UNITED STATES NAVY

INTEGRATED COMPREHENSIVE MONITORING PROGRAM

2010 UPDATE

20 December 2010

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EXECUTIVE SUMMARY

The Navy is responsible for compliance with a suite of Federal environmental laws and regulations that apply to marine mammals and other marine protected species, including the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). As part of the regulatory compliance process associated with these Acts, the Navy is responsible for meeting specific requirements for monitoring and reporting on activities involving active sonar and/or detonations from underwater explosives.

This Integrated Comprehensive Monitoring Program (ICMP) plan provides the overarching framework for coordination of the United States Navy monitoring program. It has been developed in direct response to Navy Range permitting requirements established in the various MMPA Final Rules, ESA consultations, Biological Opinions, and applicable regulations. As a framework document, the ICMP applies by regulation to those activities on ranges and operating areas for which the Navy sought and received incidental take authorizations.

The ICMP is intended for use as a planning tool to focus Navy monitoring priorities pursuant to ESA and MMPA requirements. Top priority will always be given to satisfying the mandated legal requirements across all ranges. Once legal requirements are met, any additional monitoring-related research will be planned and prioritized using guidelines provided by the ICMP, consistent with availability of both funding and scientific resources. As a planning tool, the ICMP is a “living document” that will be routinely updated as the Program matures.

The ICMP will be evaluated annually through the adaptive management process to assess progress, provide a matrix of goals for the following year, and make recommendations for refinement and analysis of the monitoring and mitigation techniques. This process includes conducting an annual Adaptive Management Review (AMR) at which the Navy and National Marine Fisheries Service (NMFS) jointly consider the prior year’s goals, monitoring results, and related science advances to determine if modifications are needed to more effectively address monitoring program goals. Modifications to the ICMP that result from AMR decisions will be incorporated by an addendum or revision to the ICMP. The ICMP updates will be provided to NMFS by 31 December annually beginning in 2010. This adaptive management process recurs annually, with some modifications to the process in 2011, when the Navy, with guidance and support from NMFS, is to host a monitoring workshop that incorporates outside experts and expanded participation.

Section 1 introduces the ICMP, including purpose, objectives, specific ranges and geographic areas included, and additional background material. Section 2 describes overall monitoring goals and prioritization guidelines. Section 3 discusses standard data collection and management procedures. Section 4 addresses the coordination of reporting requirements, including a specific timeline for coordination of the current year’s reporting requirements, and the record-keeping system that documents how each Range Complex contributes to ongoing monitoring objectives. Section 5 outlines the adaptive management process, including provisions for annual reviews as well as a monitoring workshop in 2011. Section 6 discusses near-term plans for continued maturation of the Monitoring Program. Section 7 provides roles and responsibilities among the various Navy components. References are listed in Section 8.

OPNAV (N45) is responsible for maintaining and updating this ICMP, as required, to reflect the results of future regulatory agency final rulemakings, adaptive management reviews, best available science, improved assessment methodologies, or more effective protective measures. This will be done in consultation with Navy technical experts, Fleet Commanders, and Echelon II Commands, as appropriate, as part of the adaptive management process.

2010 UPDATE SUMMARY

The initial version of the ICMP was released in December 2009. This document is updated on an annual basis and modifications of substance to the 2010 version are summarized below:

In Section 1, Table 1, "Status of MMPA Final Rules for Navy Range Complexes included in the ICMP" was updated. Additionally, information derived from those Final Rules published during 2010 was used to update Appendices A and B.

In Section 2, the top-level goals for monitoring were refined through the adaptive management process and expanded to incorporate comments from the Marine Mammal Commission (MMC). The process by which these goals would be further refined through collaboration with a newly created Scientific Advisory Group (SAG) and group review was added. This section also notes that Navy awarded *HDR engineering-environmental Management (*HDR|e^{2}M*)* of Englewood, CO a contract to assist with designing, managing, and performing the overall monitoring. A description of an alternate approach to the study questions currently used to focus the range-specific monitoring plans was added. This alternate approach provides that HDR|e^{2}M and the SAG will use the top-level goals established by the ICMP to define a proposed long-term strategic plan for monitoring. The intent is to incorporate this strategic plan into the framework provided by the ICMP.

In Section 3, updates to the data management approach are provided. Navy and NMFS continue to work together to develop a data-sharing process that best supports the regulatory process in a transparent manner. Navy is working with HDR|e^{2}M to develop structured procedures to meet specific access requirements for the various Fleet, Scientific, and General Public user groups. This work will continue into 2011.

In Section 4, Table 4, "Common reporting requirements for range complexes/study areas covered by ICMP" was updated. As part of adaptive management, NMFS and the Navy are coordinating on the development of a streamlined workload plan for developing and reviewing these reports. Although the reports described will always be submitted annually at a time that allows for adequate analysis by NMFS prior to the issuance of the subsequent LOA, NMFS retains the flexibility to change those dates yearly. Each annual LOA will provide the required submittal dates.

There were no substantial changes to the adaptive management process described by Section 5.

In Section 6, progress within each of the designated "ICMP Near-Term Development Focus Areas" was listed.

In Section 7, the roles and responsibilities of Naval Facilities Engineering Command were added.

Finally, Appendix E was added to provide an initial framework for the range matrix characterization. This matrix, currently under development, will include reference information that provides the user a top-level view of attributes across the various Navy range complexes and supports comparative analysis. The work to fully develop this matrix will extend into 2011.

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1. INTRODUCTION

The Navy is responsible for compliance with a suite of Federal environmental laws and regulations that apply to marine mammals and other marine protected species, including the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). As part of the regulatory compliance process associated with these Acts, the Navy is responsible for meeting specific requirements for monitoring and reporting on military readiness activities involving active sonar and underwater detonations from explosives and explosive munitions. These military readiness activities include both Fleet training events and Navy-funded research, development, test and evaluation (RDT&E) activities.

This Integrated Comprehensive Monitoring Program (ICMP) plan provides the overarching framework for coordination of the United States Navy monitoring program. It is intended for use as a planning tool to focus Navy monitoring priorities pursuant to ESA and MMPA requirements and as an adaptive management tool to analyze and refine monitoring and mitigation techniques over time. It has been developed in direct response to Navy Range permitting requirements established in the various MMPA Final Rules, ESA consultations, Biological Opinions, and applicable regulations. As a framework document, the ICMP applies by regulation to those activities on ranges and operating areas for which the Navy sought and received incidental take authorizations.

The ICMP currently includes specific monitoring plans that have been or are being developed for the Southern California (SOCAL) Range Complex, Atlantic Fleet Active Sonar Training (AFAST) Study Area, Hawaii Range Complex (HRC), Mariana Islands Range Complex (MIRC), Northwest Training Range Complex (NWTRC), Gulf of Alaska (GOA) Temporary Maritime Activities Area (TMAA), Virginia Capes (VACAPES) Range Complex, Cherry Point Range Complex, Jacksonville (JAX) Range Complex[1], Gulf of Mexico (GOMEX) Range Complex, Naval Sea Systems Command Naval Undersea Warfare Center Keyport (NUWC Keyport) Range Complex, and Naval Sea Systems Command Naval Surface Warfare Center Panama City Division (NSWC PCD) Study Area. These range complexes and study areas are depicted in Figure 1. Note that the AFAST study area encompasses multiple smaller ranges. Additional ranges or study areas may be added to the ICMP consistent with future Navy range permitting requirements.

Table 1 provides a status listing of the MMPA Final Rules for ranges and study areas presently included in the ICMP, and the applicable dates for those Final Rules that are in effect. This table is current as of 3 December 2010. Unless otherwise specified, references to “MMPA Final Rules” throughout this document include all of the rules listed by Table 1 that have a status of “In Effect”. A listing of the corresponding Letters of Authorization (LOA) and monitoring plans in effect as of the data date is provided in the reference section. While the ICMP also applies to range-specific monitoring plans that are still being developed, modifications to the ICMP may be required to appropriately reflect requirements established by future rulemakings.

[1] Note, the Jacksonville Range Complex includes operating areas for both Jacksonville, FL and Charleston, SC and is sometimes referred to as the Charleston / Jacksonville (CHASJAX) Range Complex. For purposes of this document, references to this Range Complex will simply be as Jacksonville Range Complex, which is consistent with the nomenclature used in the MMPA Final Rule.

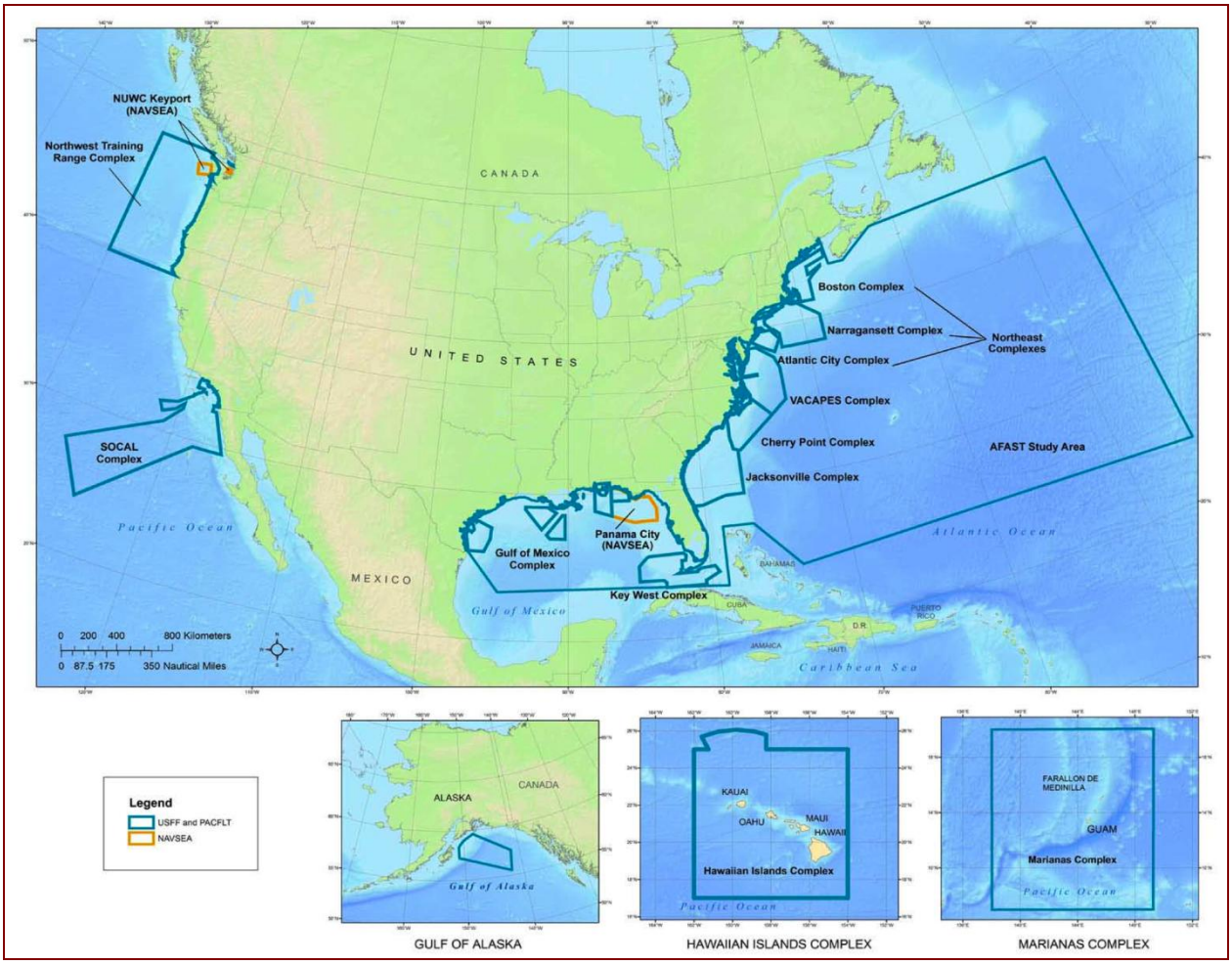

Figure 1: Navy Range Complexes and Study Areas included under the ICMP

Table 1: Status of MMPA Final Rules for Navy Range Complexes included in the ICMP
(Data date: 3 December 2010)

RANGE	MMPA Final Rule Reference (or status)	Dates Applicable
Hawaii Range Complex (HRC)	**IN EFFECT**: Taking and Importing Marine Mammals; U.S. Navy Training in the Hawaii Range Complex; Final Rule, 74 Fed. Reg. 1456 (January 12, 2009) (to be codified at 50 C.F.R. § 216).	5 Jan 2009 – 5 Jan 2014
Southern California (SOCAL) Range Complex	**IN EFFECT**: Taking and Importing Marine Mammals; U.S. Navy Training in the Southern California Range Complex; Final Rule, 74 Fed. Reg. 3883 (January 21, 2009) (to be codified at 50 C.F.R. § 216).	14 Jan 2009 - 14 Jan 2014
Atlantic Fleet Active Sonar Training (AFAST) Study Area	**IN EFFECT**: Taking and Importing Marine Mammals; U.S. Navy's Atlantic Fleet Active Sonar Training (AFAST); Final Rule, 74 Fed. Reg. 4844 (January 27, 2009) (to be codified at 50 C.F.R. § 216).	22 Jan 2009 - 22 Jan 2014
Cherry Point Range Complex	**IN EFFECT:** Taking and Importing Marine Mammals; U.S. Navy Training in the Cherry Point Range Complex; Final Rule, 74 Fed. Reg. 28370 (June 15, 2009) (to be codified at 50 C.F.R. § 218).	5 Jun 2009 – 4 Jun 2014
Jacksonville (JAX) Range Complex	**IN EFFECT**: Taking and Importing Marine Mammals; U.S. Navy Training in the Jacksonville Range Complex; Final Rule, 74 Fed. Reg. 28349 (June 15, 2009) (to be codified at 50 C.F.R. § 218).	5 Jun 2009 – 4 Jun 2014
Virginia Capes (VACAPES) Range Complex	**IN EFFECT**: Taking and Importing Marine Mammals; U.S. Navy Training in the Virginia Capes Range Complex; Final Rule, 74 Fed. Reg. 28328 (June 15, 2009) (to be codified at 50 C.F.R. § 218).	5 Jun 2009 – 4 Jun 2014
Naval Sea Systems Command Naval Surface Warfare Center Panama City Division (NSWC PCD) Study Area	**IN EFFECT:** Taking and Importing Marine Mammals; U.S. Naval Surface Warfare Center Panama City Division Mission Activities; Final Rule, 75 Fed. Reg. 3395 (January 21, 2010) (to be codified at 50 C.F.R. § 218).	21 Jan 2010 - 21 Jan 2015
Mariana Islands Range Complex (MIRC)	**IN EFFECT**: Taking and Importing Marine Mammals; Military Training Activities and Research, Development, Testing and Evaluation Conducted Within the Mariana Islands Range Complex; Final Rule, 75 Fed. Reg. 45527 (August 3, 2010) (to be codified at 50 C.F.R. § 218).	3 Aug 2010 – 3 Aug 2015
Northwest Training Range Complex (NWTRC)	**IN EFFECT**: Taking and Importing Marine Mammals; Navy Training Activities Conducted Within the Northwest Training Range Complex; Final Rule, 75 Fed. Reg. 69296 (November 10, 2010) (to be codified at 50 C.F.R. § 218).	9 Nov 2010 - 9 Nov 2015
Naval Sea Systems Command Naval Undersea Warfare Center Keyport (NUWC Keyport) Range Complex	**PROPOSED**: Taking and Importing of Marine Mammals; U.S. Navy's Research, Development, Test, and Evaluation Activities Within the Naval Sea Systems Command Naval Undersea Warfare Center Keyport Range Complex; Proposed Rules, 74 Fed. Reg. 32264 (July 7, 2009) (to be codified at 50 C.F.R. § 218).	TBD. Proposed Rule closed to public comments on 6 Aug 2009.
Gulf of Mexico (GOMEX) Range Complex	**PROPOSED**: Taking of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Training Operations Conducted Within the Gulf of Mexico Range Complex; Proposed Rules, 74 Fed. Reg. 33960 (July 14, 2009) (to be codified at 50 C.F.R. § 218).	TBD. Proposed Rule closed to public comments on 13 Aug 2009.
Gulf of Alaska (GOA) Temporary Maritime Activities Area (TMAA)	**PROPOSED:** Taking and Importing Marine Mammals; Military Training Activities Conducted Within the Gulf of Alaska (GoA) Temporary Maritime Activities Area (TMAA); Proposed Rules, 75 Fed. Reg. 64508 (October 19, 2010)	TBD. Proposed Rule closed to public comments on 18 Nov 2010.

There are two broad categories of authorized activities covered by the ICMP. These include:

1) Authorized Fleet activities carried out on Fleet-permitted ranges in support of military readiness, and
2) Authorized Navy Acquisition Community RDT&E activities carried out on NAVSEA-permitted ranges in support of military readiness.

