ANNUAL MARINE SPECIES MONITORING REPORT 2013

FOR THE

NAVAL SURFACE WARFARE CENTER PANAMA CITY DIVISION (NSWC PCD) STUDY AREA

Submitted To:

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

In accordance with:

21 January 2012 - 20 January 2014 Letter of Authorization for NSWC PCD Mission Activities;
50 Code of Federal Regulations Part 218, Subpart S

September 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

AFTT	Atlantic Fleet Training and Testing
AMNS	Airborne Mine Neutralization System
AMR	Adaptive Management Review
BO	Biological Opinion
BOSS	Buried Object Scanning Sonar
BSS	Beaufort Sea State
CNO	Chief of Naval Operations
DON	Department of the Navy
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FY	Fiscal Year
HFAS	high-frequency active sonar
hr	hour(s)
ICMP	Integrated Comprehensive Monitoring Program
ID	identification
ITA	Incidental Take Authorization
km	kilometer(s)
LMMO	liaison marine mammal observer
LO	lookout
LOA	Letter of Authorization
m	meter(s)
MFAS	mid-frequency active sonar
MMO	marine mammal observer
MMPA	Marine Mammal Protection Act
N45	Energy and Environmental Readiness Division
nmi	nautical mile(s)
NMFS	National Marine Fisheries Service
NSWC PCD	Naval Surface Warfare Center Panama City Division
NUWCDIVNPT	Naval Undersea Warfare Center Division, Newport
OEIS	Overseas Environmental Impact Statement
ONR	Office of Naval Research
OPAREA	Operating Area
OT	observation team
PAM	passive acoustic monitoring
Q-20	AN/AQS-20A Mine Reconnaissance Sonar System
RDT&E	research, development, test, and evaluation
REMUS	Remote Environmental Monitoring Units
R/V	Research Vessel
SAG	Scientific Advisory Group
SSAM2	Small Synthetic Aperture Minehunter 2
TTS	temporary threshold shift
U.S.	United States

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I. INTRODUCTION

Background

The United States (U.S.) Navy developed Range Complex and Study Area monitoring plans to provide marine mammal and sea turtle monitoring as required under the Marine Mammal Protection Act (MMPA) of 1972 and the Endangered Species Act (ESA) of 1973. In order to issue an Incidental Take Authorization (ITA) for an activity, Section 101(A)(5)(A) of the MMPA states that National Marine Fisheries Service (NMFS) must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 Code of Federal Regulations Section 216.104(a)(13) note that requests for Letters of Authorization (LOAs) must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present. While the ESA does not have specific monitoring requirements, recent Biological Opinions (BOs) issued by NMFS also have included terms and conditions requiring the U.S. Navy to develop a monitoring program. In addition to Range Complex and Study Area monitoring plans, a monitoring plan for Naval Surface Warfare Center Panama City Division (NSWC PCD) mission activities was developed for protected marine species, primarily marine mammals and sea turtles, as part of the environmental planning and regulatory compliance process associated with a variety of research, development, test, and evaluation (RDT&E) activities. As part of the issuance of the NSWC PCD Mission Activities LOA in 2010 (NMFS 2010), the U.S. Navy published the NSWC PCD Mission Activities Monitoring Plan (Department of the Navy [DON] 2010a).

Based on discussions with NMFS, Range Complex and Study Area monitoring plans were designed as collections of focused "studies" to gather data that will attempt to address the following questions, which are described more fully in the NSWC PCD Mission Activities Monitoring Plan:

1. Are marine mammals and sea turtles exposed to mid-frequency active sonar (MFAS)/high-frequency active sonar (HFAS), especially at levels associated with adverse effects (i.e., based on NMFS's criteria for behavioral harassment, temporary threshold shift (TTS), or permanent threshold shift)? If so, at what levels are they exposed?
2. If marine mammals and sea turtles are exposed to MFAS/HFAS, do they redistribute geographically as a result of continued exposure? If so, how long does the redistribution last?
3. If marine mammals and sea turtles are exposed to MFAS/HFAS, what are their behavioral responses to various levels?
4. Is the U.S. Navy's suite of mitigation measures for MFAS/HFAS (e.g., Protective Measures Assessment Protocol) effective for avoiding TTS, injury, and mortality of marine mammals and sea turtles?

Monitoring methods proposed for the NSWC PCD Study Area, similar to those in the Range Complex and Study Area monitoring plans, include a combination of research elements designed

both to support study area-specific monitoring and to contribute information to a larger U.S. Navy-wide science-based program. These field methods include visual surveys from vessels or airplanes, passive acoustic monitoring (PAM), and marine mammal observers (MMOs) aboard U.S. Navy platforms participating in the test event. Each monitoring technique has advantages and disadvantages that vary temporally and spatially, and each method supports one particular study objective better than another. The U.S. Navy uses a combination of techniques so that detection and observation of marine animals is maximized, and meaningful information can be derived to answer the research questions proposed above.

