary of Defense, National Defense Exemption from Requirements of the Marine Mammal Protection Act for Certain DoD Military Readiness Activities That Employ Mid-Frequency Active Sonar or Improved Extended Echo Ranging Sonobuoys at 2 (Jan. 23, 2007).

[96] 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).

[97] See, e.g., Royal Australian Navy, "Maritime Activities Environmental Management Plan," Procedure S-1 and Planning Guide 16 (July 8, 2005); NATO Undersea Research Centre, Human Diver and Marine Mammal Risk Mitigation Rules and Procedures (2006) (NURC-SP-2006-008); ICES, Report of the Ad-hoc Group on the Impacts of Sonar on Cetaceans and Fish 33-36 (2005) (ICES CM 2005/ACE:06). The U.S. Navy has also used additional mitigation measures for various exercises in the past.

(2) Seasonal avoidance of North Atlantic right whale feeding grounds, calving grounds, and migration corridor;

(3) Avoidance of federal and state marine protected areas, including the national marine sanctuaries located along the eastern seaboard and in the Gulf of Mexico;

(4) 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;

(5) Avoidance of fronts and other major oceanographic features, such as the Gulf Stream, warm core rings, and other areas with marked differentials in sea surface temperatures, which have the potential to attract offshore concentrations of animals, including beaked whales;[98]

(6) Avoidance of areas with higher modeled takes or with high-value habitat for particular species, many of which are indicated in the predictive habitat modeling undertaken for the DEIS (see DEIS App. D);

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

(8) 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;

(9) Expansion of the marine species "safety zone" to a 4 km shutdown, reflecting international best practice, or 2 km, reflecting the standard prescribed by the California Coastal Commission and adopted in NRDC v. Winter, 527 F.Supp.2d 1216 (C.D. Cal. 2008), aff'd __ F.3d __, 2008 WL 565680 (9th Cir. 2008);[99]

(10) Suspension of relocation of exercises when beaked whales or significant aggregations of other species, such as melon-headed whales, are detected by any means within the orbit circle of an aerial monitor or near the vicinity of an exercise;

(11) 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;

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

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[98] See, e.g., Waring et al., U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments—2006 at 233 (reporting recent results that suggest "beaked whale abundance may be highest in association with Gulf Stream and warm-core ring features").

[99] California Coastal Commission, Adopted Staff Recommendation on Consistency Determination CD-086-06 (2007); Approved Letter from M. Delaplaine, California Coastal Commission, to Rear Adm. Len Hering, Navy (Jan. 11, 2007).

(13) 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;

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

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

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

(17) 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;

(18) Modification of sonobuoys for passive acoustic detection of vocalizing species;

(19) Suspension or reduction of exercises or power-down of sonar outside daylight hours and during periods of low visibility;

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

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

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

(23) Establishment of long-term research, to be conducted through an independent agent such as the National Fish and Wildlife Foundation, on the distribution, abundance, and population structuring of protected species in the AFAST study area, with the goal of supporting adaptive geographic avoidance of high-value habitat;

(24) 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;

(25) 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;

(26) Avoidance of high-value sea turtle habitat;

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

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

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

(30) 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

(31) 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.

G. 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]").

With regard to noise-producing activities, for example, the Navy must describe source levels, frequency ranges, duty cycles, and other technical parameters relevant to determining potential impacts on marine life. The AFAST DEIS and its predecessors provide some of this information, indicating, for example, the nominal source level of the SQS-53 system, which is deployed on surface ships. But it fails to disclose sufficient information about helicopter dipping sonar, active sonobuoys, acoustic device countermeasures, training targets, or range sources that would be used during the exercise; and, even with respect to the SQS-53 system, refrains from giving any indication of platform speed, pulse length, repetition rate, beam widths, or operating depths—that is, most of the data that the Navy presumably used in modeling acoustic impacts. See DEIS at C-1 to C-13.

Just as important, 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 H-5 to H-6. These models 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. 42 C.F.R. §§ 1502.9(a), 1503.1(a) (NEPA); 5 U.S.C. § 706(2)(D) (APA). And 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.[100] We encourage the Navy to contact us immediately to discuss how to make this critical information available.

H. Scope of Review

As a threshold issue, we are concerned about the Navy's understanding of its obligations under applicable law. The Navy indicates that its analysis of "extraterritorial" activities, those activities that would take place outside U.S. territorial waters, was prepared under the authority of Executive Order 12114 rather than under NEPA. See DEIS at 1-8. Not only is this position on the scope of review inconsistent with the statute (see, e.g., Environmental Defense Fund v. Massey, 968 F.2d 528 (D.C. Cir. 1994) and NRDC v. Navy, No. CV-01-07781, 2002 WL 32095131 at *9-12 (C.D. Cal. Sept. 19, 2002)), but, insofar as it represents a broader policy, it provides further indication that current operations off the east coast and Gulf of Mexico are likewise out of compliance. Most of area used for sonar training is sited beyond the 12nm territorial boundary, within the U.S. Exclusive Economic Zone. If, as we expect, activities currently taking place there have not received their due analysis in a prior environmental impact statement, then the Navy is operating in ongoing violation of NEPA.

I. Compliance with Other Applicable Laws

A number of other statutes and conventions are implicated by the proposed activities, considering their marine acoustic impacts alone. 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 has applied for an Incidental Harassment Authorization under the MMPA (see 73 Fed. Reg. 11889 (Mar. 5, 2008)), 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

[100] Navy, Ensuring the Quality of Information Disseminated to the Public by the Department of Defense: Policy and Procedural Guidance § 3.2.3.1 (Feb. 10, 2003). The Defense Department defines "influential" to mean "that the Component can reasonably determine that dissemination of the information will have or does have clear and substantial impact on important public policies or important private sector decisions"—which is clearly the case here. See Ensuring the Quality of Information Disseminated to the Public by the Department of Defense: Definitions § 3 (Feb. 10, 2003).

grounds, Weinberger v. Romero-Carcelo, 456 U.S. 304, 313 (1982). The Navy must consult with the NMFS over blue whales, fin whales, humpback whales, North Atlantic right whales, sei whales, sperm whales, green sea turtles, Kemp's ridley sea turtles, olive ridley sea turtles, hawksbill sea turtles, leatherback sea turtles, loggerhead sea turtles, Bermuda petrels, gulf sturgeon, smalltooth sawfish, brown pelicans, least terns, and roseate terns, all of which are listed under the Act.

(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." Remarkably, notwithstanding the comments of "several regulatory agencies" (see DEIS at 1-15) and at least one adverse federal court ruling, the Navy has declined to engage in consistency review both for certain states and certain of its activities. In the first place, although it has prepared consistency determinations for the states of Connecticut, Florida, Georgia, Texas, and Virginia (see DEIS App. F), these submissions appear to cover only those activities, like in-port testing, that actually occur within the state's coastal zone. See, e.g., DEIS at F-18 (consistency determination for Florida). This narrow approach plainly violates the CZMA's federal consistency requirements and, indeed, has already been rejected by the courts. NRDC v. Winter, 2007 WL 2481037 at *8-9 (C.D. Cal. 2007).

Second, the Navy has failed to prepare consistency determinations for at least some states whose coastal resources would be affected. Most notably, it promises to present a negative determination to North Carolina—even though hundreds of hours of sonar training would place off the coast of that state, in the Cherry Point Operating Area, and even though the enforceable policies of the state's coastal zone management program clearly demand it. See, e.g., 15A N.C.A.C. 07M .0701 (mandatory mitigation policy adopted pursuant to state's Coastal Area Management Act). It is discouraging to see the Atlantic Fleet repeat the same legal violations that the Navy has seen rejected in the Pacific. The Navy must fulfill its CZMA commitments.

(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 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 Atlantic Fleet's sonar training area 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). The Navy indicates that it will not presently consult with any of the Sanctuaries within the AFAST region—not Stellwagen Bank, USS Monitor, Gray's Reef, Flower Garden, or Florida Keys National Marine Sanctuaries—even though none of these protected areas would be excluded under its preferred alternative. DEIS at 6-75. 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 sanctuaries or otherwise affects their resources. The mere claim that the Navy would avoid adverse impacts "to the maximum extent practicable" (see DEIS at 6-75) does not, of course, obviate consultation. Since sonar may impact sanctuary resources even when operated outside their bounds, the Navy should indicate how close it presently operates, or forseeably plans to operate, to each of these areas.

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, migratory birds occur within the Atlantic Fleet's sonar use area. The Navy must therefore consult with the Secretary of the Interior regarding measures to 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, including the national marine sanctuaries discussed above and the numerous other areas potentially affected by activities taking place along the East Coast and Gulf of Mexico.

The proposed activities also implicate the Clean Air Act and Clean Water Act as well as other statutes protecting the public health. The Atlantic Fleet's exercises cannot legally be undertaken absent compliance with these and other laws.

J. 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 certainly 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.

K. Alternatives Analysis under Section 102(2)(E) of NEPA

Above and beyond the EIS requirement, NEPA directs agencies to "study, develop, and describe appropriate alternatives" to any project that presents "unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Courts have concluded that this duty is "both independent of, and broader than, the EIS requirement." Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1229 (9th Cir. 1988), cert. denied, 109 S.Ct. 1340 (1989). Because the Navy's proposal presents "unresolved conflicts" about the proper use of "available resources," the Navy must explicitly address its separate and independent obligations under section 4332(2)(E).

III. CONCLUSION

For the reasons set forth above, we urge the Navy to withdraw its DEIS and to revise the document prior to its recirculation for public comment.

Very truly yours,

Michael Jasny
Senior Policy Analyst

Table J-6. Summary of Comments and Responses

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1361	A-010	1.4.2	The Navy indicates that its analysis of "extraterritorial" activities, those activities that would take place outside U.S. territorial waters, was prepared under the authority of Executive Order 12114 rather than under NEPA…Not only is this position on the scope of review inconsistent with the statues...but, insofar as it represents a broader policy, it provides further indication that current operations off the east coast and Gulf of Mexico are likewise out of compliance...If, as we expect, activities currently taking place there have not received their due analysis in a prior environmental impact statement, then the Navy is operating in ongoing violation of NEPA.	The EIS/OEIS has received extensive legal review to ensure that current operations are in compliance all required Federal, state, and local regulations/laws.
1369	A-010	1.4.9	Executive Order 13158, which sets forth protections for marine protected areas ("MPAs") nationwide. 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, including the national marine sanctuaries and the numerous other areas potentially affected by activities taking place along the East Coast and Gulf of Mexico.	Please see revised text in Section 1.4.9 and Chapters 3 and 4.
1359	A-010	2.2.1	…the Navy must describe source levels, frequency ranges, duty cycles, and other technical parameters relevant to determining potential impacts on marine life. The AFAST DEIS and its predecessors provide some of this information, indicating, for example, the nominal source level of the SQS-53 system, which is deployed on surface ships. But it fails to disclose sufficient information about helicopter dipping sonar, active sonobuoys, acoustic device countermeasures, training targets, or range sources that would be used during the exercise; and, even with respect to the SQS-53 system, refrains from giving any indication of platform speed, pulse length, repetition rate, beam widths, or operating depths...	This information is classified to protect national security.
1351	A-010	2.4	For somewhat less critical areas, the Navy has not attempted to identify "increased awareness" areas for Alternative 3 (or use areas for Alternatives 1 and 2) by category of exercise. Such an analysis is necessary, since certain exercises presumable would have greater flexibility in their operational requirements than others.	Please refer to Section 2.4, Operational Requirements and 2.6.2 Process for developing Alternatives. Typical training space requirements for each exercise type are described in Section 2.4. In developing alternatives, various required training spaces often overlapped. See Appendix D.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1347	A-010	2.5	First, the Navy declines to consider a reduction in the level of current training in the AFAST study area. Yet the Navy's assumption that exercises on the range must continue at their current tempo may well be an artifact of the navy's Tactical Training Theater assessment and Planning Program (TAP) process, which, in requiring separate environmental analysis of existing ranges and operating areas, seems to assume a priori that exercises cannot be reapportioned or alternative sites found. Moreover, the DEIS fails to analyze meaningfully whether a different mix of simulators and at-sea exercises would accomplish its aim. Instead, it rules out the increased use of simulators by stating, in a cursory few sentences, that they do not obviate the need for realistic training...Alternatives that combine greater use of simulators with fewer open-water exercises-or that develop a plan to maximize use of synthetic training-should have been analyzed, not dismissed out of hand.	Please see Sections 2.5 and 2.6 for alternatives analysis. Also, please see Sections 1.1 and 1.2 for discussion of Purpose and Need as well as Section 2.3 for a description of active sonar activities for research, development, testing and evaluation.
1352	A-010	2.5	…from the omission of reasonable alternative locations, the Navy fails to consider alternatives of any other kind. While the question of proper siting is crucial, it is not the only factor that must by considered in identifying other, less harmful ways to fulfill the Navy's purpose...many reasonable alternatives are missing from the Navy's analysis...the DEIS fails to include a range of mitigation measures among its alternatives...omission from the alternatives analysis renders that analysis inadequate.	The Navy considered a reasonable range of alternatives as discussed in Sections 2.5, 2.6 and 2.7. All alternatives would employ the mitigation described in Chapter 5.
1353	A-010	2.5	Fourth, 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 exclude full consideration of reasonable alternatives..."The existence of a viable but unexamined alternative renders an environmental impact statement inadequate."	The Navy considered a reasonable range of alternatives as discussed in Section 2.5, 2.6 and 2.7. All alternatives would employ the mitigation described in Chapter 5.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1354	A-010	2.5	In sum, the DEIS omits from its analysis reasonable alternatives-with regard to both the siting of the range and other operational choices-that might achieve the navy's core aim while minimizing environmental harm. These omissions are all the more unreasonable given the long period during which the Navy has worked on this document and its predecessors. For these reasons, we urge the Navy to issue and EIS that adequately informs the public of all reasonable alternatives that would reduce adverse impacts to whales, fish, sea turtles, and other marine resources.	The Navy considered a reasonable range of alternatives as discussed in Sections 2.5, 2.6 and 2.7.
1372	A-010	2.5	Because the Navy's proposal presents "unresolved conflicts" about the proper use of "available resources," the Navy must explicitly address its separate and independent obligations under section 4332(2)(E).	The Navy considered a reasonable range of alternatives as discussed in Sections 2.5 and 2.6.
1348	A-010	2.6	The Navy's refusal to adopt any meaningful geographic mitigation for the AFAST study area is unjustifiable and, indeed, outrageous.	Please see Sections 2.6 and Chapter 5.
1349	A-010	2.6	The Navy rules out Alternative 3 because the annual take numbers it implies are roughly comparable to those associated with the no-action alternative; but a closer examination of the numbers strongly suggests that the Navy's would-be "areas of increased awareness" were poorly chosen...the DEIS has not identified "increased awareness" areas in such a way as to lower harbor porpoise take. A similar point may be made about North Atlantic right whales, even though many areas of high concentrations are known and critical habitat has been defined...there is no justification for why some areas along the shelf break and shoreward of the Gulf Stream are included while others are not...the Navy must revisit Alternative 3 to heuristically identify areas whose exclusion would, indeed, effectively lower risks to vulnerable species and/or reduce the amount of overall take.	As discussed in the EIS/OEIS, in the southeast North Atlantic right whale critical habitat, activities could include object detection/navigational sonar training and maintenance activities for surface ships and submarines while entering/exiting ports located in Kings Bay, Georgia, and Mayport, Florida. In addition, helicopter dipping sonar would occur off of Mayport, Florida in the established training areas within the right whale critical habitat. In the northeast North Atlantic right whale critical habitat, a limited number of TORPEXes would be conducted in August through September when many North Atlantic right whales have migrated to the south. Under all alternatives, no sonar activities occur within 12 NM of shore with few exceptions. Harbor porpoises have an exceptionally low threshold for behavioral response (see criteria section); therefore, geographic differences in the alternatives do

Comment Number	Commenter Number	Section Number	Comment	Comment Response
				not substantially affect overall harbor porpoise exposures.
1350	A-010	2.6	In addition, Alternative 3 makes exceptions for certain biologically critical areas that it has identified for exclusion. For example, after acknowledging the importance of "reducing[ing] potential exposures of endangered right whales during their critical calving and feeding activities," the Navy goes on to allow certain exercises in established critical habitat, including TORPEX exercises in the foraging grounds in the northeast and tracking activities in the breeding grounds in the southeast...Similarly, the Navy would allow major carrier strike grouped exercises in DeSoto Canyon in the Gulf of Mexico. Despite the Navy's claims, we believe the Navy has no viable operational justification for use of many of these critical areas.	No more than one strike group level event would occur in GOMEX annually. Also, refer to mitigation measures for North Atlantic Right Whales, including TORPEX mitigations. Only a limited number of TORPEXes would occur in a given year.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1019	A-010	2.7	For sonar training, there is no step more crucial to reducing impacts than the careful siting of exercises, avoiding concentrations of vulnerable and endangered species and high abundances of marine life to the greatest extent possible. Yet, after spending what must have been millions of dollars on habitat analysis, the Navy did not establish a single environmental exclusion zone, neither along the eastern seaboard nor in the Gulf of Mexico, nor in any part of the vast AFAST study area, which appears to run more than half the size of the continental United States. No exclusions are made for North Atlantic right whales, the critically endangered species that has been the focus of enormous conservation effort; for harbor porpoises, a strategic stock that even the Navy admits is extremely vulnerable to sonar; for other highly vulnerable species, such as beaked whale that have been associated with severe sonar-related injury, and species listed under the Endangered Species Act; for areas with large concentrations of marine mammals; or even for national marine sanctuaries or other protected areas along the U.S. coast. And this is the case despite the Navy's admission of flexibility in the siting of exercises and a past record of using geographic mitigation to reduce harm.	Refer to Section 2.7. The Navy does attempt to limit its activities within critical right whale habitat. The alternatives carried forward in the analysis were selected based on their ability to meet the following criteria: (a) use existing Navy ranges and facilities; (b) be consistent with the stated requirements for active sonar training; (c) achieve training tempo requirements based on Fleet deployment schedules; and (d) support realistic training that replicates expected operating environments for naval forces. In addition, Chapter 5 presents the Navy's mitigation measures, outlines steps that would be implemented to protect marine mammals and federally listed species during AFAST activities. This chapters also presents a discussion of other measures that have been considered and rejected because they are either: (a) not feasible; (b) present a safety concern; (c) provide no known or ambiguous protective benefit; or (d) have an unacceptable impact on training fidelity.
1013	A-010	3.2	It assumes that no marine mammals would be seriously injured or killed, despite a growing, peer-reviewed, scientific record of injuries and mortalities.	The Navy is using the best available peer reviewed and gray literature
1106	A-010	3.2	(5) The Navy's analysis of marine mammal distribution, abundance, population structure, and ecology contains false assumptions that tend to underestimate impacts on species; and	The best available science was utilized in the determination of distribution, densities and abundance. Refer to Section 3.2.2 for additional information.
1111	A-010	3.2.1	The Navy's main source for information about marine mammal populations in the AFAST study area is its Marine Resource Assessments; but as these are secondary sources, it is generally difficult to assess which primary reference was used to support the Navy's analysis and whether it in fact constitutes the best available scientific evidence.	The MRAs are posted on the AFAST public web site and are available for download.

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1112	A-010	3.2.1	Where references are offered in the DEIS, many appear to be more than 10 years old, predating increased sighting effort and data routinely available to take reduction teams. This sometimes results in inadequate or inaccurate depiction of habitat use and consequently, inappropriate characterization of risk.	The Navy used the best available scientific data, including all relative published peer-reviewed material. Species densities are based on the best study data available. Please refer to Section 3.2 for a discussion on marine species density determinations.
1056	A-010	3.6	There is no reason for the limited presentation of information on distribution of fin whales, minke whales, and other species when information is readily available and used by corporate project proponents.	Chapter 3 describes typical distribution of marine mammals including these high-use areas. The marine mammal density estimates used in the acoustic analysis of this DEIS were compiled from the most recent NMFS survey data. Refer to the AFAST web site for density reports for the AFAST study area.
1057	A-010	3.6	By grouping at least four beaked whale species into the single genus of mesoplodon (DEIS at 3-65); the Navy has understated risk to individual populations.	The beaked whales' species were grouped because there was a paucity of biological information available for individual species. The marine mammal density estimates used in the acoustic analysis of this DEIS were compiled from the most recent NMFS survey data. Bycatch and stranding data, while not useful in determining marine species' densities, is used to assess species' presence in specific areas. Please refer to Section 4.4.10 for discussion of effects.
1058	A-010	3.6	As with beaked whales, the Navy treats the two pilot whale species present in the AFAST study area-long-finned and short-finned pilot whales-as though they were a single species. Apparently, bycatch and genetic data provided to the Atlantic Trawl Gear Take Reduction Team and Atlantic Pelagic Longline Take Reduction Team, which are convened pursuant to the Marine Mammal Protection Act to address bycatch mortality, have not been incorporated in the species summaries, although these data can be used to delineate the distributions of each species.	Refer to Section 3.6.1.2.21 for a discussion on both short-finned and long-finned pilot whales, as well as an explanation of the reason for grouping the two species (for example, common grouping of the species in surveys because of difficulty in differentiating the two from a distance).

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1059	A-010	3.6	The DEIS does not consider data presented to take reduction teams for various Atlantic stocks of odontocetes.	Refer to Section 3.6.1.2, which includes updated survey numbers of various odontocetes.
1060	A-010	3.6	In addition, the Navy has not incorporated the latest information on bycatch and mortality events in its discussion of various marine mammal populations. For example, the Atlantic stock of harbor porpoises ... It is difficult to see how the estimated take of harbor porpoises under the Navy's no-action alternative can so easily be dismissed as insignificant.	The most current bycatch and mortality data is used to assess species' status. AFAST EIS/OEIS is addressing the potential effects associated with the use of sonar only. The EIS was updated with 2008 data of survey results, and behavioral estimates were updated with the new data. Overall effects to the marine mammals are addressed in cumulative impacts. Effects to individual populations are addressed as part of the NMFS rule-making during the LOA process.
1113	A-010	3.6.1.1.1	The Navy appears to understate the degree to which right whales are present in New England waters during the winter months. See DEIS 3-34. In fact, data from NMFS's right whale sightings advisory system ("SAS") show right whales off New England in virtually every month of the year, with considerable numbers of sightings throughout winter. Within the past year, passive acoustic monitoring buoys have documented almost daily use of Stellwagen Bank and of waters in and around critical habitat in the Great South Channel, in virtually all areas where buoys have been placed; and SAS data show right whales in both Cape Cod and the Great South Channel throughout the winter months, and significant concentrations around and to the north of Jeffrey's Ledge through late fall and into winter.	Please refer to Section 3.6.1.1.1, which states right whales are present in and around these areas year-round.
1114	A-010	3.6.1.1.1	Contrary to the Navy's assumptions, the SAS reports sightings of right whales in the mid-Atlantic through the spring and even into late summer.	Please refer to Section 3.6.1.1.1.
1115	A-010	3.6.1.1.1	The Navy mischaracterizes the water of George and Florida as the only area in which right whales birth their calves. In fact, with expanded survey effort, sightings in recent years suggest that the calving grounds extend off northern Georgia and South Carolina and possibly as far north as Cape Fear.	Please see revised section 3.6.1.1.1

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1377	A-010	3.6.1.1.1	In general, the sources cited on right whales date largely from the 1980s, and much of the information is outdated and incomplete or incorrect. More recent sources of information, including NMFS' own SAS data and Baumgartner and Mate's tagging study (which indicates a wider summertime use of the Gulf of Maine and the mid-Atlantic than represented in the Navy's modeling), present a more complex picture of habitat use than the DEIS assumes. The risk to right whales is likely to have been underestimated.	Please refer to Section 3.6.1.1.1 for additional and updated information on right whale surveys
1370	A-010	4	The proposed activities also implicate the Clean Air Act and Clean Water Act as well as other statutes protecting the public health. The Atlantic Fleet's exercises cannot legally be undertaken absent compliance with these and other laws.	The majority of AFAST activities will occur outside of territorial waters, where these regulations do not apply. Where the Navy's activities do occur within territorial waters, the Navy operates in compliance with the Clean Air Act and Clean Water Act.
1363	A-010	4.20, Appendix F	…the Navy has declined to engage in consistency review both for certain states and certain of its activities. …although, it has prepared consistency determinations for the states of Connecticut, Florida, Georgia, Texas, and Virginia…, these submissions appear to cover only those activities, like in-port testing, that actually occur within the state's coastal zone. This narrow approach plainly violates the CZMA's federal consistency requirements and, indeed, has already been rejected by the courts. NRDC v. Winter 2007 WL 2481037 at *8-9 (C.D.Cal. 2007).	Coastal determinations are based on the enforceable policy of individual states as approved by NOAA.

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1364	A-010	4.20, Appendix F	Navy has failed to prepare consistency determinations for at least some states whose coastal resources would be affected. Most notably, it promises to present a negative determination to North Carolina-even though hundreds of hours of sonar training would place off the coast of that state, in the Cherry Point Operating Area, and even though the enforceable policies of the state's coastal zone management program clearly demand it. It is discouraging to see the Atlantic Fleet repeat the same legal violations that the Navy has seen rejected in the Pacific. The Navy must fulfill its CZMA commitments.	Coastal determinations are based on the enforceable policy of individual states as approved by NOAA.
1026	A-010	4.4	In this case, the Navy's assessment of impacts on marine mammals is consistently undermined by its failure to meet these fundamental responsibilities of scientific integrity, methodology, investigation, and disclosure. As with the Navy's initial Draft Environmental Impact Statement for the Undersea Warfare Training Range, the DEIS excludes a great deal of relevant information adverse to the Navy's interest, 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 environmental harm - behavioral, auditory, and physiological - that is at odds with established scientific authority and practice.	The Navy relied on all available literature, but placed a high degree of confidence on peer-reviewed literature.
1102	A-010	4.4.1	(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, and fails to consider the combined effects of multiple exercises, which, as NMFS indicates, may have played a role in the 2004 Hanalei Bay strandings;	By modeling individual sources and adding their footprints individually, the analysis slightly overestimates the number of exposures and therefore accounts for the cumulative effect of multiple systems operating simultaneously Synergistic effects are not well-studied and can only be accounted for qualitatively.

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1021	A-010	4.4.2	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, and detect and capture prey; 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 agnostic) 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 the 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.	Please refer to the revised Section 4.4.3; including updated analytical framework (conceptual biological framework). Per Section 4.7 and 4.9, there will be no significant impact to fish or invertebrates.
1030	A-010	4.4.2	Third, the numbers do not reflect other non-auditory physiological impacts, as from stress and from chronic exposure during development, which are discussed further among "Other Impacts on Marine Mammals" (below)	Please refer to the revised Section 4.4.3; including updated analytical framework (conceptual biological framework).
1072	A-010	4.4.2	See id. 1508.8(a). It must also take into account the activity's indirect effects. This requirement is particularly critical in the present case given the potential of sonar exercises to cause significant long-term impacts not clearly observable in the short or immediate term.	Refer to the revised conceptual framework discussion in Section 4.4.2 (conceptual biological framework).
1091	A-010	4.4.2	(2) dismisses the potential for sonar to injure whales at sea, grossly mischaracterizing the literature;	Refer to revised analytical framework, (conceptual biological framework) Section 4.4.3.
1101	A-010	4.4.2	(2) Navy does not properly account for reasonably foreseeable reverberation effects (as in the Haro Strait incident), giving no indication that its modeling sufficiently represents areas in which the risk of reverberation is greatest;	The Navy uses the most current range-dependent propagation models.

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1103	A-010	4.4.2	(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;	Refer to Section 4.4.3.
1108	A-010	4.4.2	(6) 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.	The Navy analysis does not assume that each exposure represents a "new whale;" however, it is not possible to accurately predict how many times an individual animal may (or may not) be exposed to a sonar source annually.
1064	A-010	4.4.2.3	The Navy fails to adequately assess the impact of "stress" on marine mammals…stress…alone or in combination with other stressors,…may weaken a cetacean's immune system, making it "more vulnerable to parasites and diseases that normally would not be fatal. …if they are resident animals exposed repeatedly to a variety of stressors in the AFAST study area. Yet despite the potential for stress in marine mammals and the significant consequences that can flow from it, the Navy assumes that such effects would be minimal. We note that substantial work on noise-related "stress" in marine mammals is shortly to be published, and we encourage the Navy to revise its DEIS accordingly.	Please refer to revised Section 4.4.3.3.
1029	A-010	4.4.3	Second, the DEIS fails to take proper account of published research on bubble growth in marine mammals, which separately indicates the potential for injury and death at levels far lower than the Navy proposes. 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; 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. The Navy's argument to the contrary simply misrepresents the available literature. What is more, the default assumption in the DEIS - that whales suffer injury only through the physical act of stranding itself (or through direct tissue injury) - has been soundly rejected in the literature. The Navy's refusal to consider these impacts is insupportable under NEPA. 42 C.F.R. Sections 1502.22, 1502.24.	It has not been established that whales get "the bends," as explained in Section 4.4.3. The issue raised and other potential hypotheses with regards to causes of marine mammal strandings, remain highly speculative.

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1027	A-010	4.4.5	There are gross problems with the Navy's thresholds here. A. Injury Threshold. The Navy fixes its highest threshold of 215 dB re 1 microPa2-s - which it considers the ground floor for direct physical injury - on the amount of energy necessary to induce permanent hearing loss (or "threshold shift") in marine mammals. DEIS at 4-39. Beneath this decision lies an assumption that the tissues of the ear are "the most susceptible to physiological effects of underwater sound" (DEIS at 4-31, 33), and, indeed, a few paragraphs are spent in an effort to set aside other types of injury that have been identified or observed. Unfortunately, the Navy's position is inconsistent with the scientific literature, with the legal standard of review, and with recent court decisions. See NRDC v. Winter, 527 F.Supp.2d 1216 (C.D. Cal. 2008), aff'd_F.3_,2008 WL 565680 (9th Cir. 2008); Ocean Mammal Institute v. Gates, 2008 WL 564664 (D. Hawaii 2008).	The "identified or observed" injuries referred to in the comment have not been directly linked to sound exposure and may result from other processes related to the behavior of the animal. The Navy's position is consistent with the interpretation of the scientific literature and no scientific literature exists that demonstrates a direct mechanism by which injury will occur as a result of sound exposure levels less than those predicted to cause PTS in a marine mammal.
1028	A-010	4.4.5	First the DEIS disregards data gained from actually 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 of injury here: approximately 150-160 dB re 1 microPa for 50-150 seconds, over the course of the transit. 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 lower than 140 dB re 1 microPa. (In another context, where it wishes to dismiss evidence of impacts to hearing at lower levels than its standard allows, the Navy refers to the statistical mean as "the best unbiased estimator." DEIS at 4-41.) Factoring in duration, then, evidence of actually sonar-related mortalities would compel a maximum energy level ("EL") threshold for serious injury on the order of 182 dB re 1 microPA2-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 microPa2-s. The Navy's claim that no beaked whales would suffer injury, let alone serious injury or mortality, because none would be exposed to levels above 215 dB re 1 microPa is simply not tenable.	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.4.5), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in East Coast and Gulf of Mexico waters.

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1031	A-010	4.4.5	Fourth, the Navy's exclusive reliance on energy flux density as its unit of analysis does not take other potentially relevant acoustic characteristics into account. For example, an expert group commissioned by the Office of Naval Research in 2003 to provide recommendations on mitigation suggested that peak power may matter more to beaked whales mortalities than integrated energy. Reflecting this uncertainty, the Navy should establish a dual threshold for marine mammal injury.	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.4.5), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in East Coast and Gulf of Mexico waters.
1040	A-010	4.4.5	b. Hearing loss threshold. First, 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. Yet, as noted below at subsection c ("Threshold for Significant Behavioral Change"), 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. 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.	The TTS work conducted by Nachtigall, Finneran, Schlundt and others are widely recognized by the scientific community as representing the best information available. The thresholds and criteria were developed in cooperation with NMFS and as more data becomes available, the methodology and thresholds will be revised as warranted.

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1043	A-010	4.4.5	In other words, the Navy's own graphic indicates that a 190 dB re 1 microPa2-s threshold would have fit its data better than the threshold it established and would have had the advantage of being marginally more conservative given the enormous uncertainties - yet there is no justification in the DEIS for the choice it made. The Navy's assumption of a 195 re 1 microPa2-s EL threshold in the present DEIS, as in all documents that depend on the same methodology, is arbitrary and capricious.	Please refer to Section 4.4.5.2.
1044	A-010	4.4.5	In the AFAST study area, the Navy estimates that sonar training will result each year in approximately 2.75 million behavioral takes of marine mammals. The Hawaii data suggests that this take level - while still very large - represents far less than what the Navy would have predicted had it continued to use the previous EL-based standard of 173 re 1 microPa2-s.	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.4.5), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in East Coast and Gulf of Mexico waters.
1048	A-010	4.4.5	First, the Navy again relies on inapposite studies of temporary studies threshold shift in captive animals for its primary source of data. Marine mammals 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.	Contrary to the statement that the data from TTS studies is inapposite, the Navy relies upon these studies because they are the most controlled studies of behavioral reactions to sound exposure available and provide the greatest amount of data. The studies recorded baseline behavior of the test subjects over many sessions so that behavioral alterations could be defined as a deviation from normal behavior. The sound exposure level received by each animal was recorded and quantified. The exposure signals used were close to the frequencies typically employed by MFA sonar. No other study provides the same

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				degree of control or relevance to signal type as the TTS studies from which much of the behavioral response thresholds are derived. The data from these studies are the "best available" scientific data both with respect to quality and quantity. Data from animals in the wild were utilized when sufficient information on animal behavior (both baseline and reactionary) and sound exposure levels existed. This is unfortunately a sparse amount of data. Utilization of the copious other studies with inadequate control, observational periods, or ability to determine exposure levels of the animals introduces a large amount of guesswork and estimation that weakens any numerical association between behavioral reactions and sound exposure. Furthermore, the deficiencies of the TTS studies referred to in the comment were acknowledged in the original behavioral analysis. Please see "Finneran, J. J., and Schlundt, C. E. (2004). "Effects of intense pure tones on the behavior of trained odontocetes," (SSC San Diego, San Diego, CA)," in particular section 5.1.1 which details the limitations of the data collection and analysis. The NMFS is aware of these deficiencies yet still approves of the usage of the data at this time because of the quality and quantity of the data. As quality data continues to be collected on animals in the wild, the relevance of the behavioral data collected during the TTS studies will decrease and they will eventually be replaced. However, at this time, they provide the best available data for assessing the relationship between behavioral reactions and sound exposure.

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1049	A-010	4.4.5	The SPAWAR studies have several other major deficiencies that NMFS, among others, has repeatedly pointed out; and 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 criticize the Navy for putting any serious stock in them.	Contrary to the statement that the data from TTS studies is inapposite, the Navy relies upon these studies because they are the most controlled studies of behavioral reactions to sound exposure available and provide the greatest amount of data. The studies recorded baseline behavior of the test subjects over many sessions so that behavioral alterations could be defined as a deviation from normal behavior. The sound exposure level received by each animal was recorded and quantified. The exposure signals used were close to the frequencies typically employed by MFA sonar. No other study provides the same degree of control or relevance to signal type as the TTS studies from which much of the behavioral response thresholds are derived. The data from these studies are the "best available" scientific data both with respect to quality and quantity. Data from animals in the wild were utilized when sufficient information on animal behavior (both baseline and reactionary) and sound exposure levels existed. This is unfortunately a sparse amount of data. Utilization of the copious other studies with inadequate control, observational periods, or ability to determine exposure levels of the animals introduces a large amount of guesswork and estimation that weakens any numerical association between behavioral reactions and sound exposure. Furthermore, the deficiencies of the TTS studies referred to in the comment were acknowledged in the original behavioral analysis. Please see "Finneran, J. J., and Schlundt, C. E. (2004). "Effects of intense pure tones on the behavior of trained odontocetes," (SSC San Diego, San Diego, CA)," in particular section 5.1.1 which details the limitations of the data collection and analysis. The NMFS is aware of these

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				deficiencies yet still approves of the usage of the data at this time because of the quality and quantity of the data. As quality data continues to be collected on animals in the wild, the relevance of the behavioral data collected during the TTS studies will decrease and they will eventually be replaced. However, at this time, they provide the best available data for assessing the relationship between behavioral reactions and sound exposure.
1069	A-010	4.4.5	For all these reasons, the thresholds of injury, hearing loss, and significant behavioral change utilized by the Navy in this DEIS are fundamentally inconsistent with the scientific literature on acoustic impacts, and, indeed, with marine mammal science in general, and, if used to support a Record of Decision, would violate NEPA.	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Sections 4.4.5 and 4.4.6, there is paucity of data upon which to base threshold criteria; however, the Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation

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1100	A-010	4.4.5	It is difficult to fully gauge the accuracy and rigor of these models with the paucity of 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, hearing loss, and significant behavioral change are inconsistent with the available data and are based, in part, on assumptions not acceptable within the field.	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.4.5), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in East Coast and Gulf of Mexico waters.