There are variations in the monitoring and mitigation requirements between Fleet and Acquisition Community activities. This is in part due to the significant differences in the nature of activities conducted by these two communities relative to factors such as the types of sound sources, numbers and size of platforms (boats, ships, aircraft), as well as numbers of individuals involved. Monitoring and mitigation measures are tailored to the specific authorized activities consistent with permitting requirements. For the Fleet-permitted ranges, the associated monitoring plans are generally "range-specific" and apply across all authorized activities on that range. For the NAVSEA-permitted ranges, their monitoring plans tend to be "project-specific", that is, specifically tailored to each individual authorized activity.

Appendices A and B provide a listing by range complex/study area of specific sound sources and activities included in the associated MMPA Final Rules/Proposed Rules for the Fleet and Naval Sea Systems Command (NAVSEA) action proponents respectively. Note that for Atlantic ranges in the AFAST study area, monitoring and mitigation requirements for mid-frequency active sonar (MFAS), high-frequency active sonar (HFAS), and underwater detonations from explosive sonobuoy (specifically IEER) Fleet military readiness activities are addressed in the AFAST MMPA Final Rule. Monitoring requirements associated with Fleet military readiness activities involving other types of underwater detonations are established in the MMPA Final Rules for the individual range complexes (e.g., VACAPES, JAX, Cherry Point, and GOMEX) where these activities will be conducted.

The MMPA Final Rules detail specific requirements for this document. The following quote is from the Final Rule for the SOCAL Range Complex[2]. Similar language is found in each of the other MMPA Final Rules listed by Table 1.

> "The Navy shall complete an Integrated Comprehensive Monitoring Plan (ICMP) 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 across Range Complexes."

The MMPA Final Rules further provide that the primary objectives of the ICMP are to:

[2] See 74 Fed. Reg. 3882 (January 21, 2009) (50 C.F.R.§216.275(c)).

- Monitor and assess the effects of Navy activities on protected marine 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; and
- Add to the overall knowledge base of protected marine species and the effects of Navy activities on these species.

The ICMP meets these requirements and objectives by:

- Identifying top-level goals for the monitoring program, as well as guidelines for use in prioritizing monitoring projects and related RDT&E activities;
- Defining standard procedures for the compilation and management of data from range/project-specific monitoring plans;
- Establishing an adaptive management process that includes annual reviews with NMFS;
- Making provisions to review relevant monitoring-related research and, where appropriate, incorporate findings as updates to the range/project-specific monitoring plans and mitigation measures through adaptive management; and
- Providing an unclassified recordkeeping system that will allow interested parties to see how each range complex is contributing to ongoing monitoring.

As the overarching framework, the ICMP focuses Navy monitoring priorities pursuant to ESA and MMPA requirements. However, the ICMP does not include or specify the actual monitoring fieldwork components, nor does it commit to fund specific monitoring-related activities. Individual Navy permit-holders and research sponsors are responsible for defining the range/project-specific fieldwork components and research activities for their respective range monitoring plans and research programs. Top priority will always be given to satisfying the mandated legal requirements across all ranges. Once legal requirements are met, any additional monitoring-related activities will be planned and prioritized using guidelines provided by the ICMP, consistent with availability of both funding and scientific resources.

The ICMP will be evaluated annually through the adaptive management process to assess progress, provide a matrix of goals for the following year, and make recommendations for refinement and analysis of the monitoring and mitigation techniques. This process includes conducting an Adaptive Management Review (AMR) at which Navy and National Marine Fisheries Service (NMFS) will jointly consider the prior year's goals, monitoring results, and related science advances to determine if modifications are needed to more effectively address monitoring program goals. Modifications to the ICMP that result from AMR decisions will be incorporated by an addendum or revision to the ICMP. These ICMP updates will be provided to NMFS by 31 December annually beginning in 2010. This adaptive management process recurs annually, with some modifications to the process in 2011, when the Navy, with guidance and support from NMFS, is to host a monitoring workshop that incorporates outside experts and expanded participation.

The ICMP is organized in the following way: Section 2 describes overall monitoring goals and prioritization guidelines; Section 3 discusses standard data collection and management procedures; Section 4 addresses the coordination of reporting requirements and the recordkeeping system that documents how each range complex contributes to ongoing monitoring objectives; Section 5 outlines the adaptive management review process,

including provisions for a monitoring workshop in 2011; Section 6 discusses near-term plans for continued maturation of the Monitoring Program; Section 7 provides roles and responsibilities among the various Navy components; and references are listed in Section 8.

2. MONITORING GOALS AND PRIORITIZATION GUIDELINES

Research relating to the effects of anthropogenic sound on marine species is an evolving science. The Navy is committed to utilizing the best available science in developing and implementing the monitoring programs required pursuant to ESA and MMPA. The Navy demonstrated this commitment by funding approximately $26 million annually in marine mammal-related research projects for fiscal years 2007-2009[3] to better understand how marine mammals hear and how they are affected by sound. Researchers at Navy laboratories and warfare centers are investigating marine mammal bioacoustics, marine mammal distribution and abundance, and passive acoustic detection of marine mammals. The Navy also collaborates with universities, institutions, conservation agencies, private industries, and independent researchers around the world to better understand what combinations of ocean conditions, bathymetry, and sonar usage patterns may lead to marine species disturbances. The Navy intends to continue this level of annual investment in protected marine species research over the next five years.[4]

As the overarching framework for coordination of the Navy's monitoring efforts, the ICMP guides the research investment by establishing top-level goals and guidelines for use in prioritizing monitoring projects and related RDT&E activities. The guidelines are not intended to supersede the specific legal requirements that each range complex must meet for monitoring and mitigation of ongoing Navy military readiness activities as detailed by its associated LOA. Top priority will continue to be given to satisfying the mandated legal requirements across all ranges.

To meet requirements in the MMPA Final Rules for Navy range complexes[5], this section provides a method for prioritizing monitoring projects and clearly describes the characteristics of a proposal that factor into its priority. However, as noted previously, the ICMP does not specify or commit to fund specific monitoring-related research; that remains the responsibility of individual research sponsors. The ICMP also makes provisions for maintaining an unclassified record of Navy-sponsored monitoring projects and research using the procedures described in Section 4.

The adaptive management process described in Section 5 will be used to review and, when appropriate, incorporate findings from relevant research as updates to the range/project-specific monitoring plans. Adaptive management will also be used to evaluate and update the goals and priorities presented here on an annual basis. ICMP updates resulting from the adaptive management process will be documented and provided to NMFS by 31 December annually beginning in 2010.

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[3] Research funding level from http://www.navy.mil/oceans/environmental.html on 14 April 2009.

[4] Projected investment level from http://www.navy.mil/oceans/science.html on 15 July 2009.

[5] *E.g.*, 50 C.F.R. § 216.175(c).

2.1 MONITORING GOALS

Monitoring measures prescribed in range/project-specific monitoring plans and Navy-funded research relating to the effects of Navy training and testing activities on protected marine species should be designed to accomplish one or more of the following top-level goals:

- An increase in our understanding of the likely occurrence of marine mammals and/or ESA-listed marine species in the vicinity of the action (i.e., presence, abundance, distribution, and/or density of species);

- An increase in our understanding of the nature, scope, or context of the likely exposure of marine mammals and/or ESA-listed species to any of the potential stressor(s) associated with the action (e.g., tonal and impulsive sound), through better understanding of one or more of the following: 1) the action and the environment in which it occurs (e.g., sound source characterization, propagation, and ambient noise levels); 2) the affected species (e.g., life history or dive patterns); 3) the likely co-occurrence of marine mammals and/or ESA-listed marine species with the action (in whole or part) associated with specific adverse effects, and/or; 4) the likely biological or behavioral context of exposure to the stressor for the marine mammal and/or ESA-listed marine species (e.g., age class of exposed animals or known pupping, calving or feeding areas);

- An increase in our understanding of how individual marine mammals or ESA-listed marine species respond (behaviorally or physiologically) to the specific stressors associated with the action (in specific contexts, where possible, e.g., at what distance or received level);

- An increase in our understanding of how anticipated individual responses, to individual stressors or anticipated combinations of stressors, may impact either: 1) the long-term fitness and survival of an individual; or 2) the population, species, or stock (e.g., through effects on annual rates of recruitment or survival);

- An increase in our understanding of the effectiveness of mitigation and monitoring measures;

- A better understanding and record of the manner in which the authorized entity complies with the Incidental Take Authorization and Incidental Take Statement;

- An increase in the probability of detecting marine mammals (through improved technology or methods), both specifically within the safety zone (thus allowing for more effective implementation of the mitigation) and in general, to better achieve the above goals; and

- A reduction in the adverse impact of activities to the least practicable level, as defined in the MMPA.

Several of the top-level goals listed above focus on understanding the short-term effects to individual animals from naval anthropogenic sound. For the purposes of the ICMP, short-term is defined as the period during which the behavioral response is empirically determined or presumed to be directly attributable to exposure to naval anthropogenic sound.

The original set of range-specific monitoring plans were designed as a collection of focused ‘‘studies’’ to gather data that would allow the Navy to address a series of proposed questions (not all questions apply to each range). However, during the Adaptive Management Review in 2010, discussions reported that these five “study questions” [provided below for completeness] were determined to be too general for practical application across all ranges/study areas. The original study questions were as follows:

- Are marine mammals (and sea turtles) exposed to mid-frequency active sonar (MFAS), especially at levels associated with adverse effects (i.e., based on NMFS’ criteria for behavioral harassment, temporary threshold shift (TTS), or permanent threshold shift (PTS))? If so, at what levels are they exposed?

- If marine mammals (and sea turtles) are exposed to MFAS, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?

- If marine mammals (and sea turtles) are exposed to MFAS, what are their behavioral responses to various received levels?

- What are the behavioral responses of marine mammals and sea turtles that are exposed to explosives?

- Is the Navy’s suite of mitigation measures for MFAS (e.g., measures agreed to by the Navy through permitting) effective at avoiding TTS, injury, and mortality of marine mammals?

As an alternate approach to these five original study questions, the Navy worked with NMFS and the scientific community to further refine the top-level goals, with refined goals as listed at the beginning of this section, and continues to work on the development of a 3-5 year strategic plan for monitoring activities across the various ranges and study areas covered by authorizations and permits.

Figure 2 depicts the process that will develop this strategic plan and lead to the selection of annual range-specific monitoring projects. This process is also described below. While revisions to the existing monitoring plans are anticipated, the Navy does not expect there will be a significant change in types of monitoring activities proposed. Rather, proposed changes to the distribution of activities are more likely to focus concentrated effort on larger, more integrated monitoring efforts.

In the initial steps of the process, the Navy will complete development of a matrix that characterizes the various geographic regions of interest and provides “bounding conditions” to the Scientific Advisory Group (SAG). Appendix E provides additional information regarding this matrix.

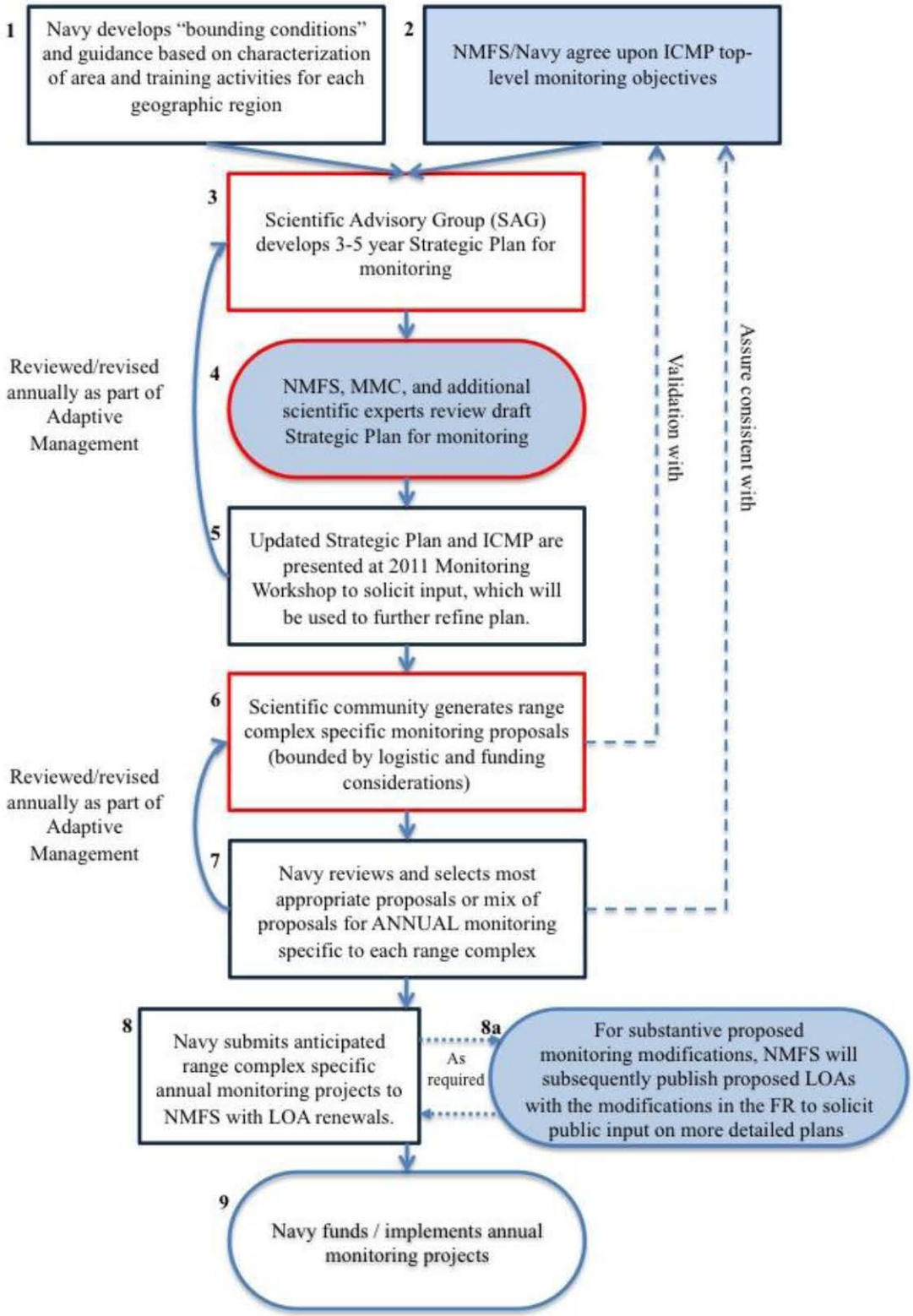

Figure 2: Strategic plan development and implementation process

Next, with support from their lead contractor[6], *HDR engineering-environmental Management (*HDR|e^{2}M*)* of Englewood, CO, the Navy will then convene the newly created SAG. The SAG will use the top-level goals provided by the ICMP to define a proposed 3-5 year "Strategic Plan for Monitoring" covering all permitted areas. The SAG will adapt the original study questions and refine the goals for individual geographic regions based on the level of information and data currently available. Specifically, they will consider what is known regarding "Occurrence, Exposure, Responses, Consequences, and Mitigation" for each geographic region of interest to suggest appropriate monitoring activities. Other parameters to be considered include those listed by the Appendix E matrix, as well as available assets and operational constraints. This strategic plan will serve as a roadmap to guide selection of appropriate monitoring projects based on region-specific considerations. The draft plan will then be circulated through a larger review group that includes NMFS HQ and the Marine Mammal Commission (MMC). The objective is to have a group-reviewed draft plan that has been developed/reviewed by experts and vetted through NMFS and MMC to present at the 2011 Monitoring Workshop.

As the overarching framework document, the ICMP will be updated to document the systematic approach and the allocation of resources for these monitoring activities. This 3-5 year strategic monitoring plan is necessary to provide sufficient lead time to put task orders in place, and procure any long-lead time material needed such as passive acoustic monitoring equipment.

Monitoring measures that are put in place to meet the above goals and focused studies will produce data sets that include short-term individual observations. These observations, in combination with parallel monitoring and data analysis efforts by others, support research efforts directed towards identifying biologically significant behavioral responses that may have either cumulative or population-level effects. These data sets will also support the assessment of population trends, including species composition, distribution, and abundance, to determine the efficacy of mitigation and monitoring measures, and increase knowledge regarding the response of marine mammals and other threatened or endangered marine species to Navy sound sources. These data sets may also help to provide important information on the geographic and temporal extent of key habitats and provide baseline information to account for natural perturbations such as El Niño or La Niña events. Additionally, the data sets will provide observational data and baseline information to determine the spatial and temporal extent of reactions to Navy operations, or indirect effects from changes in prey availability and distribution. These data sets will be managed and made available for use by the procedures outlined in Section 3.

In developing range/project-specific monitoring plans or research programs to address these top-level goals and focused studies, sponsors should strive to prevent creating situations that leave the Navy "data rich but information poor." That is, it is often easier to collect some types of information than it is to analyze and draw meaningful conclusions from the data.

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[6] *HDR engineering-environmental Management (*HDR|e^{2}M*)* of Englewood, CO was awarded an indefinite-delivery / indefinite-quantity contract in April 2010 to assist with designing, managing, and performing the overall monitoring effort.