In addition to the NSWC PCD Mission Activities Monitoring Plan and the Fleet-funded monitoring plans described above, the Chief of Naval Operations (CNO) Energy and Environmental Readiness Division (N45) and the Office of Naval Research (ONR) have developed coordinated Science & Technology and Research & Development programs focused on marine mammals and sound. These include an extensive program of basic research and exploratory development at the ONR as well as the U.S. Navy's Living Marine Resources applied research program, managed by the Naval Facilities Engineering Command. Both programs are focused on delivering the data and technologies needed by the U.S. Navy and others to minimize potential risks to marine mammals and sea turtles from human activities like military training and testing.

The U.S. Navy's Living Marine Resources applied science program includes the following focus areas:

- Marine Mammal Distribution and Abundance Determination
- Criteria and Thresholds to Measure Effects of U.S. Navy-Generated Sounds
- Improving Monitoring Techniques
- Sound Field Characterization

Total investment in these programs has exceeded $230 million for protected marine species research from 2004 to 2012. These programs currently fund several significant projects relative to potential operational impacts to marine mammals ongoing within some U.S. Navy Range Complexes. Additional information on these programs can be found at the U.S. Navy's Green Fleet – Energy, Environment and Climate Change website (http://greenfleet.dodlive.mil/environment/marine-mammals-ocean-resources).

Integrated Comprehensive Monitoring Program

The Integrated Comprehensive Monitoring Program (ICMP) provides the overarching framework for coordination of the U.S. Navy's monitoring (DON 2010b). It has been developed in direct response to permitting requirements for U.S. Navy ranges, which are established in the various MMPA Final Rules, ESA Consultations, BOs, and applicable regulations. As a framework document, the ICMP applies by regulation to those activities on ranges and operating areas (OPAREAs) for which the U.S. Navy has sought and received ITAs.

The ICMP is intended for use as a planning tool to focus U.S. 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" and will be routinely updated as needed. Initial areas of focus for improving U.S. Navy protected marine species monitoring in 2012 and 2013 focused on development of a Strategic Plan to be incorporated as a major component of the ICMP to guide investments and help refine specific monitoring actions to more effectively and efficiently address ICMP goals and objectives.

The ICMP is evaluated through the Adaptive Management Review (AMR) process to: (1) assess progress, (2) provide a matrix of goals and objectives for the following year, and (3) make recommendations for refinement and analysis of the monitoring and mitigation techniques. This process includes conducting an annual AMR meeting at which the U.S. Navy and NMFS jointly consider the prior-year goals, monitoring results, and related scientific advances to determine if modifications are needed to more effectively address U.S. Navy monitoring program goals. Modifications to the ICMP that result from AMR discussions are incorporated into a revision to the ICMP and submitted to NMFS.

Under the ICMP, monitoring measures prescribed in range-/project-specific monitoring plans and U.S. Navy-funded research relating to the effects of U.S. Navy testing activities on protected marine species should be designed to accomplish one or more of the following top-level goals as prescribed in the current revision of the ICMP (DON 2010b):

a) 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).

b) 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., sound, explosive detonation, or expended materials), through better understanding of one or more of the following: (1) the nature of the action and its surrounding environment (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); 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).

c) An increase in our understanding of how individual marine mammals or ESA-listed marine animals 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).

d) 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).

e) An increase in our understanding of the effectiveness of mitigation and monitoring measures, including increasing the probability of detecting marine mammals (through

improved technology or methodology), both generally and more specifically within the safety zone (thus allowing for more effective implementation of the mitigation). Improved detection technology resulting from these goals will be rigorously and scientifically validated prior to being proposed for mitigation, and should meet practicality considerations (e.g., engineering, logistic, fiscal).

f) A better understanding and record of the manner in which the authorized entity complies with the MMPA ITA and ESA incidental take statement.

CNO N45 is responsible for maintaining and updating the ICMP, as necessary, reflecting the results of current regulatory agency rulemaking, adaptive management, best available science, improved assessment methodologies, and more effective protective measures. This is done as part of the AMR process, in consultation with U.S. Navy technical experts, Fleet Commanders, and Echelon II Commands as appropriate. The ICMP (updated in December 2010) is provided in **Appendix A**.

Report Objective

Design of the NSWC PCD Mission Activities Monitoring Plan represented part of a new U.S. Navy-wide and regional assessment, and as with any new program, there are many coordination, logistic, and technical details that continue to be refined. The scope of the Range Complex and Study Area monitoring plans was to lay out the background for monitoring, as well as to define initial procedures to be used in meeting certain study objectives derived from NMFS-U.S. Navy agreements.