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1055	A-010	4.4.6	We must insist that the Navy provide the public with its propagation analysis for the Haro Strait event, and also describe precisely how this data set along with results from the SPAWAR and Nowacek et al. studies, were factored into its development of the behavioral risk function.	There is significant ambiguity regarding the behavior and responses of Jpod killer whales prior to the point of closest approach of the USS Shoup. There is also significant discrepancy among scientists who have viewed the video images of the animals during the point of closest approach. Researchers on the water with the animals at the time did note some apparent changes in behavior earlier in the event, although these are not reported in the records provided to NMFS as being nearly so pronounced as during the point of closest approach. Given the uncertainties, limited records, and differences of opinion, those exposures that seemed to clearly affect the behavior of the animals was used. Also, a range of exposure estimates was determined for each ‘ping’ from the USS Shoup. The values used in the DEIS represent the mean of that range, not the maximum. Please refer to the dose response information in Section 4.4.5.3.2 as well as the description of the data sources used in Section 4.4.5.3.2.
1061	A-010	4.4.6	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, as described below, 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. 42 C.F.R. Section 1502.16(b).	The Haro Strait event was considered when developing the risk function.

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1062	A-010	4.4.6	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 ("EL")	Refer to the risk function section 4.4.5 for development and section 4.4.5.3.6 for limitations of the risk function.
1065	A-010	4.4.6	By placing great weight on the SPAWAR data, excluding other relevant data, and misusing the Haro Strait data, the Navy has produced a risk function that is belied by the existing record: one that clearly demonstrates high risk of significant behavioral impacts from mid-frequency sources, including mid-frequency sonar, on a diverse range of wild species (e.g., right whales, minke whales, killer whales, harbor porpoises, Dall's porpoises) at levels below the function curve.	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.4.4.1), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in East Coast and Gulf of Mexico waters.

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1052	A-010	4.4.6.5	Second, 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 (see discussion below at section A.2).	There is significant ambiguity regarding the behavior and responses of "J" pod killer whales prior to the point of closest approach of the USS Shoup. There is also significant discrepancy among scientists who have viewed the video images of the animals during the point of closest approach. Researchers on the water with the animals at the time did note some apparent changes in behavior earlier in the event, although these are not reported in the records provided to NMFS as being nearly so pronounced as during the point of closest approach. Given the uncertainties, limited records, and differences of opinion, those exposures that seemed to clearly affect the behavior of the animals was used. Also, a range of exposure estimates was determined for each 'ping' from the USS Shoup. The values used in the DEIS represent the mean of that range, not the maximum.
1360	A-010	4.4.9	Just as important, 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…These models must be made avoidable to the public, including the independent scientific community, for public comments to be meaningful under NEPA and the Administrative Procedure Act...And guidelines adopted under the Data (or Information) Quality Act also requires their disclosure...and the Defense Department's own data quality guidelines mandate that "influential" scientific material be made reproducible as well.	The model will be subject to independent peer review for conferences or journal submissions, but has been reviewed by acoustic experts. Based on the information provided in the EIS/OEIS, others with the required technical expertise can use the existing information to calculate similar results. The CASS/GRAB program is not available for public release; however, approximate results can be obtained using other mathematical models commonly available to those with the technical expertise to utilize those tools.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1066	A-010	4.4.11	Sixth, as noted below in the discussion of Cumulative Impacts, 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, cab become significant if experienced repeatedly or over time.	The Navy is studying the long-term population effects of sonar and is also developing a monitoring plan as part of this EIS/OEIS effort.
1067	A-010	4.4.12.1	The Navy fails to consider the risk of ship collisions with large cetaceans, which is only exacerbated by the use of active acoustics.	Ship strikes are discussed in Section 4.4.12.1 and Chapter 5. Results of the research by Nowacek et al (2004) where right whales reacted to multiple "alert stimuli" that were developed specifically to elicit a response, with a limited similarity to tactical sonar systems.
1089	A-010	4.4.13	In its analysis, the Navy capriciously (1) denies the potential for beaked whale mortalities during the myriad training and testing activities proposed for the AFAST study area;	AFAST sonar activities are not conducted in locations similar to those where sonar-related beaked whale strandings have occurred in the past.
1098	A-010	4.4.13	(4) fails to consider the potential for strandings and mortalities in other species of cetaceans; and	It was considered but the analysis did not lead us to conclude that a stranding would occur. Please refer to Section 4.4.13 and Appendix E for additional information.
1099	A-010	4.4.13	(5) assumes that the Navy's failure to observe mortalities during past sonar training is probative of a lack of mortalities, despite the lack of any remotely adequate monitoring system.	As part of the AFAST EIS, a detailed monitoring program has been developed.
1023	A-010	4.5	Sea turtles, most of which are considered threatened or endangered under federal law, have been shown to engage in escape behavior and to experience heightened stress in response to noise.	Refer to Section 4.5 for information on sea turtle hearing. In addition, the Navy is consulting with NMFS under the ESA for sea turtles and marine mammals.
1365	A-010	4.6	The Atlantic Fleet's sonar training area 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.	Refer to revised Section 4.6.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1022	A-010	4.7	Impacts on fish are of increasing concern due to several recent studies demonstrating hearing loss and widespread disruption in commercial species of fish and to reports, both experimental and anecdotal, of catch rates plummeting in the vicinity of noise sources.	Based on best available science, per Section 4.7, there will be no significant impact to fish.
1075	A-010	4.7	…the Navy dismisses the notion that fisheries in the area would suffer economic loss (DEIS at 4-167), even though…its activities appear to have disrupted fishing in the past. But,…, the available evidence underscores the need for a more serious and informed analysis than the DEIS currently provides. The Navy must meaningfully assess the economic consequences of reduced catch rates on commercial and recreational fisheries and on marine mammal foraging in the AFAST study area.	Sonar exposure to fish population is transient in nature because the use is intermittent and the sources are moving; therefore, no chronic exposures are expected. Please see revised text in Sections 4.7 and 6.4.1.7.2.
1076	A-010	4.7	The Navy's current and proposed activities pose risks to marine wildlife beyond ocean noise: injury or death from collisions with ships, bioaccumulation of toxins, and the like. Indeed, many of the same concerns that apply to marine mammals (and are discussed above) apply to fish, sea turtles, and other biota as well. The Navy must adequately evaluate impacts and propose mitigation for each category of harm. 42 C.F.R. 1502.14, 1502.16.	These issues are discussed in Chapters 3 through 6. In addition, the Navy is consulting with NMFS under the ESA for sea turtles and marine mammals.
1073	A-010	4.7.1	The Navy capriciously dismisses the potential for significant adverse impacts on fish. First, while admitting that mid-frequency sonar can cause significant injury at distances of hundreds of feet, and having previously noted (with reference to Norwegian studies) that "some sonar levels have been shown to be powerful enough to cause injury to particular size classes of juvenile herring from the water's surface to the seafloor." …the Navy now claims that Atlantic and Gulf of Mexico populations would not suffer significant impacts. …-a conclusion that fails to take into account the Navy's higher source levels, the specific ecology of Atlantic and Gulf of Mexico fish populations, the potential for cumulative effects, and the differential impacts that activities in spawning areas may have.	Sonar may cause some temporary behavioral impacts to alewife and blueback herring due to their hearing sensitivity, but those impacts would be temporary and infrequent as a sonar ship operating mid-frequency sonar transits an area. Additionally, the source levels analyzed in this DEIS/OEIS are comparable with those in the study.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1074	A-010	4.7.1	While admitting that mid-frequency noise can alter behavior, the DEIS improperly relies entirely on two studies on acoustic deterrent devices, otherwise known as "pingers":… Further, the Navy dismisses a clearly relevant study of dolphin sounds and their impact on silver perch mating signals-a study that NMFS and state regulators have cited as reason for concern. The Navy must 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.	Please see revised Section 4.7.1.
1368	A-010	4.8	As the Navy acknowledges, migratory birds occur within the Atlantic Fleet's sonar use area. The Navy must therefore consult with the Secretary of the Interior regarding measures to minimize and monitor the effects of the proposed range on migratory birds, as required.	The Navy has determined there will be no incidental takes of migratory birds in accordance with MBTA.
1362	A-010	4.8	The Navy must consult with NMFS over blue whales, fine whales, humpback whales, North Atlantic right whales, sei whales, sperm whales, green sea turtles, Kemp's ridley sea turtles, olive ridley sea turtles, hawksbill sea turtles, leatherback sea turtles, loggerhead sea turtles, Bermuda petrels, gulf sturgeon, least terns and roseate terns, all of which are listed under the (ESA) Act.	The Navy has initiated consultation with NMFS on marine mammals and sea turtles. There will be no effect to threatened or endangered sea birds due to AFAST activities. Refer to Section 4.8.3.
1024	A-010	4.9.1	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.	Most marine invertebrates cannot hear sound because they do not possess the physical structures needed to detect sound. The few invertebrates that may detect sound could experience infrequent and temporary effects because ships utilizing sonar are in transit. However, most invertebrates have a similar to the surrounding seawater and therefore are not capable of feeling physical effects from sound. Please see revised text in Section 4.9.1 for additional information.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1366	A-010	4.11	The Navy indicates that it will not presently consult with any of the Sanctuaries within the AFAST region-…-even though none of these protected areas would be excluded under its preferred alternative. 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 sanctuaries or otherwise affects their resources. The mere claim that the Navy would avoid adverse impacts "to the maximum extent practicable" does not, of course, obviate consultation. Since sonar may impact sanctuary resources even when operated outside their bounds, the Navy should indicate how close it presently operates, or foreseeable plans to operate, to each of these areas.	The Navy states in the AFAST EIS/OEIS that it will consult with the National Marine Sanctuaries officials if future training requirements dictate we need to train in the sanctuaries. Please refer to revised Sections 4.11 and 6.4.1.12.1 for additional information.
1367	A-010	4.11	…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", and prohibits all persons, including Federal agencies, from dumping materials into ocean waters, except as authorized by the Environmental Protection Agency. The Navy has not indicated its intent to seek a permit under the statute.	The Navy states in the AFAST EIS/OEIS that it will consult with the National Marine Sanctuaries officials if future training requirements dictate we need to train in the sanctuaries. Please refer to revised Sections 4.11 and 6.4.1.12.1 for additional information.
1016	A-010	5	It adopts mitigation that a federal court found to be "woefully inadequate and ineffectual," and fails to prescribe measures that have been used repeatedly by the Navy in the past, used by other navies, or required by the courts.	The Navy is best suited to determine what mitigation it can effectively use during its training and testing activities to mitigate harm to marine mammals while still being able to meet its operational needs to train for the real-world conditions it may face. A thorough understanding of tactical sonar acoustic propagation characteristics, marine mammal physiology and population ecology, and oceanographic vagaries in the waters of the AFAST study area has been a benchmark of the Navy's effective mitigation program.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1355	A-010	5	To comply with NEPA, an agency must discuss measures designed to mitigate its project's impact on the environment…Yet here the Navy does little more than set forth a cribbed set of measures, falling short even of what other navies have implemented for transient exercises and providing no discussion on a variety of other options.	The mitigation measures were determined through consultation with NMFS. Please refer to Chapter 5.
1374	A-010	5	We urge the Navy to revise its analysis consistent with federal law and to provide a mitigation plan that truly maximizes environmental protection given the Navy's actual operational needs.	Mitigation measures were determined in consultation with NMFS, and this document was prepared in accordance with NEPA and EO 12114.
1356	A-010	5.1.2	All of the mitigation that the Navy has proposed for acoustic impacts boils down to the following: a very small safety zone around the sonar vessel, maintained primarily with visual monitoring by onboard lookouts, with aid from non-dedicated aircraft…and passive monitoring...It has been the pattern for the Navy to claw back mitigation with each new set of guidelines, and AFAST is no exception, reducing the safe transit distance in the current national defense exemption from 2000 to 1000 yards...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 sighted; as the distance approaches 1 kilometer, that number drops to zero. The Navy's reliance on visual observation as the mainstay of its mitigation of its mitigation plan is therefore profoundly misplaced.	The safe transit distance has been corrected to 2,000 yards. Refer to mitigation effectiveness discussion in Chapter 5.
1015	A-010	5.4	It claims, against generations of field experience, that marine mammals - even cryptic, deep-diving marine mammals like beaked whales - can effectively be spotted from fast-moving ships and avoided.	Refer to Section 5.4 for a discussion of mitigation measure effectiveness.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1357	A-010	5.6	Moreover, the Navy's analysis ignores or improperly discounts an array of options that have been considered and imposed by other active sonar users, including avoidance of coastal waters, high-value habitat, and complex topography; the employment of a safety zone more protective than the 1000-yard power-down and 200-yard shutdown proposed by the Navy' general passive acoustic monitoring for whales; special rules for surfacing ducting and low-visibility conditions; monitoring and shutdown procedures for sea turtles and large schools of fish; and many others. The Navy's conclusions are all the more remarkable given recent court decisions finding that the navy can and must do more to reduce harm to protected species from sonar training.	Please see revised mitigation text in Section 5.6. It is critical that Navy be able to conduct Anti-Submarine Warfare training in a variety of environments and bathymetric conditions.
1358	A-010	5.6	Measures that the Navy should consider include,…(1)Establishment of a coastal exclusion zone for acoustics training and testing, such as one for major exercises that would minimally run at least 25 nm from the 200 meter isobath, or beyond the shelf break and Gulf Stream, whichever is greater; (2) Seasonal avoidance of North Atlantic right whale feeding grounds, calving grounds, and migration corridor; (3) Avoidance of federal and state marine protected areas, including the national marine sanctuaries located along the eastern seaboard and in the Gulf of Mexico; (4) 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 risks to marine species; (5) Avoidance of fronts and other major oceanographic features, such as the Gulf Stream, warm core rings, and other areas with marked differentials in sea surface temperatures, which have the potential to attract offshore concentrations of animals, including beaked whales; (6) Avoidance of areas with higher modeled takes or with high-value habitat for particular species, many of which are indicated in the predictive habitat modeling undertaken for the DEIS (see DEIS App. D); (7) Concentration of exercises to the maximum extent practicable in abyssal waters and in surveyed offshore habitat of low value to species; (8) 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; (9) Expansion of the marine species "safety zone" to a 4 km shutdown, reflecting international best practices, or 2 km, reflecting the standard prescribed by the California Coastal Commission and adopted in NRDC v. Winter, 527 F.Supp.2d 1216 (C.D. Cal. 2008), aff'd_F.3d_, 2008 WL 565680 (9th Cir. 2008); (10) Suspension of relocation of exercises when beaked whales or significant aggregations of	Please see revised mitigation text in Section 5.6. It is critical that Navy be able to conduct Anti-Submarine Warfare training in a variety of environments and bathymetric conditions. Refer to Chapter 5 for a discussion of miltigation measures.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
			other species, such as melon-headed whales, are detected by any means within the orbit circle of an aerial monitor or near the vicinity of an exercise; (11) 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; (12) Avoidance or reduction of training during months with historical significant surface ducting conditions, and use of power-downs during significant surface ducting conditions at other times; (13) Use of additional power-downs when significant surface ducting conditions coincide with other conditions that elevate risk...(14) Planning of ship tracks to avoid embayments and provide escape routes for marine mammals; (15) Suspension or postponement of chokepoint exercises during surface ducting conditions and scheduling of such exercises during daylight hours; (16) Use of dedicated aerial monitors during chokepoint exercises, major exercises, and near-coastal exercises; (17) 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; (18) Modification of sonobuoys for passive acoustic detection of vocalizing species; (19) Suspension or reduction of exercises or power-down of sonar outside daylight hours and during periods of low visibility; (20) Use of aerial surveys and ship-based surveys before, during, and after major exercises; (21) Use of all available range assets for marine mammal monitoring; (22) Use of third-party monitors for marine mammal detection; (23) Establishment of long-term research, to be conducted through an independent agent such as the National Fish and Wildlife Foundation, on the distribution, abundance, and population structuring of protected species in the AFAST study area, with the goal of supporting adaptive geographic avoidance of high-value habitat; (24) 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; (25) 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; (26) Avoidance of high-value sea turtle habitat; (27) Evaluating before each major exercise whether reductions in sonar use are possible; given the readiness status of the strike groups involved; (28) Dedicated Research and development of technology to reduce impacts of active acoustic sources on marine mammals; (29) Establishment of a plan and a timetable for maximizing synthetic training in order to reduce the use of active sonar in Atlantic Fleet training; (30) Prescription of specific mitigation requirements for individual classes (or sub-classes) of testing and training activities, in order to maximize mitigation give varying sets of operational needs; and (31)	

Comment Number	Commenter Number	Section Number	Comment	Comment Response
			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.	

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1078	A-010	6	…it is necessary to consider the impacts of the proposed exercise alongside those of other activities in the region, including industrial and commercial activities such as fishing, shipping, and coastal development. As it stands, the Navy says little more than that all of the impacts from its thousands of annual hours of activity would necessarily be "short-term" in nature and therefore would not affect vital rates in individuals or populations. The Navy also offers the bromide that mitigation will preclude any significant or long-term impacts on marine mammals and the marine environment. Not only are both statements factually insupportable given the lack of any population analysis or quantitative assessment of long-term effects in the document…but they misapprehend the definition of "cumulative impact,"…Navy assumes..that its…sonar activities will not result in the serious injury or death of even a single animal. It simply assumes all behavioral impacts are short-term in nature and cannot affect individuals or populations through repeated activity… And, while it states that behavioral harassment…involves a stress response that may contribute to an animal's allostatic load, it again assumes without further analysis that any such impacts would be "incremental, but recoverable."	Please refer to Chapter 6 for an extensive cumulative impacts discussion.
1345	A-010	6	Nor does the Navy consider the potential for acute synergistic effects from sonar training…it does not consider the greater susceptibility to vessel strike of animals that have been temporarily harassed or disoriented by certain AFAST noise sources…Nor does the Navy consider (for example) the synergistic effects of noise with other stressors in producing or magnifying a stress-response. In short, the Navy's conclusion that cumulative and synergistic impacts from AFAST sonar training are insignificant cannot plausibly be supported.	See revised Chapter 6.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1346	A-010	6	All of these failures of analysis are reflected not only in the Navy's unsupported conclusions about the benignity of AFAST standing alone, but in its broader conclusions about human activities along the eastern seaboard and in the Gulf of Mexico…The idea that all of these events, when taken as a whole, are having at most "moderate", but recoverable, adverse effects" (see DEIS at 6-83) is, to say the least, implausible...Given the scope of the proposed action, the deficiencies of the Navy's cumulative impacts assessment represent a critical failure of the DEIS.	See revised Chapter 6.
1014	A-010	6.4	It presumes, entirely without analysis, that all of its impacts are short-term in nature and that none will have cumulative effects, even though the same populations would repeatedly be affected.	Although long-term effects are not anticipated, we are instituting a monitoring plan to better understand this issue.
1070	A-010	6.4.1.3	The DEIS generally fails to consider the cumulative impacts of these toxins on marine mammals, from past, current, and proposed exercises. Careful study is needed into the way they might disperse and circulate around the islands and how they may affect marine wildlife. The Navy's analysis of hazardous materials is therefore incomplete. Navy's analysis cannot be limited only to direct effects.	Please refer to Section 6.4.1.3 and Table 6.19, referring to water quality and cumulative impacts. Also refer to Table 4-1 for a listing of expended materials.
1068	A-010	6.4.1.5	Sixth, as noted below in the discussion of Cumulative Impacts, 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, cab become significant if experienced repeatedly or over time.	The Navy is studying the long-term population effects of sonar and is also developing a monitoring plan as part of this EIS/OEIS effort.
1017	A-010	E	Although mass mortalities of beaked whales have resulted from the single transit of a sonar ship, the DEIS concludes that no animals would suffer serious injury or die during the many thousands of hours of sonar training.	There are no documented cases beaked whale mass strandings caused by a single transit of a sonar ship. Refer to Appendix E on cetacean stranding.

Comment Number	Commenter Number	Section Number	Comment	Comment Response
1083	A-010	E	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. Indeed, it is not even certain that some beaked whale species naturally strand in numbers.	Refer to Appendix E for a discussion of stranding events that the Navy acknowledges may have been linked to sonar operations.
1376	A-010	E	Stranding and Mortalities Associated with Mid-Frequency Sonar ...Some preliminary 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.	Refer to Appendix E for a discussion of stranding events that the Navy acknowledges may have been linked to sonar operations.
1375	A-010	H	We also urge the Navy to make available to the public the data and modeling on which its analysis is based.	Refer to the acoustic modeling technical report incorporated as Appendix H.
1025	A-010	Not Applicable	In nearly every respect, the Navy's DEIS fails to meet the high standards of rigor and objectivity established under NEPA.	The overall effects to the population from this and other actions, to be addressed as part of the LOA process, and NMFS final rule. The EIS/OEIS is prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA), the Council no Environmental Quality, the Department of the Navy procedures for implementing NEPA, and Executive Order 12114.

Comment #P1

P1-1

To Whom It May Concern,

As it stands right now it would appear that you will need at least 33 more ships to complete your missions. Some of which should probably be Littoral Combat ships which can quickly get your personnel out of the danger zone or areas. Being newer vessels the cost may be higher now for awhile. But lower as you mass produce and companies become more skilled at building the ships and as you get more skilled workers to build the vessels. You might contact Ghirardi Marine 1-800-298-2419

The remainder of this letter is supports for your missions. www.attisupport.com (631) 231-8777 For first aid kits, food and supplies 1-800-226-7667, 1-800-227-7776 For updated health information and starter kits 1-866-632-6446. And consider using Soymilk and at least Tropicana orange juice 1-800-237-7799 for hydration especially in warm climates and Simply Lemonade as the body has certain daily nutritional requirements. Try V8 Fusion and bottled spring water.

Fleet and Family Support 1-800-372-5463 www.nffsp.org Air Force 703-697-0067 Army 703-681-5375, 703-681-7236 fax Marines 703-784-0275, 703-784-9816 fax

See films:

Air Force One
An Officer and A Gentleman
Anna & The King
Top Gun

Books:

Air Battle Force

Al Jazeera.com

Comment #P2

GOMEX EIS Comments

Name: carolyn kinch

Organization: registered nurse/mother/human

Comment #:

Date: January 17, 2009

Comment: if the actions of the military cause harm to other life forms in the areas of their 'practice' i will support every effort to hold agencies involved fully accountable... the failure to recognize and adapt to the fragile web of life on earth has epitomized the conduct of the military since it's inception and it will not be tolerated as we approach the edge of our own destruction as a species....

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Cross Reference Index by Comment Tracking Number **GOMEX Final EIS/OEIS**		
Comment No.	**Agency or Public Comment**	**Navy Response**
F1- US DOA, New Orleans District, Corps of Engineers		
F1-1	Since there appears to be no connection between your proposed action and our projects or regulatory program, we have no further comments on the DEIS/OEIS.	Comment noted.
F2- US Department of the Interior, Office of Environmental Policy and Compliance		
F2-1	The interior least tern, piping plover, and red-cockaded woodpecker do not occur within the project area associated with Louisiana, and would therefore not be impacted by this project.	Comment noted.
F2-2	We concur that activities in OPAREA W-92 and W-54 are not likely to adversely affect the brown pelican.	Comment noted.
F3- Marine Mammal Commission		
F3-1	Revise the Gulf of Mexico Range Complex DEIS to include a description of past and current activity levels to verify that the activity level proposed under the no-action alternative is indeed consistent with the current level.	CEQ guidance states that a No Action alternative can be defined as current operations. Historically, training activities have included a surge capability. Levels of current activity were determined by a number of means including the use of Range Complex Management Plans, interviews of range operators, and logistics data in order to best establish historic training levels. The text describing the No Action alternative has been amended. Additionally, the Navy has added Section 2.2.7 describing a “true No Action” alternative in the alternatives considered but eliminated from further consideration. This alternative was eliminated from further consideration because it fails to meet the Purpose and Need of the Proposed Action.
F3-2	Revise the DEIS by incorporating a set of explicit and clear metrics that the public and decision-makers can use to make more informed judgments about the benefits and costs of various types and levels of activity.	Section 1.2.1.1 of the EIS discusses the requirements set forth in Title 10 U.S.C., Part 5062 that directs the Chief of Naval Operations to train all naval forces for combat. The operations described in Table 2.2-4 are essential to meet these requirements.

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Comment No.	Agency or Public Comment	Navy Response
F3-3	Revise the DEIS to include an alternative involving a reduction in activity to ensure that the decision makers are both well informed and presented with a full range of alternatives.	The Preferred Alternative includes a reduction in the activities with the highest potential to impact marine species (explosives). Table 2.2-4 shows under Alt 2 (Preferred) there is an elimination of Mine Warfare training and the reduction of high explosive bombing exercises by 84%. An overall reduction in all activities would fail to meet the Purpose and Need of the Proposed Action.
F3-4	Revise the DEIS by limiting the scope to those proposed activities that can be described in sufficient detail to provide a reliable basis for assessing benefits and costs.	The Navy utilized best available science to conduct the analysis contained in the DEIS. For details regarding training operation or ordnance, please refer to Appendix D and E of the EIS. In addition, the Navy is in consultation with NMFS for potential impacts on ESA/MMPA species.
F3-5	Subject its reviews of marine mammal density, distribution, behavior, and habitat use to scientific peer reviews.	The marine mammal density estimates were developed by contractors and researchers external to the Navy and were reviewed by NMFS staff at the Northeast and Southeast Fisheries Science Centers. In addition, the background information on marine mammals in Section 3.7.2 of the EIS was reviewed by a professor at a respected University. The Navy OPAREA Density Report (NODE) and the Marine Resource Assessment (MRA) for the Gulf of Mexico are available to the public at: http://www.gomexrangecomplexeis.com/OtherResources.aspx
F3-6	Develop and implement a plan to validate the effectiveness of monitoring and mitigation measures before beginning, or in conjunction with, operations under the final environmental impact statement and anticipated issuance by the National Marine Fisheries Service of an incidental harassment authorization.	Chapter 5 of the EIS has been revised to include a new summary on the Integrated Comprehensive Monitoring Program (ICMP), the GOMEX Range Monitoring Plan, reporting requirements, adaptive management, etc. Range specific monitoring plans will also be included in the Final Rule and posted on the NOAA web site. Some components of the ICMP have already begun implementation and the Navy is continuing to develop the ICMP in cooperation with NMFS. The ICMP will be used both as: 1) a planning tool to focus Navy monitoring priorities (pursuant to ESA/MMPA requirements) across Navy Range Complexes and Exercises; and 2) an adaptive management tool, through the consolidation and analysis of the Navy's monitoring and watchstander (lookout) data, as well as new information from other Navy programs (e.g., research and development), and newly published non-Navy information.

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GOMEX Final EIS/OEIS

Comment No.	Agency or Public Comment	Navy Response
F3-7	Implement a minimum 60 minute waiting period when deep-diving species (e.g. sperm and beaked whales) or that cannot be identified by watchstanders are observed within or are about to enter a safety zone.	The mitigation measures involving pre-exercise visual observations have been cross-referenced with average dive times of marine mammals. Table 3.7.7 of the EIS has been added to include a summary of marine mammal dive times that have been documented. The majority of documented research has noted that most marine mammals complete dives averaging less than 30 minutes. Only the sperm whale, with a 37 min average dive time, exceeds this amount of time. Therefore, the 45 minute visual observation period, that is required before a Firing Exercise can begin or resume, takes into account the average dive times of all marine mammals in the area.
F3-8	Clarify whether the Navy intends to install and use either the M3R or HARP systems described on page 5-4 of the DEIS.	Ch 5 has been updated with regards to the discussion on the ICMP and the Navy's research. Regardless of whether M3R or passive acoustic monitoring will be used within the Gulf of Mexico, it is still relevant to the overall knowledge of the potential impacts of Navy activities and marine mammals. Therefore, the research is necessary and applicable to everywhere that the Navy trains, including the Gulf of Mexico.
F4- US Environmental Protection Agency		
F4-1	EPA has no environmental concerns about the preferred alternative and has rated it as LO-"Lack of Objections".	Comment noted.
F5- US DOA, Jacksonville District, Corps of Engineers		
F5-1	The proposed activity apparently has no direct impact on any of our civil works projects.	Comment noted.
S1- Florida Department of State Division of Historical Resources		
S1-1	Re: Sections 3.13 and 6.4.13, which deal with cultural resources of the GOMEX DEIS/OEIS. It is the opinion of this office that the Department of the Navy has adequately addressed cultural resources.	Comment noted.
S2- Florida Department of Environmental Protection		

Cross Reference Index by Comment Tracking Number **GOMEX Final EIS/OEIS**		
Comment No.	**Agency or Public Comment**	**Navy Response**
S2-1	The state has no objections to the proposal and has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program.	Comment noted.
O1- Natural Resources Defense Council		
O1-1	The DEIS fails to meet the environmental review standards prescribed by NEPA.	The EIS/OEIS is prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality, the Department of the Navy procedures for implementing NEPA, and Executive Order 12114.
O1-2	The Navy does not properly analyze environmental impacts.	Comment noted.
O1-3	The Navy's analyses of alternatives or mitigations are not credible.	Comment noted.
O1-4	The enclosed letter was provided for the AFAST DEIS.	Refer to the AFAST FEIS for the comment responses to your letter dated March 31, 2009.
O1-5	Table 3.30-4 on page 3-491 and Table 6.4-1 on page 6-41 of the DEIS provide contradictory estimates.	The Navy has updated both tables to reflect the values shown in the AFAST FEIS.
P1- Anonymous		
P1-1	Concerned that the Navy will need additional ships and supports the Navy's mission.	Comment noted.
P2- Carolyn Kinch		
P2-1	Concerned the actions of the military will cause harm to other life forms in the study area.	Chapter 3 of the EIS conducts the analysis of the affected environment and environmental consequences to minimize affects to life forms in the study area.

PUBLIC HEARINGS

Four public hearings were held 2-6 February 2009 to receive public comments on the Gulf of Mexico Range Complex Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). The following is information resulting from each of these hearings.

PUBLIC HEARING #1

The first public hearing was held in Panama City, FL at the Marriott's Legend's Edge at Bay Point, 4000 Marriott Drive, February 2, 2009. The public was invited to attend an open-house from 5-7 pm during which time the Navy displayed six poster stations on various information regarding the EIS/OEIS. Subject Matter Experts (SME) were present to answer questions. From 7-9 pm a formal hearing was held and public comments were solicited. No speakers from the general public made a presentation. Thirteen people attended the open house, the hearing, or both. No written comments were received during the meeting.

PUBLIC HEARING #2

The second public hearing was held in Pensacola, FL at the New World Landing, 600 South Palafox, February 3, 2009. The public was invited to attend an open-house from 5-7 pm during which time the Navy displayed six poster stations on various information regarding the EIS/OEIS. Subject Matter Experts (SME) were present to answer questions. From 7-9 pm a formal hearing was held and public comments were solicited. No speakers from the general public made a presentation. Two people attended the open house, the hearing, or both. No written comments were received during the meeting.

PUBLIC HEARING #3

The third public hearing was held in New Orleans, LA at the New Orleans Marriott, 555 Canal Street, February 4, 2009. The public was invited to attend an open-house from 5-7 pm during which time the Navy displayed six poster stations on various information regarding the EIS/OEIS. Subject Matter Experts (SME) were present to answer questions. From 7-9 pm a formal hearing was held and public comments were solicited. No speakers from the general public made a presentation. Three people attended the open house, the hearing, or both. No written comments were received during the meeting.

PUBLIC HEARING #4

The fourth public hearing was held in Corpus Christi, TX at the Holiday Inn - Emerald Beach Hotel, 1102 South Shoreline Blvd, February 6, 2009. The public was invited to attend an open-house from 5-7 pm during which time the Navy displayed six poster stations on various information regarding the EIS/OEIS. Subject Matter Experts (SME) were present to answer questions. From 7-9 pm a formal hearing was held and public comments were solicited. No speakers from the general public made a presentation. Two people attended the open house, the hearing, or both. No written comments were received during the meeting.

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APPENDIX G
STATE HISTORIC PRESERVATION OFFICE CORRESPONDENCE

This appendix contains the following letters:

1. Florida Department of State, Division of Historic Resources, letter dated September 20, 2007 to the GOMEX Project Manager regarding their review of the EIS/OEIS
2. Mississippi Department of Archives and History letter dated October 14, 2009 to NAVFAC Atlantic
3. Alabama Historical Commission letter dated October 21, 2009 to NAVFAC Atlantic
4. Texas Historical Commission letter dated November 2, 2009 to NAVFAC Atlantic
5. Florida Division of Historical Resources letter dated November 5, 2009
6. NAVFAC Atlantic letter dated November 18, 2009 to Texas Historical Commission
7. NAVFAC Atlantic letter dated November 20, 2009 to Florida Division of Historical Resources
8. Texas Historical Commission concurrence dated December 15, 2009 to NAVFAC Atlantic
9. Florida Department of State, Division of Historical Resources' concurrence letter dated December 18, 2009 to NAVFAC Atlantic

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FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. Robert L. Riley (Code OPC5)
GOMEX EIS/OEIS Project Manager
Naval Facilities Engineering Command Southeast
P.O. Box 30 (Building 135 North, Ajax Street)
NAS Jacksonville, Florida 32212-0030

September 20, 2007

RE: DHR Project File Number: 2007-6993
Received by DHR September 10, 2007
Preparation of an Environmental Impact Statement/Overseas Environmental Statement for the Navy Atlantic Fleet Training & Testing, and Associated Range Capabilities Enhancements in the Gulf of Mexico Range Complex (GOMEX)

Dear Mr. Riley:

Our office reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*, or otherwise of historical, architectural or archaeological value. The review was conducted in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended and *36 CFR Part 800: Protection of Historic Properties,* the *National Environmental Policy Act of 1969, as amended* and the implementing state regulations.

We look forward to reviewing the *Environmental Impact Statement* for the Navy Atlantic Fleet Training & Testing and Associated Range Capabilities Enhancements in the Gulf of Mexico Range Complex and coordinating in the protection and preservation of significant cultural resources.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservationist, by electronic mail *sedwards@dos.state.fl.us*, or at 850-245-6333 or 800-847-7278.

Sincerely,

Frederick P. Gaske

Frederick P. Gaske, Director, and
State Historic Preservation Officer

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

HISTORIC PRESERVATION
Ken P'Pool, director • Jim Woodrick, acting director
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

October 14, 2009

Mr. R.D. Curfman
Environmental Business Line Manager
Department of the Navy
6506 Hampton Blvd.
Norfolk, Virginia 23508-1278

RE: Proposed infrastructure improvements for the Gulf of Mexico Range Complex Training Operations, MDAH Project Log #10-004-09, Noxubee County

Dear Mr. Curfman:

We have reviewed your request for a cultural resources assessment, received on October 1, 2009, for the above referenced project in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After reviewing the information provided, it is our determination that no cultural resources are likely to be affected. Therefore, we have no objection with the proposed undertaking.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations.

If you have any questions, please do not hesitate to contact us at (601) 576-6940.

Sincerely,

For: Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Office

c: Clearinghouse for Federal Programs

STATE OF ALABAMA
ALABAMA HISTORICAL COMMISSION
468 SOUTH PERRY STREET
MONTGOMERY, ALABAMA 36130-0900

FRANK W. WHITE
EXECUTIVE DIRECTOR

TEL: 334-242-3184
FAX: 334-240-3477

October 21, 2009

Mr. R. D. Curfman
Dept. of the Navy
6506 Hampton Blvd.
Norfold, VA 23508-1278

Re: AHC 10-0001
Gomex Range Complex EIS
Gulf of Mexico

Dear Mr. Curfman:

Upon review of the above referenced project, we have determined that the project activities will have no effect on any known cultural resources listed on or eligible for the National Register of Historic Places. Therefore, we concur with the proposed project activities.

However, should artifacts or archaeological features be encountered during project activities, work shall cease and our office shall be consulted immediately. Artifacts are objects made, used or modified by humans. These include but are not limited to arrowheads, broken pieces of pottery or glass, stone implements, metal fasteners or tools, etc. Archaeological features are stains in the soil that indicate disturbance by human activity. Some examples are post holes, building foundations, trash pits and even human burials. This stipulation shall be placed on the construction plans to insure contractors are aware of it.

We appreciate your commitment to helping us preserve Alabama's non-renewable resources. Should you have any questions, the point of contact for this matter is Amanda Hill at 334-230-2692. **Please have the AHC tracking number referenced above available and include it with any correspondence.**

Sincerely,

Elizabeth Ann Brown
Deputy State Historic Preservation Officer

TEXAS HISTORICAL COMMISSION

real places telling real stories

November 2, 2009

R.D. Curfman
Environmental Business Line Manager
Department of the Navy
Naval Facilities Engineering Command, Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508-1278

Re: Project review under Section 106 of the National Historic Preservation Act of 1966
Determination of "No Historic Properties Affected" for the GOMEX Range in Texas.
(NAVY)

Dear Mr. Curfman:

Thank you for allowing us to review selected chapters from the Gulf of Mexico Range Complex Draft EIS/OEIS and a document entitled, "Technical Memorandum, Submerged Cultural Resource Predictive Model for the Gulf of Mexico Range Complex." This letter serves as comment on your determination from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Bill Martin, has completed its review. After examining the submerged cultural resource documentation, our State Marine Archeologist has no concerns and concurs with your determination of "No Historic Properties Affected" for submerged resources.