One example of this potential situation is the collection of marine mammal vocalizations using passive acoustic monitoring, where terabytes of acoustic data can be collected over the course of a given monitored event. To fully benefit from this type of monitoring and data collection investment, it is critical that sufficient funding for data analysis be factored into the program plans.

2.2 PRIORITIZATION GUIDELINES

In establishing prioritization guidelines, it is important to "begin with the end in mind." The desired end-result from Navy monitoring and mitigation conducted pursuant to ESA and MMPA requirements is a comprehensive and accurate assessment of applicable Navy military readiness and scientific research activities that involve active sonar and/or underwater detonations, performed in a manner that enables Fleet Commands, Program Executive Offices (PEOs), and other Echelon II Commands to meet their requisite operational, training, acquisition, research, development, testing, and evaluation requirements.

The guidelines presented here maximize marine resource protection by focusing Navy efforts and resources on those geographic areas where potential effects to marine mammals and other threatened or endangered marine species are most likely to occur due to concentrated and repetitive Navy activities. However, the guidelines are not intended to preclude monitoring activities in other areas of moderate or low Navy use when there might be special biological circumstances or other overriding considerations. The guidelines are intended for use when developing or modifying range/project-specific monitoring plans and monitoring-related research programs that will be considered as part of the adaptive management process described in Section 5. The guidelines are not intended to supersede the specific legal requirements that each range complex must meet for monitoring and mitigation of ongoing Navy military readiness activities as detailed in its associated LOA. Top priority will continue to be given to satisfying the mandated legal requirements across all ranges. Once legal requirements are met, additional monitoring activities will be prioritized using the guidelines that follow, consistent with availability of both funding and scientific resources.

In shaping, designing or evaluating prospective monitoring projects, sponsors should consider the following factors for each proposal:

a. Number of monitoring goals that the project addresses;

b. Relative density of marine mammals and other protected marine species in the proposed area;

c. Relative occurrence of concentrated and repetitive Navy active sonar activities in the proposed area;

d. Level of anticipated impacts to marine mammals in the area;

e. Presence of unique biological and/or physical attributes that better allow monitoring goals to be addressed;

f. Degree to which the proposed activity might provide unique contributions or additional diversity to the data set collection that will assist in meeting the top-level goals,

g. Ability to leverage and/or augment existing efforts by Navy monitoring to positive effect,

h. Availability of specialized Navy assets within a specific area to support monitoring efforts (e.g. instrumented ranges);

i. Return on investment as measured by confidence level in the likelihood of obtaining meaningful monitoring data based on factors such as prior success with the specific method itself, anticipated sea states, seasonal weather patterns, local animal densities and migration patterns, and anticipated success rate for integrating the monitoring method with training events; and

j. Degree to which the proposed activity might affect the ability of Navy Commands to meet their requisite operational, training, acquisition, research, development, testing, and evaluation requirements.

Many of the factors listed above are highly dependent on the specific location at which the proposed activity is to be conducted. To better assist planning efforts within the ICMP, a characterization of the unique attributes associated with each range complex/study area is under development. This characterization matrix is further addressed in Appendix E.

The monitoring requirements established in the MMPA Final Rules listed by Table 1 are currently in effect for 5-year periods beginning in 2009. To fully evaluate and respond to the effects of naval anthropogenic sound on living marine resources, it is anticipated that monitoring time frames extending beyond the initial 5 years will be needed.

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3. DATA COLLECTION AND MANAGEMENT

This section discusses standardized data collection and management methods in support of Navy monitoring activities, and is a required element of the ICMP under the MMPA Final Rules for Navy ranges and operating areas. The Navy makes substantial investments in monitoring programs to ensure compliance with terms of ESA consultations and MMPA authorizations, and to provide for adaptive program management. Standardized procedures are essential to make the most of this investment. The objective for this standardization is to collect data in a manner that will enable comparison between and among different geographic locations to the extent that is scientifically justifiable. These standardized approaches apply to both range/project-specific monitoring plans as well as Navy-funded R&D studies.

Improved monitoring and assessment methodologies are likely to be developed as the science surrounding marine species monitoring continues to evolve. These improvements will be reviewed and assessed annually as part of the adaptive management process conducted jointly by Navy and NMFS. This process will determine whether modifications to the standardized collection and management methods are appropriate for the upcoming year. If so, updates to the ICMP will be made to reflect the results of Navy-NMFS adaptive management decisions to incorporate the improved monitoring and assessment methodologies as standard procedures and provided to NMFS by 31 December annually. As discussed in Section 5, adaptive management reviews will be done in consultation with Navy technical experts, Fleet Commanders, and Echelon II Commands, as appropriate.

3.1 DATA COLLECTION

There is a large suite of monitoring methods that may be used to detect, locate, identify, and study the behaviors and responses of individual marine animals *in situ*. Some of the more prevalent categories of monitoring techniques and tools include:

- Visual observations made using Navy lookouts, civilian protected species observers (PSOs), vessel-based surveys, aerial surveys, shore surveys, and photo-identification;
- Acoustic monitoring using both passive and active methods; and
- Behavioral monitoring through tag attachments.

This suite of methods is continually evolving in step with advances in research. Each monitoring technique has advantages and disadvantages that vary temporally and spatially. Therefore, a combination of techniques is generally recommended so that the detection and observation of marine animals is maximized. The optimal choice of monitoring approach will vary depending on the purpose for the monitoring, the type of data to be collected, and a number of other factors such as the species of concern (whether frequently on surface, deep-diving, or cryptic), animal density, geographical location, weather, visibility, expected sea state conditions, type of Navy activities conducted in the area, and the total size of the area to be monitored. The particular choice of monitoring approaches will also be influenced by duration of monitoring period, effectiveness, practicality, impact to training, and cost.

It is beyond the scope of this framework document to fully describe this suite of monitoring methods or to prescribe "best practices" for the implementation of these independent techniques for monitoring purposes. Instead, the focus here is on prescribing both essential as well as desired data elements to be collected and recorded as "standard data" to support future data comparisons to the extent that is scientifically appropriate.

This section prescribes the data elements that are to be collected as standard practice for both range/project-specific monitoring as well as Navy-funded R&D studies. While it may not be scientifically valid to directly combine data sets from varied platforms such as shipboard and aerial surveys, the use of standardized sampling and survey protocols will be critical to meeting the overall monitoring goals, as well as assisting better data comparison between years and across different sets of observations. While detailed sampling and survey protocols are specific to independent monitoring techniques and outside the scope of this document, some overall guidelines on sample size and statistical analysis are provided by Appendix C.

Each range/operating area LOA designates particular types and quantities of military readiness activities that require mitigation, monitoring, and reporting pursuant to MMPA and ESA. The LOA details the specific mitigation measures that must be implemented when conducting these activities, and the data that is to be recorded and documented for the various compliance reports. While the information presented here is intended to highlight common data collection requirements from the LOAs, requirements imposed in the range/project-specific LOA take precedence over the information listed here.

The MMPA Final Rules pertaining to Fleet military readiness activities prescribe essential data elements that are to be recorded for individual marine mammal sightings during MFAS/HFAS Major Training Exercises (MTEs) and SINK Exercises (SINKEXs). Table 2 highlights these essential data elements. As one step towards collecting this data in a standardized manner, formatted marine species sighting forms are used by Navy lookouts during monitored military readiness activities. Appendix D provides the current Fleet version of this form. Note, while the LOAs prescribe the collection of these data elements specifically during Fleet MTEs and SINKEXs, the marine species sighting form may also be used to document sightings during other monitored military readiness activities. Its use is not strictly limited to MTEs or SINKEXs.

The MMPA Proposed Rules pertaining to RDT&E activities also prescribe the reporting of individual marine mammal sightings. For purposes of standardized data collection, PSOs monitoring RDT&E activities, as well as third-party biologists under contract to the Navy for marine species monitoring, should be tasked to collect (at minimum) the essential data elements highlighted by Table 2. They may elect to use a different format than that presented in Appendix D as long as these essential data elements are included. In addition, the associated LOA, once issued, should be verified in the event additional essential data elements are prescribed for marine species sightings associated with RDT&E activities. To the extent possible, data will be collected from all distinct habitats in the region to avoid potential sampling bias.

Table 2 also lists additional oceanographic data elements that are highly desirable to fully support analysis of the observations and associated acoustic propagation conditions.

DATA ELEMENTS TO BE RECORDED FOR INDIVIDUAL MARINE ANIMAL SIGHTINGS ASSOCIATED WITH MONITORED MILITARY READINESS ACTIVITIES	
COMMON DATA ELEMENTS	
1)	Location of sighting (lat / long)
2)	Species (if species not possible— indication of whale/dolphin/pinniped/turtle)
3)	Number of individuals
4)	Calves observed (y/n)
5)	Initial Detection Sensor
6)	Indication of specific type of platform observation made from (including, for example, type of surface vessel, i.e., FFG, DDG, or CG)
7)	Length of time observers maintained visual contact with marine animal(s)
8)	Wave height (in feet)
9)	Visibility
10)	Sonar source in use (y/n). If impulsive or explosive source in use, skip to line 15.
IF ACTIVE SONAR SOURCE IN USE:	
11)	Indication of whether animal is <200yd, 200–500yd, 500–1000yd, 1000– 2000yd, or >2000yd from sonar source in (10) above
12)	Mitigation Implementation— Whether operation of sonar sensor was delayed, or sonar was powered or shut down, and how long the delay was.
13)	If source in use (from 10 above)) is hull-mounted, true bearing of animal from ship, true direction of ship's travel, and estimation of animal's motion relative to ship (opening, closing, parallel)
14)	Observed behavior— Watchstanders shall report, in plain language and without trying to categorize in any way, the observed behavior of the animals (such as animal closing to bow ride, paralleling course/ speed, floating on surface and not swimming, etc.) [END for active source essential data elements]
IF IMPULSIVE/EXPLOSIVE SOURCES ARE BEING USED:	
15)	Whether sighting was before, during, or after detonations/exercise, and how many minutes before or after.
16)	Distance of individual/group from actual detonations—or target spot if not yet detonated—use four categories to define distance: (a) The modeled injury threshold radius (MITR) for the largest explosive used in that exercise type in that OPAREA; (b) the required exclusion zone (e.g., 1 nm for SINKEX); (c) the required observation distance (if different than the exclusion zone) (e.g., 2 nm for SINKEX); and (d) greater than the required observed distance. In this example, the observer would indicate if < MITR, from MITR — 1 nm, from 1 nm—2 nm, and > 2 nm.
17)	Observed behavior— Watchstanders will report, in plain language and without trying to categorize in any way, the observed behavior of the animals (such as animal closing to bow ride, paralleling course/ speed, floating on surface and not swimming etc.), including speed and direction.
18)	Resulting mitigation implementation—Indicate whether explosive detonations were delayed, ceased, modified, or not modified due to marine mammal presence and for how long.
19)	If observation occurs while explosives are detonating in the water, indicate munition type in use at time of marine mammal detection. [END for explosive source essential data elements]
OPTIONAL DATA ELEMENTS, PROVIDE AS AVAILABLE or KNOWN	
20)	Sound Velocity Profile for location
21)	Sea surface temperature
22)	Presence of strong gulf stream currents, fronts, and/or mesoscale eddies (y/n)
23)	Other prominent oceanographic features

Table 2: Data Elements to be recorded for individual marine animal sightings associated with monitored military readiness activities

Distribution and abundance of marine species are highly dependent on oceanographic conditions and other environmental factors. Some scientific literature suggests that animals often limit their range to certain habitat areas or broad ocean regions based on sea surface temperature, bathymetric features, and prey abundance. Thus, it is desirable to include data from additional oceanographic and environmental monitoring, predictive forecasts of oceanographic conditions, or some mix of both to account for ambient conditions. The Navy's meteorological and oceanographic community has an extensive array of ocean data gathered by satellite sensing, direct measurements, and predictive models that may be used to support this. Oceanographic conditions can be monitored by a variety of different platforms including satellites, *in situ* observation systems such as buoys, and vessel surveys. For more extensive monitoring efforts, UAVs or gliders might be utilized to obtain oceanographic data. In addition, the recent distribution of joint civilian-government agency Ocean Observing Systems, ocean monitoring satellites, and in-situ buoys offer multiple information sources that could support the Navy's protected marine species monitoring program. Whenever possible, these optional data elements should be recorded for individual marine mammal sightings or relevant groups of individual sightings when made in close proximity to each other. Note that these optional data elements, if available, are typically recorded pre- or post-monitoring by personnel other than the Navy lookouts assigned to sight marine animals.

3.2 DATA MANAGEMENT

As previously discussed, results from Navy-funded monitoring activities will establish time-series data sets that may be used to research trends in species abundance, behavioral reactions and mitigation effectiveness. The data collected through protected marine species monitoring and mitigation activities across all permitted Navy range complexes and relevant Navy-funded RDT&E activities will be incorporated into an electronic centralized data repository established under the guidance of OPNAV N45. These data will be used to support a Navy-wide analysis of monitoring and produce required reports for NMFS on behalf of the Navy Action Proponent. The electronic central repository will include data that are the result of activities conducted under the MMPA authorizations, such as monitoring data from sonar activities and underwater detonations from designated ranges and OPAREAS, marine species sighting observations, and exercise reports pertaining to protected marine species monitoring. The repository will also include annual results from Navy-funded R&D programs such as technical and professional journal articles. Due to the potential for inclusion of classified data, distribution of raw acoustic time series data from monitoring activities is subject to the written consent of the Secretary of the Navy or appointed designee. Unclassified NMFS-required monitoring reports, as specified by the MMPA Final Rules, will be made publicly available by posting on the internet.

As the ICMP matures, and greater amounts of monitoring data are recorded and available for analysis, ways of efficiently organizing this data to support discovery and access within the bounds of existing regulations will become increasingly important. The Navy's first priority is on managing the data collected in support of permitted activities. However, there is also interest in setting up links to relevant reports or a data library so that "best available" science can be easily accessed. This may include active research awards and grants, as well as annual status reports of work accomplished.

Navy is working with their contractor, HDR|e^{2}M, to develop structured procedures to address data archiving, security, and analysis needs as well as to meet specific access requirements for the various Fleet, Scientific, and General Public user groups. This development effort will continue into 2011. Initially, all visual survey data from Fleet-funded monitoring efforts will be made publically available through the OBIS-SEAMAP (Ocean Biogeographic Information System – Spatial Ecological Analysis of Megavertebrate Populations) interface and may also be integrated into other public databases. Navy and NMFS will continue to work together to develop a data-sharing process that best supports the regulatory process in a transparent manner, as well as provides public access to appropriate data products and reports. Unclassified NMFS-required monitoring reports as specified by the MMPA Final Rules are currently available on the NMFS website. These reports along with unclassified results from monitoring-related Navy R&D programs will also be publicly available from the Navy repository.

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4. REPORTING

This section addresses the overarching structure and coordination that will be used to coordinate reporting requirements from range/project-specific monitoring plans, and the recordkeeping system that tracks and documents how each range complex or operating area contributes to ongoing monitoring.

4.1 REPORT COORDINATION

The Navy is required to monitor and report on the effects of Navy actions on protected marine species. The MMPA Final Rules and LOAs specify the compilation of reports that summarize range/project-specific monitoring activities, analyses and results. These reports are submitted to the NMFS Office of Protected Resources (NMFS OPR) and provide critical inputs to the adaptive management process that allows the Navy and NMFS to assess and refine the Navy's overall monitoring effort. If there is a conflict between the reporting information described here and the requirements specified in the LOA, the LOA requirements take precedence.

Navy range action proponents are responsible for report development and submittal. The action proponents include Commander United States Fleet Forces Command (USFF), Commander Pacific Fleet (CPF), and Commander Naval Sea Systems Command (NAVSEA). Note, while Commander NAVSEA is the Action Proponent, he has designated Commander NUWC Keyport Division and Commander NSWC Panama City Division as the responsible individuals for report development and submittal. It is recognized that some information provided in the annual reports may be classified and not releasable to the public.

For the Fleet range complexes and study areas, there are two recurring reports required annually: an Annual Exercise Report and an Annual Monitoring Plan Report.

The primary purpose of the Annual Exercise Report is to report on authorized military readiness activities conducted within each range complex or study area, as well as the monitoring and mitigation performed in association with those activities. Table 3 provides a summary of contents for this multi-part report. As noted in Section 1, Anti-Submarine Warfare (ASW) military readiness activities that take place within the AFAST Study Area are covered in entirety under the AFAST MMPA Final Rules and LOA. Subsequently, only the explosives summary section is required in the Annual Exercise Report for the Cherry Point, JAX, VACAPES, and GOMEX Range Complexes.

The Annual Monitoring Plan Report describes the implementation and results from the associated range/project-specific monitoring plan. It relies on standardized data collection methods across the Navy range complexes to allow for comparison of different geographic locations. The individual range reports may be provided to NMFS within a consolidated report that includes the required Monitoring Plan Reports from multiple range complexes.

For the NAVSEA ranges, there is a single recurring annual report required on RDT&E military readiness activities authorized under their permit. This report includes an estimated number of hours of sonar operation broken down by source type as well as a report of all marine mammal sightings.