Overall, this report serves two main objectives:

1. Present data and results from the U.S. Navy-funded marine mammal and sea turtle monitoring conducted in the NSWC PCD Study Area during the period from 02 August 2012 to 01 August 2013 (**Section II**). Due to the reporting requirements that extend from 02 August 2012 to 01 August 2013, this report covers a time period that includes the middle portion of the 2-year LOA, which covers the period from 21 January 2012 to 20 January 2014 (NMFS 2012). Primary focus over the first years of the U.S. Navy-wide monitoring program has been on establishing initial monitoring efforts, refining data-collection efforts, and overall organization and coordination of the monitoring program. This report will focus on summarizing collected data and providing a brief description of the major accomplishments from techniques used over the past year.
2. Continue the AMR process by providing an overview of monitoring initiatives and presenting progress made toward development of a Strategic Plan for U.S. Navy-wide monitoring. These initiatives continue to shape the evolution of the NSWC PCD Mission Activities Monitoring Plan for 2014. Input and recommendations from the Scientific Advisory Group (SAG) (e.g., SAG 2011) form a cornerstone of the Strategic Plan development, reflecting input received from the scientific community and other stakeholders. **Section III** provides an overview of the events that have prompted these most recent adaptive management actions.

II. NSWC PCD MISSION ACTIVITIES

The NSWC PCD Study Area includes military warning areas W-151 (includes Panama City OPAREA), W-155 (includes Pensacola OPAREA), and W-470 (**Figure 1**), and additionally St. Andrew Bay (**Figure 2**). The NSWC PCD RDT&E activities may be conducted anywhere within the existing military warning areas and St. Andrew Bay from the mean high-water line (mean high-tide mark) out to 222 kilometers (km) (120 nautical miles [nmi] offshore). RDT&E activities are more fully described in the NSWC PCD Mission Activities Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) (DON 2009).

Thirty species of marine mammals potentially occur in the NSWC PCD Study Area. These species include whales, dolphins, and the manatee. Twenty-four species regularly occur here and were evaluated in the NSWC PCD Mission Activities EIS/OEIS (DON 2009). All marine mammals are afforded protection under the MMPA. Of the 24 common marine mammal species, the sperm whale (*Physeter macrocephalus*) and the West Indian manatee (*Trichechus manatus*) are also protected under the ESA. Additionally, five species of threatened or endangered sea turtles can be found in the NSWC PCD Study Area: leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), green turtle (*Chelonia mydas*), hawksbill turtle (*Eretmochelys imbricata*), and Kemp's ridley turtle (*Lepidochelys kempii*). The distribution and habitat preferences of these protected marine species are reviewed in the U.S. Navy's Marine Resources Assessment for the Gulf of Mexico (DON 2007).

NSWC PCD Mission Activities Monitoring Plan Accomplishments

NSWC PCD Study Questions Overview

The goal of the NSWC PCD Mission Activities Monitoring Plan is to implement field methods chosen to address the long-term monitoring objectives outlined in **Section I**. In the NSWC PCD Mission Activities Monitoring Plan (DON 2010a; **Appendix B**), the U.S. Navy proposed to implement a variety of field methods to gather monitoring data on marine mammals and sea turtles in the NSWC PCD Study Area. Specifically, the U.S. Navy proposed to conduct visual surveys (aerial or vessel), to deploy PAM devices when possible, and to put MMOs aboard U.S. Navy vessels to meet its monitoring requirements. Studies were specifically designed to address the questions outlined in **Section I. Table 1** shows the Fiscal Year (FY) 2013 monitoring commitments agreed upon by NMFS and the U.S. Navy.

Table 1. Monitoring Commitments under NSWC PCD Final Rule, LOA, and BO for FY 2012-2014.

	Monitoring Commitments	FY 2013 Status
STUDY 1 (behavioral responses)		
Aerial or Vessel Surveys	2 sonar activities and 2 explosive events per year	Completed 3 sonar events; completed 2 explosive events
Marine Mammal Observers (MMOs)	1 explosive event per year	Completed 3 explosive events
STUDY 2 (mitigation effectiveness)		
MMO/Lookout Comparison	1 explosive event per year	MMOs completed 3 explosive events
Vessel or Aerial Surveys Before And After Test Events	2 sonar activities and 2 explosive events per year	Completed 3 sonar events; completed 2 explosive events