However, we cannot concur with your determination that the sites at the Dixie and Yankee target areas in McMullen County have little potential to yield significant information about history or prehistory and are not eligible for inclusion in the National Register of Historic Places. As we noted in our comments on the survey of the Dixie target area, in a letter dated April 23, 2007, the survey methods did not appear to meet the minimum survey standards for Texas. The amount of shovel testing was too infrequent to adequately characterize the deposits, and it appeared to have been too shallow. Only 55 shovel tests were dug within the 1,735 acres that were surveyed. Most of these were no deeper than 30 cm below surface. No reference publications were cited regarding buried sites on similar landforms in the region. No backhoe trenches were dug and no geomorphological assessment was conducted to verify the assertion that soils likely to contain archeological deposits are shallow and that deeper sediments predate human occupation.

Moreover, we understood that the survey was conducted under Section 110 to document resourc on the Navy-owned portion of the McMullen Range complex. We specifically stated in our lette "If this is not the case, and actions are planned that require consultation under Section 106, additional research should be conducted to complete the evaluation process. In this case, the leased buffer zone to the north should be surveyed too. Please clarify the nature of the impact in the buffer zone areas."

In our opinion, a complete survey of all land owned and leased by the Navy at both the Dixie and Yankee target areas should be conducted, and National Register eligibility assessments should be completed so that an effect determination can be made on the basis of evidence.

Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If we may be of further assistance, please call Bill Martin of our staff at 512/463-5867.**

Sincerely,

William A. Martin

for
F. Lawerence Oaks, State Historic Preservation Officer

FLO/wam

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

November 5, 2009

Mr. R.D. Curfman
Department of the Navy
Naval Facilities Engineering Command, Atlantic
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

Re: SHPO/DHR Project File No: 2009-5905
Received: October 1, 2009
Determination of "No Historic Properties Affected" for the Gulf of Mexico Range Complex Training Operations
Technical Memorandum – Submerged Cultural Resource Predictive Model for the Gulf of Mexico Range Complex

Dear Mr. Curfman:

This office reviewed and reevaluated the referenced Department of the determination of effect statement and the application of the submerged cultural resource predictive model for cultural resources project for possible impact to historic properties listed, or eligible for listing, in the National Register of Historic Places. The review was conducted in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 36 CFR Part 800: Protection of Historic Properties; as well as the National Environmental Policy Act of 1969, as amended.

Panama City Harbor Security Group Machine Gun Range and the MINEX Boxes
We note that these two training areas are located in areas with low potential for submerged historic resources. We concur with that recommendation. However, the study conducted by Southeastern Archaeological Research did not address the potential for drowned prehistoric terrestrial sites in these areas. If no drowned features such as river channels or bedrock outcrops are extant within the PC range or boxes, or bottom was not exposed during low sea levels during the Pleistocene period, or training activities are very unlikely to disturb the Panama City bottom, it is the opinion of this office that no historic properties are likely to be affected.

We have questions regarding the GOMEX Range Complex interior training area at NSA Panama City referred to as the Demolition Pond Area included in the draft environmental impact statement. Is this a natural water body or manmade? If natural, has it ever been subjected to a cultural resources assessment, and will ongoing or proposed training activities in the Pond directly or indirectly disturb the bottom? However, if it is natural, but past and proposed activities are unlikely to have an affect on the bottom this office has no concerns regarding potential historic properties.

Pensacola BOMBEX Hot Box

We note that the hot box is located within a deep water area. This office concurs with the findings of model application exercise by Southeastern Archaeological Research and the recommendation that it has the highest potential to have submerged historic vessels within the GOMEX Range Complex in waters offshore of Florida. Again we have questions. What types of proposed training activities will or could be carried out in the Hot Box area that will or could directly or indirectly disturb the bottom? If the bottom is unlikely to be affected, this office will concur that no historic properties will be affected.

We look forward to hearing from your agency and working with you to move this important Navy plan forward to completion for purposes of assessing affects in a timely manner. Please do no hesitate to contact me to discuss the undertaking and to address our questions and comments. The telephone number is 850-245-6333, or I can be reached at lkammerer@dos.state.fl.us.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

Pc: Mr. Len Winter, Historic Preservation Officer - NAVFAC SE
Mr. Roger Smith, Ph.D., Florida Div. of Historical Resources – Underwater Archaeology

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC
6506 HAMPTON BLVD
NORFOLK VA 23508-1278

IN REPLY REFER TO:
5090
EV22NPG
November 18, 2009

Mr. Bill Martin, Archaeologist
Texas Historical Commission
1511 Colorado
Austin, TX 78701

Dear Mr. Martin:

SUBJECT: EFFECTS OF INERT BOMBING EXERCISES ON CULTURAL RESOURCES IN THE DIXIE AND YANKEE TARGETS, MCMULLEN RANGE, TEXAS

Thank you for your letter dated November 2, 2009, which addresses the Navy's determination of "No Historic Properties Affected" for the Gulf of Mexico Range Training Operations under Section 106 of the National Historic Preservation Act (NHPA), and for your related follow up discussion with the Navy on November 16, 2009 regarding the potential effects of inert bombing (BOMBEX) and gunnery (GUNNEX) exercises on cultural resources in the Dixie and Yankee targets, McMullen Range, Texas. For the purposes of discussion in this letter, the use of the McMullen Range constitutes an undertaking that has the potential to cause effects on historic properties, pursuant to 36 CFR 800.3(a). Pursuant to 36 CFR 800.4(a)(1), the direct impact areas at the Dixie and Yankee targets constitute the respective Areas of Potential Effects (APE) for this undertaking.

The McMullen Range was established in 1965 to provide tactical fighter pilots a training facility for firing munitions. Since its establishment, both the Navy and the Texas Air National Guard have used the Dixie and Yankee targets to train pilots and navigators in the delivery of air-to-ground munitions. Over the past four decades, large numbers of inert ordnance have been expended inside the direct impact areas at each target. Current activities at the Yankee target include expending 'sub-caliber' (e.g. 25 pounds) and full sized (generally 500 pounds) practice bombs that contain small 'spotter' charges, and 20-millimeter air-to-ground gunnery with inert target ammunition. Only sub-caliber practice bombs with inert warheads are approved for the Dixie target. The dropping of non-explosive ordnance only impacts the surface of the ground causing only superficial disturbance to the top layer of soil.

Each target is regularly cleared, grubbed, and swept for the remains of spent ordnance. Due to the rigorous training schedule at the McMullen Range as well as safety and security concerns, archaeological surveys inside the direct impact areas of the Dixie and Yankee targets have never been considered.

Section 110 surveys in the proximal buffer zones at each target have revealed a moderate number of prehistoric surface scatters, many of

5090
EV22NPG
November 18, 2009

SUBJECT: THE EFFECTS OF INERT BOMBING EXERCISES ON CULTURAL RESOURCES IN THE DIXIE AND YANKEE TARGETS, MCMULLEN RANGE, TEXAS

which have been disturbed by natural erosion. Given the numerous impacts that have been incurred inside the APEs, the Navy concludes that any prehistoric surface scatters that may have once existed inside the Dixie and Yankee targets were damaged long ago by Navy activities and natural processes.

As discussed, the Navy will not expand the footprints of the direct impact areas at the Dixie and Yankee targets and it will continue to use the same or similar inert ordnance in all activities at the McMullen Range. Given the certainty that any archaeological remains inside the APEs lack integrity, combined with the conclusion that inert ordnance will not impact deeply buried cultural resources, if present, the Navy concludes that that the continued use of the McMullen Range warrants a finding of No Historic Properties Affected.

Thank you for your attention to this matter. Please return your formal remarks to:

Commander
Naval Facilities Engineering Command, Atlantic
Attention: Mr. R. D. Curfman
6506 Hampton Blvd.
Norfolk, VA 23508-1278

If you require any additional technical information, please contact Len Winter at (904) 542-6861 or e-mail: len.winter@navy.mil. If have any additional questions related to the project, please contact Nora Gluch at (757) 322-4769 or e-mail: nora.gluch@navy.mil.

Thank you for supporting the Navy mission in Texas.

Sincerely,

K. E. Wilson

K. E. WILSON
Environmental Business Line Manager
By direction of the Commander
Acting

Copy to:
COMUSFLTFORCOM (N45)
NAVFAC SE (EV)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND, ATLANTIC
6506 HAMPTON BLVD
NORFOLK VA 23508-1278

IN REPLY REFER TO:
5090
Ser EV22NPG
November 20, 2009

Deputy State Historic Preservation Officer for Review and Compliance
Division of Historical Resources, Bureau of Historical Preservation
Attn: Ms. Laura A. Kammerer
500 South Bronough St, Room 305
Tallahassee, FL 32399-0250

Dear Ms. Kammerer:

Re: SHPO/DHR PROJECT FILE NO. 2009-5905 RESPONSE

Thank you for your response to the Determination of "No Historic Properties Affected" for the Gulf of Mexico Range Complex Training Operations dated September 18, 2009. In order to adequately address the concerns of your office the Navy has provided additional information and clarification for the three areas of interest as stated in your November 5, 2009 letter. These areas include the Panama City Harbor Security Group Machine Gun Range and MINEX Boxes, the Demolition Pond Area, and the Pensacola Hot Box.

Panama City Harbor Security Group Machine Gun Range and MINEX Boxes

The ancient shoreline may have been as much as 70 miles from the present coast, with about half of the land available for Paleo-Indian use. If they existed, older Paleo-Indian sites may have been inundated by sea level rise at the end of the last ice age. The Panama City OPAREA varies in depth from 33 to 984 feet [0 to 0.16 nm] with most of the MINEX boxes and Panama City Harbor Security Group Machine Gun Range located within 25 miles of the current coastline.

Expended machine gun projectiles ('bullets') in the Panama City Harbor Security Group Machine Gun Range would settle to the bottom of the ocean creating little to no disturbance.

Under the Preferred Alternative, no mine warfare would occur in the MINEX boxes. Therefore, there would be no effect on submerged resources.

Demolition Pond Area

The Demolition Pond Area is a natural area that has been greatly altered by dredging and has limited connection with the bay. Surveys of the area surrounding the pond, but not the pond bottom itself, were completed in 1979 and in 1994-1995.

Training conducted inside the NSA Demolition Pond includes 60 Days of salvage diver training, 12 days of EOD tech training, 10 days of security force training, and 8 days of diver training. Each of these training activities consists of the use of various small underwater charges, all less than 5 lbs. Training exercises at the Demolition Pond are confined to the previously disturbed pond area, and, therefore the proposed activities are unlikely to affect any potential archaeological resources. In addition, nearby archaeological resources have been either excavated or stabilized and nearby archaeological sites will not be affected.

Pensacola Hot Box

The proposed training activities within the Hot Box, which is located outside of Florida state waters, which have the potential to disturb the bottom, are the BOMBEX at-sea activities. BOMBEX activities primarily include the use of Non-Explosive Practice Munitions (NEPM), plus one event annually that uses High Explosive (HE) rounds. The HE rounds are designed to detonate within one meter of the surface of the water. Given that the shallowest depth of the Hot Box is approximately 300 ft, any submerged historic vessels would not be affected by the use of HE munitions.

The NEPM, once expended, would travel through the water column and settle on the bottom. However, given the scattered nature of potential wrecks and the size of the Hotbox, the chance of a NEPM settling on a submerged historic vessel would be extremely rare. In addition, the Navy will utilize mitigation measures, such as avoiding known shipwreck locations, to minimize any potential impacts. The Navy anticipates no effects to submerged resources.

We appreciate the State's cooperation in this matter and look forward to working with your agency to resolve your previous questions. We request that within 30 days you provide your views and comments on the additional information and clarifications provided above. If you have any questions, please contact Nora Gluch at (757) 322-4769 or Bruce Larson at (757) 322-4885.

Sincerely,

L. L. Speas

L. L. SPEAS
Environmental Business Line Manager
By direction of the Commander
Acting

Copy to:
USFF (N45)
NAVFAC Southeast (EV)

-----Original Message-----
From: Bill Martin [mailto:Bill.Martin@thc.state.tx.us]
Sent: Tuesday, December 15, 2009 15:52
To: Gluch, Nora CIV NAVFAC Atlantic; Steve Hoyt
Cc: Winter, Len E CIV NAVFAC SE, JAXS; ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY
Subject: RE: Gulf of Mexico Range Complex EIS/OEIS SHPO Consultation Follow-up

I found your letter. I will stamp it Concur and get it in the mail.

-----Original Message-----
From: Gluch, Nora CIV NAVFAC Atlantic [mailto:nora.gluch@navy.mil]
Sent: Tuesday, December 15, 2009 2:31 PM
To: Steve Hoyt
Cc: Bill Martin; Winter, Len E CIV NAVFAC SE, JAXS; ffc.record FLTFORCOM ADMINISTRATIVE RECORD REPOSITORY
Subject: RE: Gulf of Mexico Range Complex EIS/OEIS SHPO Consultation Follow-up

Mr. Hoyt,
Thank you for your response. I have attached the letter dated November 2, 2009 indicating that Texas THC concurred with the Navy's determination of "No Historic Properties Affected" for submerged resources. The letter indicates that the only outstanding questions relate to the terrestrial portion of the range complex (McMullen Range).

Our response to the November 2nd letter dated November 18, 2009 was sent addressed to Mr. Bill Martin as he was listed as the point of contact in the Texas THC reply. I am also attaching a copy of that letter. One of our cultural resources personnel from the Navy's Southeast Region office, Mr. Len Winter, spoke to Mr. Martin on November 16, 2009 regarding the project and the November 2, 2009 letter. Mr. Martin indicated during the discussion that given the nature of the training taking place on the land ranges (non-explosive practice ammunition only) that Texas THC would likely concur with a conclusion of No Historic Properties Affected for the McMullen Range.

I would like to ensure that your agency has all of the information required to make a determination on the matter. If you could point me in the direction of the appropriate person I would greatly appreciate it.
At this juncture in time, given the approaching holidays and our project schedule, a response email indicating concurrence would suffice for our purposes. If necessary, a formal reply could follow. I am grateful for your assistance in this matter. Feel free to contact me via phone
757-322-4769 as I would to get this resolved as quickly and easily as possible.

Thank you,
Nora

Nora Gluch
Natural Resources Specialist
Naval Facilities Engineering Command Atlantic
6506 Hampton Blvd. Bldg A
Norfolk, VA 23508

Phone: 757-322-4769
Fax: 757-322-4894

-----Original Message-----
From: Steve Hoyt [mailto:Steve.Hoyt@thc.state.tx.us]
Sent: Tuesday, December 15, 2009 11:55
To: Gluch, Nora CIV NAVFAC Atlantic
Cc: Bill Martin
Subject: Gulf of Mexico Range Complex EIS/OEIS SHPO Consultation Follow-up

Ms. Gluch,

Bill Martin forwarded your email regarding this project to me as I was the original reviewer back in 2007 when the GOMEX review came through.
I have searched through our electronic database and the only GOMEX project I find is that original document received on 9/11/2007. As I recall, I did not have any concerns regarding impacts to submerged cultural resources in the Gulf of Mexico at that time. I am having the record for that review pulled to confirm my memory. If there was an aspect of the project that involved possible cultural resources on land, then another reviewer would have looked at it as well since I only deal with submerged resources. From your email, it sounds as if additional information was requested by us to which you responded in your letter of November 18 2009. I do not recall having seen that letter. Can you email a copy directly to me and I will either sort it out myself or figure out who it needs to look at it.

Thanks for your help.

Steve

Steven D. Hoyt, MA
State Marine Archeologist
Archeology Division
Texas Historical Commission
PO Box 12276
Austin, TX 78711-2276
512-927-7882
fax 512-927-9797
www.thc.state.tx.us <http://www.thc.state.tx.us>

From: Gluch, Nora CIV NAVFAC Atlantic [mailto:nora.gluch@navy.mil]
Sent: Monday, December 14, 2009 8:55 AM
To: Bill Martin
Subject: Gulf of Mexico Range Complex EIS/OEIS SHPO Consultation Follow-up

Mr. Martin,
I am the project manager for the Navy's Gulf of Mexico Range Complex

(GOMEX) EIS/OEIS. I just wanted to touch base with you to ensure that our response letter November 18, 2009 adequately addressed all of your concerns regarding the GOMEX EIS/OEIS project and to determine when we can anticipate your reply. Please feel free to contact me if you have any additional question or need additional information. The Navy appreciates your cooperation on this project.

Thank you for your time,

Nora Gluch
Natural Resources Specialist
Naval Facilities Engineering Command Atlantic
6506 Hampton Blvd. Bldg A
Norfolk, VA 23508
Phone: 757-322-4769
Fax: 757-322-4894

FLORIDA DEPARTMENT OF STATE
Kurt S. Browning
Secretary of State
DIVISION OF HISTORICAL RESOURCES

December 18, 2009

L.L. Speas
Department of the Navy
Naval Facilities Engineering Command, Atlantic
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

Re: 5090 – Ser EV22NPG
SHPO/DHR Project File No: 2009-5905B
Response Received: November 23, 2009
Gulf of Mexico Range Complex Training Operations
Technical Memorandum – Submerged Cultural Resource Predictive Model for the Gulf of Mexico Range Complex

Dear L. L. Speas:

Thank you for your response to our letter dated November 5, 2009. This office reviewed and reevaluated the referenced training operations. The information provided has satisfactorily answered our questions and eliminated concerns regarding impacts to archaeological resources. Please be sure that all training activity supervisors are instructed about the process for handling the chance discovery of unexpected cultural resources in areas of archaeological sensitivity, particularly around the Panama City Demolition Pond area, a natural freshwater pond.

This office concurs with the Navy's finding of "no historic properties affected. If you have any questions, do not hesitate to contact me. The telephone number is 850-245-6333, or I can be reached at lkammerer@dos.state.fl.us.

Sincerely,

Laura A. Kammerer

Laura A. Kammerer
Deputy State Historic Preservation Officer
For Review and Compliance

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APPENDIX H
OVERVIEW OF AIRBORNE AND UNDERWATER ACOUSTICS

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APPENDIX H
OVERVIEW OF AIRBORNE AND UNDERWATER ACOUSTICS

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H.1 INTRODUCTION

This appendix provides additional information on the characteristics of in-air and underwater noise. Sound transmission characteristics are different for sounds in air versus sounds in water. Similarly, sound reception sensitivities vary for in-air sound and in-water sound. Therefore, this appendix is divided into two major subsections: Airborne Noise Characteristics and Underwater Noise Characteristics. A third subsection describes sound transmission through the air-water interface. Underwater ambient noise is partially a result of sound sources that occur outside the GOMEX Range Complex. However, for the purposes of this Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), the region of influence for underwater noise is limited to airborne and underwater sound sources that occur primarily within the GOMEX Range Complex boundaries.

H.2 AIRBORNE NOISE CHARACTERISTICS

Primary sources of airborne noise in the GOMEX Range Complex include aircraft and their weapons and naval gunfire. Throughout this section, the F/A-18 aircraft is used to represent typical jet aircraft that operate in the GOMEX Range Complex. For the purpose of noise characterization airborne ordnance are essentially small-scale aircraft.

Two distinct types of noise may result from aircraft operations. When an aircraft flies slower than the speed of sound or subsonically, noise is produced by the aircraft's engine and by effects of aircraft movement through air. When an aircraft flies faster than the speed of sound, a sharply defined shock front is created, producing a distinct phenomenon called "overpressure." Noise produced by this physical phenomenon is termed "impulse noise." Thunder claps, noise from explosions, and sonic booms are examples of impulse noise. Airborne noise that originates in higher altitudes is seldom heard on the ground. This is due to the upward bending of sound that takes place in temperature inversions, where the surface temperature is warmer than the temperature at the higher altitude of the sound source. The characteristics of subsonic and supersonic noise are discussed below.

H.2.1 SUBSONIC NOISE

The physical characteristics of noise (or sound) include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces pressure waves that travel through a medium, like air or water, and are sensed by the eardrum. This may be likened to ripples in water that would be produced when a stone is dropped into it. As acoustic energy increases, the intensity or height of these pressure waves increases, and the ear senses louder noise. The ear is capable of responding to an enormous range of sound levels, from that of a soft whisper to the roar of a rocket engine.

Units of Measurement

The range of sound levels humans are capable of hearing is very large. If the faintest sound level recognized (threshold of hearing) is assigned a value of one, then the highest level capable of being heard (threshold of pain), measured on the same scale, would have a value of 10 million. To make this large range of values more meaningful, a logarithmic mathematical scale is used: the decibel [dB] scale. On this scale, the lowest level audible to humans is 0 dB and the threshold of pain is approximately 140 dB. The reference level for the decibel scale used to describe airborne sound is, thus, the threshold of hearing (for young adults). In physical terms, this corresponds to a sound pressure of 20 micro Pascals (μPa). Atmospheric pressure is about 100,000 Pa.

Noise Measurement (weighting)

The normal human ear can detect sounds that range in frequency from about 20 cycles per second (or Hertz (Hz)) to 15,000 Hz. However, all sounds throughout this range are not heard equally well.

Figure H.1 shows the in-air hearing threshold curve (audiogram) for humans. The human ear is most sensitive at 1 to 4 kilohertz (kHz).

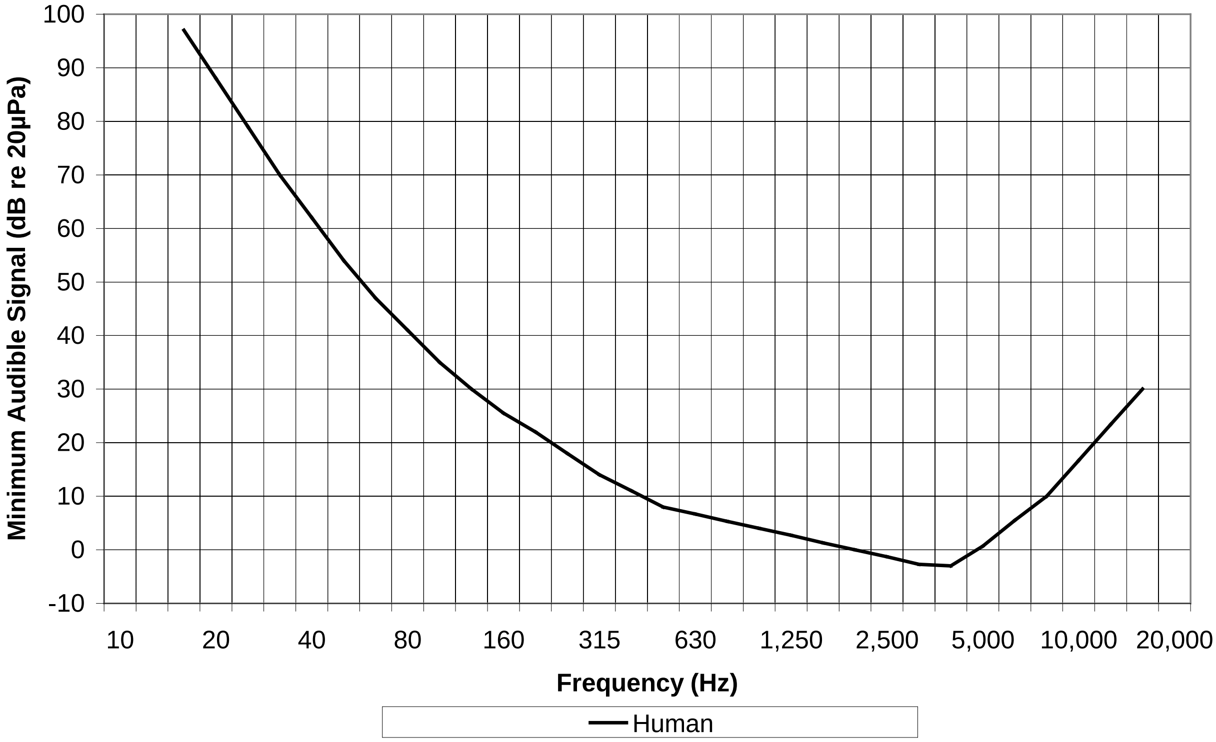


Figure H.1 Human In-Air Hearing Threshold

Sound level meters have been developed to measure sound fields and to show the sound level as a number proportional to the overall sound pressure as measured on the logarithmic scale described previously. This is called the sound pressure level. It is often useful to have this meter provide a number that is directly related to the human sensation of loudness. Therefore, some sound meters are calibrated to emphasize frequencies in the 1 to 4 kHz range and to de-emphasize higher and especially lower frequencies to which humans are less sensitive. Sound level measurements obtained with these instruments are termed “A-weighted” (expressed in dBA). The A-weighting function is shown in Figure H.2. It is closely related to the human hearing characteristic shown previously in Figure H.1. Because other animals are sensitive to a different range of frequencies, various other weighting protocols may be more appropriate when their specific hearing characteristics are known. Alternative measurement procedures such as C-weighting or flat-weighting (unweighted), which do not de-emphasize lower frequencies, may be more appropriate for various animal species such as the baleen whale.

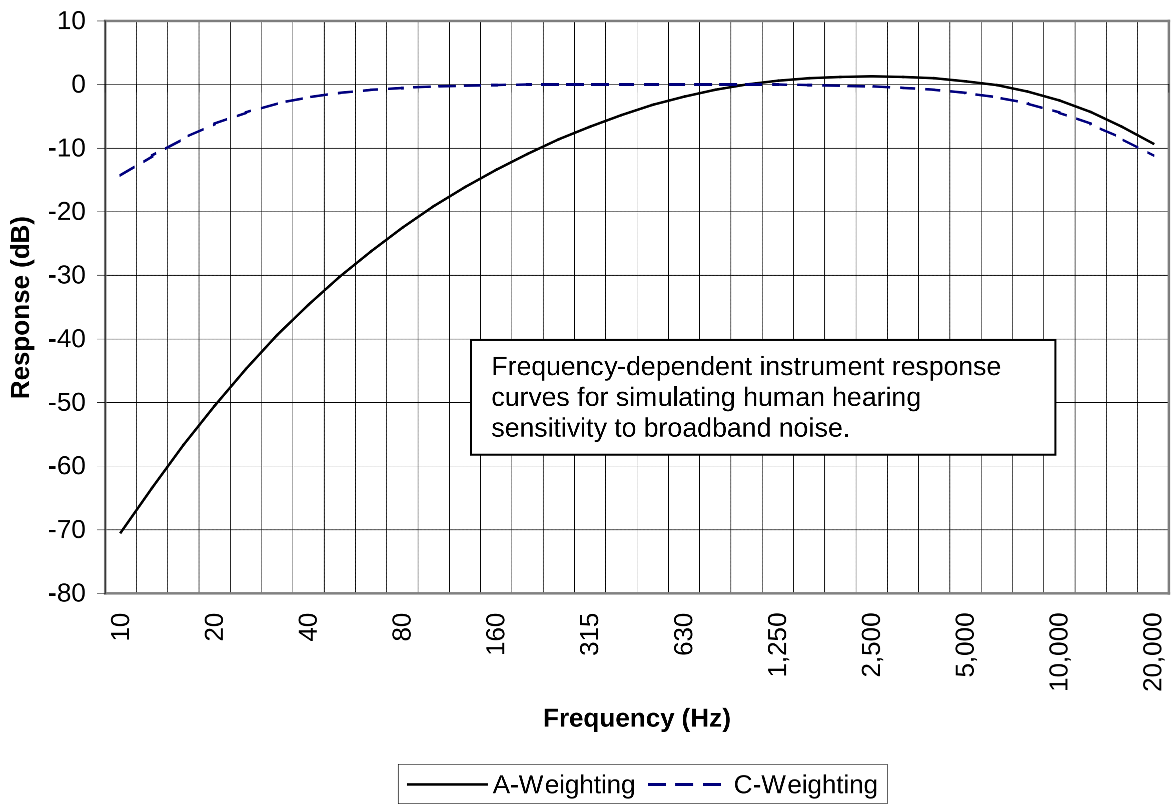


Figure H.2 Noise Weighting Characteristics

Although sound is often measured with instruments that record instantaneous sound levels in dB, the duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. With these measurements, sound levels for individual noise events and average sound levels, in decibels, over extended periods of hours, days, months, or years can be calculated (e.g., the daily day-night average sound level [L_{dn}] in dB).

Sound Exposure Level (Single Noise Event)

The sound exposure level (SEL) measurement provides a means of describing a single, time varying, noise event. It is useful for quantifying events such as an aircraft overflight, which includes the approach when noise levels are increasing, the instant when the aircraft is directly overhead with maximum noise level, and the period of time while the aircraft moves away with decreasing noise levels. SEL is a measure of the physical energy of a noise event, taking into account both intensity (loudness) and duration. SEL is based on the sounds received during the period while the level is above a specified threshold that is at least 10 dB below the maximum value measured during a noise event. SEL is usually determined on an A-weighted basis, and is defined as the constant sound level that provides the same amount of acoustic exposure in one second as the actual time-varying level for the exposure duration. It can also be expressed as the one-second averaged equivalent sound level (L_{eq} 1 sec).

Table H.1 provides a brief comparison of A-weighted, C-weighted, and flat SEL (F-SEL) values for military aircraft operating at various altitudes and power settings. By definition, SEL values are normalized to a reference time of 1 second and should not be confused with either the average or maximum noise levels associated with a specific event. There is no general relationship between the SEL value and the maximum decibel level measured during a noise event. By definition, SEL values exceed the maximum decibel level where noise events have durations greater than one second. For subsonic aircraft overflights, maximum noise levels are typically 5 to 7 dB below SEL values.

Table H.1 SEL Comparison for Select Department of Defense Aircraft (in dB)

	P-3			F/A-18		
Power Setting	2000 ESHP			88% RPM		
Speed (knots)	180			400		
Altitude	**A-SEL**	**C-SEL**	**F-SEL**	**A-SEL**	**C-SEL**	**F-SEL**
2,500 feet	83.5	88.4	88.4	91.3	95.3	95.2
2,000 feet	85.6	90.0	90.0	93.7	97.4	97.3
1,600 feet	87.7	91.6	91.6	96.0	99.4	99.4
1,000 feet	91.7	94.7	94.7	100.2	103.2	103.2
500 feet	97.2	99.2	99.3	105.9	108.5	108.5
315 feet	100.6	102.2	102.2	109.3	111.7	111.8
200 feet	103.9	105.1	105.2	112.5	114.8	114.9

ESHP – effective shaft horsepower
RPM – revolutions per minute

Day-Night Average Sound Level

The day-night average sound level (L_{dn} or DNL[1]) is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by summation and averaging of SEL values for a given 24-hour period. DNL is the preferred noise metric of the U.S. Department of Housing and Urban Development, Federal Aviation Administration, U.S. Environmental Protection Agency, and Department of Defense insofar as potential effects of airborne sound on humans are concerned.

People are constantly exposed to noise. Most people are exposed to average sound levels of 50 to 55 L_{dn} or higher for extended periods on a daily basis. Normal conversational speaking produces received sound levels of approximately 60 dBA. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor average sound levels below 65 L_{dn} (Federal Aviation Administration, 1985).

DNL considers noise levels of individual events that occur during a given period, the number of events, and the times (day or night) at which events occur. Since noise is measured on a logarithmic scale, louder noise events dominate the average. To illustrate this, consider a case in which only one aircraft flyover occurs in daytime during a 24-hour period, and creates a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The calculated sound level for this 24-hour period is 65.5 L_{dn}. To continue the example, assume that 10 such overflights occur during daytime hours during the next 24-hour period, with the same 50 dB ambient sound level during the remaining 23 hours and 55 minutes. The calculated sound level for this 24-hour period is 75.4 L_{dn}. Clearly, the averaging of noise over a given period does not suppress the louder single events.

In calculating DNL, noise associated with aircraft operations is considered, and a 10 dB penalty is added to operations that occur between 10:00 p.m. and 7:00 a.m.; this time period is considered nighttime for the purposes of noise modeling. The 10 dB penalty is intended to compensate for generally lower background noise levels and increased human annoyance associated with noise events occurring between the hours of 10:00 p.m. and 7:00 a.m.

[1] L_{dn} is the formula version of the Day-Night Average Sound Level metric and DNL is normally used in text.

While DNL does provide a single measure of overall noise, it does not provide specific information on the number of noise events or specific individual sound levels that occur. For example, as explained above, a DNL of 65 dB could result from very few, but very loud events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent total sound exposure. Scientific studies and social surveys have found DNL to be the best measure to assess levels of human annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (U.S. Environmental Protection Agency, 1974; Federal Interagency Committee on Urban Noise, 1980; Federal Interagency Committee on Noise, 1992).

Onset-Rate Adjusted Day-Night Average Sound Level

Aircraft operating at low altitude and in special use airspace generate noise levels different from other community noise environments. Overflights can be sporadic, which differ from most community environments where noise tends to be continuous or patterned.

Military overflight events also differ from typical community noise events because of the low altitude and high airspeed characteristics of military aircraft. These characteristics can result in a rate of increase in sound level (onset rate) of up to 30 dB per second. To account for the random and often sporadic nature of military flight activities, computer programs calculate noise levels created by these activities based on a monthly, rather than a daily, period. The DNL metric is adjusted to account for the surprise, or startle effect, of the onset rate of aircraft noise on humans. Onset rates above 30 dB per second require an 11 dB penalty because they may cause a startle associated with the rapid noise increase. Onset rates from 15 to 30 dB per second require an adjustment of 0 to 11 dB. Onset rates below 15 dB per second require no adjustment because no startle is likely. The adjusted L_{dn} is designated as onset-rate adjusted monthly day-night average sound level (L_{dnmr}).

H.2.2 SUPERSONIC NOISE

A sonic boom is the noise a person, animal, or structure on the earth's surface receives when an aircraft or other type of air vehicle flies overhead faster than the speed of sound (or supersonic). The speed of sound is referred to as Mach 1. This term, instead of a specific velocity, is used because the speed at which sound travels varies for different temperatures and pressures. For example, the speed of sound in air at standard atmospheric conditions at sea level is about 772 statute miles per hour, or 1,132 feet per second (fps). However, at an altitude of 25,000 feet, with its associated lower temperature and pressure, the speed of sound is reduced to 1,042 fps (approximately 710 miles per hour). Thus, regardless of the absolute speed of the aircraft, when it reaches the speed of sound in the environment in which it is flying, its speed is Mach 1.

Air reacts like a fluid to supersonic objects. When an aircraft exceeds Mach 1, air molecules are pushed aside with great force, forming a shock front much like a boat creates a bow wave. All aircraft generate two shock fronts. One is immediately in front of the aircraft; the other is immediately behind it. These shock fronts "push" a sharply defined surge in air pressure in front of them. When the shock fronts reach the ground, the result is a sonic boom. Actually, a sonic boom involves two very closely spaced impulses, one associated with each shock front. Most people on the ground cannot distinguish between the two and they are usually heard as a single sonic boom. However, the paired sonic booms created by vehicles that are the size and mass of the space shuttle are very distinguishable, and two distinct booms are easily heard.

Sonic booms differ from most other sounds because: (1) they are impulsive; (2) there is no warning of their impending occurrence; and (3) the peak levels of a sonic boom are higher than those for most other types of outdoor noise. Although air vehicles exceeding Mach 1 always create a sonic boom, not all sonic booms are heard on the ground. As altitude increases, air temperature normally decreases, and these layers of temperature change cause the shock front to be turned upward as it travels toward the ground. Depending on the altitude of the aircraft and the Mach number, the shock fronts of many sonic booms are bent upward sufficiently that they never reach the ground. This same phenomenon also acts to limit the width (area covered) of those sonic booms that actually do reach the ground.

Sonic booms are sensed by the human ear as an impulsive (sudden or sharp) sound because they are caused by a sudden change in air pressure. The change in air pressure associated with a sonic boom is generally a few pounds per square foot, which is about the same pressure change experienced riding an elevator down two or three floors. It is the rate of change - the sudden onset of the pressure change - that makes the sonic boom audible. The air pressure in excess of normal atmospheric pressure is referred to as "overpressure." It is quantified on the ground by measuring the peak overpressure in pounds per square foot (psf) and the duration of the boom in milliseconds. The overpressure sensed is a function of the distance of the aircraft from the observer; the shape, weight, speed, and altitude of the aircraft; local atmospheric conditions; and location of the flight path relative to the surface. The maximum overpressures normally occur directly under the flight track of the aircraft and decrease as the slant range, or distance, from the aircraft to the receptor increases. Supersonic flights for a given aircraft type at high altitudes typically create sonic booms that have low overpressures but cover wide areas.

The noise associated with sonic booms is measured on a C-weighted scale (as shown previously in Figure H.2). C-weighting provides less attenuation at low frequencies than A-weighting. This is appropriate based on the human auditory response to the low frequency sound pressures associated with high-energy impulses (such as those generated by sonic booms).

H.2.3 AIRBORNE NOISE EFFECTS ON WILDLIFE

The previous discussion primarily concerned the metrics that have been developed to predict human response to various noise spectral and temporal characteristics. Response prediction metrics for non-human species such as marine mammals are generally not available, except in a limited form for a few examples such as gray and humpback whales, whose responses to industrial noise playbacks and vessel traffic have been studied. Some studies of response to impulse noise in the form of air gun signals have also been made. Those sounds are underwater sounds. Although several studies of pinniped response to airborne noise and sonic booms from aircraft and missile flyovers have been made, few sound exposure data have been reported.

Because of the limited amount of response data available for marine mammals, it is not possible to develop total sound exposure metrics similar to those applied to human population centers. Instead, the potential impacts of noise sources in the GOMEX Range Complex need to be assessed by examining individual source-receiver encounter scenarios typical of range operations.