Summary Sections contained in the Annual Exercise Report
Summary of MFAS/HFAS Major Training Exercises
a) Exercise info for Integrated Coordinated, and Major Training Exercises (MTEs)
– (i) Exercise designator. – (ii) Date that exercise began and ended. – (iii) Location. – (iv) Number and types of active sources used in the exercise. – (v) Number and types of passive acoustic sources [*sic*] used in exercise. – (vi) Number and types of vessels, aircraft, etc., participating in exercise. – (vii) Total hours of observation by lookouts. – (viii) Total hours of all active sonar source operation. – (ix) Total hours of each active sonar source (along with explanation of how hours are calculated for sources typically quantified in alternate way (buoys, torpedoes, etc.)). – (x) Wave height (high, low, and average during exercise).
b) Individual marine mammal sighting info (for each sighting in each MTE).
– See list of data elements described in Section 3.1
c) An evaluation (based on data gathered during all of the MTEs) of the effectiveness of mitigation measures designed to avoid exposing marine mammals to mid-frequency sonar. This evaluation shall identify the specific observations that support any conclusions the Navy reaches about the effectiveness of the mitigation.
ASW Summary
a) Summarized information For MTEs & non-major training exercises Include total annual hours of each type of sonar source (along with explanation of how hours are calculated for sources typically quantified in alternate way (buoys, torpedoes, etc.)), plus other range-specific information.
b) Cumulative Impact Report
c) Annual (and seasonal, where practicable) depiction of non-major training exercises geographically across the Study Area.
SINKEX Summary
a) Exercise info for each SINKEX completed that year
– (i) Location. – (ii) Date and time exercise began and ended. – (iii) Total hours of observation by lookouts before, during, and after exercise. – (iv) Total number and types of rounds expended/explosives detonated. – (v) Number and types of passive acoustic sources used in exercise. – (vi) Total hours of passive acoustic search time. – (vii) Number and types of vessels, aircraft, etc., participating in exercise. – (viii) Wave height in feet (high, low, and average during exercise). – (ix) Narrative description of sensors and platforms utilized for marine mammal detection and timeline illustrating how marine mammal detection was conducted.
b) Individual marine mammal sighting info (for each sighting in each MTE).
– See list of data elements described in Section 3.1
IEER / AEER Summary
– (i) Total number of IEER and AEER events conducted. – (ii) Total expended/detonated rounds (buoys). – (iii) Total number of self-scuttled IEER rounds.
Explosives Summary
– (i) Total annual number of each type of explosive exercise (of those identified as part of the ‘‘specified activity’’ in this MMPA Final Rule) conducted in the action area – (ii) Total annual expended/detonated rounds (missiles, bombs, etc.) for each explosive type.

Table 3: Summary Sections contained in the Annual Exercise Report

Each range complex submits annual summaries as applicable for authorized military readiness activities.

The annual reporting requirements associated with the MMPA Final Rules are designed to provide NMFS with monitoring data from the previous year and assist NMFS in analyzing the information for subsequent LOA applications. As part of the adaptive management process described in Section 5, NMFS and the Navy will meet yearly, prior to LOA issuance, to discuss these annual reports and to determine whether mitigation or monitoring modifications are appropriate. Range/project-specific monitoring plans are then updated and submitted as part of the LOA renewal application. If substantial modification, as determined by NMFS, to the described mitigation or monitoring will occur during the upcoming season, NMFS will provide the public a period of 30 days for review and comment on the request.

There are also non-recurring reporting requirements. For both Fleet and NAVSEA ranges and study areas, these requirements include a draft "Range Complex 5-year Comprehensive Report" that analyzes and summarizes all multi-year marine mammal information gathered during authorized activities for which annual reports are required. This report is submitted at the end of the fourth year of the rule, covering activities that occurred through a specified data cutoff date.

For the Fleet ranges only, the non-recurring requirements also include a draft "Comprehensive National ASW Report" that analyzes, compares, and summarizes the active sonar data gathered from Navy lookouts pursuant to the implementation of range-specific monitoring plans. This National ASW Report is not required for the Cherry Point, JAX, VACAPES, and GOMEX Range Complexes, as active sonar data from these OPAREAS is included in the AFAST reporting requirements. Further guidance to support the preparation of these two comprehensive reports will be promulgated by OPNAV N45 in conjunction with the adaptive management process.

Table 4 provides an overall summary listing of specific report dates under the current MMPA Final Rules, current as of 16 November 2010. NMFS is responsible for establishing the specific timeline for each year's report submittals. As part of adaptive management, NMFS and the Navy are coordinating on the development of a streamlined workload plan for developing and reviewing these reports. Although the reports described will always be submitted annually at a time that allows for adequate analysis by NMFS prior to the issuance of the subsequent LOA, NMFS retains the flexibility to change those dates yearly. Therefore, regulatory text may not specify the dates that the reports are due, but each annual LOA will provide these required dates. Additionally, by way of adaptive management, the Navy may choose to combine the annual reports from multiple ranges into a Multi-Range Complex Annual Report.

The Navy shall respond to NMFS' comments and requests for additional information or clarification on the individual annual or comprehensive reports 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 3 months after the submittal of the original submittal if NMFS does not comment by then.

It is anticipated that reporting requirements will be added pursuant to the implementation of monitoring plans and MMPA Final Rules for the NUWC Keyport Range Complex and the GOA TMAA. The ICMP plan will be updated as appropriate to reflect these requirements through the adaptive management process.

Table 4: Common reporting requirements for range complexes/study areas covered by ICMP*
(Data date: 16 November 2010)

** 2010 update: The requirements as written include specific due dates for each of the reports. As part of adaptive management, NMFS and the Navy are coordinating on the development of a streamlined workload plan for developing and reviewing these reports. Although the reports described will always be submitted annually at a time that allows for adequate analysis by NMFS prior to the issuance of the subsequent LOA, NMFS retains the flexibility to change those dates yearly. Therefore, regulatory text may not always specify the dates that the reports are due, but each annual LOA will provide these required dates.*

RANGE	Annual Exercise (or RDT&E) Report	Annual Monitoring Plan Report	5-Year Comprehensive Monitoring Report	Comprehensive National ASW Report
Hawaii Range Complex (HRC)	1 Aug cutoff / 1 Oct submit	1 Aug cutoff / 1 Oct submit	1 June 2012 cutoff / 30 Nov 2012 submit	1 Jan 2014 cutoff / June 2014 submit
Southern California (SOCAL) Range Complex	1 Aug cutoff / 1 Oct submit	1 Aug cutoff / 1 Oct submit	1 June 2012 cutoff / 30 Nov 2012 submit	1 Jan 2014 cutoff / June 2014 submit
Atlantic Fleet Active Sonar Training (AFAST) Study Area	1 Aug cutoff / 1 Oct submit	1 Aug cutoff / 1 Oct submit	1 June 2012 cutoff / 30 Nov 2012 submit	1 Jan 2014 cutoff / June 2014 submit
Cherry Point Range Complex	Annual report required, but submittal date not specified.	1 Jan cutoff / 1 Mar submit	1 Dec 2012 cutoff / 31 May 2013 submit	Not Applicable
Jacksonville (JAX) Range Complex	Annual report required, but submittal date not specified.	1 Jan cutoff / 1 Mar submit	1 Dec 2012 cutoff / 31 May 2013 submit	Not Applicable
Virginia Capes (VACAPES) Range Complex	Annual report required, but submittal date not specified.	1 Jan cutoff / 1 Mar submit	1 Dec 2012 cutoff / 31 May 2013 submit	Not Applicable
Naval Surface Warfare Center Panama City Division (NSWC PCD) Study Area	Annual RDT&E report 1 Aug cutoff / 1 Oct submit	1 Aug cutoff / 1 Oct submit	1 July 2013 cutoff / 31 Dec 2013 submit	Not Applicable
Mariana Islands Range Complex (MIRC)	15 April submit/15 Feb cutoff (not specified in LOA but derived by Navy)	15 April submit/15 Feb cutoff (not specified in LOA but derived by Navy)	15 Jul 2014 cutoff / 30 Nov 2014 submit	1 Jan 2014 cutoff / June 2014 submit
Northwest Training Range Complex (NWTRC)	Annual report required; submission date will be identified each year in the LOA.	Annual report required; submission date will be identified each year in the LOA.	1 Feb 2014 cutoff / July 2014 submit	1 Jan 2014 cutoff / June 2014 submit
Naval Undersea Warfare Center Keyport (NUWC Keyport) Range Complex	Not Applicable	PROPOSED: 1 Sep cutoff / 1 Dec submit	PROPOSED: 1 Sep 2013 [*sic*] cutoff / 30 Jun 2013 submit	Not Applicable
Gulf of Mexico (GOMEX) Range Complex	Annual report required, but submittal date not specified.	PROPOSED: 1 Jan cutoff / 1 Mar submit	PROPOSED: 1 Sep 2013 cutoff / 30 Mar 2014 submit	Not Applicable
Gulf of Alaska (GOA) Temporary Maritime Activities Area (TMAA)	PROPOSED: October cutoff/ Dec 15 submit	PROPOSED: October cutoff/ Dec 15 submit	PROPOSED: Oct 2014 cutoff / Dec 2014 submit	PROPOSED: 1 Jan 2014 cutoff / June 2014 submit

4.2 RECORDKEEPING SYSTEM

OPNAV (N45) is responsible for coordinating the development, funding, and assessment of Navy marine research, and ensuring prioritization of research monitoring projects consistent with the top-level goals and priorities established by the ICMP or other applicable legal requirements. Monitoring activities will be allocated and resourced based on the strength of particular and specific monitoring proposals. With NMFS concurrence, they will not be allocated based on maintaining an equal (or commensurate to effects) distribution of monitoring effort across the range complexes. For example, careful prioritization and planning through the ICMP (which would include a review of both past monitoring results and current scientific developments) may show that a large, intense monitoring effort in one range complex would likely provide extensive, robust and much-needed data that could be used to understand the effects of sonar on the marine environment throughout different geographical areas. In this case, 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. In the event that monitoring is allocated in this fashion, clear recordkeeping is needed to demonstrate how each range complex/project is contributing to all of the ongoing monitoring. This will be done by maintaining a record of these resource allocation decisions in the electronic central data repository previously discussed in Section 3.

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5. ADAPTIVE MANAGEMENT

The MMPA Final Rules for Navy range complexes[7] require an adaptive management process to be established. Section 5.1 describes the process that will be used to annually review, with NMFS, monitoring results, Navy RDT&E, and current science to use for potential modification of mitigation or monitoring methods. The MMPA Final Rules also prescribe a monitoring workshop to be held in 2011 to review cumulative monitoring results from 2009 and 2010. Section 5.2 discusses this monitoring workshop, as well as how and when Navy/NMFS will subsequently utilize the findings of the monitoring workshop to potentially modify subsequent monitoring and mitigation.

5.1 ANNUAL REVIEWS

The reporting requirements associated with the MMPA Final Rules are designed to provide NMFS with monitoring data from the previous year in sufficient time to allow NMFS to consider the data before reissuing subsequent LOAs. Using the data collection and reporting procedures previously described in Sections 3 and 4, the Navy's monitoring data and marine species sighting observations will be consolidated and made available for analysis. NMFS and Navy will then meet to conduct an annual Adaptive Management Review (AMR). The AMR is a multipart review at which NMFS and the Navy jointly consider prior year goals, monitoring results and advancing science to assess overall progress. The review will determine if modifications are needed in mitigation or monitoring measures to more effectively address monitoring program goals. The AMR will consider data as available from across all of the range complexes included within the ICMP. At present, only one AMR per year is planned, and it will be applicable to all range complexes covered by the ICMP. The AMR will also consider an updated matrix of goals and prioritization guidelines proposed for the following year.

OPNAV N45 is responsible for the overall AMR meeting coordination and agenda. Navy action proponents will be asked to assign staff familiar with range/project-specific monitoring results to participate in this review and present an overview of the past year's monitoring activities. Additionally, sponsors of Navy-funded monitoring-related research will be asked to participate and provide a summary of their activities and accomplishments. Other potential presentation and discussion topics for the AMR include:

- Lessons learned from previous year's monitoring efforts;
- Other (non Navy-funded) monitoring-related science advances;
- Effectiveness of existing monitoring and mitigation tools;
- Operational feasibility of new tools and technologies;
- Recommendations for refinement and analysis of monitoring and mitigation methods; and
- Recommendations for the next year's monitoring activities.

[7] *E.g.*, 50 C.F.R. § 216.175(c)(4).

If available, collaboration with regional NMFS scientists, academic scientists, and other non-Navy subject matter experts will be informally sought.

Products of the AMR include a determination as to whether mitigation or monitoring modifications are appropriate for the upcoming year, and an updated matrix of monitoring goals and prioritization guidelines. Adaptations and refinements to monitoring programs that result from the AMR will be incorporated into the range/project-specific monitoring plans as they come up for renewal in the normal course of events.

Adaptive management will also lead to updates and improvements to the overall ICMP. The updated matrix of goals and prioritization guidelines resulting from the AMR will be incorporated by an annual addendum or revision to the ICMP. Additionally, expanded descriptions of the data repository, details for data standardization protocols, expanded information on range-specific characteristics, and planning information for the 2011 Monitoring Workshop are among the candidate information to be included in future updates. Annual ICMP updates will be provided to NMFS by 31 December beginning in 2010.

With the annual AMR, NMFS and Navy will have the ability to consider new data from different sources for purposes of making minor modifications to improve the effectiveness of range/project-specific monitoring plans, or to potentially identify substantial changes for subsequent 5-year regulations. This could result in mitigation or monitoring measures being added, modified, or deleted for subsequent annual LOAs. If a request to renew an LOA indicates that a substantial modification as determined by NMFS to the described activity, mitigation, or monitoring during the upcoming season will occur, NMFS will provide the public a period of 30 days for review and comment on the request.

AMRs potentially could lead to significant restructuring of the monitoring plans put forward by individual ranges. In order to obtain robust, much-needed data that addresses high-priority monitoring goals, monitoring activities may be prioritized and resourced based on the likely contribution of specific monitoring proposals to stated monitoring goals, as well as the likely technical success of the proposed monitoring approach based on a review of past monitoring results. This is in contrast to allocating monitoring resources based on maintaining an equal (or commensurate to effects) distribution of monitoring effort across range complexes. For example, if careful prioritization and planning were to suggest that a large, intense monitoring effort in one Range Complex 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.

A record of decisions and monitoring resource allocations made as a result of the AMR will be documented and maintained in the electronic central data depository previously discussed in Section 3. This will allow NMFS and other interested parties to see how each range complex is contributing to all of the ongoing monitoring (funding, staffing, and level of effort).

This adaptive management process recurs annually. However, there will be modifications to the process in 2011, when the Navy, with guidance and support from NMFS, is to host a monitoring workshop that incorporates outside experts and expanded participation.

5.2 MONITORING WORKSHOP IN 2011

As part of the adaptive management process in 2011, the Navy, with guidance and support from NMFS, will convene a monitoring workshop with participation from marine mammal and acoustic experts, as well as other interested parties. This monitoring workshop, tentatively scheduled for mid-2011 in the Metropolitan D.C. area, will present a consolidated overview of monitoring activities accomplished in 2009 and 2010 pursuant to the regulations in place to govern the unintentional taking of marine mammals incidental to authorized activities conducted on Navy ranges and operating areas. It will also include outcomes of selected monitoring-related research activities. One possible outcome of this workshop is the potential identification of substantial changes in monitoring approaches for subsequent 5-year regulations.

Participation in this jointly sponsored NMFS/Navy Workshop will be by invitation only. Participants will include, among others, recognized experts in marine species monitoring from across government, academia, and the private sector. After considering the current science and working within the framework of available resources and feasibility of implementation, monitoring workshop participants will be asked to submit their individual recommendations to the Navy and NMFS. Navy and NMFS will then analyze the input from participants and determine the best way forward from a national perspective.

The workshop will not be used to seek or achieve consensus on a way forward for the monitoring program. NMFS has statutory responsibility to prescribe regulations pertaining to monitoring and reporting, and will develop in coordination with the Navy the most effective and appropriate monitoring and reporting protocols for future authorizations. As necessary, NMFS will incorporate any changes into future LOAs and rulemakings. If the modification to the described activity, mitigation, or monitoring is determined by NMFS to be substantial, then NMFS will provide the public a period of 30 days for review and comment.

OPNAV N45 will take the lead for Navy in coordinating this monitoring workshop with NMFS. There will be a series of detailed planning meetings for this 2011 workshop starting with the 2010 AMR.

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6. ICMP NEAR-TERM DEVELOPMENT FOCUS AREAS

To be an effective planning tool, the ICMP must continue to develop and evolve over time. Specific recommendations for near-term development of the ICMP were suggested in December 2009. Progress in each of the focus areas listed below was the subject of discussion in the October 2010 AMR. This progress is also summarized below.

The three specific areas originally identified for the ICMP near-term development included:

1. **Top-level Goal Refinement**. NMFS and Navy, with input from the 2010 monitoring workshop, refined the top-level goals. These refined goals are provided in Section 2. The Navy is now working with their contractor, HDR|e^{2}M, and a newly created Scientific Advisory Group (SAG) to implement these refined goals into a 3-5 year Strategic Plan for monitoring. The current objective is to produce a group-reviewed draft Strategic Monitoring Plan that has been refined/reviewed by experts and vetted through NMFS and MMC to present at the 2011 Monitoring Workshop.