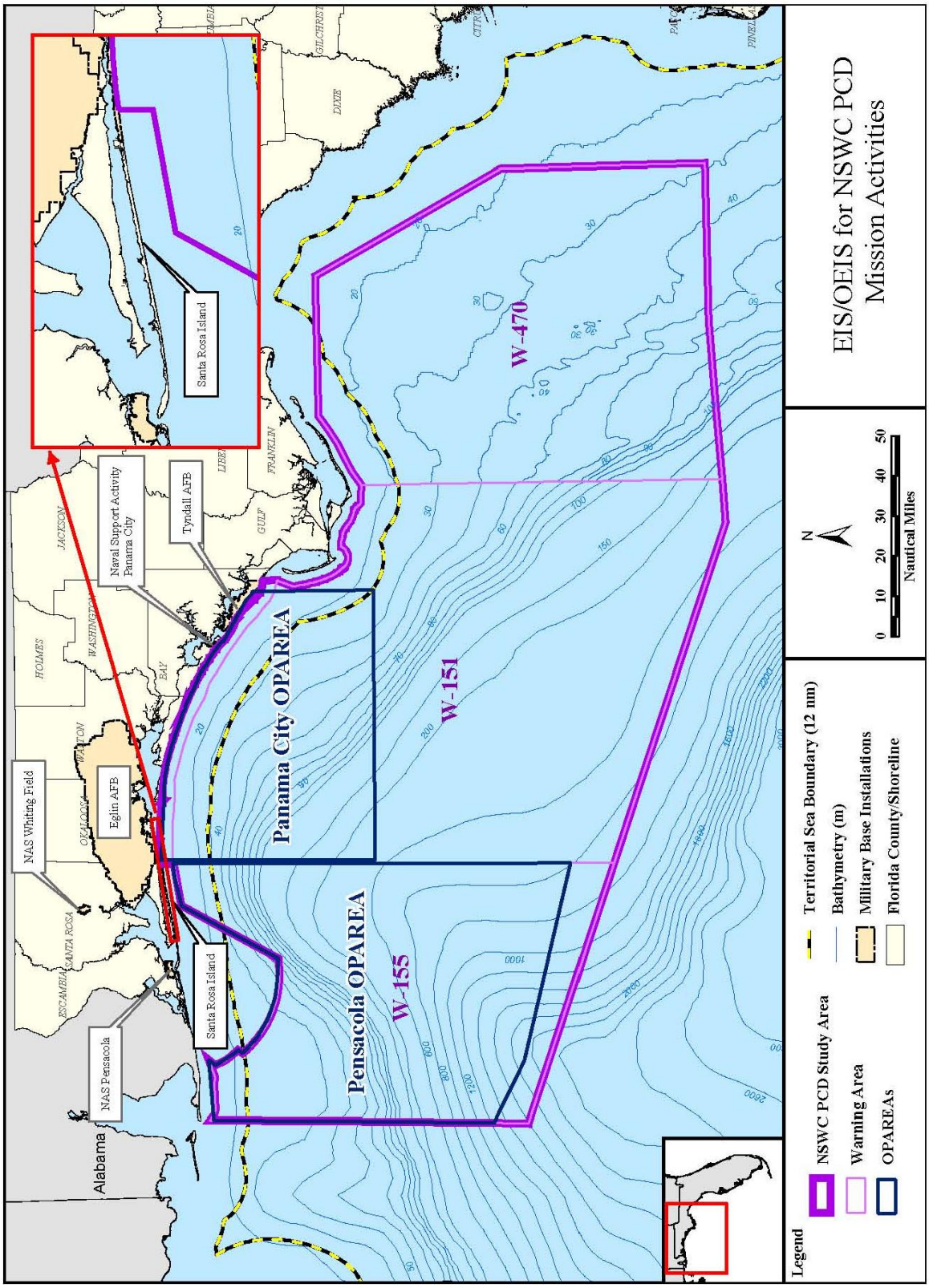

Figure 1. NSWC PCD Study Area: Gulf of Mexico.