A wide variety of noise sources must be considered in assessing the potential impact of airborne noise sources in the GOMEX Range Complex on non-human species. It is necessary to provide an overall sound level measure that is proportional to the sound level perceived by a given species. This facilitates the application of sound level criteria based on potential avoidance behavior, potential temporary threshold shift, or some other appropriate response (refer to Section 3.7 of the EIS/OEIS, Marine Mammals). A weighting function related to the hearing characteristics of a specific species is required, analogous to the A-weighting used for human response prediction.

H.2.4 AMBIENT NOISE

Ambient noise is the background noise at a given location. Airborne ambient noise can vary considerably depending on location and other factors, such as wind speed, temperature stratification, terrain features, vegetation, and the presence of distant natural or man-made noise sources.

In predicting human response to loud airborne noise sources, it is reasonable to assume that ambient background noise would have little or no effect on the calculated noise levels since the ambient levels would add insignificant fractions to calculated values. Therefore, ambient background noise is not considered in noise calculations.

Ambient noise may have a more significant effect on prediction of marine mammal response to loud airborne noise sources. Marine mammals are exposed to a wide range of ambient sounds ranging from the loud noise of nearby wave impacts to the quiet of remote areas during calm wind conditions. The ambient noise background on beaches is strongly influenced by surf noise. Some examples of airborne noise levels in human and marine mammal habitat are given in Table H.2.

It should be noted that the characteristics of subsonic noise, which is measured on an A-weighted scale, and supersonic noise, which is measured on a C-weighted scale, are different. Therefore, each is calculated separately, and it would be incorrect to add the two values together. Nevertheless, both subsonic and supersonic noises occur in the GOMEX Range Complex. Together, they form the cumulative acoustic environment in the region. Therefore, each is addressed where applicable in this EIS/OEIS.

Table H.2 Representative Airborne Noise Levels

Source of Noise	dBA re 20 µPa
F/A-18 at 1,000 feet (Cruise Power)	98
Helicopter at 200 feet (UH-1N)	91
Car at 25 feet (60 mph) [1]	70 – 80
Light Traffic at 100 feet [1]	50 – 60
Quiet Residential (daytime) [1]	40 – 50
Quiet Residential (night) [1]	30 – 40
Wilderness Area [1]	20 – 30
Offshore (low sea state) [2]	40 – 50
Surf [2]	60 – 70

[1] Kinsler, et al., 1982.
[2] U.S. Coast Guard, 1960.

H.3 SOUND TRANSMISSION THROUGH THE AIR-WATER INTERFACE

Many of the sound sources considered in this EIS/OEIS are airborne vehicles, but a significant portion of the concern about noise impacts involves marine animals at or below the surface of the water. Thus, transmission of airborne sound into the ocean is given consideration. This section describes some basic characteristics of air-to-water transmission of sound for both subsonic and supersonic sources.

H.3.1 SUBSONIC SOURCES

Sound is transmitted from an airborne source to a receiver underwater by four principal means: (1) a direct path, refracted upon passing through the air-water interface; (2) direct-refracted paths reflected from the bottom in shallow water; (3) lateral (evanescent) transmission through the interface from the airborne sound field directly above; and (4) scattering from interface roughness due to wave motion.

Several papers are available in the literature concerning transmission of sound from air into water. Urick (1972) presents a discussion of the effect and reports data showing the difference in the underwater signature of an aircraft overflight for deep and shallow conditions. The study includes analytic solutions for both the direct and lateral transmission paths and presents a comparison of the contributions of these paths for near-surface receivers. Young (1973) presents an analysis which, while directed at deep-water applications, derived an equivalent dipole underwater source for an aircraft overflight that can be used for direct path underwater received level estimates. A detailed description of air-water sound transmission is given in Richardson, *et al.* (1995). The following is a short summary of the principal features.

Figure H.3 shows the general characteristics of sound transmission through the air-water interface. Sound from an elevated source in air is refracted upon transmission into water because of the difference in sound speeds in the two media (a ratio of about 0.23). Because of this difference, the direct sound path is totally reflected for grazing angles less than 77°, i.e., if the sound reaches the surface at an angle more than 13° from vertical. For smaller grazing angles, sound reaches an underwater observation point only by scattering from wave crests on the surface, by non-acoustic (lateral) pressure transmission from the surface, and from bottom reflections in shallow water. As a result, most of the acoustic energy transmitted into the water from a source in air arrives through a cone with a 26° apex angle extending vertically downward from the airborne source. For a moving source, the intersection of this cone with the surface traces a "footprint" directly beneath the path of the source, with the width of the footprint being a function of the altitude of the source. To a first approximation, it is only the sound transmitted within this footprint that can reach an underwater location by a direct-refracted path. Because of the large difference in the acoustic properties of water and air, the pressure field is actually doubled at the surface of the water, resulting in a 6 dB increase in pressure level at the surface. Within the direct-refracted cone, the in-air sound transmission paths are affected both by geometric spreading and by the effects of refraction.

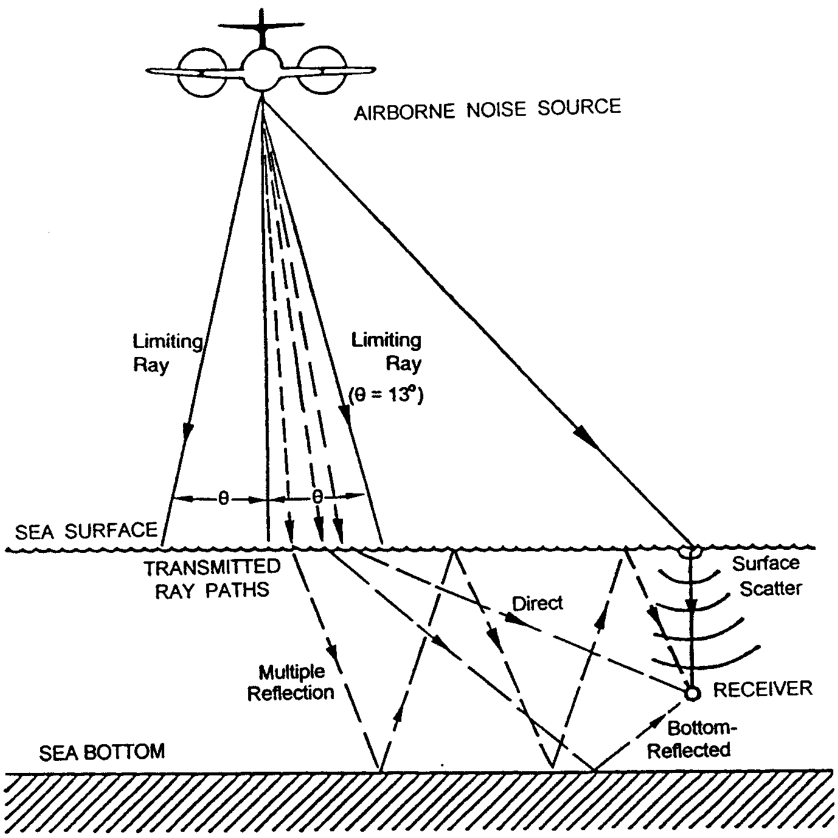


Figure H.3 Characteristics of Sound Transmission through Air-Water Interface

In shallow water within the direct transmission cone, the directly transmitted sound energy is generally greater than the energy contribution from bottom-reflected paths. At horizontal distances greater than the water depth, the energy transmitted by reflected paths becomes dominant, especially in shallow water. The ratio of direct to reverberant energy depends on the bottom properties. For hard bottom conditions the reverberant field persists for longer ranges than the direct field. However, with increasing horizontal distance from the airborne source, underwater sound diminishes more rapidly than does the airborne sound.

Near the surface, the laterally transmitted pressure from the airborne sound is transmitted hydrostatically underwater. Beyond the direct transmission cone this component can produce higher levels than the underwater-refracted wave. However, the lateral component is very dependent on frequency and thus on acoustic wavelength. The level received underwater is 20 dB lower than the airborne sound level at a depth equal to 0.4 wavelength.

For this application, it is necessary to have an analytical model to predict the total acoustic exposure level experienced by marine mammals near the surface and at depth near the path of an aircraft overflight. Malme and Smith (1988) describe a model to calculate the acoustic energy at an underwater receiver in shallow water, including the acoustic contributions of both the direct sound field (Urick, 1972) and a depth-averaged reverberant sound field (Smith, 1974).

In the present application, the Urick (1972) analysis for the lateral wave field was also included to predict this contribution. The paths of most concern for this application are the direct-refracted path and the lateral path. These paths will likely determine the highest sound level received by mammals located nearly directly below a passing airborne source and mammals located near the surface, but at some distance away from the source track. In shallow areas near shore, bottom-reflected acoustic energy will also contribute to the total noise field, but it is likely that the direct-refracted and lateral paths will make the dominant contributions.[2]

Figure H.4 shows an example of the model prediction for a representative source-receiver geometry. The transmission loss (TL) for the direct-refracted wave, the lateral wave, and their resultant energy-addition total is shown. Directly under the aircraft, the direct-refracted wave is seen to have the lowest TL. For the shallowest receiver at a 3-foot depth, the lateral wave is seen to become dominant at about a horizontal range of 40 feet. Beyond this point the underwater level is controlled by the sound level in the air directly above the receiver and follows the same decay slope with distance. For the deeper receiver at 10 feet, the lateral wave does not become dominant until the horizontal range is about 130 feet. When sound reaches the receiver via the direct-refracted path, it decays at about 12 dB/distance doubled (dd), consistent with a surface dipole source. In contrast, when the sound reaches the receiver via the lateral path, it decays at about 6 dB/dd, consistent with the airborne monopole source. Underneath the aircraft, the drop in sound level with depth change from 3 to 10 feet is only about 2 dB, but beyond about 200 feet, a 12 dB drop occurs for the same change in depth.

[2] The bottom-reflected reverberant sound field section of this model for nearshore applications requires detailed knowledge of bottom slope and bottom composition. In view of the requirements of this application, this level of detail is not appropriate and the reflected path subroutine was not used.

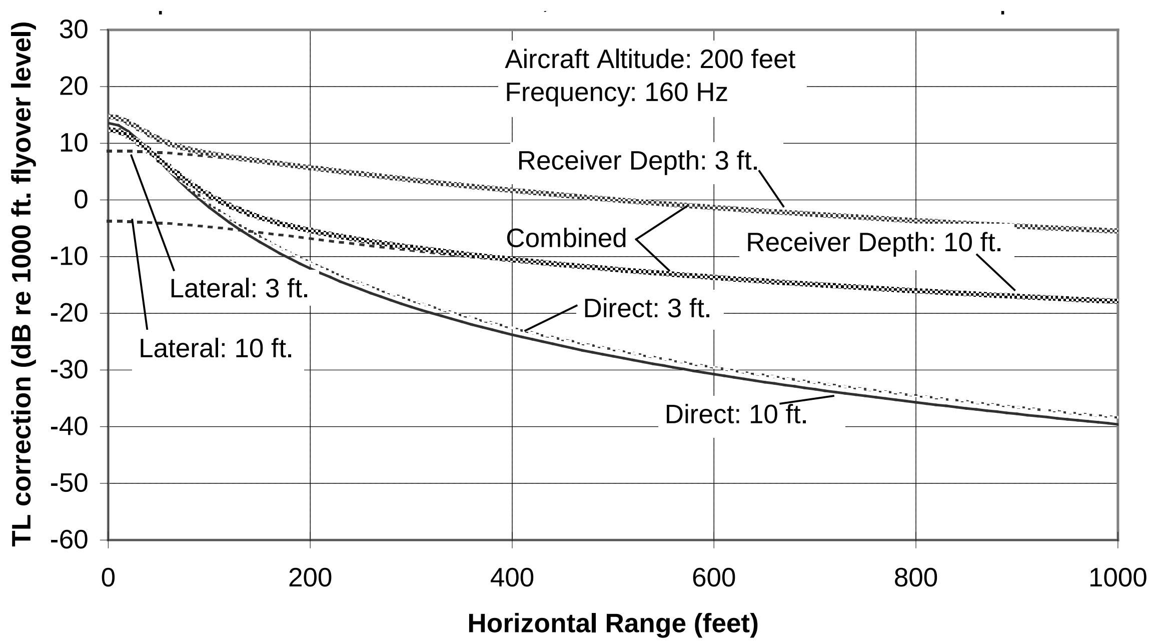


Figure H.4 Transmission of Loss of Noise through Air-Water Interface, Comparison of Direct-Refracted, Lateral and Combined TL Component

Figures H.5A-C illustrate the interaction between the various parameters for different sets of variables. For clarity, only the total transmission loss curves are shown in these figures. Figure H.5A shows the influence of frequency (wavelength) change on transmission loss. Here the loss at a depth of 3 feet can be seen to increase significantly with frequency in the region where the lateral wave is dominant. Thus, marine mammals near the surface will benefit from high frequency attenuation when they are not directly below the source track. Figure H.5B shows the change in TL with receiver depth for low frequency sound. Near the source track, a 6 dB drop in level occurs for a change in depth from 1 to 30 feet, but beyond a horizontal range of 200 feet, there is a 20 to 30 dB drop in level for the same change in receiver depth. Note, however, that for an increase in depth from 30 to 300 feet, the received level increases because of the effective source directionality. Figure H.5C shows the effect of increasing the aircraft altitude. In this case the region near the source track is affected the most with about a 38 dB drop in level for an altitude change of 50 feet to 5,000 feet. At a horizontal range of 200 feet, this drop is about 20 dB, with a decrease to 15 dB at 500 feet.

For a passing airborne source, received level at and below the surface diminishes with increasing source altitude, but the duration of exposure increases. The maximum received levels at and below the surface are inversely proportional to source altitude, but total noise energy exposure is inversely proportional to the product of source altitude and speed because of the link between altitude and duration of exposure.

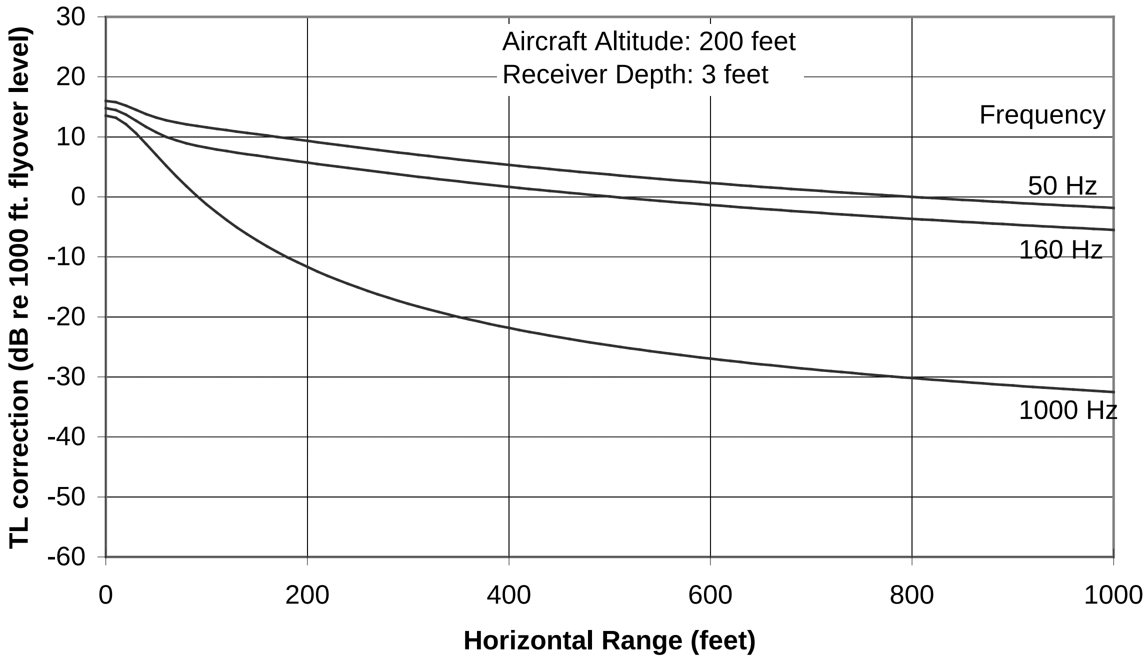


Figure H.5A Air-Water Transmission Loss vs. Frequency

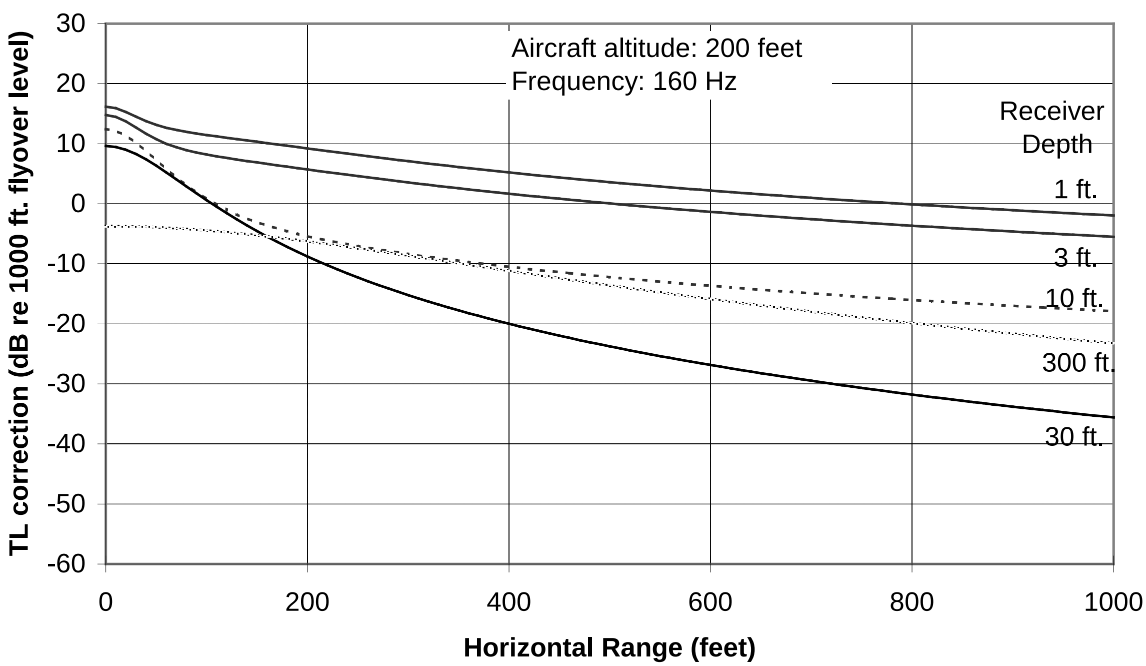


Figure H.5B Air-Water Transmission Loss vs. Receiver Depth

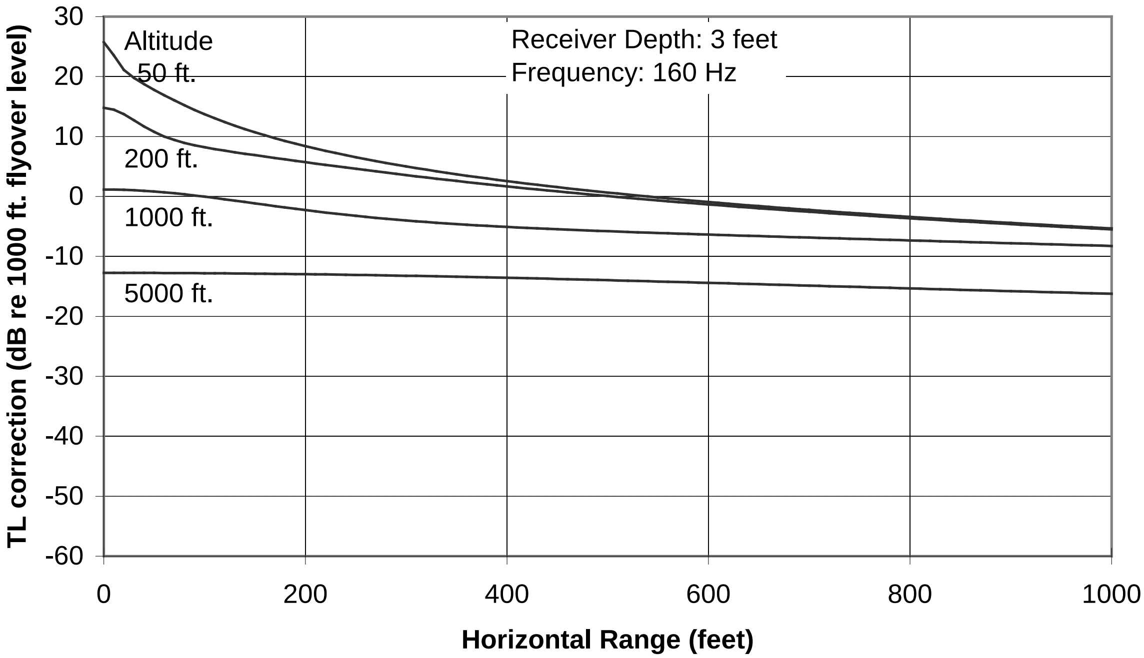


Figure H.5C Air-Water Transmission Loss vs. Aircraft Altitude

H.3.2 SUPERSONIC SOURCES

The sonic boom footprint produced by a supersonic aircraft in level flight at constant speed traces a hyperbola on the sea surface. The apex of the hyperbola moves at the same speed and direction as the aircraft with the outlying arms of the hyperbola traveling at increasing oblique angles and slower speeds until the boom shock wave dissipates into a sonically propagating pressure wave at large distances from the flight path. The highest boom overpressures at the water surface are produced directly below the aircraft track. In this region the pressure-time pattern is described as an "N-wave" because of its typical shape. Aircraft size, shape, speed, and altitude determine the peak shock pressure and time duration of the N-wave. The incidence angle of the N-wave on the water surface is determined by the aircraft speed, i.e., for Mach 2 the incidence angle is 45°. Thus, for air vehicles in level flight at speeds less than about Mach 4.3, the N-wave is totally reflected from the surface. Dives and other maneuvers at supersonic speeds of less than Mach 4.3 can generate N-waves at incidence angles that are refracted into the water, but the water source regions affected by these transient events are limited. Since the aircraft, missiles, and targets used in range activities generally operate at less than Mach 4.3, sonic boom penetration into the water from these sources occurs primarily by lateral (evanescent) propagation. Analyses by Sawyers (1968) and Cook (1969) show that the attenuation rate (penetration) of the boom pressure wave is related to the size, altitude, and speed of the source vehicle. The attenuation of the N-wave is not related to the length of the signature in the simple way that the lateral wave penetration from subsonic sources is related to the dominant wavelength of their signature. Specific examples will be given for the supersonic vehicles used in range tests as appropriate in this EIS/OEIS.

H.4 UNDERWATER NOISE CHARACTERISTICS

Many of the general characteristics of sound and its measurement were discussed in the introduction to airborne noise characteristics. This section expands on this introduction to summarize the properties of underwater noise that are relevant to understanding the effects of noise produced by range activities on the underwater marine environment in the GOMEX Range Complex area. Since the effect of underwater noise on human habitat is not an issue (except perhaps for divers), the primary environmental concern that is addressed is the potential impact on marine mammals.

H.4.1 UNITS OF MEASUREMENT

The reference level for airborne sound is 20 μPa, consistent with the minimum level detectable by humans. For underwater sound, a reference level of 1 μPa is used because this provides a more convenient reference and because a reference based on the threshold of human hearing in air is irrelevant. For this reason, as well as the different propagation properties of air and water, it is not meaningful to compare the levels of sound received in air (measured in dB re 20 μPa) and in water (in dB re 1 μPa) without adding the 26 dB correction factor to the airborne sound levels.

H.4.2 SOURCE CHARACTERISTICS

The most significant range-related sources of underwater noise operating on the GOMEX Range Complex are the ships used in Anti-Submarine Warfare (ASW) exercises[3]. Because of their slow speed compared to most of the airborne sources considered in the last section, they can be considered to be continuous sound sources. The primary underwater transient sound sources in the GOMEX Range Complex are naval gunfire, aircraft-delivered bombs and gunfire, and water surface impacts from falling debris. All sources are subsonic or stationary in water. While supersonic underwater shock waves are produced at short ranges by underwater explosions, no sources operate at supersonic speeds in water.

H.4.3 UNDERWATER SOUND TRANSMISSION

Airborne sources transmit most of their acoustic energy to the surface by direct paths that attenuate sound energy by spherical divergence (spreading) and molecular absorption. For sound propagating along oblique paths relative to the ground plane, there may also be attenuation (or amplification) by refraction (bending) from sound speed gradients caused by wind and temperature changes with altitude. There may also be multipath transmission caused by convergence of several refracted and reflected sound rays, but this is generally not important for air-to-ground transmission. However, for underwater sound, refracted and multipath transmission is often more important than direct path transmission, particularly for high-power sound sources capable of transmitting sound energy to large distances.

A surface layer sound channel often enhances sound transmission from a surface ship to a shallow receiver in tropical and mid-latitude deep-water areas. This channel is produced when a mixed isothermal surface layer is developed by wave action. An upward refracting sound gradient, produced by the pressure difference within the layer, traps a significant amount of the sound energy within the layer. (Sound travels faster with increasing depth.) This results in cylindrical rather than spherical spreading. This effect is particularly observable at high frequencies where the sound wavelengths are short compared to the layer depth. When the mixed layer is thin or not well defined, the underlying thermocline may extend toward the surface, resulting in downward refraction at all frequencies and a significant increase in transmission loss at shorter ranges where bottom reflected sound energy is normally less than the directly transmitted sound component.

In shallow water areas sound is trapped by reflection between the surface and bottom interfaces. This often results in higher transmission loss than in deep water because of the loss that occurs with each reflection, especially from soft or rough bottom material. However, in areas with a highly reflective bottom, the transmission loss may be less than in deep water areas since cylindrical spreading may occur.

[3] For more information on underwater noise analysis related to ASW exercises, please see the Navy's Atlantic Fleet Active Sonar Training EIS/OEIS available at: http://afasteis.gcsaic.com/.

The many interacting variables involved in prediction of underwater transmission loss have led to the development of analytical and computer models. One or more of these models will be used in analyzing the potential impact of the underwater noise sources in the range areas.

H.4.4 UNDERWATER AMBIENT NOISE

Above 500 Hz, deep ocean ambient noise is produced primarily by wind and sea state conditions. Below 500 Hz, the ambient noise levels are strongly related to ship traffic, both near and far. In shallow water near continents and islands, surf noise is also a significant factor. Wenz (1962) and Urick (1983) are among many contributors to the literature on underwater ambient noise. Figure H.6, based on these two sources, was adapted by Malme, *et al*. (1989) to show ambient noise spectra in 1/3-octave bands for a range of sea state and ship traffic conditions.

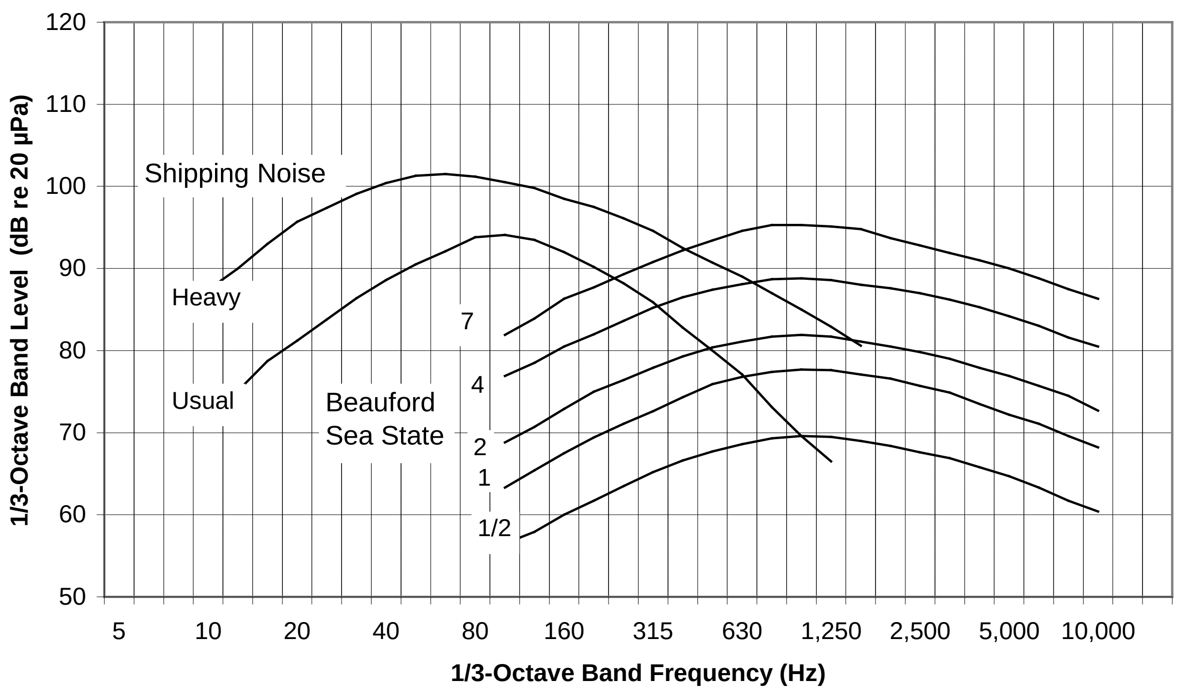


Figure H.6 Underwater Ambient Noise

Wind

On a 1/3-octave basis, wind-related ambient noise in shallow water tends to peak at about 1 kHz (see Figure H.6). Levels in 1/3-octave bands generally decrease at a rate of 3 to 4 dB per octave at progressively higher frequencies, and at about 6 dB per octave at progressively lower frequencies. Sound levels increase at a rate of 5 to 6 dB per doubling of wind speed. At a frequency of about 1 kHz, maximum 1/3-octave band levels are frequently observed at 95 dB referenced to 1 µPa for sustained winds of 34 to 40 knots and at about 82 dB for winds in the 7 to 10-knot range. Wave action and spray are the primary causes of wind-related ambient noise; consequently, the wind-related noise component is strongly dependent on wind duration and fetch as well as water depth, bottom topography, and proximity to topographic features such as islands and shore. A sea state scale, which is related to sea surface conditions as a function of wind conditions, is commonly used in categorizing wind-related ambient noise. The curves for wind-related ambient noise shown in Figure H.6 are reasonable averages, although relatively large departures from these curves can be experienced depending on site location and other factors such as bottom topography and proximity to island or land features.

Surf Noise

Very few data have been published relating specifically to local noise due to surf in nearshore areas along mainland and barrier island coasts. Estimated noise source level densities for heavy surf at Duck, North Carolina, varied from 120 to 125 dB re 1 μPa/Hz$^{1/2}$ /m at 200 Hz to 90-100 dB re 1 μPa/Hz$^{1/2}$ /m at 900 Hz, with a slope of -5 dB per octave (Fabre and Wilson, 1997). These results compare well with previous surf noise studies conducted in Monterey Bay, California by Wilson, *et al*. (1985). Wilson, *et al*. (1985) presents underwater noise levels for wind-driven surf along the exposed Monterey Bay coast, as measured at a variety of distances from the surf zone. Wind conditions varied from 25 to 35 knots. They vary from 110 to 120 dB in the 100 to 1,000 Hz band at a distance of 650 feet from the surf zone, down to levels of 96 to 103 dB in the same band 4.6 nm from the surf zone. Assuming these levels are also representative near shorelines in the GOMEX Range Complex area, surf noise in the 100 to 500 Hz band will be 15 to 30 dB above that due to wind-related noise in the open ocean under similar wind speed conditions.

Distant Shipping

The presence of a relatively constant low frequency component in ambient noise within the 10 to 200 Hz band has been observed for many years and has been related to distant ship traffic as summarized by Wenz (1962) and Urick (1983). Low frequency energy radiated primarily by cavitating propellers and by engine excitation of the ship hull is propagated efficiently in the deep ocean to distances of 100 nm or more. Higher frequencies do not propagate well to these distances due to acoustic absorption. Also, high frequency sounds radiated by relatively nearby vessels will frequently be masked by local wind-related noise. Thus, distant shipping contributes little or no noise at high frequency. Distant ship-generated low frequency noise incurs more attenuation when it propagates across continental shelf regions and into shallow nearshore areas than occurs in the deep ocean.

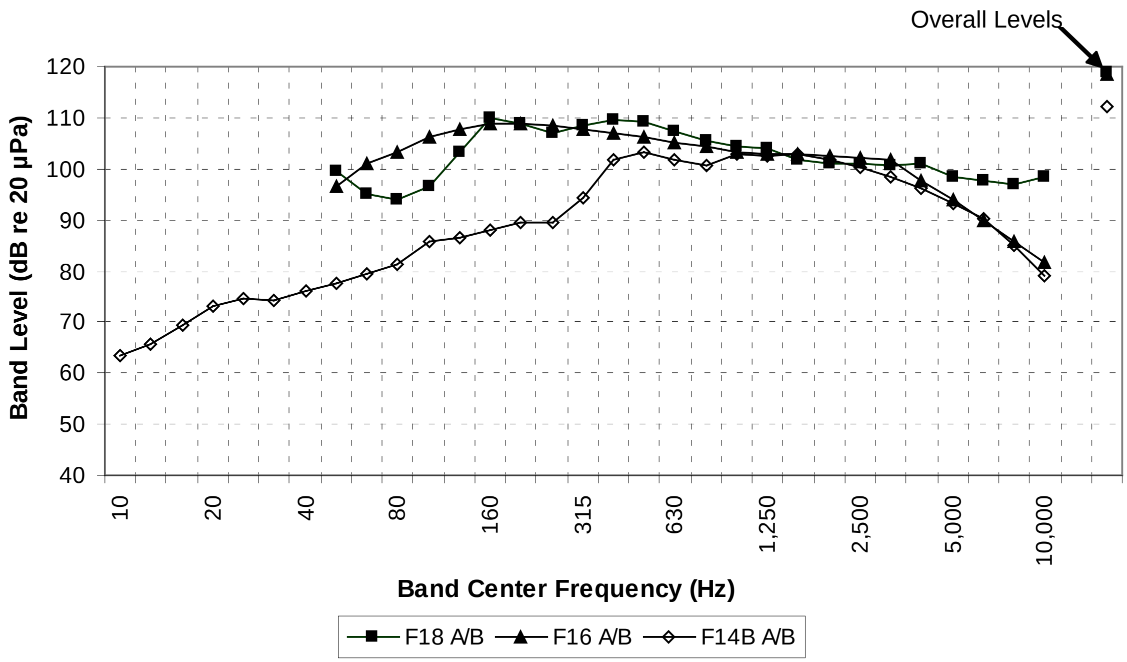
Figure H.6 also provides two curves that approximate the upper bounds of distant ship traffic noise. The upper curve represents noise at sites exposed to heavily used shipping lanes. The lower curve represents moderate or distant shipping noise as measured in shallow water. As shown, highest observed ambient noise levels for these two categories are 102 dB and 94 dB, respectively, in the 60 to 100 Hz frequency range. In shallow water the received noise from distant ship traffic can be as much as 10 dB below the lower curve given in Figure H.6, depending on site location on the continental shelf. In fact, some nearshore areas can be effectively shielded from this low frequency component of shipping noise due to sound propagation loss effects.

Note that the shipping noise curves shown in Figure H.6 show typical received levels attributable to *distant* shipping. Considerably higher levels can be received when a ship is present within a few miles.

H.4.5 MARINE MAMMAL NOISE METRICS

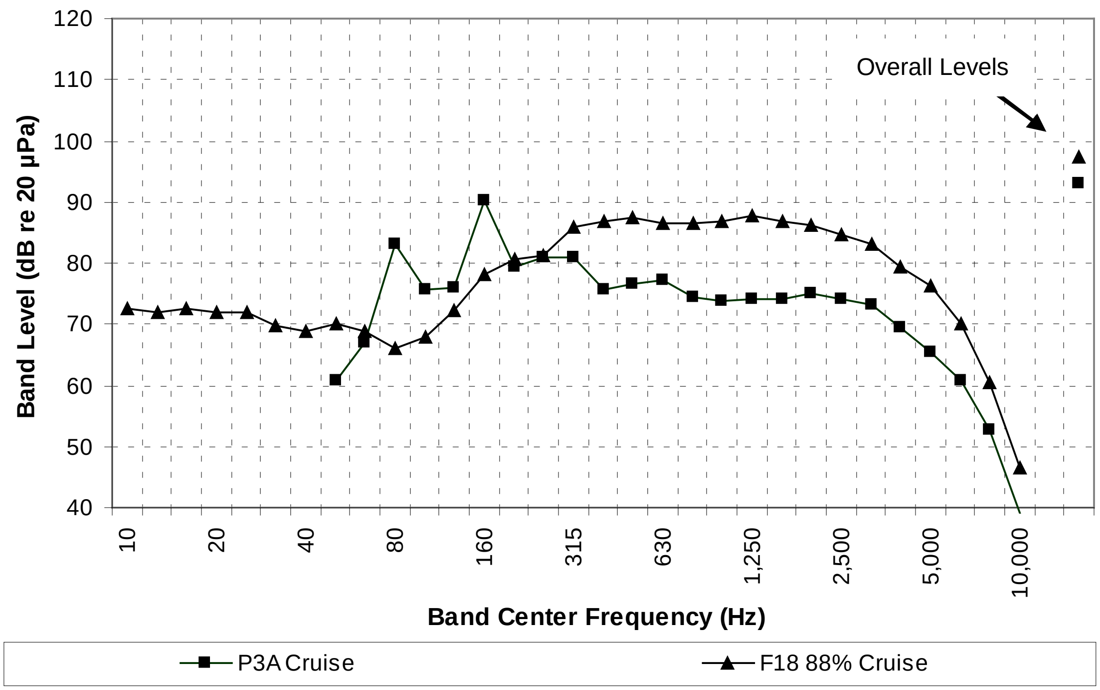
Noise received at and below the sea surface is relevant to marine mammals and some other marine animals at sea. The spectral composition and overall level of each airborne noise source must both be considered in assessing potential impacts on marine mammals present at sea in the GOMEX Range Complex. As described earlier, the sources are low-flying aircraft, aircraft-released explosive ordnance, naval gunfire, and debris impacts. Brief noise transients or impulses from low level explosions, and gunfire may also be important during training operations.