2. **Characterization of Navy Range Complexes/Study Areas**. Many of the prioritization guideline factors provided by Section 2 are highly dependent on the specific location at which the proposed monitoring activity is to be conducted. To better assist planning efforts within the ICMP, one would like to predict a confidence level for the likelihood of obtaining meaningful monitoring data in any given location based on factors such as prior success with the specific monitoring method itself, anticipated sea states, seasonal weather patterns, local animal densities and migration patterns, and anticipated success rate for integrating the monitoring method with training events at that location. For this framework document to support that level of comparative analysis, it needs to include reference information that allows the user a top-level view of attributes across the various Navy range complexes. This characterization of the unique attributes associated with each range complex/study area is under development, and the work will extend into 2011. Appendix E provides the initial framework and selected portions of the current draft matrix for the range characterization.

3. **Data Management Organization and Access Procedures Development**. Section 3 provided a preliminary description of the centralized electronic repository for data associated with the ICMP, and the types of data that might be made available, as appropriate, to various categories of users. At present, there is a mix of classified and unclassified data that falls under the ICMP umbrella. As the ICMP matures, and greater amounts of monitoring data are recorded and available for analysis, ways of efficiently organizing this data to support discovery and access within the bounds of existing regulations will become increasingly important. The Navy's first priority is on managing the data collected in support of permitted activities. However, there is also interest in setting up links to relevant reports or a data library so that "best available" science can be easily accessed. This might include active research awards and grants, as well as annual reports of work accomplished. Navy is working with their contractor, HDR|e^{2}M, to develop structured procedures to meet specific access requirements for the various Fleet, Scientific, and General Public user groups. This development effort will continue into 2011. Initially, all visual survey data from Fleet-funded monitoring efforts will be made publically available through the OBIS-SEAMAP interface and may also be integrated into other public databases. Unclassified NMFS-required monitoring reports as specified by the MMPA Final Rules are currently available on the NMFS website. These reports along

with unclassified results from monitoring-related Navy R&D programs will also be publicly available from the Navy repository.

7. ROLES AND RESPONSIBILITIES

OPNAV (N45) is responsible for maintaining and updating this ICMP, as appropriate, to reflect future regulatory agency final rulemakings, adaptive management reviews, best available science, improved assessment methodologies, or more effective protective measures. This will be done in consultation with Navy technical experts, Fleet Commanders, and Echelon II Commands as appropriate.

OPNAV (N45) shall:

- Coordinate the development, funding, and assessment of Navy marine research, ensuring prioritization of monitoring projects consistent with the top-level goals established by the ICMP or other applicable legal requirements;
- Establish an electronic central repository that includes both monitoring data from activities conducted under the MMPA authorizations and annual results from Navy-funded R&D programs;
- Review annual ESA and MMPA reports prepared by Echelon II Commands to ensure a standardized approach is maintained that will enable appropriate consolidation and comparison of data;
- Chair an annual Adaptive Management Review (AMR) with NMFS on a schedule that supports the reissuance of LOA and annual Biological Opinions (BO) to maintain uninterrupted Fleet training and operations as well as Acquisition Community RDT&E activities. Attendees should include representatives from OPNAV, Office of the Assistant Secretary of the Navy for Installations and Environment (OASN I&E), Office of Naval Research (ONR), and Echelon II commands. OPNAV (N45) may approve additional attendees;
- In conjunction with the Adaptive Management Review, submit an annual evaluation of monitoring-related goals and priorities to NMFS; and
- Co-chair planning sessions with NMFS to address detailed planning for the mid-2011 Monitoring Workshop.

USFF, CPF, NAVSEA, and other permit holders shall:

- Coordinate completion of environmental planning, permitting, consultations, and reports to support uninterrupted Fleet training and research, development, testing, and evaluation requirements;
- Conduct monitoring measures consistent with applicable NMFS MMPA Final Rules, Biological Opinions, and other governing legal requirements;
- Monitor changes in ESA species, critical habitats, Habitat Areas of Particular Concern (HAPC), sanctuaries and protected marine species regulations as it may affect Navy military readiness activities authorized under their permits; and
- Assign staff to participate in the AMR.

NAVFAC, NUWC, and other Echelon III commands have contracting authority and provide support to the permit holders through contracting, executing, and managing Fleet-funded monitoring activities as directed.

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8. REFERENCES

MMPA FINAL RULES / PROPOSED RULES:

Taking and Importing Marine Mammals; U.S. Navy Training in the Hawaii Range Complex; Final Rule, 74 Fed. Reg. 1456 (January 12, 2009) (to be codified at 50 C.F.R. pt. 216).

Taking and Importing Marine Mammals; U.S. Navy Training in the Southern California Range Complex; Final Rule, 74 Fed. Reg. 3883 (January 21, 2009) (to be codified at 50 C.F.R. pt. 216).

Taking and Importing Marine Mammals; U.S. Navy's Atlantic Fleet Active Sonar Training (AFAST); Final Rule, 74 Fed. Reg. 4844 (January 27, 2009) (to be codified at 50 C.F.R. pt. 216).

Taking and Importing Marine Mammals; U.S. Navy Training in the Cherry Point Range Complex; Final Rule, 74 Fed. Reg. 28370 (June 15, 2009) (to be codified at 50 C.F.R. pt. 218).

Taking and Importing Marine Mammals; U.S. Navy Training in the Jacksonville Range Complex; Final Rule, 74 Fed. Reg. 28349 (June 15, 2009) (to be codified at 50 C.F.R. pt. 218).

Taking and Importing Marine Mammals; U.S. Navy Training in the Virginia Capes Range Complex; Final Rule, 74 Fed. Reg. 28328 (June 15, 2009) (to be codified at 50 C.F.R. pt. 218).

Taking and Importing Marine Mammals; U.S. Naval Surface Warfare Center Panama City Division Mission Activities; Final Rule, 75 Fed. Reg. 3395 (January 21, 2010) (to be codified at 50 C.F.R. § 218).

Taking and Importing Marine Mammals; Military Training Activities and Research, Development, Testing and Evaluation Conducted Within the Mariana Islands Range Complex (MIRC); Final Rule, 75 Fed. Reg. 45527 (August 3, 2010) (to be codified at 50 C.F.R. pt. 218).

Taking and Importing Marine Mammals; Navy Training Activities Conducted Within the Northwest Training Range Complex; Final Rule, 75 Fed. Reg. 69296 (November 10, 2010) (to be codified at 50 C.F.R. pt. 218).

Taking and Importing of Marine Mammals; U.S. Navy's Research, Development, Test, and Evaluation Activities Within the Naval Sea Systems Command Naval Undersea Warfare Center Keyport Range Complex; Proposed Rules, 74 Fed. Reg. 32264 (July 7, 2009) (to be codified at 50 C.F.R. pt. 218).

Taking of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Training Operations Conducted Within the Gulf of Mexico Range Complex; Proposed Rules, 74 Fed. Reg. 33960 (July 14, 2009) (to be codified at 50 C.F.R. pt. 218).

RANGE-SPECIFIC MONITORING PLANS

Hawaii Range Complex Monitoring Plan dated December 2008.

Atlantic Fleet Active Sonar Training Range Complex Monitoring Plan dated January 2009.

Southern California Range Complex Monitoring Plan dated 9 January 2009.

Jacksonville Range Complex Monitoring Plan dated February 2009.

VACAPES Range Complex Monitoring Plan dated February 2009.

Cherry Point Range Complex Monitoring Plan dated April 2009.

Gulf of Mexico Complex Monitoring Plan (draft) dated April 2009.

Mariana Islands Range Complex Monitoring Plan dated May 2010.

Northwest Training Range Complex Monitoring Plan dated June 2010.

Gulf of Alaska Temporary Maritime Activities Area Monitoring Plan (draft) dated June 2010.

OTHER REFERENCES:

CNO Memo dated 6 Mar 2006, “Mid-Frequency Active Sonar Effects Analysis Interim Policy”.

DRAFT United States Navy Comprehensive Marine Species Monitoring Program dated October 2007. Naval Facilities Engineering Command Pacific, Pearl Harbor, HI. Prepared by: ManTech SRS Technologies, Inc., 3865 Wilson Boulevard, Suite 800, Arlington, VA 22203 under Contract No. N68711-02-D-8043; Task Order No. 0035 in collaboration with: Cascadia Research Collective; Centre for Research into Ecological and Environmental Modeling, University of St. Andrews; Greeneridge Sciences, Inc.; LGL Limited; Kim Holland, Ph.D. University of Hawaii; and U. S. Navy Marine Resources Support Group.

Endangered Species Act (ESA), 16 U.S.C. §1531, *et seq*.

Executive Order 12114, “Environmental Effects Abroad of Major Federal Actions”.

Marine Mammal Protection Act (MMPA), 16 U.S.C. §1361, *et seq.*, as amended by the 2004 National Defense Authorization Act, Pub. L. No. 108-136, 319, 117, Stat. 1433.

National Environmental Policy Act (NEPA), 42 U.S.C. §4321, *et seq.*

OPNAVINST 5090.1C, Environmental Readiness Program Manual dated 30 October 2007.

APPENDIX A:

SOUND SOURCES AND ACTIVITIES AUTHORIZED OR ANTICIPATED TO BE AUTHORIZED UNDER THE MMPA FINAL RULES FOR FLEET TRAINING RANGE COMPLEXES / STUDY AREAS

Green: Proposed Rules

Sound Source / Activity	Range: AFAST	SOCAL	HRC	VACAPES	Cherry Pt	JAX	NWTRC	MIRC	GOMEX	GOA TMAA
Use of mid-frequency active sonar (MFAS) and high frequency active sonar (HFAS) sources for Fleet Training:										
AN/AQS–22 or 13 (helicopter dipping sonar)	X	X	X					X		X
AN/BQQ–10 or 5 (submarine mounted sonar)	X	X	X					X		X
AN/BQS–15 (submarine navigation)	X	X					X	X		X
AN/SLQ–25 (NIXIE—towed countermeasure)	X	X								
AN/SQQ–32 (over the side mine-hunting sonar)	X									
AN/SQS–53 (hull-mounted sonar)	X	X	X				X	X		X
AN/SQS–56 (hull-mounted sonar)	X	X	X				X	X		X
AN/SSQ–125 (AEER sonar sonobuoys)	X	X					X	X		X
MK–1 or 2 or 3 or 4 (Submarine-fired Acoustic Device Countermeasure (ADC))	X									
MK–46 or 54 (lightweight torpedoes)	X	X						X		
MK–48 (heavyweight torpedoes)	X	X	X				X	X		X
Noise Acoustic Emitters (NAE - Sub-fired countermeasure)	X									
SSQ–62 DICASS (sonobuoys)	X	X	X				X	X		X
MK-84 range tracking pingers for ASW tracking							X	X		X
Portable Undersea Tracking Range Uplink							X	X		X
Detonation of underwater explosives for Fleet Training:										
AN/SSQ–110A (IEER explosive sonobuoy) (5 lbs)	X	X	X				X	X		X
MK–48 Heavyweight Torpedo (851 lbs)		X	X				X	X		X
Airborne Mine Neutralization System (AMNS)				X						
Demolition Charges (20 lbs)		X	X	X	X	X	X	X		
AGM–65 E/F Maverick missile (78.5 lbs)		X	X	X		X	X	X		
Harpoon missile (448 lbs)		X	X				X	X		
AGM–114 Hellfire missile				X	X	X	X	X		
AGM–88 High-speed anti-radiation missile (HARM)				X			X	X		
Tube-launched Optically tracked Wire-guided (TOW) missile					X					
SLAM missile							X	X		
MK–82 Bomb / GBU-12		X	X				X	X		X
MK–83 Bomb / GBU-16 / GBU -32		X	X	X			X	X	X	X
MK–84 Bomb / GBU-10		X	X				X	X		X
5” Naval Gunfire (9.5 lbs)		X	X	X	X	X	X	X		X
76 mm rounds (1.6 lbs)		X	X				X	X		X
MK3A2 anti-swimmer concussion grenades (0.5 lbs)						X		X	X	
Training Events or Activity:										
ASW Exercise	X	X	X				X	X		X
MINEX (Neutralization, Avoidance, Countermeasures)	X	X	X	X	X	X	X	X		
MISSILEX (Air-to-Surface)		X	X	X	X	X	X	X		X
MISSILEX (Surface-to-Surface)			X							X
BOMBEX (Air-to-Surface)		X	X	X			X	X	X	X
SINKEX		X	X				X	X		X
GUNEX (Surface-to-Surface)		X	X				X	X		X
Naval Surface Fire Support			X							
FIREX with Integrated Maritime Portable Acoustic Scoring System (IMPASS)				X	X	X				
Small Arms Training with grenades						X		X	X	
Maintenance	X	X								
RDT&E (unspecified)	X	X						X		

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APPENDIX B:

Sound Sources and Activities anticipated to be authorized under the MMPA Final Rules for NAVSEA RDT&E Ranges / Study Areas

Green: Proposed Rules

Sound Source / Activity	Range: NUWC Keyport	Range: NSWC PCD
Use of mid-frequency and high frequency active sound sources for NAVSEA RDT&E:		
Acoustic communication modems, HF	X	X
Acoustic devices for general range and UUV tracking (HF)	X	
Aids to navigation (range equipment)	X	
AN/AQS-22 (helicopter dipping sonar)	X	
AN/AQS–20 (helicopter towed mine-hunting sonar)		X
AN/SQQ–32 (over the side mine-hunting sonar)		X
AN/SQS–53/56 (hull-mounted sonar, Kingfisher)		X
AN/WLD–11 RMS Navigation (HF)	X	X
F84Y (Tower-mounted parametric sonar used to simulate mine-like objects, HF)		X
Object detection and navigation sonars (multiple HF)	X	X
Range Targets with active acoustic devices (MF, HF)	X	
Sidescan Sonars (multiple HF frequencies)	X	X
Sonobuoys, active	X	
Special Test Systems with active acoustic devices (MF, HF)	X	
Sub-bottom profilers (MF, HF)	X	X
Torpedo Sonars (HF)	X	
TVSS (Toroidal Volume Search Sonar, HF)		X
Detonation of underwater explosives for NAVSEA RDT&E:		
Live Ordnance (1 – 10 lb net explosive weight)		X
Live Ordnance (11 – 75 lb net explosive weight)		X
Live Ordnance (76 – 600 lb net explosive weight)		X
Line Charges (1750 lb net explosive in 5 lb increments)		X
Projectiles (5in, 40mm, 30mm, 20mm, 76mm, 25mm, and small arms)		X
NAVSEA RDT&E Activity:		
Acoustic and non-acoustic sensor testing	X	
Countermeasure testing	X	
Impact testing	X	
Inert mine detection, classification, and localization	X	
Ordnance Live T&E		X
Projectile Firing T&E		X
Sonar T&E		X
Surf zone clearing T&E with line charges		X
Surface Operations – equipment deployment and recovery	X	X
Surface Operations – system development	X	X
Surface Operations – test support	X	X
Surface Operations – tows	X	X
UUV and UAS testing	X	
Vehicle propulsion testing	X	

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APPENDIX C:
Sample size and Statistical analysis

Specific guidelines for sample size and statistical analysis are under development. This is a PLACEHOLDER for a FUTURE UPDATE.

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APPENDIX D:
Marine Mammal Sighting Form for Navy Lookouts

Example:

A. DTG: **061234 Z JAN 09**	B. Species/Type of Mammal: **Whale**	C. Number of Mammals: **2**	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: **215** T / **1400** Yds	G. Unit Position: LAT: **123456N** LONG: **1234555E**	
H. Unit Course/Speed: **265** T / **12** Kts	I. Last Known Brg/Rng: **095** T / **900** Yds	J. Total Time Visually Observed: **14** MIN	
K. Wave Height: **4** FT	L. Visibility: **12** NM	M. MFAS Status: **ON**	N. MFAS Action Taken: **Powerdown**
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: **14** MIN	P. Maneuver Conducted: **Turn Stbd**	Q. Degrees of Course Chg: **45** DEG	R. Range Action Taken: **800** YDS
S. Action impact (note 1): **slight - degraded integrity of ASW screen, as ship maneuvered to avoid whales**			
T. Narrative of observation (note 2): **two whales paralleled ship's course, CPA of 600 yds after maneuver. Powered down MFAS for 14 min until lost sight of whales.**			

Data Fields:

A. DDHHMM Z MMM YY
B. WHALE / DOLPHIN / PORPOISE / SEAL / SEAL LION / TURTLE /GENERIC (i.e unknown)
C. Number
D. YES / NO
E. VISUAL / AURAL
F. Bearing in Degrees True / Range in Yards
G. Position: DDMMSS N/S DDDMMSS E/W
H. Course in Degrees True / Speed in Knots
I. Bearing in Degrees True / Range in Yards
J. Minutes
K. Feet
L. Nautical Miles
M. NO / YES
N. Powerdown -6dB / Powerdown -10dB / Shutdown / None
O. Minutes
P. Turn STBD / Turn PORT / -
Q. Degrees
R. Range in Yards
S. Tactical Degradation Assessment examples:
- None
- Slight - Degraded ASW screen integrity when ship maneuvered to open whales.
- Moderate - Lost Contact when power reduced.
- Significant - Engagement interrupted when MFAS was Shutdown.