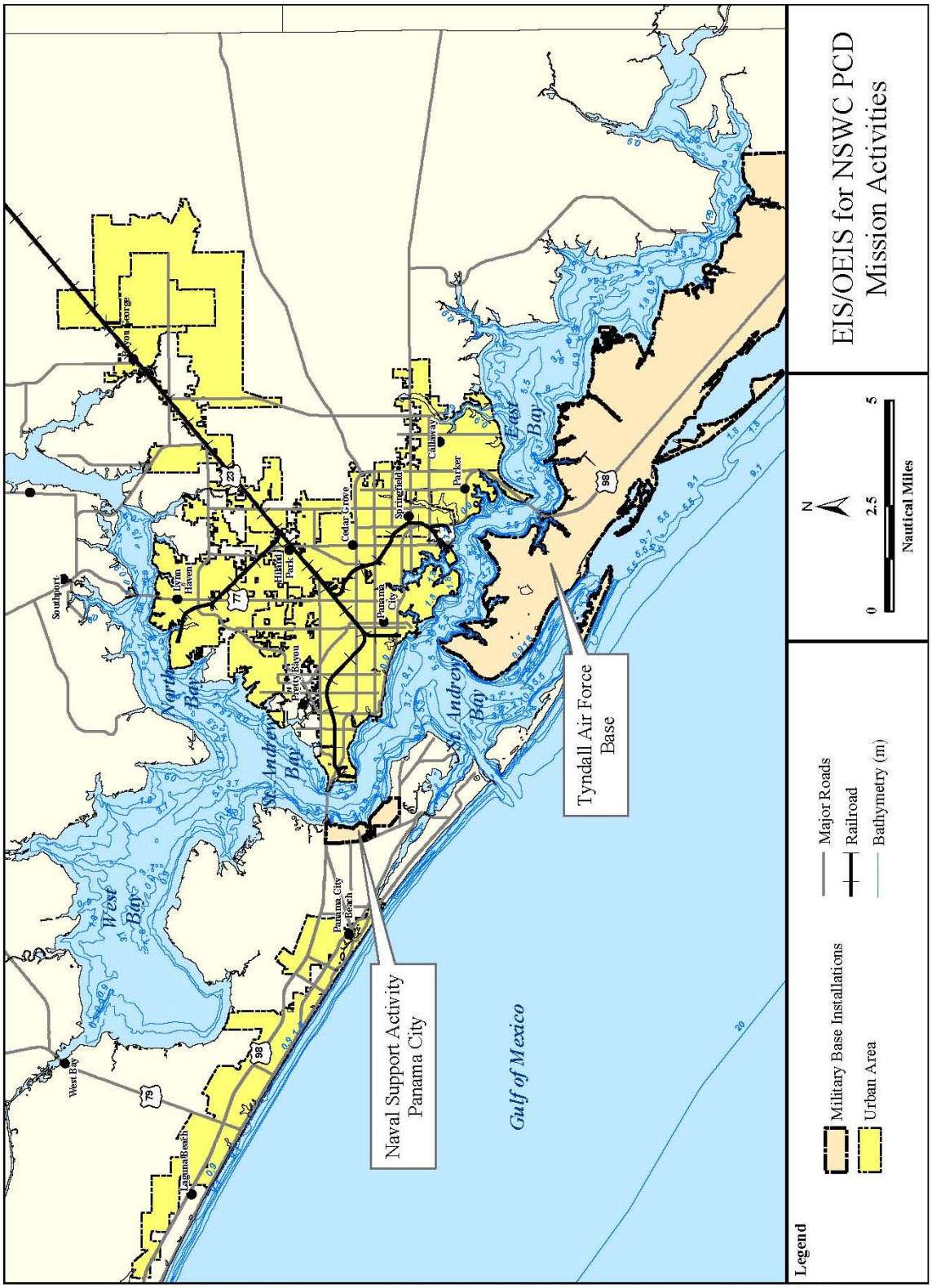

Figure 2. NSWC PCD Study Area: Nearshore and St. Andrew Bay.

III. NSWC PCD MONITORING ACCOMPLISHMENTS FOR THE REPORTING PERIOD

During the 02 August 2012–01 August 2013 reporting period, NSWC PCD implemented the Mission Activities Monitoring Plan as part of the third full year of monitoring since the January 2010 promulgation of the NSWC PCD Mission Activities LOA. Major accomplishments from the 2012–2013 compliance monitoring in the NSWC PCD Study Area included the completion of aerial surveys before, during, and after three sonar test events; and aerial surveys before, during, and after two live-inert detonation test events. NSWC PCD also incorporated MMOs into the AN/AQS-20A Mine Reconnaissance Sonar System (Q-20) sonar test events intermittently from August 2012 through May 2013. No vessel or PAM surveys occurred in the reporting period.

Monitoring During Test Events

Monitoring events are one of the primary components being used to address specific monitoring questions posed in the NSWC PCD Mission Activities Monitoring Plan (**Appendix B**) and to fulfill the requirements of the NMFS-issued LOA for 2012–2014 NSWC PCD mission activities that involve underwater detonations, sonar systems, and projectile firing (NMFS 2012). NSWC PCD conducted monitoring during three sonar test events: (1) the Q-20 sonar; (2) the Small Synthetic Aperture Minehunter 2 (SSAM2) and Buried Object Scanning Sonar (BOSS); and (3) the Remote Environmental Monitoring Units (REMUS) sonar during the reporting period. The Q-20 sonar system is an HFAS mine-hunting system. The SSAM2 is a bottom-mapping and mine-hunting sonar, while the BOSS images buried objects. The REMUS is an unmanned undersea vehicle equipped with sonar. Additionally, NSWC PCD executed monitoring during two tests of the Airborne Mine Neutralization System (AMNS), which included live-inert detonations, in the NSWC PCD Study Area.

Aerial Surveys for Sonar Test Events

NSWC PCD conducted aerial monitoring surveys for three sonar test events: (1) the Q-20 sonar; (2) the SSAM2 and BOSS; and (3) REMUS sonar during the reporting period. A summary of survey effort and sightings is provided in **Tables 2 through 4**. Complete survey and sighting details for the test events are included in **Appendices C through E**. Observers searched for and subsequently recorded any observed cetacean and sea turtle species during pre-test, during-test, and post-test monitoring for SSAM2 and BOSS test events and REMUS sonar system test events. Only pre-test monitoring was conducted for Q-20 sonar system tests because the event was cancelled due to adverse weather conditions for testing. No stranded or injured marine mammals or sea turtles were observed during any of the aerial monitoring efforts.