Aircraft spectrum information was obtained from the U.S. Air Force Armstrong Laboratory for various aircraft types (Armstrong Aerospace Medical Research Laboratory, 1990). Data for some additional types of aircraft occasionally used on the GOMEX Range Complex were also included. The information obtained is summarized in the 1/3-octave band spectra shown in Figure H.7A (for fighter and attack aircraft), and Figure H.7B (selected GOMEX Range Complex aircraft). Most of these spectra represent received levels near the surface during overflights at 1,000 feet above sea level under standard atmospheric conditions (59° F, 70 percent relative humidity). The data shown in this standard format can be adjusted for different aircraft altitudes and other atmospheric attenuation conditions – an important consideration at high frequencies.



Source: Air Force Aerospace Medical Research Laboratory, 1990.

Figure H.7A Noise Spectra: Fighter and Attack Aircraft



T/O = takeoff

Source: Air Force Aerospace Medical Research Laboratory, 1990.

Figure H.7B Noise Spectra: Selected GOMEX Range Complex Aircraft

Helicopters of different sizes and types emit intense low frequency engine sounds during flights. Most frequencies are in the range of 20 to 200 Hz, well within the range of hearing of most terrestrial and marine animals. Sound levels associated with the SH-60R are similar to the current H-60 helicopters, since the engines are the same. The SH-60R also uses the same engine as the variant, MH-60S helicopter used in the GOMEX Range Complex, and thus sound levels are representative of GOMEX Range Complex helicopters.

In 1991, the Air ASW Systems Program Office conducted tests to determine the effects of in-water H-60 helicopter noise on ASW operations (DoN, 1999). During these tests, an H-60 flew over calibrated sonobuoys (receiver depth 400 feet) at altitudes ranging from 250 to 5000 feet. Results showed a relatively flat spectrum (increases of approximately 1 to 5 dB over ambient) below 200 Hz rising to a maximum increase of 18 dB between 2 and 3 kHz. Models to determine precise in-water, near-surface noise levels are not reliable for all sea surface conditions. Spherical spreading can be used to estimate near-surface point noise levels. These levels were estimated by adding 42.5 dB (calculated from spherical spreading) to the received levels at 400 feet and by summing the energy across the entire spectrum. Table H.3 provides a summary of the estimated equivalent in-water, near-surface spectrum noise level for an H-60 helicopter operating at 250 feet. When this energy is summed across the entire spectrum, the nominal case estimate is an in-water, near-surface total energy level of 142.2 dB for a helicopter hovering at 250 feet. This level could be higher if the helicopter hovers at a lower altitude.

Table H.3 Estimated H-60 In-Water, Near-Surface Noise Levels

Frequency	**Spectrum Noise Level at 122 m (400 ft) Depth** (dB re 1 μPa)	**Estimated Near-Surface Spectrum Noise Level** (dB re 1 μPa)
10 Hz	80	123
100 Hz	72	115
500 Hz	60	103
1 kHz	56	99
2.5 kHz	45	88
5 kHz	28	71
Source: DoN, 1999.		

The aircraft spectra can be compared to the shapes and quantitative features of marine mammal audiograms, when known, to determine the weighting functions and overall level adjustments needed to estimate the perceived overall levels produced during close encounters. These levels can then be compared to known or assumed impact thresholds to determine whether a detailed analysis is needed. If a detailed analysis is indicated, then contour plots can be calculated to estimate the total number of animals potentially affected by an encounter scenario.

H.4.6 SONIC BOOM PROPAGATION INTO THE WATER

Aircraft Overflights

Supersonic operations in the GOMEX Range Complex result in sonic boom penetration of the water in the operating area. Boom signatures were estimated using PCBOOM3 (Air Force Aerospace Medical Research Laboratory, 1996) to determine the potential for noise impacts near or at the surface. The F-4 fighter is used as an example, although it has since been replaced by the F-14s and later by the F/A-18s. Table H.4 shows the underwater boom parameters at locations near the water surface together with the estimated attenuation rate of peak pressure with depth using a method developed by Sawyers (1968).

Table H.4 Underwater Sonic Boom Parameters for F-4 Overflight

Sonic Boom Parameters			Depth Peak Pressure Loss (feet)					
Speed	**Alt. (feet)**	**T (msec)**	**Lp (1μPa)**	**CSEL**	**ASEL**	**6 dB**	**10 dB**	**20 dB**
M1.2	10,000	103	168.0	143.9	129.6	11.5	24.6	68.9
M1.2	5,000	88	179.9	148.8	134.3	9.8	21.3	59.7
M1.2	1,000	64	182.9	159.1	145.6	6.9	15.1	42.6
M2.2	1,000	44	186.7	163.1	149.7	9.7	21.0	58.4

Source: Ogden Environmental, 1997.

APPENDIX I
STATISTICAL PROBABILITY MODELING FOR MUNITIONS STRIKES

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Statistical Probability Model for Estimating Impact Probability and Number of Exposures

A statistical probability model, **Direct Impact Model (DIM),** was developed to estimate the strike probability (P) and number of exposures (T) to marine animals (marine mammals and sea turtles) associated with direct impacts by NEPM use at the sea surface, resulting from naval operations.

Model Input Data

The GOMEX Range Complex (35,050 nm^2) was examined for this analysis. Naval operations are conducted within various training areas (i.e., restricted and warning areas, labeled by "R" and "W", respectively), including:

1) **Corpus Christi OPAREA: W-228A, W-228C, and W-228D.**
2) **New Orleans OPAREA: W-92.**
3) **Pensacola OPAREA: W-155A, W-155B, and R-2908.**
4) **Panama City OPAREA: W-151A.**
5) **Other training areas: W-228B, W-54A, W54-B, W-54C, W-155C, W-151B, W-151C, W-151D, W-151E, and W-151F.**

In addition to the identity and areas of each restricted/warning area, input data for the DIM model include animal species and munitions used in each naval operation in each restricted/warning area.

Animal Species Input Data

Animal species data include: 1) Species ID and status (*i.e.*, threatened, endangered, or neither); 2) Seasonal animal density estimates for each species and each restricted/warning area; 3) Approximate adult animal dimensions (length and width/breadth) for each species (Márquez-M. 1990; Jefferson *et al*. 1993). The animal dimensions are used to calculate individual animal footprint areas (A = length*width), and animal densities are used to calculate the number of exposures (T) from the impact probability (P): T = N*P. Unless specific data are available on animal breadth, it is assumed that animal breadth is 20% of animal length.

The following groups of species have been defined: 1) hardshell turtles (green, hawksbill, and olive ridley turtles); 2) beaked whales; 3) pilot whales; 4) dwarf and pygmy sperm whales. Animal density data were available only for the groups and not for the individual species comprising each group.

Munitions Input Data

Munitions data include: 1) Munitions ID and category (*e.g.*, gunnery, bomb); 2) Munitions dimensions (length, width/diameter); 3) Total number of munitions used in each naval operation (*e.g.*, number of bullets or bombs); 4) Percent use of the total number of munitions in the given restricted/warning area occurring in the given study area; 5) Distribution of percent use of munitions by season.

Munitions input data, specifically the ordnance quantity (*e.g.*, numbers of guns or bombs), are different in magnitude among the 3 proposed action plans (No Action Alternative, Alternative 1, and Alternative 2) but vary proportionally across all types of munitions, across all restricted/warning areas involved in the given naval operation, and across all 4 seasons. From the munitions quantities (for the given munitions type, naval operation, restricted/warning area, and season) for the No Action plan, the corresponding quantities for the Alternative 1 and Alternative 2 plans are calculated by multiplying by a proportionality factor, given by the ratio of the total number of events (munitions) for the given Alternative (1 or 2) to the total number of events (munitions) for the No Action. All animal species input data, the munitions ID and category, munitions dimensions, and the percent use distributions across all involved restricted/warning areas and across the 4 seasons are the same for the 3 action plans. Only the magnitude of munitions quantities (*i.e.*, total number of munitions) are different and vary proportionally according to the constant proportionality factor.

The DIM model assumes a rectangular individual impact footprint area equal to length*width. For a given season and training area, the total number of munitions for each munitions type is multiplied by the percent use by training area and the percent use by season to obtain the “effective” number of munitions. For each munitions type, the individual impact footprint area is multiplied by the “effective” number of munitions to obtain the type-specific impact footprint area. For example, if a total of 1,000 munitions throughout the Range Complex are distributed such that 50% is used in the given training area and 25% is used in the given season, then the effective number of munitions is 1000*0.50*0.25 = 125. If these munitions are missiles, each with a length of 1.50 m and width/diameter of 0.20 m, then the individual impact footprint area is (1.50 m)*(0.20 m) = 0.30 m^2; and the type-specific impact footprint area is (125 missiles)*(0.30 m^2 per missile) = 37.5 m^2.

Each naval operation uses one or more different types of munitions, each with a specific number of munitions (*e.g.*, gunnery, bombs), and several operations can occur in a given season and training area. When integrating over the number of munitions types for the given operation (and then over the number of operations in the given season and training area), the above calculations are repeated (considering differences in dimensions and numbers for different munitions types and different operations) for all munitions types used to obtain the type-specific impact footprint area for each munitions type. These impact footprint areas are summed over all munitions types for the given operation, and then summed (integrated) over all operations to obtain the total impact footprint area as a result of all operations occurring in the given season and training area.

Parameters for Model Application

Impact probabilities, P, and number of exposures, T, were estimated by the DIM model for the following parameters:

1) **Three proposed action plans**: No Action Alternative, Alternative 1, and Alternative 2. Number of events (munitions) for each naval operation in each restricted/warning area for the 2 alternatives is proportional to that of the No Action plan (based on a proportionality factor, the ratio of total number of events between the given alternative plan and the No Action plan) across all types of munitions, all 4 seasons, all animal species, all naval operations, and all restricted/warning areas of the study area involved in the given naval operation. Animal densities and dimensions, munitions dimensions, and percent use distributions of munitions across the restricted/warning areas and seasons are the same for the 3 action plans.
2) **All restricted and warning areas** within the GOMEX Range Complex for which animal densities and naval operations using inert munitions data are available: W-54A/B/C, W-92, W-151A/B/C/D/E/F, W-155A/B/C, W-228A/B/C/D, and R-2908. Percent use distributions of munitions for each naval operation across the involved restricted/warning areas were used in the model calculations.
3) **Types of munitions**: The DIM model calculates probabilities and exposures of animal impacts from falling munitions/ordnance (including gunnery, and bombs) associated with a given naval operation.
4) **All animal species** of interest to the GOMEX Range Complex: Marine mammals and sea turtles, including threatened and endangered species.
5) **Four seasons:** Seasons were defined as follows: winter (December, January, February); spring (March, April, May); summer (June, July, August); and fall (September, October, November). Seasonal percent use distributions of munitions for each naval operation were used in the seasonal model calculations.

Direct Impact Model (DIM)

The DIM was developed to estimate the impact probability (P) and number of exposures (T) associated with direct impact of falling munitions (ordnance) with marine animals on the sea surface within the given restricted/warning area (R) in which naval operations are occurring. The DIM model is based on probability theory and modified Venn diagrams with rectangular "footprint" areas for the individual animal (A) and total impact (I) inscribed inside the restricted/warning area (R):

1) A = length*width, where the individual animal's width (breadth) is assumed to be 20% of its length. For a given season, this product for A is multiplied by the number of animals N_a in the restricted/warning area (*i.e.*, product of seasonal animal density (D) and restricted/warning area (R): $N_a = D*R$) to obtain the total animal footprint area ($A*N_a = A*D*R$) in the given restricted/warning area. When integrating over the number of animal species of each type (*e.g.*, all marine mammals, all sea turtles), these calculations are repeated (accounting for differences in dimensions and densities for different species) to obtain the total animal footprint area for each species. These animal footprint areas are summed over all species of interest to obtain the total animal footprint area resulting from all animals present in the given restricted/warning area in the given season.

2) I = N_{mun}*length*diameter, where N_{mun} = number of munitions, and "length" and "diameter" refer to the individual munitions dimensions. For a given season and restricted/warning area, the total number of munitions for each munitions type is multiplied by the percent use by restricted/warning area and the percent use by season to obtain the "effective" number of munitions (N_{mun}). For each munitions type, the individual impact footprint area is multiplied by the "effective" number of munitions to obtain the type-specific impact footprint area (I = N_{mun}*length*diameter). Each naval operation uses one or more different types of munitions, each with a specific number of munitions (*e.g.*, gunnery, bombs) and dimensions, and several operations can occur in a given season and restricted/warning area. When integrating over the number of munitions types for the given operation (and then over the number of operations in the given season and restricted/warning area), these calculations are repeated (accounting for differences in dimensions and numbers for different munitions types and different operations) for all munitions types used, to obtain the type-specific impact footprint area (I) for each munitions type. These impact footprint areas are summed over all munitions types for the given operation, and then summed (integrated) over all operations to obtain the total impact footprint area resulting from all operations occurring in the given restricted/warning area in the given season.

The probability (P) that a random point (*i.e.*, a falling munitions) within R is within the animal footprint (A), or within the impact footprint (I), is calculated as the area ratio A/R or I/R, respectively.[1] [Note that A (referring to an INDIVIDUAL animal footprint) and I (referring to the impact footprint resulting from the TOTAL number of munitions N_{mun}) are the relevant quantities used in the following calculations of single-animal impact probability (P), which is then multiplied by the number of animals to obtain the number of exposures T.] The probability that the random point on the restricted/warning area is within both types of footprints (*i.e.*, A and I) depends on the degree of overlap of A and I. The probability that I overlaps A is calculated by adding a buffer distance around A based on one-half of the impact area (*i.e.*, 0.5*I), such that an impact (center) occurring anywhere within the combined (overlapping) area would impact the animal. Thus, if L_i and W_i are the length and width of the impact footprint such that $L_i*W_i = 0.5*I$ and $W_i/L_i = L_a/W_a$ (*i.e.*, similar geometry between the animal footprint and impact footprint), and if L_a and W_a are the length and width (breadth) of the individual animal such that $L_a*W_a = A$ (= individual animal footprint area), then, assuming a purely static, rectangular model (Model 1), the total area $A_{tot} = (L_a + 2*L_i)*(W_a + 2*W_i)$, and the buffer area $A_{buffer} = A_{tot} – L_a*W_a$.

Four models were examined with respect to defining and setting up the overlapping combined areas of A and I:

[1] For a discussion and basic applications of the fundamental concepts underlying the probability of random detection of a point within an area (*e.g.*, the probability of detection of a stationary animal) please refer to the following website: http://www.usna.edu/MathDept/.courses/pre97/sm230/urs.htm.

1) **Model 1**: Purely static, rectangular model. Impact is assumed to be static (*i.e.*, direct impact effects only; non-dynamic; no explosions or scattering of shrapnel after the initial impact). Hence the impact footprint area (I) is assumed to be rectangular and given by the product of ordnance length and ordnance width (multiplied by the number of ordnances). $A_{tot} = (L_a + 2*L_i)*(W_a + 2*W_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.
2) **Model 2**: Dynamic model with end-on collision, in which the length of the impact footprint (L_i) is enhanced by R_n = 4-5 ordnance lengths to reflect forward momentum. $A_{tot} = (L_a + (1+R_n)*L_i)*(W_a + 2*W_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.
3) **Model 3**: Dynamic model with broadside collision, in which the width of the impact footprint (W_i) is enhanced by Rn = 4-5 ordnance lengths to reflect forward momentum. $A_{tot} = (L_a + 2*W_i)*(W_a + (1+R_n)*L_i)$ and $A_{buffer} = A_{tot} – L_a*W_a$.
4) **Model 4**: Purely static, radial model, in which the rectangular animal and impact footprints are replaced with circular footprints while conserving area. Define the radius (R_a) of the circular individual animal footprint such that $pi*R_a^2 = L_a*W_a$, and define the radius (R_i) of the circular impact footprint such that $pi*R_i^2 = 0.5*L_i*W_i = 0.5*I$. Then $A_{tot} = pi*(R_a + R_i)^2$ and $A_{buffer} = A_{tot} – pi*R_a^2$ (where pi = 3.1415927).

Static impacts (Models 1 and 4) assume no additional aerial coverage effects of scattered ordnance beyond the initial impact. For dynamic impacts (Models 2 and 3), the distance of any scattered ordnance (*e.g.*, shrapnel) must be considered, by increasing the length (Model 2) or width (Model 3), depending on orientation (broadside versus end-on collision), of the impact footprint to account for the forward horizontal momentum of the falling ordnance. Forward momentum typically accounts for 4-5 ordnance lengths, resulting in a corresponding increase in impact area. Significantly different values may result from these 2 types of orientation. Both of these types of collision conditions can be calculated each with 50% likelihood (*i.e.*, equal weighting between Models 2 and 3, in order to average these potentially different values.

Impact probability P is the probability of impacting one animal with the given number, type, and dimensions of all munitions/ordnance used in all naval operations occurring in the given restricted/warning area and season, and is given by the ratio of total area (A_{tot}) to restricted/warning area (R): $P = A_{tot}/R$. Number of exposures is $T = N*P = N*A_{tot}/R$, where N = number of animals in the restricted/warning area in the given season (given as the product of seasonal animal density D and restricted/warning area R). Thus, $N = D*R$ and hence $T = N*P = N*A_{tot}/R = D*A_{tot}$. Using this procedure, P and T were calculated for each of the 4 models, for each animal species, for each season (and annually), for each munitions type used in all of the naval operations in the given restricted/warning area. The model-specific P and T values were averaged over the 4 models (using equal weighting) to obtain model-averages. Annual estimates of P and T were obtained by integrating the 4 seasonal estimates. Furthermore, the following integrated impact probabilities were calculated:

1) **Munitions-integrated**: Impact footprint areas were calculated for each individual munitions type and number. These footprint areas were summed to include all munitions used in all naval operations in the given season and annually in the given restricted/warning area. This enhanced impact footprint area was used together with the species-specific animal footprint area to calculate the munitions-integrated impact probability P and number of exposures T.

2) **Species-integrated**: Animal footprint areas were calculated for each individual animal species and associated density. These animal densities and footprint areas were summed to include all animal species of interest occurring in the given season and annually in the given restricted/warning area. These enhanced animal densities and animal footprint areas were used together with the munitions-specific impact footprint area to calculate the species-integrated impact probability P and number of exposures T. Species integrations were conducted over all species and also over only those species in the following categories: a) All marine mammals only; b) All sea turtles only.

3) **Species-and-munitions-integrated**: Both the enhanced impact footprint area and the enhanced animal footprint area were used to calculate this double-integrated impact probability P and number of exposures T.

Model Output Data

Generating seasonal estimates of impact probability (P) and number of exposures (T) for each season and species of interest, the DIM model was run for each restricted/warning area (accounting for all naval operations and their specific munitions numbers and percent use distributions across restricted/warning areas and seasons) for each of the 3 action plans. The model calculates P and T from falling munitions associated with all naval operations occurring in the given restricted/warning areas of the GOMEX Range Complex for the given action plan. These P and T estimates were calculated for all 4 seasons for all animal species of interest and were categorized according to species, season, restricted/warning area, and action plan. Probabilities and exposure estimates were also integrated over all restricted/warning areas within the given study area, over all species of a given animal type (*i.e.*, all animal species, all marine mammals, all sea turtles), and over all 4 seasons (to obtain annual estimates). Seasonal variability in P and T arise from seasonal variability in animal densities and in percent use distributions of munitions for the naval operations occurring in the given restricted/warning area. Differences in P and T among restricted/warning areas within the GOMEX Range Complex arises from geographical differences in animal densities and differences in percent use distributions of munitions among all restricted/warning areas involved in the given naval operations. Differences in P and T among action plans for the given restricted/warning area arise from different numbers of events (munitions) for the two alternative action plans relative to the No Action plan.

Species- and munitions-integrated P and T values are summarized in final output form for each action plan, restricted/warning area, season and annually, and type of species integrated (*i.e.*, all species, all marine mammals, all sea turtles). Typical impact probabilities (P) range on the order of 10^{-5} to 10^{-7}.

Exposure estimates could not be calculated for several species (North Atlantic right whale, humpback whale, sei whale, fin whale, blue whale, minke whale, West Indian manatee, and Kemp’s ridley sea turtle) because density data are limited for these species. However, the likelihood of exposure should be even lower than that estimated for other species with given densities since they are less likely to occur in the study area.

The results of the modeling are presented in the following tables. Tables I-1 through I-14 report results under the No Action Alternative; Tables I-15 through I-28 report results under the Alternative 1; and Tables I-29 through I-42 report results under Alternative 2.

Direct Munitions Strike – No Action Alternative

Table I-1
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151A in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	0.00000	<0.0001	0.00000	0.00000
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-2
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151B in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	0.00000	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]*Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)*
[2]*Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.*

Table I-3
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151C in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-4
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151D in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-5
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151E in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-6
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151F in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-7
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155A in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1] *Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)*
[2] *Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.*

Table I-8
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155B in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-9
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228A in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	0.00000	0.00000	0.00000	0.00000
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-10
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228B in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-11
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228C in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-12
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228D in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-13
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in Hotbox in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]*Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)*
[2]*Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.*

Table I-14
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in UNDET-Area E3 in the GOMEX Range Complex for the No Action Alternative. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Direct Munitions Strike-Alternative 1

Table I-15
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151A in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	0.00000	<0.0001	0.00000	0.00000
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-16
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151B in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	0.00000	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-17
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151C in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-18
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151D in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-19
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151E in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-20
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151F in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-21
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155A in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-22
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155B in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-23
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228A in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	0.00000	0.00000	0.00000	0.00000
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-24
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228B in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-25
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228C in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-26
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228D in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-27
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in Hotbox in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-28
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in UNDET-Area E3 in the GOMEX Range Complex for Alternative 1. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

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Table I-29
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151A in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	0.00000	<0.0001	0.00000	0.00000
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-30
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151B in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	0.00000	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-31
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151C in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-32
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151D in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-33
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151E in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-34
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-151F in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-35
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155A in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-36
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-155B in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-37
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228A in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	0.00000	0.00000	0.00000	0.00000
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-38
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228B in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-39
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228C in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	0.00000	0.00000	0.00000	0.00000

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-40
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in W-228D in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	0.00000	0.00000	0.00000	0.00000
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-41
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in the Hotbox in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	<0.0001	<0.0001	<0.0001	<0.0001
Clymene Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
False Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Frasers Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	<0.0001	<0.0001	<0.0001	<0.0001
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	<0.0001	<0.0001	<0.0001	<0.0001
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	<0.0001	<0.0001	<0.0001	<0.0001
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

Table I-42
Seasonal[1] exposure estimates from impacts/collisions of falling munitions/ordnance with marine animals in UNDET Area E3 in the GOMEX Range Complex for Alternative 2. N/A = No exposure estimate available.

SPECIES	WINTER	SPRING	SUMMER	FALL
Atlantic Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Beaked Whale	<0.0001	<0.0001	<0.0001	<0.0001
Common Bottlenose Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Brydes Whale	0.00000	0.00000	0.00000	0.00000
Clymene Dolphin	0.00000	0.00000	0.00000	0.00000
False Killer Whale	0.00000	0.00000	0.00000	0.00000
Frasers Dolphin	0.00000	0.00000	0.00000	0.00000
Hardshell Turtle[2]	<0.0001	<0.0001	<0.0001	<0.0001
Killer Whale	0.00000	0.00000	0.00000	0.00000
Kogia spp.	<0.0001	<0.0001	<0.0001	<0.0001
Leatherback Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Loggerhead Turtle	<0.0001	<0.0001	<0.0001	<0.0001
Melon-Headed Whale	0.00000	0.00000	0.00000	0.00000
Pantropical Spotted Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pygmy Killer Whale	0.00000	0.00000	0.00000	0.00000
Rissos Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Rough-Toothed Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Pilot Whale(Long+Short Finned)	0.00000	0.00000	0.00000	0.00000
Sperm Whale	<0.0001	<0.0001	<0.0001	<0.0001
Spinner Dolphin	<0.0001	<0.0001	<0.0001	<0.0001
Striped Dolphin	<0.0001	<0.0001	<0.0001	<0.0001

[1]Winter (December, January, February); Spring (March, April, May); Summer (June, July, August); and Fall (September, October, November)
[2]Hardshell Turtles consist of greens, hawksbills, Kemps ridleys, and extralimital occurrences of olive ridleys.

References:

Jefferson, T.A., S. Leatherwood, and M.A. Webber. 1993. Marine mammals of the world: FAO species identification guide. Rome, Italy: Food and Agriculture Organization of the United Nations.

Márquez-M., R. 1990. FAO species catalogue: Sea turtles of the world. An annotated and illustrated catalogue of sea turtle species known to date. FAO Fisheries Synopsis. No. 125, Volume11. Rome, Italy: Food and Agriculture Organization of the United Nations.

Appendix J

Technical Risk Assessment for the Use of Underwater Explosives in the Gulf of Mexico (GOMEX) Range Complex

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CHAPTER 1 INTRODUCTION

This appendix provides the background information, assumptions, and the details of the impact assessment for use of underwater explosives and HE ordnance use in conjunction with the training outlined in Chapter 2 of this FEIS/OEIS. It specifically addresses the potential impact to marine mammals and sea turtles from explosives used in the Bombing Exercises (BOMBEX), Mine Neutralization Exercises (MINEX), and small arms training (MK3A2 anti-swimmer grenades) in the Gulf of Mexico (GOMEX) Range Complex. Assumptions that were made for the analysis include:

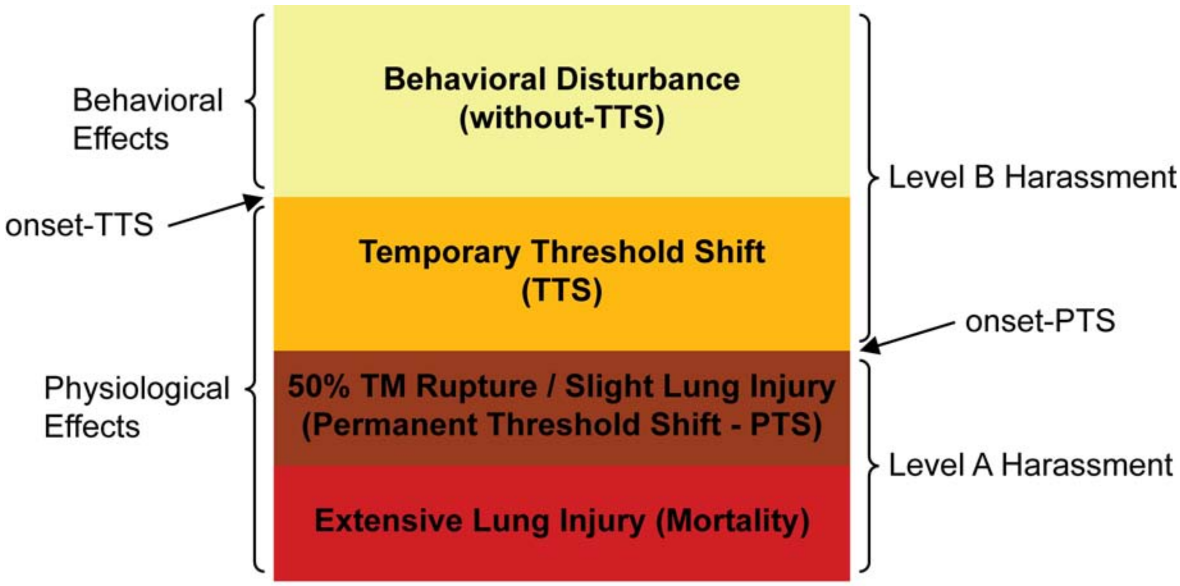
- Exposures were rounded to the nearest whole number using conventional rounding methods (<0.5 was rounded down and ≥0.5 was rounded up).
- Unless otherwise indicated, annual event totals were divided evenly across the four seasons as we assume these events can occur at anytime during the year.
- In the absence of specifically developed criteria for sea turtles, the criteria developed for marine mammals is used in this analysis to determine potential exposures for sea turtles.
- MINEX was modeled (using CASS/GRAB) to support previous Navy documentation. Due to the fact that these events did not change, those results were used for this analysis. BOMBEX and small arms training events were modified and therefore were remodeled for this analysis (using REFMS).

In Chapter 2 of the FEIS/OEIS, **Figures 2.1-1, 2.1-3, and 2.2-6** show each of the areas where explosive ordnance is used in the GOMEX Range Complex. In Chapter 2 of the FEIS/OEIS, Table 2.2-9 summarizes the number of events (per year) and specific areas where each occurs for each type of explosive ordnance used for each of the Alternatives.

1.1 Thresholds and Criteria for Impulsive Sound

Criteria and thresholds for estimating the exposures from a single explosive activity on marine mammals were established for the Seawolf Submarine Shock Test Final Environmental Impact Statement (FEIS) (“Seawolf”) and subsequently used in the USS Winston S. Churchill (DDG-81) Ship Shock FEIS (“Churchill”) (DoN, 1998 and 2001). NMFS adopted these criteria and thresholds in its final rule on unintentional taking of marine animals occurring incidental to the shock testing (NMFS, 2001). Since the ship-shock events involve only one large explosive at a time, additional assumptions were made to extend the approach to cover multiple explosions for BOMBEX and small arms training. In addition, this section reflects a revised acoustic criterion for small underwater explosions (< 1500 NEW) (i.e., 23 pounds per square inch [psi] instead of previous acoustic criteria of 12 psi for peak pressure over all exposures), which is based on an incidental harassment authorization (IHA) issued to the Air Force (NOAA, 2006). As was the case for Seawolf and Churchill, in the absence of specifically developed criteria, criteria and thresholds for impact on protected marine mammals are used for protected sea turtles. **Figure 1-1** depicts the acoustic impact framework used in this assessment.

Figure 1-1 Physiological and Behavioral Acoustic Effects Framework for Explosives



(Figure is not to scale and is for illustrative purposes only)

1.1.1 Metrics

Several standard acoustic metrics are used for underwater pressure waves in this document; textbooks on underwater sound (e.g., Urick, 1983) should be consulted for details. Four metrics are especially important for this analysis:

- *Energy flux density (EFD).* For plane waves, as assumed here, energy flux density (EFD) is the time integral of the squared pressure divided by the impedance. It has SI units of J/m^2 (but in-lb/in^2 is also used in CHURCHILL). EFD levels have units of dB re 1 μPa^2-s (using the usual convention that the reference impedance is the same as the impedance at the field point).
- *1/3-Octave EFD.* This is the energy flux density in a 1/3-octave frequency band. A 1/3-octave band has upper and lower frequency limits with a ratio of $2^{1/3}$. Hence, the bandwidth is about 23% of center frequency.
- *Positive impulse.* This is the time integral of the pressure over the initial positive phase of an arrival. SI units are Pa-s, but psi-ms are also used. There is no decibel analog for impulse.
- *Peak pressure.* This is the maximum positive pressure for an arrival. Units used here are psi and decibel levels with the usual underwater reference of 1 μPa.

1.1.2 Thresholds and Criteria for Injurious Physiological Effects

Single Explosion

For injury, the Navy uses dual criteria: eardrum rupture (i.e., tympanic-membrane [TM] rupture) and onset of slight lung injury. These criteria are considered indicative of the onset of injury. The threshold for TM rupture corresponds to a 50 percent rate of rupture (i.e., 50% of animals exposed to the level are expected to suffer TM rupture); this is stated in terms of an Energy Flux Density Level (EL) value of 1.17 inch pounds per square inch (in-lb/in^2) (about 205 dB referenced to 1 micro Pascal squared second (dB re 1 μPa^2-s)). This recognizes that TM rupture is not necessarily a serious or life-threatening injury, but is a useful index of possible injury that is well correlated with measures of permanent hearing impairment (Ketten [1998] indicates a 30% incidence of permanent threshold shift [PTS] at the same threshold).

The threshold for onset of slight lung injury is calculated for a small animal (a dolphin calf weighing 26.9 lbs), and is given in terms of the "Goertner modified positive impulse," indexed to 13 psi-millisecond (ms) (DoN, 2001). This threshold is conservative since the positive impulse needed to cause injury is proportional to animal mass, and therefore, larger animals require a higher impulse to cause the onset of injury. This analysis assumed the populations were 100% small animals. The TM rupture (energy threshold) and onset of slight lung injury are the dual criteria used in analysis to determine injurious physiological exposures (MMPA-level A).

For mortality, the Navy uses the criterion corresponding to the onset of extensive lung injury. This is conservative in that it corresponds to a 1 percent chance of mortal injury, and yet any animal experiencing onset severe lung injury is counted as a lethal exposure. For small animals, the threshold is given in terms of the Goertner modified positive impulse, indexed to 30.5 psi-ms. Since the Goertner approach depends on propagation, source/animal depths, and animal mass in a complex way, the actual impulse value corresponding to the 30.5 psi-ms index is a complicated calculation. To be conservative, the analysis used the mass of a calf dolphin (at 26.9 lbs) for 100% of the population.

Multiple Explosions

For this analysis, the use of multiple explosions only applies to the MK-82 and MK-83 bombs used in BOMBEX and the MK3A2 anti-swimmer grenades used in small arms training. Since portions of BOMBEX and small arms training require multiple explosions, the Churchill approach had to be extended to cover multiple sound events at the same training site. For multiple exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot (explosion); this is consistent with the treatment of multiple arrivals in Churchill. For positive impulse, it is consistent with Churchill to use the maximum value over all impulses received.

1.1.3 Thresholds and Criteria for Non-Injurious Physiological Effects

The Navy criterion for non-injurious harassment is TTS — a slight, recoverable loss of hearing sensitivity (DoN, 2001a). For this assessment, there are two thresholds for TTS, an energy threshold and a peak pressure threshold. Exposure is assumed to occur at the point either of the thresholds are exceeded (that criteria is then referred to as the dominant criteria in the exposure analysis).

Single Explosion –TTS-Energy Threshold

The first threshold is a 182 dB re 1 μPa2-s maximum energy flux density level in any 1/3-octave band at frequencies above 100 Hz for toothed whales/sea turtles and in any 1/3-octave band above 10 Hz for baleen whales. For large explosives, as in the case of the Churchill FEIS, frequency range cutoffs at 10 and 100 Hz make a difference in the range estimates. For small explosives (< 1500 lb NEW), as what was modeled for this analysis, the spectrum of the shot arrival is broad, and there is essentially no difference in impact ranges for toothed whales/sea turtles or baleen whales.

The TTS energy threshold for explosives is derived from the Space and Naval Warfare Systems Center (SSC) pure-tone tests for TTS (Schlundt et al. 2000, Finneran and Schlundt 2004). The pure-tone threshold (192 dB as the lowest value) is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3-octave bands, the natural filter band of the ear. The resulting threshold is 182 dB re 1 μPa2-s in any 1/3-octave band. The energy threshold usually dominates and is used in the analysis to determine potential non-injurious physiological exposures (MMPA-level B) for single explosion ordnance.

Single Explosion –TTS-Peak Pressure Threshold

The second threshold applies to all species and is stated in terms of peak pressure at 23 psi-ms (about 225 dB re 1 μPa). This criterion was adopted for Precision Strike Weapon (PSW) Testing and Training by Eglin Air Force Base in the Gulf of Mexico (NMFS, 2006). It is important to note that for small shots near the surface (such as in this analysis), the 23-psi-ms peak pressure threshold generally will produce longer impact ranges than the 182-dB energy metric. Furthermore, it is not unusual for the TTS impact range for the 23 psi-ms pressure metric to actually exceed the behavioral impact range for the 177-dB energy metric.

Multiple Explosions –TTS

For multiple explosions, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot/detonation. This is consistent with the energy argument in Churchill. For peak pressure, it is consistent with Churchill to use the maximum value over all impulses received.

1.1.4 Thresholds and Criteria for Behavioral Effects

Single Explosion

For a single explosion, to be consistent with Churchill, TTS is the criterion for MMPA-level B. In other words, because behavioral disturbance for a single explosion is likely to be limited to a short-lived startle reaction, use of the TTS criterion is considered sufficient protection and therefore behavioral effects are not considered for single explosions.

Multiple Explosions

For this analysis, the use of multiple explosions only applies to the MK-82 and MK-83 bombs used in BOMBEX and the MK3A2 anti-swimmer grenades used in small arms training. Because multiple explosions would occur within a discrete time period, a new acoustic criterion-behavioral disturbance -is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower noise levels than those that may cause TTS.