T. Observation examples:
- Dolphins sighted at 1200 YDS off Port bow, closing the ship. Maneuvered to confirm Bow Riding and continued MFAS operations
- Pod of whales sighted fin slapping 600 YDS off STBD bow, paralleling ships course. Ship maneuvered to Port to open range.
- Porpoises sighted 250 YDS off STBD Beam, opening ship. Powered down MFAS by -6dB until they opened to 1000 YDS. Lost sight astern.
- DragonSlayer 12, flying NW at 60 kts, 1200FT, spotted pod of dolphins within 150 YDS of DICASS Buoy 12. Buoy was passive at the time, and remained so until dolphins were seen leaving the area. 80% cloud layer at 3500 FT. Photos taken.

Version: 3.0N - 19 MAR 09

USS_____DAILY MARINE MAMMAL LOG

A. DTG: Z	B. Species/Type of Mammal:	C. Number of Mammals:	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: T / Yds	G. Unit Position: LAT:	LONG:
H. Unit Course/Speed: T / Kts	I. Last Known Brg/Rng: T / Yds	J. Total Time Visually Observed:	MIN
K. Wave Height: FT	L. Visibility: NM	M. MFAS Active:	N. MFAS Action Taken:
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: MIN	P. Maneuver Conducted:	Q. Degrees of Course Chg: DEG	R. Range Action Taken: YDS
S. Action impact (note 1):			
T. Narrative of observation (note 2) :			

A. DTG: Z	B. Species/Type of Mammal:	C. Number of Mammals:	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: T / Yds	G. Unit Position: LAT:	LONG:
H. Unit Course/Speed: T / Kts	I. Last Known Brg/Rng: T / Yds	J. Total Time Visually Observed:	MIN
K. Wave Height: FT	L. Visibility: NM	M. MFAS Active:	N. MFAS Action Taken:
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: MIN	P. Maneuver Conducted:	Q. Degrees of Course Chg: DEG	R. Range Action Taken: YDS
S. Action impact (note 1):			
T. Narrative of observation (note 2) :			

A. DTG: Z	B. Species/Type of Mammal:	C. Number of Mammals:	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: T / Yds	G. Unit Position: LAT:	LONG:
H. Unit Course/Speed: T / Kts	I. Last Known Brg/Rng: T / Yds	J. Total Time Visually Observed:	MIN
K. Wave Height: FT	L. Visibility: NM	M. MFAS Active:	N. MFAS Action Taken:
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: MIN	P. Maneuver Conducted:	Q. Degrees of Course Chg: DEG	R. Range Action Taken: YDS
S. Action impact (note 1):			
T. Narrative of observation (note 2) :			

A. DTG: Z	B. Species/Type of Mammal:	C. Number of Mammals:	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: T / Yds	G. Unit Position: LAT:	LONG:
H. Unit Course/Speed: T / Kts	I. Last Known Brg/Rng: T / Yds	J. Total Time Visually Observed:	MIN
K. Wave Height: FT	L. Visibility: NM	M. MFAS Active:	N. MFAS Action Taken:
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: MIN	P. Maneuver Conducted:	Q. Degrees of Course Chg: DEG	R. Range Action Taken: YDS
S. Action impact (note 1):			
T. Narrative of observation (note 2) :			

Note 1: Tactical Degradation Assessment. Impact examples: None. Slight - Degraded ASW screen when ship maneuvered to open whales. Moderate: Lost Contact when power reduced. Significant: Engagement interrupted when MFAS was Shutdown.
Note 2: Describe actions of marine mammals and ship's reactions. Aircraft include altitude. Narrative examples: Dolphins sighted at 1200 YDS off Port bow, closing the ship, CPA of 600 YDS. Powered down MFAS for 35 min until lost sight of whales.
Porpoises sighted by Lookouts using NVGs, range 550 YDS, opening the ship. Powered down MFAS -6dB for 10 min until outside of 1000 YDS.
LoneWolf 42, flying SW at 60kts, 1200 FT, sighted pod of dolphins within 100 YDS DICASS 12. Buoy was not active at the time.

Example:

A. DTG: **061234 Z JAN 09**	B. Species/Type of Mammal: **Whale**	C. Number of Mammals: **2**	D. Calves: YES/NO
E. Initial Detection Source: VISUAL / AURAL	F. Initial Brg/Rng: **215** T / **1400** Yds	G. Unit Position: LAT: **123456N** LONG: **1234555E**	
H. Unit Course/Speed: **265** T / **12** Kts	I. Last Known Brg/Rng: **095** T / **900** Yds	J. Total Time Visually Observed: **14** MIN	
K. Wave Height: **4** FT	L. Visibility: **12** NM	M. MFAS Status: **ON**	N. MFAS Action Taken: **Powerdown**
IF MFAS WAS TRANSMITTING WHEN MAMMAL WAS SIGHTED AND SUBSEQUENTLY POWERED DOWN/SHUT DOWN, OR COURSE CHANGED:			
O. Duration of Action: **14** MIN	P. Maneuver Conducted: **Turn Stbd**	Q. Degrees of Course Chg: **45** DEG	R. Range Action Taken: **800** YDS
S. Action impact (note 1): **slight - degraded integrity of ASW screen, as ship maneuvered to avoid whales**			
T. Narrative of observation (note 2): **two whales paralleled ship's course, CPA of 600 yds after maneuver. Powered down MFAS for 14 min until lost sight of whales.**			

Data Fields:

A. DDHHMM Z MMM YY
B. WHALE / DOLPHIN / PORPOISE / SEAL / SEAL LION / TURTLE /GENERIC (i.e unknown)
C. Number
D. YES / NO
E. VISUAL / AURAL
F. Bearing in Degrees True / Range in Yards
G. Position: DDMMSS N/S DDDMMSS E/W
H. Course in Degrees True / Speed in Knots
I. Bearing in Degrees True / Range in Yards
J. Minutes
K. Feet
L. Nautical Miles
M. NO / YES
N. Powerdown -6dB / Powerdown -10dB / Shutdown / None
O. Minutes
P. Turn STBD / Turn PORT / -
Q. Degrees
R. Range in Yards
S. Tactical Degradation Assessment examples:
- None
- Slight - Degraded ASW screen integrity when ship maneuvered to open whales.
- Moderate - Lost Contact when power reduced.
- Significant - Engagement interrupted when MFAS was Shutdown.

T. Observation examples:
- Dolphins sighted at 1200 YDS off Port bow, closing the ship. Maneuvered to confirm Bow Riding and continued MFAS operations
- Pod of whales sighted fin slapping 600 YDS off STBD bow, paralleling ships course. Ship maneuvered to Port to open range.
- Porpoises sighted 250 YDS off STBD Beam, opening ship. Powered down MFAS by -6dB until they opened to 1000 YDS. Lost sight astern.
- DragonSlayer 12, flying NW at 60 kts, 1200FT, spotted pod of dolphins within 150 YDS of DICASS Buoy 12. Buoy was passive at the time, and remained so until dolphins were seen leaving the area. 80% cloud layer at 3500 FT. Photos taken.

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APPENDIX E:
Characterization of Navy Range Complexes / Study Areas

Many of the prioritization guideline factors provided by Section 2 are highly dependent on the specific location at which the proposed monitoring activity is to be conducted. This appendix will present reference information that allows the user a top-level view of attributes across the various Navy range complexes.

A preliminary draft matrix has been developed, and is undergoing a broad group review. The current framework is provided here as a PLACEHOLDER for the full matrix and selected portions of the DRAFT matrix are provided as an example of content. The complete draft matrix will be available for consideration at the 2011 Monitoring workshop.

This example matrix pulls information from a variety of documents, including environmental compliance documentation, Letters of Authorization, Biological Opinions, Marine Resource Assessments, Range Monitoring Plans, and Range Monitoring Reports to name a few. It is a work in progress.

The matrix is organized into two primary sections. The first section shows the general characteristics of each range. These characteristics are expected to remain generally the same over time.

This matrix becomes quite sizable once all the information is filled in. For presentation purposes, the range complexes and study areas have been organized into four groups. These groups are shown by the color coding. The first group includes the “Big Three” (AFAST, SOCAL, and HRC), the second group includes the remaining areas that are under the cognizance of Fleet Forces Command, and the third group is the remaining areas under Pacific Fleet Command. The fourth group is RDT&E ranges that are under the Naval Sea Systems Command.

	AFAST	SOCAL	HRC	VACAPES	Cherry Pt	JAX	GOMEX	MIRC	NWTRC	GOA	NUWC Keyport	NSWC PCD
General Description												
Occurrence of Marine Mammals												
Seasonal migration patterns												
Physical geography / Bathymetry												
Weather patterns												
Major Currents												
National Marine Sanctuaries												
Level of Fleet activities												
Other Shipping												
Unique range assets												

The second section of the matrix highlights monitoring considerations for each range complex or study area. Information in this section is captured from Fleet Exercise Reports, Monitoring Reports, Marine Resource Assessments, as well as an ongoing review of available science. The information in this section is expected to change over time, particularly as advances are made to monitoring techniques and technology. This section of the matrix will be reviewed and updated as appropriate during the Adaptive Management Reviews. Preliminary information is included in the draft version of the matrix, and is subject for discussion and review by the Scientific Advisory Group. This section of the matrix will continue to be filled out more completely as information is drawn from the 2010 Monitoring Reports.

	AFAST	SOCAL	HRC	VACAPES	Cherry Pt	JAX	GOMEX	MIRC	NWTRC	GOA	NUWC Keyport	NSWC PCD
Unique biological opportunities												
Biological data-gaps												
Monitoring Considerations *- Factors that contribute to certain types of monitoring being difficult or less effective*												
- Instrumented Range												
- Passive acoustic												
- Visual Surveys (general)												
- Aerial surveys												
- Ship surveys												
- Photo-ID												
- Tagging												

DRAFT EXAMPLE OF SECTION 1- GENERAL CHARACTERISTICS FOR EACH RANGE:

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RANGE COMPLEX	**AFAST**	**SOCAL**	**HRC**
General Description	The AFAST Study Area encompasses the waters and their associated substrates within and adjacent to existing Operating Areas (OPAREAs), located along the East Coast and within the Gulf of Mexico. It extends east from the Atlantic Coast of the U.S. to 45° W. long. and south from the Atlantic and Gulf of Mexico Coasts to approximately 23° N. lat., but not encompassing the Bahamas. Overall, this is greater than 2.1 million square nautical miles (nm²). The areas where training events will most likely occur in the AFAST Study Area cover approximately 1.0 million square nautical miles (nm²).	The SOCAL Range Complex consists of 120,000 nm² of sea area from approximately Dana Point California to San Diego. It extends extends southwest-from southern California in an approximately 700 by 200 nm rectangle with the seaward comers at 27'30'00" N. lat.; 127'1 0'04" W. long. and 24'00'01" N. lat.; 125'00'03" W. long.	The HRC consists of 235,000 square nautical miles (nm²) of ocean areas. Geographically it encompasses the open ocean (outside 12 nautical miles [nm] from land), offshore waters (within 12 nm from land), and onshore areas located on or around the islands of the Hawaiian Islands chain. While it is irregularly shaped, the range complex is roughly bounded by the points: 179W 43N; 150W 43N; 154W 17N; and 179W 16 N.
Occurrence of marine mammals	43 species of marine mammals (7 mysticetes, 29 odontocetes, 6 pinnipeds, and one sirenian (manatee)) that may be observed either seasonally or year- round in the AFAST study area; seven are endangered. In addition, there are six species of threatened and endangered sea turtles that may occur either seasonally or year- round in parts of the AFAST study area. Low densities of animals preclude large sample sizes and generally result in a relatively small number of sightings during surveys.	41 potential marine mammal species or separate stocks with possible or confirmed occurrence. This includes 34 cetacean species (whales, dolphins, and porpoises), six pinnipeds (sea lions, fur seals and true seals) and one sea otter species.	27 species of marine mammals may be observed either seasonally or year-round in the Hawaiian Islands Range Complex, seven of them are listed as endangered. Four species of threatened and endangered sea turtles. Apparent low densities of marine mammals in areas where the Navy trains.
Seasonal migration patterns	Humpback and North Atlantic right whales make extensive annual migrations to low-latitude mating and calving grounds in the winter and to high-latitude feeding grounds in the summer. These migrations are thought to occur during these seasons due to the presence of highly productive waters and associated cetacean prey species at high latitudes and warm water temperatures at low latitudes. The West Indian manatee generally reside along the Southeastern Atlantic coast and the Gulf of Mexico and may migrate farther north during warm months but would be limited primarily to nearshore waters.	Variation in oceanographic and climatic conditions within Southern California has a dramatic influence on marine mammal distribution, species assemblages likely to be present, foraging, and breeding success.	Most of the central north Pacific stock of humpback whales migrate south to Hawaii in winter for breeding and calving from December through April. Green turtles occur in the coastal waters surrounding the Main Hawaiian Islands throughout the year and also migrate seasonally to the Northwestern Hawaiian Islands to reproduce.

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RANGE COMPLEX	**AFAST**	**SOCAL**	**HRC**
Physical Geography / Bathymetry	Significant variance due to large extended area encompassed by the study area. The Atlantic Fleet Study Area has a much larger shallow-water region available in comparison to the Pacific Fleet ranges because of the wide continental shelf.	The seafloor beneath the SOCAL OPAREA is comprised of a series of unique basins, steep escarpments, seamounts, and troughs that extend seaward for over 250 km. The maximum water depths in the Study Area are found over the abyssal plain in the SOCAL OPAREA and exceed 5,000 m.	In general, the Hawaiian Ridge forms a continuous barrier, exerting a dramatic influence over oceanic current patterns along the seafloor in this region. Bathymetric features include a steep, narrow continental margin and a seafloor comprised of depressed island moats, seamounts, submarine canyons and submerged banks.
Weather patterns	Significant variance due to large extended area encompassed by the study area.	Semi-arid, Mediterranean climate characterized by a well-defined cool, wet season. Semi-permanent high-pressure system creates a repetitive pattern of early morning fog, hazy afternoon sunshine, and daytime onshore breezes. Temperatures are relatively stable throughout the year.	The Hawaiian Islands are located along the northern edge of the tropics, but best described as subtropical. Persistent NE trade winds. Seasonal temperatures vary only slightly throughout the year.
Major Currents	The western continental margin of any ocean basin is the location of intense boundary currents. The Gulf Stream is the western boundary current of the North Atlantic Ocean. The Gulf Stream is part of a larger current system called the Gulf Stream System, which also includes the Loop Current in the Gulf of Mexico and the Florida Current in the Atlantic, between the Straits of Florida and Cape Hatteras. The Gulf Stream is a powerful surface current, carrying warm water into the cooler North Atlantic, and exerting a considerable influence on the oceanographic conditions in each OPAREA.	Three major surface currents: the California Current (slow equatorward flow), the California Countercurrent (northward flow), and an inshore coastal current.	Mean coast currents are to the west at variable speeds. Primary surface currents include: North Equatorial Current (to the west) and Hawaiian Lee Counter Current (to the east).
National Marine Sanctuaries	Five in AFAST. Stellwagen Bank NMS, USS Monitor NMS, Gray's Reef NMS, Flower Garden Banks NMS, and Florida Keys NMS.	One in SOCAL. Channel Islands NMS.	Two in HRC. Hawaiian Islands Humpback Whale National Marine Sanctuary Papahānaumokuākea Marine National Monument

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RANGE COMPLEX	**AFAST**	**SOCAL**	**HRC**
Level of Fleet Activities	High. Navy OPAREAs in AFAST include designated ocean areas near fleet concentration areas (i.e., homeports) where the majority of routine Navy training and RDT&E occur. The majority of Atlantic Fleet active sonar activities occur in open ocean areas. While the Atlantic Fleet also has shorebased support facility requirements for ASW training, they are not concentrated in one geographic area, which provides greater potential for operational flexibility than in the Pacific Fleet Study Areas. Major training exercises (MTE) include: • Southeastern Integrated Training Initiative (SEASWITI) - 4 events annually, 5 to 7 days per entire event. • Integrated ASW Course (IAC) - 5 events annually, 2 to 5 days per entire event. • Group Sails - 20 events annually, 2 to 3 days per entire event. • Composite Training Unit Exercise (COMPTUEX) - 5 events annually, 21 days per entire event. • Joint Task Force Exercise (JTFEX.) - 2 events annually, 10 days per entire event. It should be noted that sonar is typically not in use throughout an entire event. [LOA 2009].	High. There were a total of 11 MTEs within the SOCAL Range Complex between 01 August 2008 and 03 August 2009. Of the 11, there were six MTEs between the end of January to 01 August 2009. All told, there were only 114 non-consecutive cumulative days involving MTEs within SOCAL out of the approximately 368 days between 01 August 2008 to 03 August 2009, and only 59 days of non-consecutive cumulative MTE out of approximately 192 days between 24 January 2009 and 03 August 2009. For in-water unit-level training and major training event (MTE) using sonar and explosives, only a limited subset of the overall range complex is used.	High. The large training area available to deployed forces within the HRC allows training to take place using a geographic scope that replicates possible real world events, with the channels between islands providing geography necessary for opposed transit scenarios. For in-water unit level training and major training events (MTE) using sonar and explosives, a much more limited subset of the range complex is used.
Other Shipping	The waters off the U.S. Atlantic coast support a large volume of maritime traffic heading to and from foreign ports as well as traffic traveling north and south to various U.S. ports. Commercial shipping comprises a large portion of this traffic, and a number of commercial ports are located along the Atlantic and Gulf of Mexico U.S. coasts.	There are three major commercial ports in SOCAL: Los Angeles, Long Beach, and San Diego. There are four primary shipping lanes: two run south along Mexico's west coast, one extends west towards the central and western North Pacific, and another stretches nort along the U.S. west coast up to the San Francisco area and beyond.	The Hawaiian Islands serve as a major port for international shipping. Transoceanic shipping lanes extend offshore from the region in several directions: north towards Alaka; northeast towards Washington, Oregon, and California; east towards the Panama Canal; southwest towards Guam and Wake Island; and northwest towards Japan and Okinawa.