- Aerial monitoring for a Q-20 sonar test event was conducted 27 April through 02 May 2013 in good to fair sighting conditions, with all sightings made in Beaufort Sea States (BSS) from 2 to 5. The monitoring included seven flights before the Q-20 sonar test event (**Appendix C**). Observers visually surveyed 2,702 km (1,458 nmi) of systematic (on-effort) trackline and 3,433 km (1,854 nmi) of total trackline (including the systematic transects, cross-legs between transects, and circling for focal follows or species identification [ID]) during 6 days for approximately 16.8 hours (hr) of total survey effort

(combined on- and off-effort). Only one cetacean sighting was recorded, a group of bottlenose dolphins (*Tursiops truncatus*). The cetacean sighting was made before Q-20 sonar test events. There were 39 sea turtle sightings, including 28 sightings of loggerhead turtles, 1 sighting of a Kemp's ridley turtle, and 10 sightings of unidentified hardshell turtles. Sea turtle sightings included observations before Q-20 sonar test events. There was also one sighting of a hammerhead shark (*Sphyrna* sp.). Focal follows to collect behavioral data were attempted during one sighting with bottlenose dolphins before the test event.

Table 2. On-Effort Visual Aerial Survey and Marine Mammal and Sea Turtle Observation Summary for Q-20 Sonar Tests During April-May 2013 in the NSWC PCD Study Area.

Date	Distance Surveyed (km [nmi])[1]	Time Surveyed (hr)[1]	Cetacean Sightings (*n*)	Total Number of Individual Cetaceans Sighted (*n*)	Sea Turtle Sightings (*n*)	Total Number of Individual Sea Turtles Sighted (*n*)
27 April 2013 (pre-test)	170 (92)	0.8	0	0	0	0
28 April 2013 (pre-test)	623 (336)	3.1	1	3	10	11
29 April 2013 (during-test)	484 (261)	2.4	0	0	10	10
30 April 2013 (pre-test)	311 (168)	1.5	0	0	4	4
01 May 2012 (pre-test)	389 (210)	2	0	0	5	5
02 May 2013 (pre-test)	391 (211)	2	0	0	4	4
02 May 2013 (pre-test)	334 (180)	1.6	0	0	6	6
Totals	**2,702 (1,458)**	**13.4**	**1**	**3**	**39**	**40**

Note: [1]Values are rounded.

- Aerial monitoring was conducted for a SSAM2 and BOSS test event from 22 through 28 June 2013 in good to fair sighting conditions, with all sightings made in BSS from 2 to 5. The monitoring included two flights before the SSAM2 and BOSS test event; four flights during the SSAM2 and BOSS test event; and one flight after the SSAM2 and BOSS test event (**Appendix D**). Observers visually surveyed 3,565 km (1,925 nmi) of systematic (on-effort) trackline and 5,949 km (3,212 nmi) of total trackline (including the systematic transects, cross-legs between transects, and circling for focal follows or species ID) during 7 days for approximately 30.6 hr of total survey effort (combined on- and off-effort). Thirty-one cetacean sightings were recorded, including 28 sightings of bottlenose dolphins and 3 sightings of Atlantic spotted dolphins (*Stenella frontalis*). Cetacean sightings included observations before and during the SSAM2 and BOSS test events. There were 145 sea turtle sightings, including 104 sightings of loggerhead turtles, 16 sightings of Kemp's ridley turtles, and 25 sightings of unidentified hardshell turtles. Sea turtle sightings included

observations before, during, and after SSAM2 and BOSS test events. There was also 1 sighting of a whale shark (*Rhincodon typus*) and 1 sighting of an unidentified ray. Focal follows to collect behavioral data were attempted during 16 sightings including 2 with bottlenose dolphins before the test event; 3 with Atlantic spotted dolphins during the test event; and 11 with bottlenose dolphins during the test event.

Table 3. On-Effort Visual Aerial Survey and Marine Mammal and Sea Turtle Observation Summary for SSAM and BOSS Sonar System Tests During June 2013 in the NSWC PCD Study Area.

Date	Distance Surveyed (km [nmi])[1]	Time Surveyed (hr)[1]	Cetacean Sightings (*n*)	Total Number of Individual Cetaceans Sighted (*n*)	Sea Turtle Sightings (*n*)	Total Number of Individual Sea Turtles Sighted (*n*)
22 June 2013 (pre-test)	548 (296)	2.8	5	25	23	25
23 June 2013 (pre-test)	553 (299)	2.9	1	2	18	19
24 June 2013 (during-test)	562 (303)	2.8	5	33	32	32
25 June 2013 (during-test)	418 (226)	2.1	7	45	26	26
26 June 2013 (during-test)	504 (272)	2.5	7	74	19	19
27 June 2013 (during-test)	504 (272)	2.5	6	31	22	22
28 June 2013 (post-test)	476 (257)	2.3	0	0	5	5
Totals	**3,565 (1,925)**	**17.9**	**31**	**210**	**145**	**148**

Note: [1]Values are rounded.