The threshold is based on test results published in Schlundt et al. (2000), with derivation following the approach of the Churchill FEIS for the energy-based TTS threshold. The original Schlundt et al. (2000) data and the report of Finneran and Schlundt (2004) are the basis for thresholds for behavioral disturbance. As reported by Schlundt et al. (2000), instances of altered behavior generally began at lower exposures than those causing TTS; however, there were many instances when subjects exhibited no altered behavior at levels above the onset-TTS levels. Regardless of reactions at higher or lower levels, all instances of altered behavior were included in the statistical summary.

The behavioral disturbance threshold for tones is derived from the Spawar Systems Center (SSC) tests, and is found to be five dB below the threshold for TTS, or 177 dB re 1 μPa2-s maximum energy flux density level in any 1/3-octave band at frequencies above 100 Hz for toothed whales/sea turtles and in any 1/3-octave band above 10 Hz for baleen whales. As stated previously for TTS, for small explosives (< 1500 lb NEW), as what was modeled for this analysis, the spectrum of the shot arrival is broad, and there is essentially no difference in impact ranges for toothed whales/sea turtles or baleen whales. For BOMBEX involving MK-82 or MK-83 bombs and small arms training involving MK3A2 anti-swimmer grenades, behavioral disturbance (177 dB re 1 μPa^2-s) is the criterion that is used in the analysis to determine potential non-injurious exposures (MMPA-level B) due to the use of multiple explosions.

1.2 Summary of Thresholds and Criteria for Impulsive Sounds

Table 1-2 summarizes the effects, criteria, and thresholds used in the assessment for impulsive sounds. The criteria for behavioral effects without physiological effects used in this analysis are based on use of multiple explosives that only take place during a BOMBEX event involving MK-82 or MK-83 bombs or a small arms training event involving MK3A2 anti-swimmer grenades.

Table 1-2 Effects, Criteria, and Thresholds for Impulsive Sounds

Effect	Criteria	Metric	Threshold	Effect
Mortality	Onset of Extensive Lung Injury	Goertner modified positive impulse	indexed to 30.5 psi-ms (assumes 100% small animal at 26.9 lbs)	Mortality
Physiological	50% Tympanic Membrane Rupture	Energy flux density	1.17 in-lb/in2 (about 205 dB re 1 μPa2-s)	MMPA - Level A
Physiological	Onset Slight Lung Injury	Goertner modified positive impulse	indexed to 13 psi-ms (assumes 100% small animal at 26.9 lbs)	MMPA - Level A
Physiological	TTS	Greatest energy flux density level in any 1/3-octave band (above 100 Hz for toothed whales/sea turtles and above 10 Hz for baleen whales) - for total energy over all exposures	182 dB re 1 μPa2-s	MMPA - Level B
Physiological	TTS	Peak pressure over all exposures	23 psi	MMPA - Level B
Behavioral	Behavioral Disturbance	Greatest energy flux density level in any 1/3-octave (above 100 Hz for toothed whales/sea turtles and above 10 Hz for baleen whales) - for total energy over all exposures (multiple explosions only)	177 dB re 1 μPa2-s	MMPA - Level B
MMPA = Marine Mammal Protection Act TTS = Temporary Threshold Shift				

CHAPTER 2 ACOUSTIC ANALYSIS FOR UNDERWATER EXPLOSIONS ASSOCIATED WITH BOMBEX AND SMALL ARMS TRAINING

The following material provides an explanation of the marine mammal acoustic effects model used to estimate the acoustic impact of explosive ordnance associated with BOMBEX and small arms training on marine mammals and sea turtles. The best available data were used in combination with an underwater explosion model and exercise simulation to predict impacts. The method by which predicted effects were quantified is described. Under all Alternatives, live BOMBEX training will only take place in one location (Hotbox) and small arms training will only take place in one location (UNDET Area E3).

2.1 MODEL DESCRIPTION

The modeling consists of five process components:

1. An exercise description including the type of weapons and acoustic sources used and their associated timelines and characteristics.
2. A physical oceanographic and geo-acoustic dataset for input to the acoustic propagation model for the planned exercise location and time of year.
3. An acoustic propagation model suitable for the source type to predict energy levels at ranges and depths from the source.
4. Marine animal density data for the test area.
5. A final calculation to multiply together the acoustic propagation results, the animal densities, and the number of operations.

2.1.1 Exercise Description

A timeline and sequence of weapon delivery was constructed from these records to form the basis of the test simulation. From this information, the order of weapon use, number of weapons fired, and time over which the weapons were fired is constructed.

2.1.2 Environmental Information for the Acoustic Propagation Model

Oceanographic data representative of the exercise locations were used to estimate propagation of the blast and acoustic energy using an analytical time-domain model for underwater explosions.

Environmental data parameters include bathymetry, sound speed profiles (SSP), and bottom type parameters including sediment characteristics, compressional and shear wave speed, density, and layer depth.

2.1.2.1 Bathymetry

The center latitude/longitude of the exercise boxes were used to determine the representative depth for each exercise location. The site used for BOMBEX was identified as the GOMEX Hotbox with given center latitude and longitude location as 87.03N, 29.29W. The site used for small arms training was identified as UNDET Area E3 with given center latitude and longitude location as 97.12N, 27.44W.

2.1.2.2 Ocean Water Characteristics

Acoustic propagation at the exercise locations are mostly determined by the SSP due to deep water depths. For modeling, the SSP was partitioned into isovelocity water layers in order to calculate and predict propagation of blast and acoustic energy. Environmental databases used for this analysis are limited to those that were unclassified. The Naval Oceanographic Office online

Generalized Digital Environment Model, version 2.5 was used to obtain monthly SSPs, which were accessed at https://128.160.23.42/gdemv/gdemv.html. Twelve SSPs, the average for each month, were examined for the most conservative, which is defined as the profile that results in the best propagation conditions and largest zone of influence (ZOI) for the test. The SSP was then partitioned into isovelocity layers so that no layer had a change in sound speed greater than 3.28 ft/s (1 m/s) for the model input file.

2.1.2.3 Ocean Sediment Characteristics

Given a description of the bottom sediment, the sound speed ratio and density were acquired from the database of Hamilton (1980). Parameters used in the selected acoustic model to define ocean sediments are the sediment velocity ratio and wet density. Specifically, the sediment shear wave velocity is calculated from the sediment velocity ratio as a function of the compressional wave velocity, also called sediment sound speed. **Table 2-1** summarizes the data used for the BOMBEX (Hotbox) and small arms training (Area E3) sites.

Table 2-1 Water Depth and Sediment Properties for the BOMBEX and Small Arms Training Locations

Site	Water Depth (m)	Bottom Sediment	Sound Speed Ratio	Density (gm/cm3)
GOMEX Hotbox	700	Silty Clay	1.057	1.740
GOMEX Area E3	35	Silty Clay	1.057	1.740

2.1.3 Acoustic Propagation Model

Only explosive sources were utilized and the Reflection and Refraction Multi-Layered Ocean/Ocean Bottoms with Shear Wave Effects (REFMS) model (version 5.06) (Britt et al. 1991) was used for the acoustic predictions. REFMS is used to calculate peak maximum and minimum pressures, positive impulse, EFD total and 1/3 octave band spectra, and maximum EFD above 10Hz and above 100 Hz from underwater detonations. The REFMS model calculates the combined reflected and refracted shock wave environment for underwater explosions using a single, generalized model that is based upon Cagniard's linear wave propagation theory (Cagniard 1962; Britt et al. 1991), convolved with a nonlinear similitude source term for each individual source type. In order to predict propagation of the underwater explosions, some of the various explosive types are converted to TNT equivalents.

For the present determination of ZOIs for each mammal threshold, improvements were made to the REFMS tool to allow multiple depths and range points concurrently. Two separate case runs of REFMS were selected that concentrated points near the sea surface and detonation for impulse thresholds and a second distribution set that extended down to the sea floor and further away from the explosive for the peak pressure and EFD. The acoustic results of each were combined to yield a larger more comprehensive database for the mammal ZOI determinations. Thus, the discrete points of depth and range were;

Impulse Threshold

Depth (m): 0.5, 1.0, 2.0, 5.0, 15.0, 25.0, and 50.0

Range (nmi): 0.0026, 0.0087, 0.0148, 0.0207, 0.0415, 0.688, 0.1, 0.2, 0.3, 0.4, and 0.5

Peak Pressure and EFD Thresholds

Depth (m): 0.5, 1.0, 2.0, 5.0, 15.0, 50.0, 100.0, 150.0, and 200.0

Range (nmi): 0.0375, 0.05, 0.1, 0.2, 0.3, 0.4, 0.5, 1.0, 2.0, and 3.0

These two-dimensional (range and depth) distributions give 77 discrete points of REFMS results for evaluating the ZOIs of mammal thresholds based on peak positive impulse (psi-ms) and 90 points for ZOIs of thresholds in terms of the and peak pressure (psi) and EFD in 1/3-octave bands (dB) and total energy (dB).

2.1.4 Marine Animal Data

All density estimates that were used in the analysis are presented in the species descriptions located in Chapter 3.7 and 3.8 of this FEIS/OEIS. Once the acoustic propagation model determines the impact areas or ZOIs, then they are multiplied by the animal density estimates and the number of events to determine exposure estimates.

2.2 Estimated Impact Areas

Table 2-2 and 2-3 present the BOMBEX and small arms training modeling results of the impact areas for the GOMEX Range Complex.

TABLE 2-2
ESTIMATED ZOIS (SQUARE KILOMETER [KM^2]) USED IN EXPOSURE CALCULATIONS FOR BOMBEX (A-S [AT-SEA]) IN THE GOMEX RANGE COMPLEX

Area	Ordnance	Estimated ZOI @ 177 dB re 1 µPa^2-sec (multiple detonations only)				Estimated ZOI @ 182 dB re 1 µPa^2-sec or 23 psi				Estimated ZOI @ 205 dB re 1 µPa^2-sec or 13 psi				Mortality ZOI @ 30.5 psi			
		Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall
GOMEX																	
BOMBEX Hotbox	**MK-82* (192.2 lbs NEW)**	**69.52**	**67.89**	**73.97**	**75.67**	**36.48**	**36.88**	**38.09**	**39.72**	**1.99**	**1.99**	**1.99**	**2.09**	**<0.01**	**<0.01**	**<0.01**	**<0.01**
BOMBEX Hotbox	**MK-83 * (415.8 lbs NEW)**	**98.93**	**115.93**	**161.39**	**173.27**	**55.53**	**76.82**	**137.33**	**158.07**	**4.84**	**4.84**	**4.84**	**4.98**	**<0.01**	**<0.01**	**<0.01**	**<0.01**
BOMBEX Hotbox	**MK-84 (945 lbs NEW)**	**NA**	**NA**	**NA**	**NA**	**9.52**	**9.73**	**13.04**	**9.12**	**0.57**	**0.57**	**0.57**	**0.57**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

**ZOIs for MK82 and MK-83 bombs are modeled as multiple detonations (4 bombs dropped at same location).*

NA: The MK-84 bomb is modeled as a single detonation and therefore the behavioral disturbance criterion does not apply.

TABLE 2-3
ESTIMATED ZOIS (SQUARE KILOMETER [KM^2]) USED IN EXPOSURE CALCULATIONS FOR SMALL ARMS TRAINING IN THE GOMEX RANGE COMPLEX

Area	Ordnance	Estimated ZOI @ 177 dB re 1 µPa^2-sec (multiple detonations only)				Estimated ZOI @ 182 dB re 1 µPa^2-sec or 23 psi				Estimated ZOI @ 205 dB re 1 µPa^2-sec or 13 psi				Mortality ZOI @ 30.5 psi			
		Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall	Win	Spr	Sum	Fall
GOMEX																	
UNDET Area E3	**MK3A2 grenade**	**4.94**	**5.45**	**4.71**	**5.81**	**1.80**	**2.18**	**1.96**	**3.27**	**0.09**	**0.09**	**0.09**	**0.10**	**<0.01**	**<0.01**	**<0.01**	**<0.01**

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CHAPTER 3 ACOUSTIC ANALYSIS FOR UNDERWATER EXPLOSIONS ASSOCIATED WITH MINEX

3.1 Introduction

This appendix provides explanatory text for a risk assessment of the GOMEX Range Complex MINEX sites. The driving sources of shock energy and noise in the water are from small (5 to 60 pounds explosive weight) charges of C-4. The analysis is done in a per shot/season format, so that exposure estimates are easy to determine for any combination of sites and seasons.

Since the MINEX explosive events are isolated in time, and hence in the same category as the ship shock trials, temporary threshold shift (TTS) is the sole criterion used to determine non-injurious (MMPA-Level B) harassment.

3.2 Characterization of Source Properties

For the acoustic analysis, the exploding shell is characterized here as a point source, with a 5 lb, 10 lb, 20 lb or 60 lb charge of high-energy explosive.

3.2.1 Depths of Animals and Explosions

For this analysis an assumption of a 1 ft (0.3 m) depth is made, and is more conservative than an assumption of a shallower detonation depth. Animal depths are selected to ensure the greatest direct path for the harassment ranges, and to give the greatest impact range for the injury thresholds; they are thus conservative. The latter is consistent with the approach of CHURCHILL.

3.2.2 Similitude Formulas for Source Properties

Standard similitude formulas are used to model the free-field source properties close to the source, starting at a nominal source-level range of 1 m (3.3 ft). Weak shock theory is used to estimate the waveform and levels to ranges beyond a few meters. Rather than revert to linear propagation theory when the amplitudes are small, the weak shock is used to all ranges. This is consistent with the SEAWOLF and CHURCHILL FEISs (although not explicitly stated in the documents). References for similitude and explosive sound propagation include Cole (1948), Arons et al. (1949), Weston (1960), Urick (1983), Goertner (1982), Gaspin (1983), Chapman (1988), Gaspin and Shuler (1971), and Bluy and Payne (1974). The formulas are provided below.

Waveform for Shock Wave, Positive Phase (Similitude, Arons et al., 1949):

The pressure as a function of time at a fixed location is given by:

$$P(t) = P_o \exp(-t/t_o), \text{ for } t > 0, \text{ and}$$

$$P(t) = 0, \ t < 0,$$

where P_o is peak pressure, t is time (with t = 0 as arrival time of the shock front), and t_o is time constant. This is an idealized waveform, and does not include negative phase or bubble pulses. The latter is not at issue for shots at the surface. Negative pressure disturbances are treated here for the case of the surface reflected path.

Peak Pressure of Shock Wave (Similitude, Arons et al., 1949):

Peak pressure in psi is given by:

$$P_o = 2.16 \times 10^4 \, (W^{1/3}/R)^{1.13}$$

where W is net explosive weight (NEW) in pounds, and R is range in feet.

Time Constant for Shock Wave (Similitude, Arons et al., 1949):

The 1/e time in ms is given by:

$$t_0 = 0.052W^{1/3} (W^{1/3}/R)^{-0.26}$$

where W is NEW in pounds and R is range in feet.

Positive Impulse for Shock Wave (Similitude, Arons et al., 1949):

Positive impulse is calculated directly from the time integral of the pressure over the positive phase.

Goertner (1982) Modified Positive Impulse

As in the CHURCHILL FEIS, this document utilizes the Goertner (1982) approach to determine the positive impulse. In this approach, either: (1) a surface reflected impulse, or (2) a lung/bubble resonance period is used to modify the positive impulse at various ranges and depths. For a pressure-release surface, the reflected pulse is the negative of the incident, with perhaps a reduction in amplitude and distortion of the waveform. The result of combining the surface reflected and direct paths is a reduction in positive impulse. Similarly, the lung/bubble resonance period cuts off the decaying peak pressure. The Goertner modified positive impulse is the integral of the pressure from the start of the arrival of the direct-path impulse until the start of the arrival of the surface-reflected pulse (or the period of the resonance). The minimum of the two integrals is calculated as a function of animal depth, and compared to the Goertner depth-dependent threshold. Since the maximum range over the possible animal depths is used in the analysis, the estimated impact ranges are conservative.

Energy Flux Density (Similitude, Arons et al., 1949):

EFD is calculated directly from the time integral of the squared pressure, normalized by impedance.

Energy Flux Density Spectrum (Similitude, Weston, 1960):

The EFD spectrum is the squared modulus of the Fourier transform of the exponential waveform. It can be written as:

$$E = \{2P_o^2\} / \{\rho c\ (1/t_o^2 + 4\pi^2 f^2)\}$$

where E is in ergs/cm^{2}Hz, P_o is the peak pressure in μPa, $\rho c = 1.539 * 10^5$ g/cm^2-s, t_o is time constant in seconds, and f is frequency in Hz.

Dependence of Formulas on the Type of Explosive

All of the formulas above assume TNT as the high-explosive material. For other explosives, the formulas remain the same, but an adjustment is made for the density of the explosive relative to TNT. For example, RDX has a density about 15% greater than TNT.

3.3 Environmental Provinces and Sound Propagation

3.3.1 Overview

To determine impact areas for the MINEX deployment sites, Navy standard acoustic models and databases were applied to environmental 'provinces' within which the ocean acoustic environments are expected to be similar. The environmental provincing follows naturally from the Navy databases.

3.3.2 Propagation Modeling

The approach begins with a high-fidelity acoustic model that has all of the required properties for the 'linear' problem. Since the OPAREA of interest includes shallow-water regions, the selected model must treat range-dependent environments and be able to exploit Navy standard bottom-sediment interaction approaches (e.g., the Navy Standard: OAML, 2002). It must cover a wide frequency band (up to about 10 kHz), and correctly account for caustics, surface cutoff, ducting, low-frequency cutoff, and important diffraction effects. Because of the wide bandwidth for small shots, wave-theory models (such as modal theory or parabolic equation method or finite-element approaches) are usually not practical, so that modified ray theory models are favored. Examples include Navy standard models (CASS/GRAB or ASTRAL) and the model used for long-range, flat bottom estimates in CHURCHILL and SEAWOLF -

the REFMS model (Britt et al., 1991). The CASS/GRAB model is well suited for small shots and is used in this assessment.

Consider first the linear case. The approach is to first calculate the impulse response of the channel. This is one of the standard applications for the CASS/GRAB model. Let $\delta(t)$ be the delta function, $s_o(t)$ be the pressure waveform at the source (at 1 m from the source), and $S(s_o(t), x; t)$ be the pressure time series of the field at location x. Then:

$S(\delta(t), x; t)$ is the impulse response at location x.

Now, $S(s, x; t)$ is linear in s, and it is trivially the case that $s_o(t) = s_o(t) \otimes \delta(t)$, where $\otimes$ denotes convolution. Hence,

$$S(s(t)\ , x; t) = S(s(t) \otimes \delta(t), x; t) = s\ (t) \otimes S(\delta(t), x; t).$$

Thus, given the impulse response, the field for any source waveform is available through simple convolution. This is a standard approach in sound wave modeling (e.g., Clay and Medwin, 1977).

The starting field (e.g., at 1 m), s(t), is prescribed as an idealized, exponentially decaying shock wave, followed by double-exponential bubble pulses, with negative pressures in between to ensure the impulse is zero (e.g., Weston, 1960).

The peak pressures of the bubble pulses are smaller than the peak pressure of the main pulse. The same is true for the positive impulse and the total energy. However, the bubble pulse contributions can change the shape of the energy spectrum. Note that for the approach used here, it is no more difficult to include the bubble pulses, but there is no reason to add this complication to the problem.

In regions of high pressure, non-linearities can be important -- particularly in the rate of decay of the peak pressure and in the increasing time constant for the pressure wave. Although total energy is minimally affected, the energy spectrum is sensitive to nonlinear effects. The usual approach to incorporating these effects in a ray model is to propagate the waveform for each ray path according to the similitude formulas. This is what is done, for example, in REFMS (Britt et al., 1991).

The non-linear correction is made as follows. Let $S_n(x; t)$ be the idealized similitude waveform at location x, over time t. Then, for ranges at which the peak pressure is greater than 100 psi, the field is estimated as:

$$S(s(t)\ , x; t) = [\,|x|^2\, S_n(x; t)] \otimes S(\delta(t), x; t)$$

Since the model yields the full time series at each location, it can directly calculate the peak pressure, positive impulse, Goertner modified positive impulse, energy spectrum, and frequency-band values (e.g., 1/3 octave band) of the EFD. This model uses the same (similitude) approach to account for non-linearities in water-borne shock wave propagation as does the REFMS model.

Note on Propagation by Weak Shock Theory

Weak shock theory dates to the 19th century and is used in all types of shock wave propagation (in air, in water, etc.). Gaspin (1983) recommends that it be used beyond a range of:

$$R_o = 12.0 * W^{1/3}$$

where W = explosive weight in pounds, and R_o = 'limiting range' in feet. For an 8-lb NEW charge, the range is only 24 ft (7.3 m). The recommendation is to use the similitude formulas to range R_o, and the weak shock formula, thereafter.

The weak shock formulas are:

$$P = Po * \{[\ 1 + 2 * (R_o/L_o) * Ln\ (R/ R_o)]^{1/2} - 1\} / \{[R/ L_o] * Ln\ (R/ R_o)\}$$

$$T = To * [\ 1 + 2 * (R/ L_o) * Ln\ (R/ R_o)]^{1/2}$$

where: $L_o = (\rho c^3 T_o) / (P_o \beta)$, P_o = peak pressure at R_o, T_o= time constant at R_o , ρc = acoustic impedance for seawater, β= coefficient of non-linearity for water (3.5).

These formulas have been published many times, with a recent, relevant example in Richardson et al. (1995). What is sometimes not noted is the comparison of the weak shock formulas with the similitude formulas, although Rogers (1977) does address this quite well. In particular, note that the weak shock theory and the Arons et al. (1949) similitude formulas are within 20% of each other for most parameters of interest in this assessment.

3.3.3 Underwater Explosive Measurements for Validation

Because of the special geometry of MINEX (especially the shallow and uncertain depth of the explosions), there are very few measurements that can be used directly to estimate the sound field. Measurements for small shots and deeper depths are available for some of the MINEX sites, and they are useful for determining bottom interaction properties. Results for these data sets have in most cases been analyzed and incorporated into the Navy databases (OAML 2002) (which are used for this assessment). In that sense, the risk estimates have exploited the available propagation data.

3.4 Estimated Impact Areas

The modified CASS-GRAB shot-propagation model was used, together with existing environmental provinces for the MINEX sites. Because all the sites are shallow (less than 50 m), propagation model runs were made for bathymetry in the range from 10 m to 40 m.

Variations in estimated impact ranges varied as much within a single area as from one area to another. There was, however, little seasonal dependence. As a result, the impact ranges are stated as mean value with a percentage variation. As a rule, in the case of ranges determined from energy metrics, the deeper the water the shorter the range.

Table 4-1 shows the results of the model estimation.

TABLE 4-1 ESTIMATED ZOIS (KM^2) USED IN EXPOSURE CALCULATIONS FOR MINEX

Threshold	ZOIs			
	5-lb NEW	10-lb NEW	20-lb NEW	60-lb NEW
Estimated ZOI @ 13 psi	0.03 km^2 ± 10%	0.07 km^2 ± 10%	0.13 km^2 ± 10%	0.4 km^2 ± 10%
Estimated ZOI @ 182 dB re 1 μPa^2-sec	0.2 km^2 ± 25%	0.4 km^2 ± 25%	0.8 km^2 ± 25%	2.5 km^2 ± 25%

Note: The ZOI resulting from the 13 psi-ms criterion was larger than the ZOI resulting from the 205 dB re 1 uPa2-s (1/3 octave band) criterion, and was therefore used in the analysis to calculate injurious exposures (MMPA-Level A). The ZOI resulting from the 182 dB re 1 uPa2-s (1/3 octave band) criterion was larger than the ZOI resulting from the 13 psi-ms criterion, and was therefore used in the analysis to calculate non-injurious exposures (MMPA-Level B).

MMPA-Level A impact areas are dominated by the onset slight lung injury criteria (13 psi-ms). TTS is the applicable criteria to determine MMPA-Level B harassment, and the impact areas are dominated by the energy threshold (182 dB re 1 μPa^2-sec). The results for the MMPA-Extrapolation of exposures resulting from the 13 psi criterion showed that there would be zero mortality exposures, so the modeling was not completed for the 30.5 psi mortality criteria.

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APPENDIX K
REGULATORY FRAMEWORK

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APPENDIX K
REGULATORY FRAMEWORK

This appendix to the Gulf of Mexico (GOMEX) Range Complex Final Environmental Impact Statement (EIS)/Overseas EIS (OEIS) provides a general description of each resource and addresses the federal, state, and local environmental review programs that do, or may, apply to the No Action Alternative, Alternative 1, and Alternative 2. Project facilities and activities will be implemented in accordance with applicable federal laws and regulations and with State and local laws, regulations, programs, plans, and policies as applicable.

National Environmental Policy Act. This Final Environmental Impact Statement (EIS)/Overseas EIS (OEIS) has been prepared and provided for public review in accordance with the President's Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] Part 1500-1508). In 1969, Congress enacted the NEPA, which provides for consideration of environmental issues in federal agency planning and decision making. Regulations for federal agency implementation of the act were established by the CEQ. NEPA requires that federal agencies prepare an EIS for proposed actions with the potential to significantly affect the quality of human and natural environments. The EIS must disclose significant environmental impacts and inform decision makers and the public of the reasonable alternatives to the proposed action. Impacts to ocean areas of the Gulf of Mexico Study Area that lie within 12 nautical miles nm) of land (U.S. territory) are subject to analysis under NEPA. This is based on Presidential Proclamation 5928, issued December 27, 1988, in which the United States extended its exercise of sovereignty and jurisdiction under international law to 12 nm from land. The Proclamation expressly provides that it does not extend or otherwise alter existing federal law or any associated jurisdiction, rights, legal interests, or obligations.

Executive Order 12114. Executive Order (EO) 12114 directs federal agencies to provide for informed decision making for major federal actions outside the United States, including the global commons, the environment of a non-participating foreign nation, or impacts on protect global resources. An OEIS is required when an action has the potential to significantly harm the environment of the global commons. "Global commons" are defined as "geographical areas outside the jurisdiction of any nation, and include the oceans outside the territorial limits (outside 12 nm from the coast) and Antarctica. Global commons do not include contiguous zones and fisheries zones of foreign nations (32 CFR 187.3). The Navy has published procedures for implementing EO 12114 in 32 CFR 187, *Environmental Effects Abroad of Major Department of Defense Action*, as well as the October 2007 Office of the Chief of Naval Operations Instruction (OPNAVINST) 5090.1C.

Unlike NEPA, EO 12114 does not require a scoping process. However, the EIS and OEIS have been combined into one document, as permitted under NEPA and EO 12114, to reduce duplication. Therefore, the scoping requirements found in NEPA were implemented with respect to action occurring seaward of U.S. territorial waters (referred to in this Final EIS/OEIS as "U.S. territory"), and discussions regarding scoping requirements reference the combined GOMEX Final EIS/OEIS. See Section 1.5 for additional information regarding the Scope and Content of this EIS/OEIS, and Section 1.6 for a detailed discussion of the environmental review process (to include scoping actions taken for this Final EIS/OEIS).

K.1 Bathymetry and Sediments

Section 3.1 of this Final EIS/OEIS was prepared in accordance with NEPA and EO 12114, *Environmental Effects Abroad of Major Federal Actions,* as described in Chapter 1. States' jurisdictional boundaries extend 3 nm offshore of the coast. Impacts of operations evaluated under NEPA are further distinguished by state regulatory authorities where applicable. In addition, EO 13089, *Coral Reef Protection*, was issued on June 11, 1998, "to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment." Another regulation protecting the underwater environment is the Marine Protection, Research, and Sanctuaries Act, enacted by Congress in 1972. This Act prohibits dumping material into the ocean that would unreasonably degrade or endanger human health or the marine environment. Where dredging and ocean dumping of the dredged materials occur, a permit must be issued by the U.S. Corp of Engineers (USACE), which is subject to U.S. Environmental Protection Agency's (USEPA) approval.

K.2 Military Expended Materials

Federal Regulations

Resource Conservation and Recovery Act (RCRA): 42 USC § 6901 *et seq*. regulates management of solid waste and hazardous waste. The Military Munitions Rule clarifies when conventional and chemical military munitions become a hazardous waste under RCRA. RCRA provides that the USEPA may delegate authority to states to regulate hazardous waste under state law in lieu of RCRA. Regardless of USEPA-delegated hazardous waste authority, Navy facilities need to meet state hazardous waste substantive and procedural requirements under the Federal Facilities Compliance Act. These include the requirement to obtain state permits for hazardous waste management and disposal.

Military munitions are not considered hazardous waste under two conditions stated in the USEPA Military Munitions Rule and the Department of Defense (DoD) Interim Policy on Military Munitions (1997). Specifically, munitions are not considered hazardous waste when:

1) Used for their intended purpose, including training of military personnel and explosive emergency response specialists, research and development activities, and when recovered, collected, and destroyed during range clearance events.
2) Unused and being repaired, reused, recycled, reclaimed, disassembled, reconfigured, or subjected to other material recovery activities.

These two conditions cover virtually all uses of missiles, munitions, and targets at the GOMEX Range Complex.

State Regulations

Florida

Regulations for Florida hazardous waste can be found in the following:

- FS 403.01 *et seq*.;
- FAC 62-730.001 to 62-730-900;
- FAC 62-737.100 to 62-737.400; and
- FAC 62-710.210 to 62-710.901.

Hazardous waste is regulated by Florida Department of Environmental Protection (FDEP), Division of Waste Management, Bureau of Solid and Hazardous Waste. FDEP's hazardous waste management program covers:

- Hazardous waste generators;
- Transporters;
- Treatment, storage, and disposal facility (TSDF) owners and operators;
- Used oil management; and
- Universal waste.

The state has its own Superfund program, which is not as extensive as the federal Superfund program. DEP responds to hazardous substance spills and controls the funding for the cleanup of hazardous substance sites.

Alabama

Regulations for Alabama hazardous waste can be found in the following:

- Alabama Hazardous Waste Management and Minimization Act;
- Alabama Code 22-30-1 *et seq.*; and
- Alabama Administrative Code r 335-14-1 to 335-14-17.

The regulatory agency is the Alabama Department of Environmental Management (ADEM) Land Division, Hazardous Waste Branch. State hazardous waste management rules affect hazardous waste generators; transporters; owners; and operators of TSDFs; and handlers of universal waste and used oil. Alabama has RCRA authorization to administer and enforce the state's hazardous waste management rules. There are state Superfund rules for the cleanup of hazardous waste disposal sites in the state. The ADEM performs cleanup activities at state sites not listed on the federal National Priorities List (NPL). Alabama's Hazardous Substance Cleanup Fund divides liability proportionately among those responsible.

Alabama follows the federal used oil management regulations and adds several more-stringent provisions related to:

- Notification by used oil handlers;
- Container and tank management;
- Secondary containment systems;
- Labeling;
- Ignitable used oil; and
- Transporter requirements.

In Alabama, spills of oil or hazardous materials should be reported to the Alabama Emergency Management Agency. ADEM response staff is the State On-Scene Coordinator for facility-related releases of hazardous materials, including releases to state waters and oil releases to the state waters. ADEM also directs the containment, treatment, and removal of hazardous materials impacting or threatening the citizens or the environment. ADEM coordinates between the state and federal response resources of the USEPA and the U.S. Coast Guard.

Mississippi

Regulations for Mississippi hazardous waste can be found in the Solid Wastes Disposal Law of 1974, Mississippi Code Ann. 17-17-1 to 17-17-507; and Mississippi Regulation, Hazardous Waste Management Regulations, Section 260 *et seq*. The lead agency is the Mississippi DEQ, Office of Pollution Control. Mississippi's hazardous waste management rules include the RCRA rules and additional state requirements.

Louisiana

Regulations for Louisiana hazardous waste can be found in the following:

- Louisiana Hazardous Waste Control Law (LRS) 30:2171 to 30:2206;
- LAC 33:V.101 to 33:V.5311;
- LAC 33:V.1701 to 33:V.176 and Appendix; and

- LAC 33:V4549 to 33:V.4589.

The lead agency is the Louisiana DEQ, Office of Environmental Services. Hazardous waste management rules include RCRA rules and some state requirements. Louisiana classifies hazardous waste as either Category I (federal-listed waste) or Category II (federal characteristic hazardous waste). Generators are subject to federal rules and the state's requirements for generator classification, onsite storage of hazardous waste, registration, annual reports, manifests, pre-transport requirements, and fees.

Texas

Regulations for Texas hazardous waste can be found at the following:

Solid Waste Disposal Act, Texas Health and Safety Code (H&SC) 360.001, *et seq.*;

- 30 TAC 335;
- 30 TAC 335.152(a)(17) to (19);
- 30 TAC 335.112(a)(19) to (21); and
- 30 TAC Sections 327.1-327.5 (spill response).

The lead regulatory agency is the Texas Commission on Environmental Quality (TCEQ), Office of Compliance and Enforcement. Texas hazardous waste management rules include the federal RCRA rules and additional state requirements. The state's rules apply to hazardous waste generators; transporters; owners and operators of TSDFs; handlers of universal waste; and handlers of used oil. Texas has its own unique system for classifying hazardous waste. There are no equivalent federal waste classifications. TCEQ has received RCRA authorization from the USEPA to administer and enforce the state's hazardous waste management rules.

Unlike the federal law, Texas' Superfund specifies that it applies only to sites contaminated by hazardous wastes (a subset of hazardous substances) and therefore, is more limited in scope. However, TCEQ has the authority to order potentially responsible parties to clean up any "solid waste facility" that poses a threat to human health or the environment.

K.3 Water Resources

<u>Federal Regulations</u>

Clean Water Act

Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws protecting water quality are the Federal Water Pollution Control Act or Clean Water Act (CWA) (33 USC §1251, *et seq*.) as amended in 1977, the Rivers and Harbors Act (33 USC §401), and the Safe Drinking Water Act (SDWA) (42 USC §300f, *et seq*.). The CWA addresses surface water quality and preservation of wetlands. The Rivers and Harbors Act controls construction of structures and the discharge of fill into navigable waters of the United States. The SDWA addresses protection of drinking water supplies. The USEPA enforces both the CWA and the SDWA. Section 403 of the CWA provides for the protection of ocean waters (waters of the territorial seas, the contiguous zone, and the high seas beyond the contiguous zone) from point-source discharges. Under Section 403(a), USEPA or an authorized state may issue a permit for an ocean discharge only if the discharge complies with CWA guidelines for protection of marine waters. Under the CWA, territorial sea jurisdiction is defined as 3 nm from the coastal baseline [33 USC §1362 (8)].

The National Oceanic and Atmospheric Administration (NOAA) is also responsible for ocean water quality. NOAA is a trustee agency for coastal and marine resources under CWA, Comprehensive Environmental Response, Compensation, and Liability Act, also known as Superfund, the Coastal Zone Management Act (CZMA), and the Oil and Pollution Act. NOAA established programs to monitor coastal environmental quality, protect marine habitat, and restore natural resources.

The CWA was amended in 1996 to authorize the DoD and USEPA to jointly establish Uniform National Discharge Standards (UNDS) for incidental liquid discharges from Armed Forces vessels. USEPA published final rules for Phase 1 of the UNDS program. In those rules, USEPA and the Navy identified which discharges require control standards and a marine pollution control device (MPCD). The rules also identify the mechanism by which states can petition USEPA and DoD to review whether or not a discharge should require control by an MPCD, or to review a federal performance standard for an MPCD. Finally, the rules establish the processes USEPA and the states must follow to establish no-discharge zones, where any release of a specified discharge is prohibited.

According to the OPNAVINST 5090.1B, Chapter 7, as required by EO 12088, *Federal Compliance with Pollution Control Standards*, and the CWA, Navy facilities will comply with all substantive and procedural requirements applicable to point and nonpoint sources of pollution.

The CWA §402(p) establishes a framework for regulating storm water discharges under the National Pollution Discharge Elimination System (NPDES) program. 40 CFR Parts 122-125 set forth the NPDES regulations. Discharges of pollutants into waters of the United States are prohibited unless in compliance with an NPDES permit. The NPDES regulations allow authorized states to administer the NPDES program.

The CWA requires each state to establish water quality standards for its surface waters based on designated uses. For "impaired" water bodies, each state is supposed to develop total maximum daily loads (TMDL), which are the amount of pollutants that can be assimilated by a body of water without exceeding the water quality standards (WQS). Based on the developed TMDLs, the state or USEPA can limit any discharge of pollutants to a level sufficient to ensure compliance with state WQSs.

The TMDL program requires that states:

- Establish WQSs for its waters.
- Monitor the conditions of its waters.
- List waterbodies that do not meet WQSs with technology-based controls alone (303(d) list).
- Set priority rankings for the waterbodies listed.
- Establish TMDLs that meet WQSs for each listed waterbody.
- Solicit public comment.
- Submit 303(d) list and TMDLs to USEPA for approval.
- Incorporate TMDLs into the State's Continuing Planning Process.

Statutory water quality authorities for the five states (Florida, Alabama, Mississippi, Louisiana, and Texas) within the GOMEX Study Area are contained in the following agencies and regulations.

State Regulations

Florida

Regulations for Florida water quality can be found in the Florida Air and Water Pollution Control Act, Florida Statutes 403.011 to 403.067), Florida Safe Drinking Water Act (Statute. 403.850 to 403.88), Statute 373 (storm water), and Florida Administrative Code (F.A.C.) Ch. 62-65 (storm water). Florida's surface water quality standards system is published in F.A.C. 62-302 (and 62-302.530). The components of this system include: classifications, criteria, an anti-degradation policy, and special protection of certain waters (Outstanding Florida Waters).