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RANGE COMPLEX	**AFAST**	**SOCAL**	**HRC**
Unique range assets	Geographically-fixed monitoring sites off the coasts of North Carolina (Onslow Bay) and Florida (Jacksonville) have been established to support consistent ongoing visual shipboard and aerial surveys, as well as passive acoustic monitoring. Data collected by a consortium of researchers from Duke University, the University of North Carolina at Wilmington, the University of St. Andrews, and NMFS Northeast Fisheries Science Center under a pilot study that started in 2007 established a longitudinal baseline of marine species distribution and abundance in Navy training areas during periods when training is not occurring at the site. This baseline provides the foundation for a monitoring program designed to provide meaningful data on potential long term effects to marine species that may be chronically exposed to training activities.	Fixed Hydrophone range at SOAR. Availability to the Floating Instrument Platform, FLIP. FLIP is a 355 foot long manned spar buoy designed as a stable research platform for oceanographic research. FLIP is owned by the US Navy and operated by the Marine Physical Laboratory (MPL), Scripps Institution of Oceanography, University of California, San Diego. Homeported in San Diego, FLIP is towed to its operating area in the horizontal position and through ballast changes is "flipped" to the vertical position to become a stable spar buoy with a draft of 300 feet. http://www.mpl.ucsd.edu/resources/flip.intro.html. Collaborations with California Cooperative Oceanic Fisheries Investigation (CalCOFI) for environmental data analyses.	Fixed hydrophone range at PMRF. A number of shallow, nearshore water ranges (e.g., Puuloa Underwater Range, Ewa Training Minefield, Barbers Point Underwater Range, and Lima Landing) that are used for underwater detonation training (i.e. mine neutralization, demolition of debris).

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
General Description	The VACAPES OPAREA, located off the east coast of the United States, includes the nearshore area from just off the mouth of the Delaware Bay south to Cape Hatteras and extends seaward into waters more than 4,000 m deep. The surface water areas of the Range Complex covers the coast of Delaware, Maryland, Virginia, and North Carolina, encompassing 27,661 nm².	The CHERRY POINT OPAREA, located along the coast of North and South Carolina, extends 127 nm seaward from the 3 nm state waters boundary. Water depth in the OPAREA ranges from approximately 10 to 4,000 meter (m). It encompasses 18,617 square nautical miles (nm²), of which12,529 nm² of subsurface area is greater than 100 fathoms (600 ft) in depth.	The northernmost point of the JAX Range Complex OPAREA is located just north of Wilmington, North Carolina (34°37' N) in waters less than 20 m deep, while the easternmost boundary lies 281 nm offshore of Jacksonville, Florida (77°00' W in waters with a bottom depth of nearly 2,000 m. The JAX/CHASN OPAREA covers 66,505 square miles [mi²]) of ocean area. The majority of the western (shoreward) boundary of the JAX/CHASN OPAREA is located approximately 3 nautical miles (NM) off the southeast U.S. coast.	GOMEX study area encompasses the northern or U.S. waters of the Gulf of Mexico and includes the Florida Straits. The study area occupies waters offshore of all five U.S. Gulf coast states: Texas (TX), Louisiana (LA), Mississippi (MS), Alabama (AL), and Florida (FL) and extends seaward approximately to the U.S. exclusive economic zone (EEZ). The study area is bounded to the south and southwest by the Mexican-U.S. maritime boundary and in the southeast by the Cuba-U.S. maritime boundary. Covering 384,152 square kilometers (km2) of the marine environment, the study area spans coastal to deepwater habitats and encompasses waters shallower than 10 m in depth near the Florida Keys to waters greater than 3,000 m in depth near center of the GOMEX.
Occurrence of marine mammals	41 marine mammal species with possible or confirmed occurrences in the VACAPES OPAREA. Six cetacean species, five sea turtle species, and two fish species listed as threatened or endangered and under the jurisdiction of the NMFS occur in the Action Area. The calving ground of the North Atlantic right whale, located seaward of southern Georgia and northern Florida, is designated under the ESA as critical habitat in the Action Area.	34 marine mammal species are expected to occur regularly in the marine waters off North Carolina within the CHPT Range Complex. There are 32 cetacean species (whales, dolphins, and porpoises), one pinniped species (true seal) and one sirenian species (manatee) In addition there are five species of threatened and endangered sea turtles.	35 species of marine mammals are documented to occur within or immediately adjacent to the JAX/CHSN OPAREA. This includes 7 mysticetes, 25 odontocetes, 2 pinnipeds, and 1 sirenian (manatee). Seven species are endangered. In addition, there are six species of threatened and endangered sea turtles that are documented as occuring in the JAX/CHSN OPAREA.	29 species of marine mammals with potential occurrence in the GOMEX study area. (28 cetaceans and one sirenian species [manatees]). Seven marine mammal species listed as Federally-endangered under the Endangered Species Act (ESA) occur or have the potential to occur in the area.

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
Seasonal migration patterns	During the winter (as early as November and through March), right whales may be found in coastal waters off North Carolina, Georgia, and northern Florida. The coastal waters of the Carolinas are suggested to be a migratory corridor for the North Atlantic right whale. There have also been opportunistic sightings of right whales in deep waters of the VACAPES OPAREA. North Atlantic right whale sightings in very deep offshore waters of the western North Atlantic are infrequent. However, there is limited evidence suggesting that a regular offshore component exists to their distributional and migratory cycle. Humpback whales occur on the continental shelf and in deep waters of the VACAPES OPAREA in fall, winter, and spring during migrations between calving grounds in the Caribbean and feeding grounds off the northeastern U.S.	During the winter (as early as November and through March), right whales may be found in coastal waters off North Carolina, Georgia, and northern Florida. The coastal waters of the Carolinas are suggested to be a migratory corridor for the North Atlantic right whale. There have also been opportunistic sightings of right whales in deep waters of the CHPT OPAREA. Humpback whales occur on the continental shelf and in deep waters of the CHPT OPAREA in fall, winter, and spring during migrations between calving grounds in the Caribbean and feeding grounds off the northeastern U.S.	North Atlantic right whales migrate to the coastal waters of the southeastern U.S. to calve from November through March. The waters off Georgia and northern Florida are the only known calving ground for the North Atlantic right whale. As waters warm in the spring, juvenile loggerhead, green, and Kemp's ridley sea turtles migrate northward along the U.S. Atlantic Coast in search of developmental feeding grounds. As waters cool in the fall, most sea turtles emigrate out of temperate inshore waters and travel southward at least as far as Cape Hatteras to avoid cold stunning. Although many sea turtles within the JAX/CHASN OPAREA may not exhibit extensive migrations, large concentrations of sea turtles during the spring and fall migration periods may still be expected; these large concentrations result from the combination of individuals, originating from other areas along the U.S. east coast, transiting through the area in addition to the presence of year-round residents.	
Physical Geography / Bathymetry	The VACAPES OPAREA includes the nearshore area from just off the mouth of Delaware Bay south to Cape Hatteras and extends seaward into waters more than 4,000 m (13,120 ft) deep. Along the Atlantic coast, the continental shelf extends from the shoreline to a depth of about 200 m (656 ft). At the shelf edge, the shelf gives way abruptly to the continental slope. The continental slope extends to water depths of between 2,000 and 4,000 m (6,560 and 13,120 ft). The	Large, sand shoals extend from the barrier islands off southern North Carolina. Water depths near these shoals are among the shallowest in the CHPT OPAREA; the depth of the seafloor decreases rapidly so that the shoal crests are found in <10 m of water off Cape Lookout and Cape Hatteras. Seaward of Cape Hatteras and Hatteras Canyon, the ocean bottom deepens rapidly, reaching the maximum water depth in the CHPT OPAREA of 4,000 m approximately 150 km from shore.	Seafloor includes low relief, relatively gentle gradients, and smooth bottom surfaces exhibiting features contoured by erosional processes from the Gulf Stream. The sea floor beneath the JAX/CHASN OPAREA is notably featureless. The wide, flat Florida-Hatteras Shelf, which is marked by several shallow depressions, underlies nearly half of the OPAREA. The remainder of the sea floor beneath the OPAREA consists of the northern two-thirds of Blake Plateau lying at depths between	The GOMEX is distinguished by an enormous river delta, limestone islands, expansive and relatively flat continental-shelf areas, submarine canyons, steep escarpments, sea fans, and a central deep, flat basin where water depths reach a maximum of 3,767 m.

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
	continental slope is the most prominent physiographic feature along the mid-Atlantic continental margin and is interlaced with numerous submarine canyons. Four submarine canyons—Norfolk, Washington, Accomac, and Baltimore—are found within the VACAPES OPAREA.		approximately 700 and 1,400 m.	
Weather patterns		Prevailing westerly winds result in a tropical/ subtropical climate south of Cape Hatteras. The proximity of the Gulf Stream Current to coastal North Carolina has a strong effect in the generation of cyclonic, extra-tropical storms in winter as cold, dry continental air meets the warm, moist air over Gulf Stream waters. From June through November, tropical cyclones are formed in warm, equatorial waters of the North Atlantic Ocean and Caribbean Sea and often move northward along the southeastern U.S. coast following the path of the Gulf Stream	Prevailing westerly winds result in a tropical/subtropical climate south of Cape Hatteras. Annual extremes in precipitation along the coastline bordering the OPAREA are wide-ranging. The proximity of the Gulf Stream to the southeast U.S. coast has a strong effect in the generation of cyclonic, extra-tropical storms in winter as cold, dry continental air meets the warm, moist air over Gulf Stream waters. Thunder storms and major storm systems occur in the region most often during summer and fall as hot, humid air masses collide with passing fronts. Most major storms, including hurricanes, occur in the JAX/CHASN OPAREA during the North Atlantic hurricane season which occurs annually from June through November.	Subtropical. In general, summer weather conditions in the GOMEX study area are relatively consistent and stable with winds predominantly out of the southeast while winter weather conditions are more variable with winds predominantly from the east or northeast. The eastern Gulf is characterized by a distinct wet season during summer and a dry season during winter; however no distinct seasonal variation in precipitation is evident in the northern Gulf.
Major Currents	Gulf Stream. In VACAPES, the Gulf Stream is approximately 50 km (27 NM) wide and 1,000 m (3,280 ft) deep. Surface velocity ranges from 3.7 to 9.3 kilometers per hour (km/hr) (2.0 to 5.0 knots [kn]), and temperature ranges from 25 to 28oC (77 to 82oF).	Gulf Stream. OPAREA is dominated by the strong northeasterly flowing Gulf Stream, a current which effectively forms an oceanographic barrier separating the warm, tropical/ subtropical waters found to the south from the cool, temperate waters found to the north.	The Gulf Stream Current flows north along the U.S. southeast coast, and is the dominant surface current in the northwestern Atlantic Ocean, South Atlantic Bight, and JAX/CHASN OPAREA.	Warm (>26°C) Caribbean Sea surface waters form the Yucatan Current, which flows into the GOMEX through the Yucatan Channel. The Gulf Stream Loop Current is the dominant surface current in the central and eastern GOMEX. The Florida Current is a strong, east-northeast flowing current that connects the Loop Current to the Gulf Stream at the entrance to the Florida Straits. Deep water circulation

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
				in the GOMEX is not nearly as well understood as surface water circulation.
National Marine Sanctuaries	No NMS in the VACAPES OPAREA.	One NMS in CHERRY POINT OPAREA. USS Monitor NMS.	One in JAX Range Complex. Gray's Reef NMS.	Two in the Study Area. Florida Keys National Marine Sanctuary. Flower Garden Banks National Marine Sanctuary, located on the outer edge of the continental shelf approximately 193 km and 172 km southeast of Galveston, TX.
Level of Fleet Activities	High. The VACAPES OPAREA is a major area of military usage. The DoD has used the area extensively for military and National Aeronautics and Space Administration (NASA) training, testing, and ordnance and rocket firing exercises. The Fleet Air Control Surveillance Facility (FACSFAC) VACAPES provides fleet surveillance and functional area support services that include scheduling, monitoring, and controlling air traffic from just south of Nantucket Island, Massachusetts, to Charleston, South Carolina, and eastward more than 371 km (200 NM) into the Atlantic Ocean. The types of explosive events that occur within the VACAPES Range Complex include: underwater detonations associated with Mine Exercises (MINEX), Surface-to-Surface Firing Exercises (FIREX specifically with platforms using 5" shells), Surface-to-Surface Missile Exercises (MISSILEX),	Training Events authorized in LOA for 1 year ending June 2010: (A) Mine Neutralization (20 lb NEW charges) - 20 (B) MISSILEX (Air-to-Surface; Hellfire missile) - 8 (C) MISSILEX (Air-to-Surface; TOW) - 8 (D) FIREX with IMPASS - 2	Training Events authorized for June 2009 - June 2010: (A) Mine Neutralization (20 lb NEW charges) - 12 (B) MISSILEX (Air-to-Surface; Hellfire missile) - 70 (C) MISSILEX (Air-to-Surface; Maverick) – 3 (D) FIREX with IMPASS – 10 (E) Small Arms Training with MK3A2 anti-swimmer concussion grenade (0.5 lbs NEW) - 80 HE	

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
	and Bombing Exercises (BOMBEX).			
Other Shipping	VACAPES is in the direct path of commercial shipping traffic traveling between New York, Boston, and Miami and other ports in the southeast. Ships transiting within or in the vicinity of the VACAPES Range Complex may use any one of over 15 shipping lanes that intersect the range complex. One shipping lane runs roughly parallel to the coast and serves as a connecting route between domestic ports to the north and south of the range complex.	The CHPT OPAREA lies between the major commercial shipping ports of Baltimore, New York, and Boston to the north and Savannah, Jacksonville, and Miami to the south. Several other ports are located in the vicinity of the CHPT OPAREA including: Morehead City and Wilmington in North Carolina; Norfolk, VA; and Charleston,SC. Ships transiting within or in the vicinity of the CHPT OPAREA may use any one of the nine major waterways that intersect the OPAREA. Five of these waterways are oriented roughly north-south and run parallel to the coastline. The remaining four waterways are oriented roughly perpendicular to the coast and serve as connecting routes between coastal ports and offshore waterways.	The JAX/CHASN OPAREA lies just offshore of several major commercial shipping ports including: Jacksonville, Florida; Savannah, Georgia; and Charleston, South Carolina. Ships transiting within or in the vicinity of the JAX/CHASN OPAREA may use any one of over 20 major waterways that intersect the OPAREA.	A large volume of ship traffic navigates the GOMEX. Commercial (domestic and international) shipping comprises the vast majority of this traffic. Nine primary shipping lanes radiate north from the Yucatan Straits into the study area while several major shipping lanes bisect the Florida Straits.
Unique range assets		Geographically-fixed monitoring site off the coast of North Carolina (Onslow Bay) was established to support consistent ongoing visual shipboard and aerial surveys, as well as passive acoustic monitoring. Data collected by a consortium of researchers from Duke University, the University of North Carolina at Wilmington, the University of St. Andrews, and NMFS Northeast Fisheries Science Center under a pilot study that started in 2007 established a longitudinal baseline of marine species distribution and abundance in Navy training areas during periods when training is not occurring at the site.	Geographically-fixed monitoring sites off the coast of Florida (Jacksonville) have been established to support consistent ongoing visual shipboard and aerial surveys, as well as passive acoustic monitoring. Data collected by a consortium of researchers from Duke University, the University of North Carolina at Wilmington, the University of St. Andrews, and NMFS Northeast Fisheries Science Center established a longitudinal baseline of marine species distribution and abundance in Navy training areas during periods when training is not occurring at the site. This baseline provides the foundation for a monitoring program designed to provide meaningful data on potential long term effects	

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RANGE COMPLEX	**VACAPES**	**CHERRY POINT**	**JACKSONVILLE**	**GOMEX**
		This baseline provides the foundation for a monitoring program designed to provide meaningful data on potential long term effects to marine species that may be chronically exposed to training activities.	to marine species that may be chronically exposed to training activities.	