- Aerial monitoring was conducted for a REMUS sonar test event from 28 July through 01 August 2013 in good to fair sighting conditions, with all sightings made in BSS from 2 to 4. The monitoring included two flights before the REMUS sonar test event; one flight during the REMUS sonar test event; and one flight after the REMUS sonar test event (**Appendix E**). Observers visually surveyed 1,529 km (826 nmi) of systematic (on-effort) trackline and 2,545 km (1,374 nmi) of total trackline (including the systematic transects, cross-legs between transects, and circling for focal follows or species ID) during 4 days for approximately 15.6 hr of total survey effort (combined on- and off-effort). Eight cetacean sightings were recorded, including 6 sightings of bottlenose dolphins and 2 sightings of Atlantic spotted dolphins. Cetacean sightings included observations during and after the REMUS sonar test event. There were 35 sea turtle sightings, including 15 sightings of loggerhead turtles, 9 sightings of Kemp's ridley turtles, 6 sightings of leatherback turtles, and 5 sightings of unidentified hardshell turtles. Sea turtle sightings included observations before, during, and after the REMUS sonar test event. Focal follows to collect behavioral data were attempted during 8 sightings, including 6 with bottlenose dolphins and 2 with Atlantic spotted dolphins.

Table 4. On-Effort Visual Aerial Survey and Marine Mammal and Sea Turtle Observation Summary for REMUS Sonar System Tests During July 2013 in the NSWC PCD Study Area.

Date	Distance Surveyed (km [nmi])[1]	Time Surveyed (hr)[1]	Cetacean Sightings (*n*)	Total Number of Individual Cetaceans Sighted (*n*)	Sea Turtle Sightings (*n*)	Total Number of Individual Sea Turtles Sighted (*n*)
28 July 2013 (pre-test)	459 (248)	3.4	0	0	3	3
29 July 2013 (pre-test)	553 (299)	3.0	1	2	13	13
30 July 2013 (during-test)	192 (104)	1.2	4	57	10	10
31 July 2013 (post-test)	325 (175)	1.8	3	73	9	9
Totals	**1,529 (826)**	**9.3**	**8**	**132**	**35**	**35**

Note: [1]Values are rounded.

Aerial Surveys for Detonation Test Events

NSWC PCD conducted aerial monitoring surveys for two tests of the AMNS system during the recording period. A summary of survey effort and sightings is provided in **Table 5**. Complete survey and sighting details for the test events are included in **Appendix F**. Observers searched for and subsequently recorded any present cetacean and sea turtle species during pre-test, during-test, and post-test monitoring for the live-inert test events. No stranded or injured marine mammals or sea turtles were observed during this aerial monitoring effort.

- Aerial monitoring was conducted 07 through 16 October 2012 in good to poor sighting conditions, with all sightings made in BSS from 2 to 4. The monitoring included five flights before, during, and after the first AMNS test event; one flight during an intermediate test event, which could not include monitoring before or after the event; and four flights before, during, and after the second AMNS test event (**Appendix F**). Observers visually surveyed 3,869 km (2,089 nmi) of systematic (on-effort) trackline and 4,650 km (2,511 nmi) of total trackline (including the systematic transects, cross-legs between transects, and circling for focal follows or species ID) during 10 days for approximately 29.3 hr of total survey effort (combined on- and off-effort). Nine sightings of cetaceans were recorded, including 6 sightings of bottlenose dolphins and 3 sightings of unidentified dolphins that included 1 sighting of possible Atlantic spotted dolphins. Cetacean sightings included observations before, during, and after the AMNS test event. There were two sea turtle sightings, both of unidentified hardshell turtles. Sea turtle sightings included observations made during the AMNS test event. Focal-follow behavioral data were collected during 8 sightings: 5 with bottlenose dolphins before the first test event; 1 with an unidentified dolphin during the first test event; 1 with unidentified dolphins after the first test event; and 1 with bottlenose dolphins during the second test event.

Table 5. On-Effort Visual Aerial Survey and Marine Mammal and Sea Turtle Observation Summary for AMNS System Tests Involving Detonations During October 2012 in the NSWC PCD Study Area.

Date	Distance Surveyed (km [nmi])[1]	Time Surveyed (hr)[1]	Cetacean Sightings (*n*)	Total Number of Individual Cetaceans Sighted (*n*)	Sea Turtle Sightings (*n*)	Total Number of Individual Sea Turtles Sighted (*n*)
07 October 2012 (pre-first test)	336 (181)	2	0	0	0	0
08 October 2012 (pre-first test)	421 (227)	2.5	0	0	0	0
09 October 2012 (pre-first test)	330 (178)	2.1	5	87	0	0
10 October 2012 (during-first test)	779 (421)	5.6	1	21	0	0
11 October 2012 (post-first test)	480 (259)	2.4	2	13	0	0
12 October 2012 (during intermediate event)	437 (236)	2.5	1	45	1	1
13 October 2012 (pre-second test)	317 (171)	1.9	0	0	0	0
14 October 2012 (pre-second test)	27 (15)	0.1	0	0	0	0
15 October 2012 (during-second test)	507 (274)	3.7	0	0	1	1
16 October 2012 (post-second test)	235 (127)	2.5	0	0	0	0
Totals	**3,869 (2,089)**	**25.3**	**9**	**166**	**2**	**2**

Note: [1]Values are rounded.