The regulatory agencies are the FDEP, FDEP Division of Water Resource Management, and five regional Florida Water Management Districts (WMD), including the Northwest Florida WMD, Suwanee River

WMD, St. Johns River WMD, Southwest Florida WMD, and the South Florida WMD (DoN, 2006). Only the Northwest Florida WMD is associated with the GOMEX Study Area.

Alabama

Regulations for Alabama water quality can be found in the Alabama Environmental Management Act (Alabama Administrative Code [A.A.C.] 22-22A-1, *et seq*.); Alabama Water Pollution Control Act (A.A.C. 22-22-1, *et seq*.); A.A.C. 335-6-1 to 335-6-14; NPDES permit program (A.A.C. r 335-6-6); State indirect discharge (A.A.C. 335-6-5-.03); Storm water discharge permits (A.A.C. 335-6-6-.23); and Alabama Underground Storage Tank and Wellhead Protection Act (A.A.C. 22-36-1, *et seq*.) and A.A.C. 335-6-15 to 335-6-16. Alabama's surface water quality standards system is published in A.A.C. 335-6-10 (Water Quality Criteria).

Alabama Department of Environmental Management Water Division enforces the provisions for water pollution control and wastewater discharge permits program. Alabama's water rules impose additional monitoring requirements, fees, and permit conditions over the federal rules. The water quality standards include quality criteria and use classifications that form the basis of the water pollution control permitting programs. ADEM evaluates and classifies all waters of the state based on existing and expected uses.

Mississippi

Regulations for Mississippi water quality can be found in the Mississippi Administrative Code (M.A.C) Title 49 Chapter 27 wetlands protection; M.A.C. Title 49 Chapters 17 – 19 for protection of public health and welfare associated with waters for public consumption; propagation of fish (and other aquatic life) and wildlife; and recreational, industrial, and agricultural uses. Mississippi's surface WQS system is published in M.A.C. Title 49 Chapters 17-19, as well as in a document entitled "The State of Mississippi Water Quality Criteria for Intrastate, Interstate, and Coastal Waters" (MCEQ, 2007).

The Mississippi MDEQ Office of Land and Water Resources (OLWR) enforces the provisions for water pollution control, wastewater discharge permits program, and water use. Mississippi's water rules impose additional monitoring requirements, fees, and permit conditions over the federal rules. The WQSs include quality criteria and use classifications that form the basis of the water pollution control permitting programs. MDEQ OLWR evaluates and classifies all waters of the state based on existing and expected uses.

Louisiana

Regulations for Louisiana water quality can be found in Louisiana Administrative Code (L.A.C. Title 33 Part 4 – Water Quality. L.A.C. Title 33 Part 4 Chapter 11 contains Louisiana's surface water quality standards.

The Louisiana LDEQ Office of Environmental Services (OES) is the lead entity in Louisiana for the enforcement of water pollution control, wastewater discharge, and water use provisions. Louisiana water rules impose additional monitoring requirements, fees, and permit conditions over the federal rules. The WQSs include quality criteria and use classifications that form the basis of the water pollution control permitting programs. LDEW OES evaluates and classifies all waters of the state based on existing and expected uses.

Texas

Regulations for Texas water quality can be found in the Texas Clean Water Act (Texas Administrative Code [T.A.C.] Title 30 Chapters 210 – 311. T.A.C. Title 30 Chapter 307 contains Texas' surface water quality standards.

The TCEQ Office of Permitting, Remediation and Registration and Office of Compliance and Enforcement are the lead state entities for the enforcement of water pollution control, wastewater discharge, and water use provisions. Texas water rules impose additional monitoring requirements, fees, and permit conditions over the federal rules. The WQSs include quality criteria and use classifications that form the basis of the water pollution control permitting programs. TCEQ evaluates and classifies all waters of the state based on existing and expected uses.

K.4 Air Quality

Federal Air Quality Requirements

The USEPA is the agency responsible for enforcing the federal Clean Air Act (CAA) of 1970 and its 1977 and 1990 amendments (42 USC §7401, *et seq*.). The purpose of the CAA is to classify areas as to their attainment status relative to the National Ambient Air Quality Standards (NAAQS), to develop schedules and strategies to meet the NAAQS, and to regulate emissions of criteria pollutants and air toxics to protect public health and welfare. Under the CAA, individual states are allowed to adopt ambient air quality standards and other regulations, provided they are at least as stringent as federal standards.

The USEPA requires each state to prepare a State Implementation Plan (SIP) that describes how that state will achieve compliance with the NAAQS. A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with all federal air quality standards. The predominant air quality regulations promulgated under the CAA potentially applicable to the proposed action include:

- National Ambient Air Quality Standards; and
- General Conformity Rule.

Implementation of the CAA is carried out through rules promulgated by the states through their respective agencies. For the proposed action, these agencies include: Florida Department of Environment Protection; Alabama Department of Environmental Management; Mississippi Department of Environmental Quality; Louisiana Department of Environmental Quality; and Texas Commission on Environmental Quality.

National Ambient Air Quality Standards

The CAA requires the USEPA to set NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment (Table K-1). The CAA established two types of national air quality standards (primary and secondary). Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

TABLE K-1 National Ambient Air Quality Standards

Pollutant	Primary Standards	Averaging Times	Secondary Standards
Carbon Monoxide	9 ppm (10 $\mu g/m^3$)	8-hour[1]	None
	35 ppm (40 $\mu g/m^3$)	1-hour[1]	None
Lead	0.15 $\mu g/m^3$	Rolling 3-Month Average	Same as Primary
	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary
Lead	1.5 $\mu g/m^3$	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 $\mu g/m^3$)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM_{10})	150 $\mu g/m^3$	24-hour[3]	Same as Primary
Particulate Matter ($PM_{2.5}$)	15.0 $\mu g/m^3$	Annual[4] (Arithmetic Mean)	Same as Primary
	35 $\mu g/m^3$	24-hour[5]	Same as Primary
Ozone	0.075 ppm (2008 std)	8-hour[6]	Same as Primary
	0.08 ppm (1997 std)	8-hour[7]	Same as Primary
	0.12 ppm	1-hour[8]	Same as Primary
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 $\mu g/m^3$ 3-hour[1]

Source: USEPA, 2009, Last updated July 14th, 2009.

Notes:

1. Not to be exceeded more than once per year.
2. Final Rule signed October 15, 2008.
3. Not to be exceeded more than once per year on average over 3 years.
4. To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0$\mu g/m^3$.
5. To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35$\mu g/m^3$ (effective December 17, 2006).
6. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
7. (a) To attain this standard, the 3-year average of the fourth highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. (b) The 1997 standard – and the implementation rules for that standard – will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
8. (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is ≤ 1. (b) As of June 15, 2005 EPA has revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) Areas. For one of the 14 EAC areas (Denver, CO), the 1-hour standard was revoked on November 20, 2008. For the other 13 EAC areas, the 1-hour standard was revoked on April 15, 2009.

General Conformity Rule

Section 176 (c) (1) of the CAA, commonly known as the General Conformity Rule (Conformity), requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining the NAAQS for criteria pollutants. To ensure Conformity, a federal action must not contribute to new violations of ambient air quality standards, increase the frequency or severity of existing violations, or delay timely state and/or regional attainment of standards.

The USEPA rule implementing the conformity requirements, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans," was published on November 30, 1993 at 58 Federal Register 63214 and codified at 40 CFR Parts 51 and 93. Part 51, Subpart W, contains the General Conformity Rule provisions that must be incorporated into SIPs, including the requirement that States revise the SIPs to include the conformity requirements. Once a SIP has been revised and approved by USEPA, the conformity requirements become federally enforceable and federal agencies are subject to the conformity requirements as they appear in the SIP. In cases where a Federal Implementation Plan (FIP) is in effect, federal actions must conform to the requirements of the FIP. Each federal agency taking an action subject to the General Conformity Rule must make its own conformity determination (40 CFR 93.154).

A Conformity Review must be completed for every Navy action that generates air emissions in non-attainment or maintenance (formerly non-attainment) areas. The action proponent is responsible for the documentation. The Conformity Review can be satisfied by (1) a determination that the action is not subject to the General Conformity Rule, (2) a Record of Non-Applicability, or (3) a Conformity Determination.

The action proponent may make a determination that the proposed action is not subject to the General Conformity Rule. Actions not subject to the rule are actions that occur in attainment areas, and that do not generate emissions in non-attainment areas; or actions where the criteria pollutant emitted (or its precursors) is one for which the area is in attainment. If NEPA documentation is prepared for the action, the determination shall be described in that documentation; otherwise, no documentation is required. The GOMEX Range Complex Final EIS/OEIS includes the determination that all actions occurring in the attainment areas (*i.e.*, Study Area counties of Florida, Alabama, Mississippi, Louisiana, and Texas) are not subject to the General Conformity Rule.

<u>State Air Quality Requirements</u>

Florida

Air quality in Florida is regulated by the FDEP, Division of Air Resource Management.

. Pertinent regulations for Florida air quality can be found in F.A.C. sections as follows:

- 62-204.240 (Ambient Air Quality Standards);
- 62-204.340 (Designation of Attainment, Nonattainment and Maintenance Areas);
- 62-204.500 (Conformity); and
- 62-204.800 (Federal Regulations Adopted by Reference).

The Florida SIP focuses on permitting requirements, HAPs, source specific emission standards, and numerous other air-related requirements.

Alabama

Pertinent regulations for Alabama air quality can be found at Alabama Administrative Code, revised (Ala. Admin. Code r 335-3):

- 335-3-1 (General Provisions);
- 335-3-14 to 335-3-16 (Permits);
- 335-3-17 (Conformity of Federal Actions to SIPs);
- 335-3-4 (Control of Particulate Emissions); and
- 335-3-6 (Control of Organic Emissions

Mississippi

Pertinent regulations for Mississippi air quality can be found at:

- MS Reg., APC-S-1, Air Emission Regulations for the Prevention, Abatement and Control of Air Contaminants;
- MS Reg., APC-S-4, Ambient Air Quality Standards;
- MS Reg., APC-S-6, Air Emissions Operating Permit Regulations for the Purposes of Title V of the Federal Clean Air Act.

The lead agency is the Mississippi DEQ, Office of Pollution Control, Air Division. The Mississippi SIP was submitted to the USEPA in 1972 and is frequently amended to comply with the CAA amendments.

Louisiana

Pertinent regulations for Louisiana air quality can be found at Louisiana Administrative Code (LAC) Title 33, Part III (Air):

- Chapter 7, Ambient Air Quality;
- Chapter 9, General Regulations on Control of Emissions and Emission Standards;
- Chapter 14, Conformity; and
- Chapter 21, Control of Emission of Organic Compounds.

Lead agencies are the Louisiana DEQ Office of Environmental Assessment, DEQ Office of Environmental Services, and DEQ Office of Environmental Compliance.

Texas

Pertinent regulations for Texas air quality can be found in Title 30 of the Texas Administrative Code (TAC) in the following chapters:

- Chapter 101, General Air Quality Rules (including Conformity of General Federal Actions to State Implementation Plans at §101.30);
- Chapter 106, Permits by Rule;
- Chapter 111, Control of Air Pollution from Visible Emissions and Particulate Matter;
- Chapter 113, Standards of Performance for HAPs and for Designated Facilities and Pollutants; and
- Chapter 115, Control of Air Pollution from Volatile Organic Compounds.

The TCEQ is the lead agency working with local air pollution control agencies.

K.5 Noise Environment

The Navy meets its noise management obligations at air-to-ground training ranges (*i.e*., on-land targets) through the Range Air Installations Compatible Use Zone (RAICUZ) program found in OPNAV Instruction 3550.1A (DoN, 2008). RAICUZ Program implementation includes developing current and future Range Compatibility Zones and current and prospective noise analysis for the range, partnering with appropriate federal, state, and local government agencies (working with these agencies for compatible land use near and around the ranges), considering operational alternatives as necessary, implementing a complaint response program in the surrounding communities, and developing strategies to protect the long term viability of the range while maintaining a high degree of public safety (DoN, 2008a). According to Appendix C of OPNAVINST 3550.1A, the only air-to-ground ranges within the GOMEX Range Complex wherein the RAICUZ program requirements must be implemented are the McMullen County Range and the Noxubee County Range (DoN, 2008). The RAICUZ studies for the McMullen County Range and the Noxubee County Range are discussed further in Section 3.5.2.2.

The RAICUZ program is inapplicable to the offshore GOMEX OPAREAs. The GOMEX OPAREAs are distant from any noise receptors and no recurring noise studies are required for these vast ocean areas.

Although not applicable to the GOMEX EIS/OEIS Study Area, the DoD has a similar program for air stations, called the Air Installations Compatible Use Zones (AICUZ) program found at OPNAV Instruction 11010.36C (DoN, 2008b). The foundation of the AICUZ program is an active local command effort to work with local, state, regional, other federal agencies, and community leaders to encourage compatible development of land adjacent to military airfields. The Navy is particularly susceptible to such encroachment with many of its installations located in high growth urban areas. The AICUZ process involves four basic steps:

1. Develop, and periodically update, a study for each air installation to quantify aircraft noise zones and identify accident potential zones; develop a noise reduction strategy for impacted lands, both on and off the installation; prepare a compatible land use plan for the installation and surrounding areas; and develop a strategy to promote compatible development on land within these areas.
2. Develop a prospective long-term (5 to 10 years) AICUZ analysis to illustrate impact on known future missions and how it will be implemented by the AICUZ program.
3. Implement the AICUZ plan for the installation including coordination with federal, state and local officials to maintain public awareness of AICUZ.
4. Identify and program property rights acquisition and sound suppression projects when appropriate in critical areas, where action to achieve compatibility within AICUZ program guidelines through local land use controls is either impossible or has been attempted and proven unsuccessful.

K.6 Marine Communities

The various federal laws and regulations that afford protection and management of marine communities are primarily aimed at specific community components such as ESA-listed species and designated critical habitat; marine mammals; federally managed fish species and essential fish habitat (EFH); and migratory birds. Regulatory frameworks for these marine community components are presented in Sections K.7 through K.10 (Marine Communities; Marine Mammals; Sea Turtles; Fish and Essential Habitat, Seabirds and Migratory Birds). The National Marine Sanctuaries Act, EO 13089 *Coral Reef Protection*; and EO 13158 *Marine Protected Areas* also apply to marine communities.

National Marine Sanctuaries Act

The National Marine Sanctuaries Act prohibits the destruction of, loss of, or injury to any sanctuary resource managed under law or regulations, and any violation of the act, any regulations, or permits issued thereunder (16 U.S.C. 436). In addition, Section 304(d) of the National Marine Sanctuaries Act (16 U.S.C. 1434[d]) requires federal agencies to consult with the Secretary of Commerce, through NOAA, on federal agency actions, internal or external, to any national marine sanctuary that are likely to destroy, cause the loss of, or injure any sanctuary resource. Under Section 304(d), if NOAA determines that the action is likely to destroy, cause the loss of, or injure sanctuary resources, NOAA shall recommend reasonable and prudent alternatives that can be taken by a federal agency to protect sanctuary resources. The federal agency may choose not to follow these alternatives provided the reasons are submitted in writing. However, if the head of a federal agency takes an action other than an alternative recommended by NOAA and such action results in the destruction of, loss of, or injury to a sanctuary resource, the head of the agency shall promptly prevent and mitigate further damage and restore or replace the sanctuary resource in a manner approved by NOAA. Regulations for each designated national marine sanctuary specifically address military and defense activities. No national marine sanctuaries are located within the GOMEX Study Area. The Flower Garden Banks National Marine Sanctuary is located in the Gulf of Mexico approximately 110 miles south of the Texas/Louisiana border. However, it is outside of the

GOMEX Study Area, over 100 nm west of the New Orleans OPAREA and over 100 nm east of the Corpus Christi OPAREA.

Executive Order 13089, *Coral Reef Protection*

In accordance with EO 13089, all federal agencies whose actions may affect U.S. coral reef ecosystems shall: (1) identify their actions that may affect U.S. coral reef ecosystems; (2) utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and (3) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

Executive Order 13158, *Marine Protected Areas*

Marine Protected Areas (MPAs) are defined in EO 13158 as: "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." MPAs are designated and managed at all levels of government by a variety of agencies. They have been established by well over 100 legal authorities, with some federal and state agencies managing more than one MPA program, each with its own legal purpose. Similarly, the level of protection provided by these MPAs ranges from fully protected or non-take marine reserves to sites allowing multiple uses. Examples of MPAs include National Marine Sanctuaries and National Wildlife Refuges (NMPAC, 2008).

Recognizing the significant role that MPAs play in conserving marine resources, EO 13158 calls for the development of a National System of Marine Protected Areas (national system). The National Marine Protected Areas Center, within NOAA's Office of Ocean and Coastal Resource Management, published a framework for the national system in November 2008 (NMPAC, 2008). This framework includes national system goals and priority conservation objectives; MPA eligibility criteria and other key definitions; and a process for MPAs to be included in the national system. An iterative process will be used to develop the National System of MPAs. Initially, existing MPAs that meet specified criteria and targeted conservation objectives will be included through the nomination and review process established in the framework. The framework also lays out the processes for identifying conservation gaps in the national system and developing recommendations for new or enhanced MPAs through collaborative ecosystem-based MPA planning. However, neither EO 13158 nor the framework provides authority to designate or establish new MPAs or alter protections afforded by existing MPAs. The first List of National System MPAs was published in April 2009 (NOAA, 2009).

Section 5 of EO 13158 calls for federal agencies to "avoid harm" to the natural and cultural resources protected by MPAs that become part of the national system. Specifically, EO 13158 stipulates, "each Federal agency whose actions affect the natural or cultural resources that are protected by MPAs shall identify such actions. To 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. In implementing this section, each federal agency shall refer to the MPAs identified under subsection 4(d) of this order."

Implementation of Section 5 is governed by existing authorities such as NEPA, Endangered Species Act, Marine Mammal Protection Act, and others. EO 13158 does not provide any new authority for any federal agency or the MPA Center to review activities of any other federal agency or alter standards for existing review. The thresholds and/or triggers for agency action under Section 5 are the same as those listed under any existing authority or authorities that normally require agency review of a proposed activity. Section 5 does, however, require agencies to ensure that their activities avoid harm to the natural and cultural resources as protected by the MPAs included in the national system (to the extent permitted by law and to the maximum extent practicable) when fulfilling their existing requirements for identifying, reviewing, and implementing activities. Pursuant to Section 5 of EO 13158, agency requirements apply only to the natural or cultural resources specifically afforded protection by the site as described on the

List of National System MPAs. For example, within national system MPAs established for sustainable production, other resources not specifically protected by the MPA would not be subject to the "avoid harm" provision (NMPAC, 2008).

As discussed in Section 3.6.2.4, 24 sites within or in the vicinity of the Study Area are listed in the current MPA Inventory maintained by the National MPA Center. Of these, 14 are included on the official List of National System MPAs established in April 2009. The National System MPAs include 13 National Wildlife Refuges and the Flower Garden Banks National Marine Sanctuary. All of these National System MPAs are located outside of the GOMEX Study Area.

K.7 Marine Mammals

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361 et seq.) established, with limited exceptions, a moratorium on the "taking" of marine mammals (16 U.S.C. 1371). Except as provided, it is unlawful for any person or vessel subject to the jurisdiction of the United States to "take" any marine mammal on the high seas (16 U.S.C. 1372). The term "take," as defined in Section 3 (16 U.S.C. 1362) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" was further defined in the 1994 amendments to the MMPA, which provided two levels of "harassment," Level A (potential injury) and Level B (potential disturbance).

The National Defense Authorization Act (NDAA) of Fiscal Year (FY) 2004 (Public Law [PL] 108-136) amended the definition of harassment as applied to military readiness activities or scientific research activities conducted by or on behalf of the federal government, consistent with Section 104I(3) [16 USC 1374 I(3)]. The FY 2004 NDAA adopted the definition of "military readiness activity" as set forth in the FY 2003 NDAA (PL 107-314). Military training activities within the Gulf of Mexico Range Complex constitute military readiness activities as that term is defined in PL 107-314 because training activities constitute "training and operations of the Armed Forces that relate to combat" and constitute "adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use." For military readiness activities, the relevant definition of harassment is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment").
- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") [16 USC 1362 (18)(B)(i)(ii)].

Section 101(a)(5) of the MMPA directs the Secretaries of the Departments of Commerce and Interior (depending upon the species for which takes are requested) to allow, upon request, the incidental (but not intentional) taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing) if certain findings are made and regulations are issued. Authorization will be granted by the Secretary for the incidental take of marine mammals if the taking will have a negligible impact on the species or stock; will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses; and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth.

Section 101(a)(5) of the MMPA directs the Secretaries of the Departments of Commerce and Interior (depending upon the species for which takes are requested) to allow, upon request, the incidental (but not intentional) taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing), if certain findings are made and regulations are issued. Authorization will be granted by the Secretary for the incidental take of marine mammals if the taking will have a negligible impact on the species or stock; will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses; and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth.

As discussed in Section 3.7, several species of marine mammals may occur in the GOMEX Range Complex. Accordingly, the Navy has completed an analysis to determine if the action would result in incidental harassment of individual marine mammals (Level A or B harassment, as defined by MMPA) or if the action would have more than a negligible impact on marine mammal populations. The Navy submitted to NMFS an application for a Letter of Authorization under MMPA (letter dated 16 October 2008; Appendix C) for Alternative 2 (the Preferred Alternative).

Endangered Species Act

The ESA of 1973 established protection over and conservation of threatened and endangered species and the ecosystems upon which they depend. An "endangered" species is a species that is in danger of extinction throughout all or a significant portion of its range, while a "threatened" species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) jointly administer the ESA and are also responsible for the listing of species (*i.e.*, the labeling of a species as either threatened or endangered). The USFWS has primary management responsibility for management of terrestrial species, freshwater species, sirenians, sea otters, polar bears, and sea turtles (while they are on land); the NMFS has primary responsibility for all other marine mammals (cetaceans and pinnipeds), sea turtles (in the water),and anadromous fish species (species that migrate from saltwater to freshwater to spawn). The ESA mandates the designation of geographic areas as critical habitat for threatened or endangered species.

The ESA requires federal agencies to conserve listed species and consult with the USFWS and/or NMFS to ensure that proposed actions that may affect listed species or critical habitat are consistent with the requirements of the ESA. The ESA specifically requires agencies not to "take" or "jeopardize" the continued existence of any endangered or threatened species, or to destroy or adversely modify habitat critical to any endangered or threatened species. The USFWS or NMFS may authorize incidental take of listed species by issuing an Incidental Take Statement under Section 7 of the ESA. Under Section 9 of the ESA, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect. Under Section 7 of the ESA, "jeopardize" means to engage in any action that would be expected to reduce appreciably the likelihood of the survival and recovery of a listed species by reducing its reproduction, numbers, or distribution.

Seven marine mammal species that are listed as endangered under the ESA could potentially occur in the GOMEX Range Complex. Accordingly, the Navy has initiated formal ESA Section 7 consultation with NMFS for listed whale species and has completed the ESA Section 7 consultation process with USFWS for the West Indian manatee. Marine mammal critical habitat for listed species has not been designated under the ESA in the GOMEX Range Complex. Copies of correspondence with NMFS and USFWS are in Appendix C.

K.8 Sea Turtles

Endangered Species Act.

As discussed in Section K.7, the ESA established protection over and conservation of threatened and endangered species. All five species of sea turtles that potentially occur in the Gulf of Mexico Range Complex are listed as threatened or endangered. Therefore, the ESA requirements discussed in Section K.8 are applicable to the analysis of sea turtles.

The Navy has initiated formal ESA Section 7 consultation with NMFS for listed sea turtle species. The Proposed Action would have no effect on sea turtles on land; therefore consultation with USFWS is not required. Critical habitat for listed sea turtle species has not been designated under the ESA in the GOMEX Range Complex. Copies of correspondence with NMFS and USFWS are in Appendix C.

K.9 Fish and Essential Fish Habitat

Magnuson-Stevens Fishery Conservation and Management Act

The Fishery Conservation and Management Act of 1976 (later changed to the Magnuson Fishery Conservation and Management Act in 1980) established a 200 nm fishery conservation zone in U.S. waters and a regional network of Fishery Management Councils. The Fishery Management Councils are composed of federal and state officials, including the USFWS, which oversee fishing activities within the fishery management zone. In 1996, the Magnuson Fishery Conservation and Management Act was reauthorized and amended as the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), known more popularly as the Sustainable Fisheries Act. The MSFCMA mandated numerous changes to the existing legislation designed to prevent overfishing, rebuild depleted fish stocks, minimize bycatch, enhance research, improve monitoring, and protect fish habitat.

One of the most significant mandates in the MSFCMA is the Essential Fish Habitat provision, which provides the means to conserve fish habitat. The EFH mandate requires that the regional Fishery Management Councils, through federal Fishery Management Plans, describe and identify EFH for each federally managed species, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitats. Congress defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 USC 1802[10]). The term “fish” is defined in the MSFCMA as “finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds.” The regulations for implementing EFH clarify that “waters” include all aquatic areas and their biological, chemical, and physical properties, while “substrate” includes the associated biological communities that make these areas suitable fish habitats (CFR 50:600.10). Habitats used at any time during a species’ life cycle (*i.e.*, during at least one of its life stages) must be accounted for when describing and identifying EFH. In addition to EFH designations, areas called habitat areas of particular concern (HAPC), which are a subset of designated EFH that is especially important ecologically to a species/life stage and/or is vulnerable to degradation, are also to be designated to provide additional focus for conservation efforts (50 CFR 600.805-600.815). Categorization as HAPC does not confer additional protection or restriction to designated areas.

Authority to implement the MSFCMA is given to the Secretary of Commerce through the NMFS. The MSFCMA requires that EFH be identified and described for each federally managed species. The NMFS and regional Fishery Management Councils determine the species distributions by life stage and characterize associated habitats, including HAPC. The MSFCMA requires federal agencies to consult with the NMFS on activities that may adversely affect EFH, or when the NMFS independently learns of a federal activity that may adversely affect EFH. The MSFCMA defines an adverse effect as “any impact which reduces quality and/or quantity of EFH [and] may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species’ fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions” (50 CFR 600.810).

As discussed in Section 3.9.2, Affected Environment, EFH has been designated in the GOMEX Range Complex. Accordingly, the Navy evaluated the potential impacts of all alternatives on EFH and concluded there would not be a reduction in the quality or quantity of EFH and therefore no adverse impact on EFH would result and no consultation was necessary.

Endangered Species Act

As discussed in Section K.7, the ESA established protection over and conservation of threatened and endangered species. Portions of the Study Area are within the current or historic ranges of the Gulf sturgeon (*Acipenser oxyrinchus desotoi*) and smalltooth sawfish (*Pristis pectinata*), which are federally listed threatened and endangered, respectively. Therefore, the ESA requirements discussed in Section K.7 are applicable to the analysis for the gulf sturgeon and smalltooth sawfish. NMFS proposed critical habitat for the smalltooth sawfish on November 20, 2008, but none of the proposed critical habitat is within the GOMEX Study Area. The Navy is consulting with NMFS regarding its determination of effect for the Preferred Alternative (Alternative 2) and federally listed fish. Copies of correspondence with the NMFS are provided in Appendix C of this Final EIS/OEIS.

K.10 Sea Birds and Migratory Birds

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 is the primary legislation in the United States established to conserve migratory birds. It implements the United States' commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The MBTA prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. The species of birds protected by the MBTA appears in Title 50, Section 10.13, of 50 CFR 10.13). On December 2, 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the MBTA to prescribe regulations to exempt the Armed Forces from the incidental take prohibitions of the MBTA during military readiness activities authorized by the Secretary of Defense.

Congress defined military readiness activities as all training and operations of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Congress further provided that military readiness activities do not include: (A) the routine operation of installation operating support functions, such as administrative offices, military exchanges, commissaries, water treatment facilities, storage facilities, schools, housing, motor pools, laundries, morale, welfare, and recreation activities, shops and mess halls; (B) the operation of industrial activities; or (C) the construction or demolition of facilities used for a purpose described in (A) or (B). The training operations that would occur in the Gulf of Mexico Range Complex under the proposed action are military readiness activities.

The final rule authorizing the Department of Defense to take migratory birds during military readiness activities was published in the Federal Register on February 28, 2007. The regulation can be found at 50 CFR Part 21. The regulation provides that the Armed Forces must confer and cooperate with the USFWS on development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species.

The requirement to confer with the USFWS is triggered by a determination that the military readiness activity in question will have a significant adverse effect on a population of migratory bird species. An activity has a significant adverse effect if, over a reasonable period of time, it diminishes the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem. A population is defined as "a group of distinct, coexisting, same species, whose breeding site fidelity, migration routes, and wintering areas are temporally and spatially stable, sufficiently distinct geographically (at some point of the year), and adequately described so that the population can be effectively monitored to discern changes in its status." Assessment of impacts should take into account yearly variations and migratory movements of the impacted species.

Endangered Species Act

As discussed in Section K.7, the ESA established protection over and conservation of threatened and endangered species, including bird species that are federally listed as threatened or endangered. One federally listed seabird species (brown pelican, *Pelecanus occidentalis*) potentially occurs within the Gulf of Mexico Range Complex. Therefore, the ESA requirements discussed in Section K.7 are applicable to the analysis of the brown pelican. The Navy has completed informal ESA Section 7 consultation with

USFWS regarding its determination of effect for the Preferred Alternative (Alternative 2) and the brown pelican. In a letter dated 9 March 2009 (Appendix C), USFWS concurred with the Navy's determination that Alternative 2 may affect, but is not likely to adversely affect the listed brown pelican.

K.11 Terrestrial and Freshwater Biological Resources

Federal Regulations

Endangered Species Act

As discussed in Section K.7, the ESA established protection over and conservation of threatened and endangered species, including terrestrial and freshwater species that are federally listed as threatened or endangered. As discussed in Section 3.11, several federally listed terrestrial species potentially occur within the Gulf of Mexico Range Complex. Therefore, the ESA requirements discussed in Section K.7 are applicable to the analysis of terrestrial species. The Navy has completed informal ESA Section 7 consultation with USFWS regarding its determination of effect for the Preferred Alternative (Alternative 2) and terrestrial species. In a letter dated 9 March 2009 (Appendix C), USFWS concurred with the Navy's determination that Alternative 2 would have no effect or may affect, but is not likely to adversely affect the listed terrestrial species.

State Regulations

Florida

The State of Florida has three laws dealing with the protection of wildlife and plant species:

- ***The Florida Endangered and Threatened Species Act of 1977*** – This act includes no specific prohibitions or penalties, but does establish the conservation and sustainable management of endangered and threatened species as State of Florida policy.
- ***Endangered Species Protection Act*** **–** This act prohibits the intentional wounding or killing of any fish or wildlife species designated by the Florida Game and Fresh Water Fish Commission as "endangered", "threatened" or of “special concern.” This prohibition also extends to the intentional destruction of the nests of any such species.
- ***Preservation of Native Flora of Florida Act*** **-** This act includes several prohibitions covering the "willful destroying or harvesting" of such plants, but also contains an exemption for agricultural and silvicultural uses. This law is most relevant to commercial exploitation of rare plants.

In 1994, a cooperative program was initiated between the Florida Department of Agriculture and Consumer Services (FDACS), the USEPA, and the USFWS to protect federally listed threatened and endangered species from harm by pesticides with minimum disruption to forestry, agriculture, and other interests. Compliance by pesticide users with Florida’s Endangered Species Protection Program will become mandatory when the USEPA fully implements its program through pesticide limitation statements on certain pesticide product labels that will reference “County Bulletins.” The cornerstone of the initial phase of the Florida pilot program is the development of three County Bulletins describing the safe use of pesticides in Florida Torreya (*Torreya taxifolia*) habitat. Bulletins are currently available for Jackson, Gadsen, and Liberty Counties. Landowner agreements and memoranda of agreement between agencies will also be utilized through this program to protect listed species.

Mississippi

In 1974, the State of Mississippi enacted the Mississippi Nongame and Endangered Species Conservation Act (Mississippi Administrative Code [M.A.C.] 49-5-101). The state protection extends to 67 species statewide, but the act does not cover plants. The act also authorizes the Mississippi Department of Wildlife, Fisheries and Parks to manage and protect these species, maintain state parks, and maintain public hunting areas.

Texas

In 1973, the Texas legislature authorized the Texas Parks and Wildlife Department (TPWD) to establish a list of endangered animals in the state. Endangered species are those species that TPWD determines are "endangered of statewide extinction." Threatened species are those species that TPWD has determined are likely to become endangered in the future. Laws and regulations pertaining to endangered or threatened animal species in Texas are contained in Chapters 67 and 68 of the Texas Parks and Wildlife Code and Sections 65.171 – 65.176 of Title 31 of the TAC.

In 1988, the Texas legislature authorized TPWD to establish a list of threatened and endangered plant species for the state. Laws and regulations pertaining to endangered or threatened species are contained in Chapter 88 of the Texas Parks and Wildlife Code and Sections 69.01 – 69.9 of the TAC.

K.12 Land Use

The Land Use section was prepared in accordance with NEPA and EO 12114, *Environmental Effects Abroad of Major Federal Actions*, as described in Chapter 1. States' jurisdictional boundaries extend 3 nm offshore. Impacts of operations evaluated under NEPA are further distinguished by State regulatory authorities where applicable.

Congress ceded title to the submerged lands to the states through the Submerged Lands Act of 1953 (SLA) (43 U.S.C. §§1301-1315 [2002]). However, the United States retained its navigational servitude and asserted paramount rights to conduct any activity on the submerged lands that promote commerce, navigation, national defense, or international affairs. Navy training activities may need to be coordinated with the appropriate state agencies in order to avoid state or private uses that might conflict with the United States' paramount right to conduct national defense or navigational activities over state submerged lands.

K.13 Cultural Resources

Federal Regulations

Numerous laws and regulations mandate that possible effects on important cultural resources be considered during the planning and execution of federal undertakings. These laws define the compliance process and federal agency responsibilities, as well as prescribe the relationship among other involved agencies such as the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation officer (SHPO).

These mandates include provisions of NEPA and Sections 106 and 110 of the National Historic Preservation Act (NHPA) and their implementing regulations at 40 CFR 1500 and 36 CFR 800, respectively. Section 110 of the NHPA requires federal agencies to inventory resources present in the Area of Potential Effect. Section 106 requires the agency to evaluate these resources for eligibility for listing on the National Register of Historic Places (NRHP). The federal agency must also take into account the effects of their actions on properties listed or eligible for listing on the NRHP, and provide the ACHP an opportunity to comment on the project. The ACHP regulations at 36 CFR 800 specify a process of consultation to help meet this requirement.

Other relevant laws include the 1906 Antiquities Act (16 U.S.C. 431); the Historic Sites Act of 1935; Submerged Lands Act of 1953; the Archaeological Resource Protection Act of 1979 (16 USC 470aa-470-mm), which prohibits removal of items of archaeological interest from federal lands without a permit; the Abandoned Shipwreck Act of 1987; and the Abandoned Shipwreck Act Guidelines (NPS, 2007) (55 FR 50116, 55 FR 51528, and 56 FR 7875). The Abandoned Shipwreck Act extended the jurisdiction of abandoned shipwrecks in U.S. waters, considering them U.S. property, and transferred management authority to the states. However, lost U.S. Naval vessels and downed aircraft remain the property of the United States regardless of where they were lost or the passage of time. These resources are administered by the U.S. Naval Historical Center. Commissioned Confederate vessels are the property of the United States and are administered by the General Services Administration.

In 2004, the Sunken Military Craft Act (passed as Title XIV of the FY 2005 National Defense Authorization Act) preserved the "sovereign status of sunken U.S. military vessels and aircraft by codifying both their protected sovereign status and permanent U.S. ownership regardless of the passage of time" or where they are located, in recognition of the probable historic status of the craft and the fact that they often contain the remains of U.S. military personnel. The Sunken Military Craft Act explicitly states that the protection of the law "shall not be extinguished by the passage of time, regardless of when the sunken military craft sank regardless of age" (Trocolli, *et al*., 2005).

Government-to-government consultation with federally recognized American Indian tribes is required by EO 13007, May 24, 1996. Military regulatory mandates include DoD Directive 47 10.I.

An Integrated Cultural Resources Management Plan (ICRMP) is an internal compliance and management tool used by the military services to integrate the installation's cultural resources program with ongoing mission activities. No ICRMP has been completed for the at-sea portion of the GOMEX Range Complex, and no comprehensive underwater surveys of cultural resources have been conducted.

State Regulations

Florida

The Florida Historic Resources Act (Chapter 267, Florida Statutes) contains Florida's primary historic preservation legislation, governs the use of publicly-owned archaeological and historical resources located on state property. The act focuses on protection of all archaeological sites, including shipwrecks, on state-owned or controlled lands and submerged bottomlands from unauthorized disturbance, excavation, or removal of artifacts (Florida, 2008).

The Florida Environmental Land and Water Management Act of 1972 (Chapter 280, Florida Statutes) requires a review of the impact of projects on historic and archaeological sites. Sections of other similar Florida legislation regarding coastal management, comprehensive planning, easements, *etc*. also require consideration of cultural resources (NCSL, 2008).