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RANGE COMPLEX	**MIRC**	**NWTRC**	**GOA**
General Description	The MIRC study area encompasses a 501,873-square-nautical mile (nm²) area around the islands, including Guam, Tinian, Saipan, Rota, Farallon de Medinilla, and also includes ocean areas in both the Pacific Ocean and the Philippine Sea. The Mariana Islands Range Complex (MIRC) Study Area is bounded by a pentagon with the following five corners: 16°46′29.3376″ N. lat., 138°00′59.835″ E. long.; 20°02′24.8094″ N. lat., 140°10′13.8642″ E. long.; 20°3′27.5538″ N. lat., 149°17′41.0388″ E. long.; 7°0′30.0702″ N. lat., 149°16′14.8542″ E. long; and 6°59′24.633″ N. lat, 138°1′29.7228″ E. long.	The maritime component of the Northwest Training Range Complex includes 122,440 square nautical miles (nm2) of surface/ subsurface ocean operating areas (OPAREAs) that extend west to 250 nautical miles (nm) beyond the coast of Washington, Oregon, and Northern California. For range management and scheduling purposes, the NWTRC is divided into numerous sub-component ranges or training areas used to conduct training and Research, Development, Test, and Evaluation (RDT&E) activities (Unmanned Aerial Systems [UASs] only). The NWTRC Inshore Area includes all air, land, sea, and undersea ranges and OPAREAs inland of the coastline and including Puget Sound.	Gulf of Alaska (GOA) Temporary Maritime Activities Area (TMAA) is composed of 42,146 square nautical miles (nm2) of surface and subsurface ocean training area. TMAA is approximately 300 nautical miles (nm) in length by 150 nm in width and situated south of Prince William Sound and east of Kodiak Island. The TMAA's northern boundary is located approximately 24 nm south of the shoreline of the Kenai Peninsula, which is the largest proximate landmass. The only other shoreline close to the TMAA is Montague Island, which is located 12 nm north of the TMAA. The approximate middle of the TMAA is located 140 nm offshore.
Occurrence of marine mammals	32 potential marine mammal species or separate stocks with possible or confirmed occurrence in the marine waters associated with the MIRC Range Complex: 29 cetaceans (whales, dolphins, and porpoises), 2 pinnipeds (seals), and 1 sirenia (dugong). While survey data is limited, an overview of watchstander data collected during major exercises in Hawaii and MIRC broadly suggests the number of animals encountered in the vicinity of an exercise in MIRC is not much different than the numbers encountered in Hawaii.	32 species of marine mammals known to occur in the NWTRC Study Area: 7 species of baleen whales (mysticetes), 19 species of toothed whales (odontocetes), 5 species of seals and sea lions (pinnipeds), and the sea otter (mustelid).	26 species of marine mammals with possible or confirmed occurrence in the waters of the GOA, but not all inhabit waters within the TMAA. The TMAA is well outside the normal range of six of these species and they are not expected to be present given their documented habitat preferences. The 20 species that occur in the TMAA include 7 species of baleen whales (mysticetes), 8 species of toothed whales /dolphins/porpoises (odontocetes), and 5 species of seals and sea lions (pinnipeds). [DEIS, 2009].
Seasonal migration patterns	Some baleen whale species, such as the humpback whale, make extensive annual migrations in the northern hemisphere to low-latitude mating and calving grounds in the winter and to high-latitude feeding grounds in the summer.	The gray whale (Eschrichtius robustus) transits through the Study Area during annual migrations between northern feeding grounds and breeding lagoons in Mexico. While gray whales can be found along the Washington coast year-round, they are more common during January and March when they are migrating along the coast.	For many species, the TMAA constitutes a small portion of their total range given seasonal migrations to warmer waters where breeding and calving occur. These species, for example, include the humpback whale (Megaptera noveangliae) and gray whale (Eschrichtius robustus), which both feed in Alaska waters in roughly the May to September timeframe.

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RANGE COMPLEX	**MIRC**	**NWTRC**	**GOA**
Physical Geography / Bathymetry	The seafloor of the MIRC is characterized by the Mariana Trench, the Mariana Basin, the Mariana Ridge, ridges, numerous seamounts, hydrothermal vents, and volcanic activity. These areas are comprised of very deep water (2,000 meters or more) with a very rapid transition from the shelf to deep water. It is located at the intersection of the Philippine and Pacific crustal plates. The collision of the two plates has resulted in the subduction of the Pacific Plate beneath the Philippine Plate forming the Mariana Trench. The Mariana Trench is over 1,410 mi (2,269 km) long and 71 mi (114 km) wide. The deepest point in the trench and on Earth, Challenger Deep, is found 338 mi (544 km) southwest of Guam in the southwestern extremity of the trench. The Mariana Islands are volcanic islands developed west of the Mariana Trench, an active subduction zone where one section of the ocean crust is pushed beneath another.	In general, the bathymetry of the offshore regions of the Pacific Northwest coast is smooth due to the long history of sediment accumulation. Northern California is characterized by the scarcity of submarine canyons and the absence of other conspicuous relief features. The continental shelf off of the Washington coast varies in width from 25 to 60 km and is broken by six canyons ; the canyons represent 5 to 20 km wide breaks in the otherwise smooth bathymetry along the coast.	The TMAA spans both coastal and deepwater habitats ranging from approximately 426 feet (ft) to over 12,000 ft in depth. The GOA forms a large, semicircular bight opening southward into the North Pacific Ocean. The GOA is characterized by a broad and deep continental shelf containing numerous troughs, seamounts, and ridges.
Weather patterns	The MIRC is regularly struck by typhoons. Based on records compiled by the U.S. Navy Joint Typhoon Warning Center, islands within the MIRC Study Area were affected by typhoons in 37 of the 50-year period between 1955 and 2005 (National Marine Forecast Center, 2005).	The Pacific Northwest region has a mild and varied climate with only rare occurrences of severe weather such as thunderstorms or tornadoes. The normal movement of air masses is from west to east, so most of the systems moving across the region have been moderated by traveling over the Pacific Ocean. As a result, winter minimum temperatures and summer maximum temperatures in the region are greatly moderated. The Pacific Ocean also provides unlimited moisture to air masses traveling across the Pacific, so there is abundant rainfall in western Washington, Oregon, and northwestern California.	The GOA has a typical maritime climate, being somewhat warmer than adjacent land areas in winter and somewhat cooler than these land areas in summer. The region exhibits highly variable environmental conditions. The GOA is exposed to storms off the North Pacific Ocean. Consequently, it frequently experiences high winds and precipitation. Winds in the central GOA are primarily from the east or northeast, due to the interaction of the Pacific High with the GOA Low. Wind speeds often exceed 50 miles (mi) per hour except during the summer, when winds are relatively calm. Along the coast, this general circulation pattern may be altered locally by downslope surface winds following major river valleys that empty into the GOA, or by winds blowing through gaps in the ranges of mountains that border the GOA. The GOA remains ice-free for the entire year. Portions of bays and inlets may be covered by ice or may have floating glacial ice during the coldest months.

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RANGE COMPLEX	**MIRC**	**NWTRC**	**GOA**
Major Currents	North Equatorial Current	The coasts of Washington and Oregon are located in an eastern boundary current system where the North Pacific Current divides into the northward flowing Alaskan Current and the southward flowing California Current. Seasonal mean shelf currents in the upper water column along the Pacific coastline are southward from early spring to summer, and northward the remainder of the year.	The general ocean circulation in the Gulf of Alaska is dominated by the cyclonic Alaska Gyre. The gyre includes the Alaska Current and Alaskan Stream and the eastward-flowing North Pacific Current along the southern expanses of the Gulf of Alaska. Nearshore flow is dominated by the westward-flowing Alaskan Coastal Current and is less organized than the flow found along the shelf break and slope.
National Marine Sanctuaries	Marianas Trench Marine National Monument (MTMNM)	Olympic Outer Coast NMS is located within the northern boundaries of the Pacific Northwest OPAREA along the Pacific coast of Washington.	There are no NMSs located within the boundaries of the GOA TMAA.
Level of Fleet Activities	One multi-strike group type exercise in the summer each calendar year. Valiant Shield and nearshore explosive events are appropriate for marine mammal monitoring within the MIRC, with the understanding that major exercise undergo significant schedule changes based on real-world commitments which may or may not therefore limit the availability of monitoring within these major exercises. In the MIRC study area, the Navy intends to conduct 3 exercises during a 5-year period that may include both SURTASS LFA and MFA active sonar sources. The expected duration of this exercise, commonly referred to as a "combined exercise", is approximately 14 days. Based on an exercise of this length, an LFA system would be active (i.e., actually transmitting) for no more than approximately 25 hours.	The NWTRC Study Area is unique in that it offers training across the spectrum of naval missions in all weather conditions (including cold water operations) and over many varied environments from deep ocean to shallow inland waters and from coastal beaches to mountains in close proximity to the homeport of units in the Pacific Northwest.	Limited. The Proposed Action consists of Navy training activities that occur during the period between April and October in one or two major exercises or focused activity periods. These exercises or activity periods would each last up to 21 days and consist of multiple component training activities. During these focused activity periods, intermittent Navy Unit Level Training (ULT) could also occur. However, outside of these focused activity periods, during the other 46-49 weeks of the year, the Navy does not train within the TMAA or other areas of the GOA. [DEIS 12/2009]

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RANGE COMPLEX	**MIRC**	**NWTRC**	**GOA**
Other Shipping	The proposed MIRC ASW areas are away from harbors but may include heavily traveled shipping lanes, although shipping lanes are a small portion of the overall range complex.	Commercial vessels enter and cross the Pacific Northwest OPAREA and Puget Sound Study Area on a routine basis. Along the western U.S. coast, commercial shipping routes are highly structured and controlled, even in open ocean areas. No major port cities are located along the outer coasts of northern California or Washington State; however, the Port of Portland is situated in northern Oregon and serves as a terminal for marine transportation along the western U.S. coast. Puget Sound represents the nation's third largest naval port complex and includes three major port cities in the regions' shared waters: Seattle, Vancouver, and Tacoma.	Two primary shipping lanes radiate from the Gulf of Alaska to Honolulu, Hawaii and San Francisco, California. The Alaska Marine Highway System operates a ferry network throughout Alaska and consists of nearly 14,500 km of coastal ocean routes. Important ports in the area include Kodiak, Alaska's largest commercial fishing port, and Valdez, the southern terminus of the 1,300-km trans-Alaska pipeline that originates in Prudhoe Bay.
Unique range assets	The MIRC is of particular significance for the training of U.S. military forces in the Western Pacific because of its location. As the westernmost complex in U.S. territory, it provides the only opportunity for forward-deployed U.S. forces to train on U.S.-owned lands without having to return to Hawaii or the continental United States. The premier capability of the MIRC is the combination of large ocean and airspace to support undersea, surface, air, and space warfare training combined with land-based ranges. Training may be conducted within a few miles of land masses so that battle situations may be realistically simulated. There is room and space to operate within proximity of land but at safe distances from other simultaneous training activities.	The NWTRC serves as the principle "backyard" training range for those units homeported in the Pacific Northwest area, including those aviation, surface ship, submarine, and Explosive Ordnance Disposal (EOD) units homeported at Naval Air Station (NAS) Whidbey Island, Naval Station (NAVSTA) Everett, Puget Sound Naval Shipyard, and Naval Base Kitsap (NBK) Bremerton, NBK-Bangor, formerly known as Submarine Base (SUBASE) Bangor. Additionally, the NWTRC supports other non-resident users and their training requirements to include Naval Special Warfare (NSW) units. Inshore ranges for underwater demolition training found at Crescent Harbor Underwater EOD Range, Indian Island Underwater EOD Range, and Floral Point Underwater EOD Range.	

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RANGE COMPLEX	**NUWC Keyport Division**	**NSWC Panama City Division**
General Description	The NAVSEA NUWC Keyport Range Complex is composed of the Keyport Range Site, Dabob Bay Range Complex (DBRC) Site,and Quinault Underwater Tracking Range (QUTR) Site. Portions of the QUTR Site fall outside the 12-nautical mile (22-kilometer) Territorial Waters boundary established by Presidential Proclamation 5928. The combined waters of the Range Complex are less than 100 nm².	The NSWC PCD study area includes existing military operating areas within the Gulf of Mexico [W-151 (Pensacola OPAREA), W155 (Panama City OPAREA), and W-470] and St. Andrew's Bay (SAB) from the mean high water line (average high tide mark) out to 120 nautical miles [NM] offshore.
Occurrence of marine mammals	25 species of marine mammals are known to occur in Washington waters including 19 cetacean species, 5 pinniped species, and the sea otter (mustelid); however, several are seen only rarely. Seven marine mammal species listed as Federally-endangered under the Endangered Species Act (ESA) occur or have the potential to occur in the area.	29 marine mammal species may occur in the NSWC PCD Study Area (28 cetaceans and one sirenian species [manatees]). 21 of these marine mammal species regularly occur here. The other 8 are extralimital. Of those marine mammals potentially occurring in St. Andrew Bay and the NSWC PCD Study Area, seven marine mammal species are currently listed as endangered under the Endangered Species Act.
Seasonal migration patterns	The gray whale (Eschrichtius robustus) transits through the vicinity of NUWC Keyport during annual migrations between northern feeding grounds and breeding lagoons in Mexico. While gray whales can be found along the Washington coast year-round, they are more common during January and March when they are migrating along the coast.	Some baleen whale species, such as humpback and North Atlantic right whales, make extensive annual migrations to low-latitude mating and calving grounds in the winter and to high-latitude feeding grounds in the summer. However, given the relatively shallow waters of the NSWC PCD study area, of the mysticetes, only the Bryde's Whale might be expected to regularly occur. Long migrations are not typical of Bryde's whales.
Physical Geography / Bathymetry		Wide coastal shelf 52 NM distance offshore to 183 meters (m) (600 feet [ft]) water depth, including bays and harbors. Typically sand bottom.
Weather patterns		Subtropical. In general, summer weather conditions in the NSWC PCD study area are relatively consistent and stable with winds predominantly out of the southeast while winter weather conditions are more variable with winds predominantly from the east or northeast. No distinct seasonal variation in precipitation is evident in the northern Gulf. Seas less than 0.91 m (3 ft) 80 percent of the time (summer) and less than 0.91 m (3 ft) 50 percent of the time (winter).
Major Currents	For the QUTR site, the waters along the Washington coast are dominated by the southward flowing California Current and are considered to have the greatest volume of upwelling in North America.	Warm (>26°C) Caribbean Sea surface waters form the Yucatan Current, which flows into the GOMEX through the Yucatan Channel. The Gulf Stream Loop Current is the dominant surface current in the central and eastern GOMEX. The Florida Current is a strong, east-northeast flowing current that connects the Loop Current to the Gulf Stream at the entrance to the Florida Straits. Deep water circulation in the GOMEX is not nearly as well understood as surface water circulation.
National Marine Sanctuaries	QUTR Site is in the Olympic Coast National Marine Sanctuary (OCNMS).	None in the Study Area.

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RANGE COMPLEX	**NUWC Keyport Division**	**NSWC Panama City Division**
Level of Fleet Activities	NUWC Keyport schedules the Keyport Range Site to be used an average of 55 days/year, the DBRC Site an average of 200 days/year, and the QUTR Site an average of 14 days/year of offshore use and minimally for surf-zone activities.	NSWC PCD provides in-water RDT&E for expeditionary maneuver warfare, operations in extreme environments, mine warfare, maritime special operations, and coastal operations. A unique feature of NSWC PCD that is unduplicated in the U.S. is the natural operating environment provided by the ready access to the Gulf of Mexico (GOM) and its associated littoral and coastal regions. The GOM provides a surrogate environment for most of the littoral areas of the world in which the Navy will find itself operating for the foreseeable future
Other Shipping	Commercial vessels enter and cross the Pacific Northwest OPAREA and Puget Sound Study Area on a routine basis. Puget Sound represents the nation's third largest naval port complex and includes three major port cities in the regions' shared waters: Seattle, Vancouver, and Tacoma. However, regular commercial shipping activiity through the QUTR Site is not as busy as it is farther north into the Strait of San Juan de Fuca.	Seven of Florida's deepwater ports are located on the GOM, three of which are within the NSWC PCD Study Area: Port of Pensacola, Port of Panama City, and Port St. Joe. Port St. Joe in Gulf County is currently inactive. Approximately 45 percent of U.S. shipping tonnage passes through GOM ports.
Unique range assets	Located adjacent to NUWC Keyport, the Keyport Range site provides approximately 1.5 square nautical miles (nm2) (5.1 square kilometers [km2]) of shallow underwater testing, including in-shore shallow water sites and a shallow lagoon to support integrated undersea warfare systems and vehicle maintenance and engineering activities.	Specialized surface craft to support the deployment and recovery of underwater unmanned vehicles (UUVs), sonobuoys, inert mines, mine-like objects (MLOs), Versatile Exercise Mine (VEM) systems, and other test systems. Specialized surface vessels are also utilized as a tow platform for systems that are designed to be deployed by helicopters.