Mississippi

The Antiquities Law of Mississippi (Chapter 39) declares all sunken or abandoned ships and wrecks of the sea, and any part of the contents and treasures imbedded in the earth on state lands (including tidelands, submerged lands and beds of rivers and sea within jurisdiction of the state) to be Mississippi Landmarks, and prohibits taking, alteration, damage, destruction, salvage, or excavation without a contract or permit of the board. Similar provisions apply to human burials (NCSL, 2008).

Alabama

Under existing law, the Alabama Underwater Cultural Resources Act provides for certain artifacts, treasure troves, or other resources designated as cultural resources to be managed and preserved by the Alabama Historical Commission and in conjunction with the Department of Conservation and Natural Resources (Alabama, 2008).

The Alabama Code, Section 41-3 and the Alabama Underwater Cultural Resources Act prohibits cultural resources from being taken, damaged, destroyed, salvaged, excavated or otherwise altered within a prior contract or permit obtained through the Alabama Historical commission (NCSL, 2008).

Louisiana

Louisiana Revised Statutes (41:1605) declare that, as the sole property of the state, all sunken or abandoned pre-twentieth century ships and wrecks of the sea and any part of the contents thereof and all archeological treasure located in, on or under the surface of lands belonging to the state, including its tidelands, submerged lands and beds of its rivers and the bed of the sea within the jurisdiction of the state are property of the state. The statutes also declare that it is unlawful to take, alter, damage, destroy or excavate such materials on state-owned lands without first obtaining a permit or contract from the secretary.

Texas

There are a number of Texas state rules and regulations, including Texas State Code Chapter 24 that deals with restricted cultural resource information. The Antiquities Code of Texas (Chapter 191) and its Rules of Practice includes, among other resources, Historic Shipwrecks. The code also deals with state archaeological landmarks and a wide breadth of cultural resource types.

K.14 Transportation

The Transportation section was prepared in accordance with NEPA and EO 12114, *Environmental Effects Abroad of Major Federal Actions*, as described in Chapter 1. States' jurisdictional boundaries extend 3 nm offshore of the coast. Impacts of operations evaluated under NEPA are further distinguished by State regulatory authorities where applicable.

K.15 Demographics

Demographic information is assessed to ensure federal agencies focus their attention on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately high and adverse human health or environmental effects on these communities are identified and addressed per EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (1994) and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997).

K.16 Regional Economy

The regional economy is important to the analysis of the Alternatives due to the requirements imposed by EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (1994) and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997) that requires federal agencies to focus their attention and address effects on human health or environmental effects on these communities.

K.17 Recreation

The Recreation section was prepared in accordance with NEPA and EO 12114, *Environmental Effects Abroad of Major Federal Actions*, as described in Chapter 1. States' jurisdictional boundaries extend 3 nm offshore of the coast. Impacts of operations evaluated under NEPA are further distinguished by State regulatory authorities where applicable.

K.18 Environmental Justice

The communities of minority, low-income, and children are important to the analysis of the alternatives due to the requirements imposed by EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (1994) and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997) which requires federal agencies to focus their attention and address effects on human health or environmental effects on these communities.

K.19 Public Safety

All range safety precautions and regulations contained in CINCLANTFLTINST 3120.26E, OPNAVINST 3770.4A, and DoD Directive 4540.1 apply in the GOMEX Range Complex. In addition, NDSTCINST 8020.1E and the individual range Standard Operating Procedures impose additional safety requirements, which are applied as the situation dictates.

K.20 Atlantic Fleet Active Sonar Training (AFAST) Final EIS/OEIS

In 1969, Congress enacted NEPA, which provides for the consideration of environmental issues in federal agency planning and decision making. Regulations for federal agency implementation of the act were established by the CEQ. NEPA requires that federal agencies prepare an EIS for proposed actions with the potential to significantly affect the quality of the human and natural environments. The EIS must disclose significant environmental impacts and inform decision makers and the public of the reasonable alternatives to the proposed action. Impacts to ocean areas of the AFAST Study Area that lie within 12 nm of land (territorial seas) are subject to analysis under NEPA. This is based on Presidential Proclamation 5928, issued December 27, 1988, in which the United States extended its exercise of sovereignty and jurisdiction under international law to 12 nm from land, although the Proclamation expressly provides that it does not extend or otherwise alter existing federal law or any associated jurisdiction, rights, legal interests, or obligations.

This document was also prepared in accordance with Presidential EO 12114, *Environmental Effects Abroad of Major Federal Actions*, which directs federal agencies to provide for informed decision making for major federal actions outside the United States, including the global commons, the environment of a non-participating foreign nation, or impacts on protected global resources. An OEIS is required when an action has the potential to significantly harm the environment of the global commons. Global commons are defined as “geographical areas that are outside of the jurisdiction of any nation, and include the oceans outside territorial limits (outside 12 nm from the coast) and Antarctica. Global commons do not include contiguous zones and fisheries zones of foreign nations” (32 CFR 187.3). Impacts to areas within the AFAST Study Area that lie outside 12 nm are analyzed using the procedures set out in EO 12114 and associated implementing regulations.

The proposed action requires assessment of effects both within and outside U.S. territory; therefore, the document is being prepared as an EIS/OEIS under the authorities of both NEPA and EO 12114. Chapter 4 of this Final EIS/OEIS contains italicized text that describes the effects that occur in areas located within the U.S. territory, while non-italicized text describes the effects that occur in areas located outside the U.S. territory. In addition to NEPA and EO 12114, this document complies with a variety of other environmental regulations. The following sections summarize the environmental requirements most relevant to this Final EIS/OEIS.

National Environmental Policy Act

The NEPA was enacted in 1969 and requires consideration of environmental issues in federal agency planning and decision making. The CEQ was established to implement the provisions of NEPA; the CEQ implemented the procedural provisions of NEPA in 40 CFR Parts 1500–1508. These regulations outline federal agency responsibilities under NEPA and provide detailed instructions for the preparation of EISs. The Navy has published regulations for implementing NEPA in 32 CFR 775. Additional procedures are described in the Chief of Naval Operations’ (CNO) Environmental and Natural Resources Program Manual Instruction (OPNAVINST) 5090.1B, as well as CNO’s 2004 Supplemental Environmental Planning Policy, which contains guidance and procedures to ensure the Navy complies with NEPA (DoN, 2003; 2004).

Executive Order 12114

EO 12114 directs federal agencies to provide for informed decision making for major federal actions outside the United States, including the global commons, the environment of a nonparticipating foreign nation, or effects to protected global resources. The Navy has published procedures for implementing EO 12114 in OPNAVINST 5090.1B, as well as CNO’s 2004 Supplemental Environmental Planning Policy (DoN, 2003).

Unlike NEPA, EO 12114 does not require a scoping process. However, the EIS and OEIS have been combined into one document, as permitted under NEPA and EO 12114, to reduce duplication. Therefore, the scoping requirements found in NEPA were implemented with respect to actions occurring seaward of

U.S. territorial waters, and discussions regarding scoping requirements will reference the combined GOMEX Final EIS/OEIS.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) established, with limited exceptions, a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction. The act further regulates "takes" of marine mammals in the global commons (*i.e.*, the high seas) by vessels or persons under U.S. jurisdiction. The term "take," as defined in Section 3 (16 USC 1362) of the MMPA, means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" was further defined in the 1994 amendments to the MMPA, which provided two levels of harassment, Level A (potential injury) and Level B (potential disturbance).

The National Defense Authorization Act (NDAA) of Fiscal Year (FY) 2004 (Public Law [PL] 108-136) amended the definition of "harassment" as applied to military readiness activities. Military readiness activities, as defined in PL 107-314, Section 315(f), include "training and operations of the Armed Forces that relate to combat" and constitute "adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use." These two definitions, therefore, apply to active sonar activities; as such, the amended definition of "harassment," as applied in this Final EIS/OEIS is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment").
- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") (16 USC 1362 [18][B][i],[ii]).

Section 101(a)(5) of the MMPA directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing). These incidental takes are allowed only if the NMFS issues regulations requiring NMFS to make a determination that (1) the taking will have a negligible impact on the species or stock, and (2) the taking will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses.

In support of the proposed action, the Navy is applying for an authorization pursuant to Section 101(a)(5)(A) of the MMPA. After the application is reviewed by NMFS, a Notice of Receipt of Application will be published in the *Federal Register*. Publication of the Notice of Receipt of Application will initiate the 30-day public comment period, during which time anyone can obtain a copy of the application by contacting NMFS. In addition, the MMPA requires NMFS to develop regulations governing the issuance of a Letter of Authorization (LOA) and to publish these regulations in the *Federal Register*. Specifically, the regulations for each allowed activity establish:

- Permissible methods of taking, and other means of effecting the least practicable adverse impact on such species or stock and its habitat, and on the availability of such species or stock for food purposes.
- Requirements for monitoring and reporting of such taking.
- For military readiness activities (as described in the NDAA), a determination of "least practicable adverse impacts" on a species or stock that includes consideration, in consultation with the DoD, of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

Endangered Species Act

The Endangered Species Act (ESA) (16 USC 1531 to 1543) applies to federal actions in two separate respects. First, the ESA requires that federal agencies, in consultation with the responsible wildlife agency (*e.g.*, NMFS), ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of a critical habitat (16 USC 1536 [a][2]). Regulations implementing the ESA expand the consultation requirement to include those actions that "may affect" a listed species or adversely modify critical habitat.

If an agency's proposed action would take a listed species, then the agency must obtain an incidental take statement from the responsible wildlife agency. The ESA defines the term "take" to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any such conduct" (16 USC 1532[19]).

As part of the environmental documentation for this Final EIS/OEIS, the Navy entered into early consultation with NMFS. Consultation is complete once NMFS prepares a final Biological Opinion and issues an incidental take statement.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, enacted to conserve and restore the nation's fisheries, includes a requirement for NMFS and regional fishery councils to describe and identify essential fish habitat (EFH) for all species that are federally managed. EFH is defined as those waters and the substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. Under the Act, federal agencies must consult with the Secretary of Commerce regarding any activity or proposed activity that is authorized, funded, or undertaken by the agency that may adversely affect EFH. If adverse effects to EFH are foreseeable, the Navy would submit an EFH assessment to the appropriate NMFS regional office.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs for their respective coastal zones. It is important to note that a state's coastal zone extends seaward to 3 nm, except for the Texas and Florida Gulf coasts, where the coastal zone extends seaward to 9 nm.

The CZMA requires that any federal agency activity within or outside the coastal zone that affects any land or water use, or natural resource of the coastal zone be carried out in a manner that is consistent, to the maximum extent practicable, with the enforceable policies of NOAA-approved state coastal management programs. Under the CZMA, the Navy must determine whether the proposed action will have reasonably foreseeable effects to state coastal zone uses or resources. If there are reasonably foreseeable effects, then the Navy must ensure, to the maximum extent practicable, that the activities are consistent with the enforceable policies of each respective state. Both direct and indirect effects are considered. Where required, a determination under the CZMA would be submitted to the applicable state(s') coastal zone management agency.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) was enacted to ensure the protection of shared migratory bird resources. The MBTA prohibits the take, possession, import, export, transport, selling, purchase, barter, or offering for sale, purchase or barter, any migratory bird, their eggs, parts, and nests, except as authorized under a valid permit. The MBTA protects a total of 836 bird species, 58 of which are currently legally hunted as game birds. The USFWS regulations authorize permits for takes of migratory birds for activities such as scientific research, education, and depredation control.

The USFWS published a final rule in the *Federal Register* (March 30 2007) that directly amended 50 CFR 21, *Migratory Bird Permits*, to authorize takes resulting from otherwise lawful military readiness activities (USFWS, 2007). This rule does not authorize takes under ESA, and the USFWS retains the authority to withdraw or suspend the authorization for incidental takes occurring during military readiness activities under certain circumstances.

Under this rule, the Navy is still required under NEPA to consider the environmental effects of its actions and assess the adverse effects of military readiness activities on migratory birds. If it is determined the proposed action may result in a significant adverse effect on a population of a migratory bird species, the Navy will consult with the USFWS to develop and implement appropriate conservation measures to minimize or mitigate these effects. Conservation measures, as defined in 50 CFR 21.3, include project designs or mitigation activities that are reasonable from a scientific, technological, and economic standpoint and are necessary to avoid, minimize, or mitigate the take of migratory birds or other adverse impacts. Furthermore, a significant adverse effect on a population is defined as an effect that could, within a reasonable period of time, diminish the capacity of a population of a migratory bird species to sustain itself at a biologically viable level.

National Marine Sanctuary Act

The National Marine Sanctuaries Act (NMSA) prohibits the destruction, loss of, or injury to any sanctuary resource managed under law or regulations and any violation of the act, any regulations, or permits issued there under (16 USC 436). In addition, section 304(d) of the NMSA (16 USC 1434(d)) requires federal agencies to consult with the Secretary of Commerce, through NOAA, on federal agency actions internal or external to any national marine sanctuary that are likely to destroy, cause the loss of, or injure any sanctuary resource (for Stellwagen Bank National Marine Sanctuary, the threshold is "may" destroy, cause the loss of, or injure). Under section 304(d), if NOAA determines that the action is likely to destroy, cause the loss of, or injure sanctuary resources, NOAA shall recommend reasonable and prudent alternatives that can be taken by a federal agency to protect sanctuary resources. The federal agency may choose not to follow these alternatives provided the reasons are submitted in writing. However, if the head of a federal agency takes an action other than an alternative recommended by NOAA and such action results in the destruction of, loss of, or injury to a sanctuary resource, the head of the agency shall promptly prevent and mitigate further damage and restore or replace the sanctuary resource in a manner approved by NOAA. Regulations for each designated national marine sanctuary specifically address military and defense activities.

Cooperating Agencies

The CEQ's regulations implementing NEPA allow federal agencies (as lead agencies) to invite tribal, state, and local governments, as well as other federal agencies, to serve as cooperating agencies in the preparation of EISs. The lead agency maintains the responsibility of supervising the development of the EIS, which addresses the potential effects associated with activities connected to the proposed action.

Upon request of the lead agency, any other federal agency that has jurisdiction can serve as a cooperating agency. In addition, any other federal agency with special expertise on any environmental issue that should be addressed in the EIS may serve as a cooperating agency upon request of the lead agency. The cooperating agency, upon request by the lead agency, is responsible for assisting in the development of information and preparing environmental analyses associated with the agency's area of expertise.

The Navy requested that NMFS participate as a cooperating agency in the preparation of this Final EIS/OEIS, and NMFS agreed to cooperating agency status. NMFS is a cooperating agency primarily because of its responsibilities pursuant to Section 101(a)(5)(A) of the MMPA and Section 7 of the ESA.

References:

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DoN, 2008a. OPNAV Instruction 3550.1A – Range Air Installations Compatible Use Zones (RIACUZ) Program. 28 January 2008.

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APPENDIX L
COASTAL CONSISTENCY DETERMINATIONS

1. Navy letter dated Sep 17, 2009 to Alabama, Dept. of Environmental Management
2. Navy letter dated Sep 17, 2009 to Florida, Dept. of Environmental Protection
3. Navy letter dated Sep 17, 2009 to Louisiana, Dept. of Natural Resources
4. Navy letter dated Sep 17, 2009 to Mississippi, Dept. of Marine Resources
5. Navy letter dated Sep 17, 2009 to Texas, General Land Office
6. Alabama, Department of Environmental Management letter dated October 8, 2009
7. Florida Department of Environmental Protection letter dated November 17, 2009 to NAVFAC Atlantic
8. Louisiana Department of Natural Resources letter dated November 18, 2009 to NAVFAC Atlantic
9. NAVFAC Memorandum dated December 14, 2009 on Mississippi CZMA Negative Determination

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DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/N7/179
September 17, 2009

Mr. Scott Brown
Program Chief, Coastal Programs Office
Alabama Department of Environmental Management
4171 Commanders Drive
Mobile, AL 36615

Dear Mr. Brown:

The U.S. Navy is proposing activities associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E); and associated range capabilities enhancements in the Gulf of Mexico (GOMEX) Range Complex. The purpose of the proposed action is to: 1) achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; 2) expand warfare missions supported by the GOMEX Range Complex; and 3) upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E.

Pursuant to Section 307 (c) (1) (16 United States Code [USC] 1456) of the Coastal Zone Management Act (CZMA) of 1972, as amended, we have determined that the proposed action would have no reasonably foreseeable effects on Alabama's coastal uses or resources. The bases for this "Negative Determination" are detailed in Enclosure (1) based on the enforceable policies in the State of Alabama's federally-approved Coastal Management Plan[1] (CMP).

In accordance with 15 Code of Federal Regulations (CFR) § 930.35, the Department of the Navy has reviewed Alabama's Coastal Management Program and associated enforceable policies, and has determined that the proposed activities in the GOMEX Range Complex would have no reasonably foreseeable effects on the State's coastal uses or resources.

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[1] See CZMA Section 304 (16 USC 1453 (6a)). An enforceable policy is a state policy that is legally binding under state law, and by which a state exerts control over private and public coastal uses and resources, and which are incorporated in the state's federally-approved CMP. An enforceable policy is limited to a state's jurisdiction, and must be given legal effect by state law and cannot apply to federal lands, federal waters, federal agencies or other areas or entities outside the state's jurisdiction, unless authorized by federal law.

Enclosure (2) is a CD-ROM containing the GOMEX Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and appendices, which was published and released to the public for comment on January 2, 2009[2], in compliance with the National Environmental Policy Act and Executive Order 12114. Further information regarding the GOMEX EIS/OEIS process may be obtained by visiting the project's website: www.gomexrangecomplexeis.com.

Since the publication of the GOMEX Draft EIS/OEIS in the winter of 2009, the U.S. Navy recently completed an informal consultation with the U.S. Fish and Wildlife Service (USFWS) on March 9, 2009, to address the proposed activities and its potential impact upon certain endangered and threatened species. The informal consultation with USFWS is documented in Enclosure (3).

In accordance with 15 CFR Section 930.35(c), Alabama has 60 days from the receipt of this document in which to concur with or object to this Negative Determination, or to request an extension under 15 CFR Section 930.35(c). Our point of contact is Mr. Todd Williamson, Naval Facilities Engineering Command, Atlantic, (757) 322-8162.

Alabama's concurrence will be presumed if its response is not received by the U.S. Navy within 60 days from receipt of this Determination. Alabama's response or inquiries should be sent to: Naval Facilities Engineering Command, Atlantic, ATTN: Code EV22 (GOMEX EIS/OEIS Project Manager), 6506 Hampton Blvd., Norfolk, Virginia 23508-1278; or Facsimile (757) 322-4894. Any requests for additional information should be made within ten days of receipt of this Negative Determination.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Fleet Readiness and Training

Enclosures:
1. Federal Agency CZMA Negative Determination for Alabama
2. GOMEX Draft EIS/OEIS CD-ROM
3. USFWS Informal Consultation

[2] See Federal Register, Vol. 74, No. 1, Friday, January 2, 2009, pages 96 to 97.

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/N7/177
September 17, 2009

Ms. Lauren P. Milligan
Florida State Clearinghouse
Department of Environmental Protection
3900 Commonwealth Blvd, M.S. 47
Tallahassee, FL 32399-3000

Dear Ms. Milligan:

The U.S. Navy is proposing activities associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E); and associated range capabilities enhancements in the Gulf of Mexico (GOMEX) Range Complex. The purpose of the proposed action is to: 1) achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; 2) expand warfare missions supported by the GOMEX Range Complex; and 3) upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E.

Pursuant to Section 307 (c)(1), 16 United States Code (USC) 1456 of the Coastal Zone Management Act (CZMA) of 1972, as amended, we have determined that the proposed action will be conducted in a manner consistent with the enforceable policies of Florida's approved coastal management program. The bases for this "Coastal Consistency Determination" are detailed in Enclosures (1) based on the enforceable policies in the State's federally-approved Coastal Management Plan[1] (CMP).

Enclosure (2) is a CD-ROM containing the GOMEX Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and appendices, which was published and released to the public for comment on January 2, 2009[2], in compliance with the National Environmental Policy Act and Executive Order 12114. Further information about the

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[1] See CZMA Section 304, 16 USC 1453 (6a). An enforceable policy is a state policy that is legally binding under state law, and by which a state exerts control over private and public coastal uses and resources, and which are incorporated in the state's federally-approved CMP. An enforceable policy is limited to a state's jurisdiction, and must be given legal effect by state law and cannot apply to federal lands, federal waters, federal agencies or other areas or entities outside the state's jurisdiction, unless authorized by federal law.

[2] See Federal Register, Vol. 74, No. 1, Friday, January 2, 2009, pages 96 to 97.

GOMEX EIS/OEIS process may be obtained by visiting the project's website: www.gomexrangecomplexeis.com.

Since the publication of the GOMEX Draft EIS/OEIS in the winter of 2009, the U.S. Navy recently completed an informal consultation with the U.S. Fish and Wildlife Service (USFWS) on March 9, 2009, to address the proposed activities and its potential impact upon certain endangered and threatened species. The informal consultation with USFWS is documented in Enclosure (3).

In accordance with 15 Code of Federal Regulations (CFR) Section 930.32, the Department of the Navy has reviewed Florida's CMP and associated enforceable policies, and has determined that the proposed activities occurring within Florida's coastal zone are consistent to the maximum extent practicable.

In accordance with 15 CFR Section 930.41(a), Florida has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR Section 930.41(b). Our point of contact is Mr. Todd Williamson, Naval Facilities Engineering Command, Atlantic, (757) 322-8162.

Florida's concurrence will be presumed if its response is not received by the U.S. Navy within 60 days from receipt of this Consistency Determination. Florida's response or inquiries should be sent to: Naval Facilities Engineering Command, Atlantic, ATTN: Code EV22 (GOMEX EIS/OEIS Project Manager), 6506 Hampton Blvd., Norfolk, Virginia 23508-1278; or Facsimile (757) 322-4894. Given the critical nature of the training, any requests for additional information should be made within ten days of receipt of this Consistency Determination.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Fleet Readiness and Training

Enclosures:
1. Federal Agency CZMA Consistency Determination for Florida
2. GOMEX Draft EIS/OEIS CD-ROM
3. USFWS Informal Consultation

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/N7/175
September 17, 2009

Mr. Gregory J. DuCote
Louisiana Department of Natural Resources
Coastal Management Division, Consistency Section
617 North Third Street, Suite 1048
Baton Rouge, LA 70802

Dear Mr. DuCote:

The U.S. Navy is proposing activities associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E); and associated range capabilities enhancements in the Gulf of Mexico (GOMEX) Range Complex. The purpose of the proposed action is to: 1) achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; 2) expand warfare missions supported by the GOMEX Range Complex; and 3) upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E.

Pursuant to Section 307 (c) (1) (16 United States Code [USC] 1456) of the Coastal Zone Management Act (CZMA) of 1972, as amended, we have determined that the proposed action would have no reasonably foreseeable effects on Louisiana's coastal uses or resources. The basis for this "Negative Determination" are detailed in Enclosure (1) based on the enforceable policies in the State of Louisiana's federally-approved Coastal Management Plan[1] (CMP).

In accordance with 15 Code of Federal Regulations (CFR) § 930.35, the Department of the Navy has reviewed Louisiana's CMP and associated enforceable policies, and has determined that the proposed activities in the GOMEX Range Complex would have no reasonably foreseeable effects on the State's coastal uses or resources.

Enclosure (2) is a CD-ROM containing the GOMEX Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and appendices which was published and released to the public for comment

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[1] See CZMA Section 304 (16 USC 1453 (6a)). An enforceable policy is a state policy that is legally binding under state law, and by which a state exerts control over private and public coastal uses and resources, and which are incorporated in the state's federally-approved CMP. An enforceable policy is limited to a state's jurisdiction, and must be given legal effect by state law and cannot apply to federal lands, federal waters, federal agencies or other areas or entities outside the state's jurisdiction, unless authorized by federal law.

on January 2, 2009[2], in compliance with the National Environmental Policy Act and Executive Order 12114. Further information about the GOMEX EIS/OEIS process may be obtained by visiting the project's website: www.gomexrangecomplexeis.com.

Since the publication of the GOMEX Draft EIS/OEIS in the winter of 2009, the U.S. Navy recently completed an informal consultation with the U.S. Fish and Wildlife Service (USFWS) on March 9, 2009, to address the proposed activities and its potential impact upon certain endangered and threatened species. The informal consultation with USFWS is documented in Enclosure (3).

In accordance with 15 CFR Section 930.35(c), Louisiana has 60 days from the receipt of this document in which to concur with or object to this Negative Determination, or to request an extension under 15 CFR Section 930.35(c). Our point of contact is Mr. Todd Williamson, Naval Facilities Engineering Command, Atlantic, (757) 322-8162.

Louisiana's concurrence will be presumed if its response is not received by the U.S. Navy within 60 days from receipt of this Determination. Louisiana's response or inquiries should be sent to: Naval Facilities Engineering Command, Atlantic, ATTN: Code EV22 (GOMEX EIS/OEIS Project Manager), 6506 Hampton Blvd., Norfolk, Virginia 23508-1278; or Facsimile (757) 322-4894. Any requests for additional information should be made within ten days of receipt of this Negative Determination.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Fleet Readiness and Training

Enclosures: 1. Federal Agency CZMA Negative Determination for Louisiana
2. GOMEX Draft EIS/OEIS CD-ROM
3. USFWS Informal Consultation

[2] See Federal Register, Vol. 74, No. 1, Friday, January 2, 2009, pages 96 to 97.

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/N7/176
September, 17 2009

Mr. Mike Walker
Mississippi Coastal Program
Department of Marine Resources
1141 Bayview Avenue, Suite 101
Biloxi, MS 39530

Dear Mr. Walker:

The U.S. Navy is proposing activities associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E); and associated range capabilities enhancements in the Gulf of Mexico (GOMEX) Range Complex. The purpose of the proposed action is to: 1) achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; 2) expand warfare missions supported by the GOMEX Range Complex; and 3) upgrade and modernize existing range capabilities to enhance and sustain U.S. Navy training and RDT&E.

Pursuant to Section 307 (c) (1) (16 United States Code (USC) 1456) of the Coastal Zone Management Act (CZMA) of 1972, as amended, we have determined that the proposed action would have no reasonably foreseeable effects to Mississippi's coastal uses or resources. The bases for this "Negative Determination" are detailed in Enclosure (1) based on the enforceable policies in the State of Mississippi's federally-approved Coastal Management Plan[1] (CMP).

In accordance with 15 Code of Federal Regulations (CFR) § 930.35, the Department of the Navy has reviewed Mississippi's coastal management program and associated enforceable policies, and has determined that the proposed activities in the GOMEX Range Complex would have no reasonably foreseeable effects on the State's coastal uses or resources.

Enclosure (2) is a CD-ROM containing the GOMEX Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and

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[1] <u>See</u> CZMA Section 304 (16 USC 1453 (6a)). An enforceable policy is a state policy that is legally binding under state law, and by which a state exerts control over private and public coastal uses and resources, and which are incorporated in the state's federally-approved CMP. An enforceable policy is limited to a state's jurisdiction, and must be given legal effect by state law and cannot apply to federal lands, federal waters, federal agencies or other areas or entities outside the state's jurisdiction, unless authorized by federal law.

appendices which was published and released to the public for comment on January 2, 2009[2], in compliance with the National Environmental Policy Act and Executive Order 12114. Further information about the GOMEX EIS/OEIS process may be obtained by visiting the project's website: www.gomexrangecomplexeis.com.

Since the publication of the GOMEX Draft EIS/OEIS in the winter of 2009, the U.S. Navy recently completed an informal consultation with the U.S. Fish and Wildlife Service (USFWS) on March 9, 2009, to address the proposed activities and its potential impact upon certain endangered and threatened species. The informal consultation with USFWS is documented in Enclosure (3).

In accordance with 15 CFR Section 930.35(c), Mississippi has 60 days from the receipt of this document in which to concur with or object to this Negative Determination, or to request an extension under 15 CFR Section 930.35(c). Our point of contact is Mr. Todd Williamson, Naval Facilities Engineering Command, Atlantic, (757) 322-8162.

Mississippi's concurrence will be presumed if its response is not received by the U.S. Navy within 60 days from receipt of this Negative Determination. Mississippi's response or inquiries should be sent to: Naval Facilities Engineering Command, Atlantic, ATTN: Code EV22 (GOMEX EIS/OEIS Project Manager), 6506 Hampton Blvd., Norfolk, Virginia 23508-1278; or Facsimile (757) 322-4894. Any requests for additional information should be made within ten days of receipt of this Negative Determination.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Fleet Readiness and Training

Enclosures: 1. Federal Agency Negative Determination for Mississippi
2. GOMEX Draft EIS/OEIS CD-ROM
3. USFWS Informal Consultation

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[2] See Federal Register, Vol. 74, No. 1, Friday, January 2, 2009, pages 96 to 97.

DEPARTMENT OF THE NAVY
COMMANDER
U.S. FLEET FORCES COMMAND
1562 MITSCHER AVENUE SUITE 250
NORFOLK, VA 23551-2487

5090
Ser N4/N7/178
September 17, 2009

Ms. Tammy Brooks
Coastal Division
Texas General Land Office
Stephen F. Austin Building
1700 North Congress Street
Austin, TX 78701

Dear Ms. Brooks:

The U.S. Navy is proposing activities associated with Navy Atlantic Fleet training; research, development, testing, and evaluation (RDT&E); and associated range capabilities enhancements in the Gulf of Mexico (GOMEX) Range Complex. The purpose of the proposed action is to: 1) achieve and maintain Fleet readiness using the GOMEX Range Complex to support and conduct current, emerging, and future training operations and RDT&E operations; 2) expand warfare missions supported by the GOMEX Range Complex; and 3) upgrade and modernize existing range capabilities to enhance and sustain Navy training and RDT&E.

Pursuant to Section 307 (c)(1), 16 United States Code (USC) 1456 of the Coastal Zone Management Act (CZMA) of 1972, as amended, we have determined that the proposed action will be conducted in a manner consistent with the enforceable policies of Texas' approved coastal management program. The bases for this "Coastal Consistency Determination" are detailed in Enclosure (1) based on the enforceable policies in the State's federally-approved Coastal Management Plan[1] (CMP).

Enclosure (2) is a CD-ROM containing the GOMEX Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and appendices, which was published and released to the public for comment on January 2, 2009[2], in compliance with the National Environmental Policy Act and Executive Order 12114. Further information about the

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[1] See CZMA Section 304, 16 USC 1453 (6a). An enforceable policy is a state policy that is legally binding under state law, and by which a state exerts control over private and public coastal uses and resources, and which are incorporated in the state's federally-approved CMP. An enforceable policy is limited to a state's jurisdiction, and must be given legal effect by state law and cannot apply to federal lands, federal waters, federal agencies or other areas or entities outside the state's jurisdiction, unless authorized by federal law.

[2] See Federal Register, Vol. 74, No. 1, Friday, January 2, 2009, pages 96 to 97.

GOMEX EIS/OEIS process may be obtained by visiting the project's website: www.gomexrangecomplexeis.com.

Since the publication of the GOMEX Draft EIS/OEIS in the winter of 2009, the U.S. Navy recently completed an informal consultation with the U.S. Fish and Wildlife Service (USFWS) on March 9, 2009, to address the proposed activities and its potential impact upon certain endangered and threatened species. The informal consultation with USFWS is documented in Enclosure (3).

In accordance with 15 Code of Federal Regulations (CFR) Section 930.32, the Department of the Navy has reviewed Texas' CMP and associated enforceable policies, and has determined that the proposed activities in Texas' coastal zone are consistent to the maximum extent practicable.

In accordance with 15 CFR Section 930.41(a), Texas has 60 days from the receipt of this document in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR Section 930.41(b). Our point of contact is Mr. Todd Williamson, Naval Facilities Engineering Command, Atlantic, (757) 322-8162.

Texas' concurrence will be presumed if its response is not received by the U.S. Navy within 60 days from receipt of this Consistency Determination. Texas' response or inquiries should be sent to: Naval Facilities Engineering Command, Atlantic, Attn: Code EV22 (GOMEX EIS/OEIS Project Manager), 6506 Hampton Blvd., Norfolk, Virginia 23508-1278; or Facsimile (757) 322-4894. Given the critical nature of the training, any requests for additional information should be made within ten days of receipt of this Consistency Determination.

Sincerely,

J. W. MURPHY
Deputy Chief of Staff
for Fleet Readiness and Training

Enclosures:
1. Federal Agency CZMA Consistency Determination for Texas
2. GOMEX Draft EIS/OEIS CD-ROM
3. USFWS Informal Consultation

ONIS "TREY" GLENN, III
DIRECTOR

BOB RILEY
GOVERNOR

ADEM

Alabama Department of Environmental Management
adem.alabama.gov
1400 Coliseum Blvd. 36110-2059 ♦ Post Office Box 301463
Montgomery, Alabama 36130-1463
(334) 271-7700
FAX (334) 271-7950

October 8, 2009

Naval Facilities Engineering Command, Atlantic
ATTN: CODE EV22 (GOMEX EIS/OEIS Project Manager)
6506 Hampton Blvd.
Norfolk, Virginia 235980[?]278

RE: 17September 2009 Alabama Coastal Zone Management Program Consistency Review
Gulf of Mexico EIS/OEIS
2010-002-NAVY-SED

To Whom It May Concern:

The Department has reviewed all the available information provided regarding the Gulf of Mexico Draft Environmental Impact Statement (EIS)/Overseas EIS (OEIS) and appendices. Based on the information provided, the project does not require a coastal zone management decision. Should additional information regarding impacts to water quality and/or coastal resources become available, the Department reserves the right to review the new information and/or perform a site inspection to determine if a CZM permit is needed.

If you have any questions regarding this matter, please contact me in the Mobile office at (251)432-6533 or sdingman@adem.state.al.us.

Sincerely,

Susan Dingman
ADEM Coastal/Facility Section
Mobile Branch
Field Operations Division

SED/sed FILE: CORS/XXX

Birmingham Branch
110 Vulcan Road
Birmingham, AL 35209-4702
(205) 942-6168
(205) 941-1603 (Fax)

Decatur Branch
2715 Sandlin Road, S. W.
Decatur, AL 35603-1333
(256) 353-1713
(256) 340-9359 (Fax)

Mobile Branch
2204 Perimeter Road
Mobile, AL 36615-1131
(251) 450-3400
(251) 479-2593 (Fax)

Mobile - Coastal
4171 Commanders Drive
Mobile, AL 36615-1421
(251) 432-6533
(251) 432-6598 (Fax)

Florida Department of
Environmental Protection

Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Charlie Crist
Governor

November 17, 2009

Naval Facilities Engineering Command, Atlantic
Attention: Code EV22 (GOMEX EIS/OEIS PM)
6506 Hampton Boulevard
Norfolk, VA 23508-1278

RE: Department of the Navy – Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for the Gulf of Mexico (GOMEX) Range Complex.
SAI # FL200909214962C (Reference SAI # FL200812314538C)

Dear Project Manager:

The Florida State Clearinghouse has coordinated a review of the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS) under the following authorities: Presidential Executive Order 12372; Section 403.061(40), *Florida Statutes*; the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended; and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended.

Based on the information contained in the DEIS/OEIS and comments provided by our reviewing agencies, the state has no objections to the proposal and has determined that, at this stage, the proposed federal activities are consistent with the Florida Coastal Management Program.

Thank you for the opportunity to review this proposal. Should you have any questions regarding this letter, please contact Ms. Lauren P. Milligan at (850) 245-2170.

Yours sincerely,

Sally B. Mann

Sally B. Mann, Director
Office of Intergovernmental Programs

SBM/lm

BOBBY JINDAL
GOVERNOR

SCOTT A. ANGELLE
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF COASTAL RESTORATION AND MANAGEMENT

November 18, 2009

Naval Facilities Engineering Command, Atlantic
Attn: Code EV22 (GOMEX EIS/OEIS Project Manager)
6506 Hampton Blvd.
Norfolk, VA 23508-1278

RE: **C20090533,** Coastal Zone Consistency
U. S. Navy
Negative Determination for Preferred Alternative 2 in the EIS/OEIS for changes in the operations for the GOMEX Range Complex in the Gulf of Mexico, Offshore Louisiana

Dear Sir:

The above referenced project has been reviewed for consistency with the approved Louisiana Coastal Resource Program (LCRP) as required by Section 307 of the Coastal Zone Management Act of 1972, as amended. The project, as proposed in the application, is consistent with the LCRP and this office agrees with your Negative Determination of September 17, 2009.

If you have any questions concerning this determination please contact Brian Marcks of the Consistency Section at (225)342-7939.

Sincerely yours,

Gregory J. DuCote
Administrator
Interagency Affairs/Field Services Division

GJD/JDH/bgm

cc: Tim Killeen, IA/FSD
Kimberly Clements, NMFS
Patti Holland, USFWS
David Butler, LDWF

Memorandum: File
Date: December 14, 2009
Subject: Discussion with Federal Consistency Coordinator from Mississippi Department of Marine Resources regarding GOMEX CZMA ND

In a telephone conversation September 23, 2009, Mr. Mike Walker, the Federal Consistency Coordinator for the Mississippi Department of Marine Resources, stated that Mississippi concurred with the Navy's determination of a "Negative Determination" for the Gulf of Mexico Range Complex (GOMEX) Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) project. As such, the DMR considers the file closed and would not provide additional correspondence to the Navy.