NSWC PCD MMO Activities

U.S. Navy MMOs participated in 20 days of Q-20 sonar test events during NSWC PCD mission activities that extended intermittently from 02 August 2012 through 23 May 2013, and in 13 days of AMNS underwater detonation events during RDT&E activities that extended intermittently from 10 October 2012 through 02 November 2012 and on 15 May 2013 and 17 May 2013. MMOs conducted visual observations from the bridges of the vessels conducting sonar tests involving Q-20 sonar and conducting underwater detonations in conjunction with AMNS tests. Effort and environmental information was only collected when MMOs began observing (i.e., "on-effort").

The MMOs spent more than 97.3 hr searching for marine species during sonar and underwater detonation events. The number of observers during the on-effort hours depended on the vessel size used to support the test event. Q-20 sonar activities on the Research Vessels (R/V) *Athena I* and *Athena II* incorporated two MMOs; mine countermeasure operations used five small support craft and incorporated six or seven MMOs. During detonation events, two MMOs were stationed

on the R/V *Athena I* and one or two MMOs were stationed on each of the smaller participating vessels. The naval MMO effort comprised a total of just over 130.2 hr of shipboard monitoring for protected marine species. For each day at sea, 1.03 to 10.6 hr were spent on-effort. **Table 6** summarizes U.S. Navy MMO sighting data from the test events, while **Appendix G** provides further details on those recorded sightings.

Table 6. U.S. Navy MMO Sighting Data from Sonar and Detonation Test Events in the NSWC PCD Study Area.

Species	Number of MMO Sightings	Group Size
Atlantic spotted dolphin (*Stenella frontalis*)	8	1-15
Bottlenose dolphin (*Tursiops truncatus*)	6	2-5
Unidentified dolphin	2	1
Kemp's ridley turtle (*Lepidochelys kempii*)	1	1
Loggerhead turtle (*Caretta caretta*)	5	1
Unidentified hardshell turtle	9	1
Total	**31**	**1-15**

Note: *Detailed sighting information is included in **Appendix G**

U.S. Navy Lookout Effectiveness Study

The U.S. Navy undertakes monitoring of marine mammals during naval training and RDT&E events and has mitigation procedures designed to minimize risk to these animals. One key component of this monitoring and mitigation is the shipboard lookouts (LOs, also known as watchstanders), who are part of the standard operating procedure that ships use to detect objects (including marine mammals) within a specific area around the ship during events. The watchstanders are an element of monitoring requirements specified by NMFS in the MMPA LOAs. The goal is to detect marine mammals entering ranges of 200, 500, and 1,000 yards around the vessel, which correspond to distances at which various mitigation actions should be performed. In addition to the LOs, officers on the bridge search visually while sonar operators listen for vocalizations. We refer to all of these observers together as the observation team (OT). The aim of this study is to determine the OT effectiveness in terms of detecting and identifying marine mammals. Of particular interest is the probability of an animal occurring within a defined range of the vessel without being observed by the OT, as well as determining the accuracy of the OT (primarily the LO) in identifying the species type (whale, dolphin, etc.), assessing group size, and estimating their position. In order to achieve this, experienced MMOs search and collect information on marine mammals that are detected by themselves and/or the OT. The annual monitoring report for 2012 provided a review of the design and testing of a protocol for the determining the effectiveness of the LOs in visually detecting marine mammals (DON 2012).

During the previous reporting period (2012), a new analysis method was developed and tested that allows estimation of the probability of animals approaching to within a specified stand-off range without being detected (the "sneak-up probability") (DON 2012). With regards to the lookout effectiveness study, a major accomplishment related to this project during the current reporting period included revision of Marine Species Awareness Training.

IV. ADAPTIVE MANAGEMENT RECOMMENDATIONS

Originally, five study questions were developed between NMFS and the U.S. Navy as guidance for developing monitoring plans, and all existing range-specific monitoring plans attempted to address each of these study questions. However, the state of knowledge for the various U.S. Navy Range Complexes is not equal, and many factors, including level of existing information, amount of training activity, accessibility, and available logistics resources, all contribute to the ability to perform particular monitoring activities. In addition, the U.S. Navy monitoring program has historically been compartmentalized by Range Complex and focused on effort-based metrics (survey days, trackline covered, etc.).

A 2010 U.S. Navy-sponsored monitoring meeting in Arlington, Virginia initiated a process to critically evaluate the current U.S. Navy monitoring plans and begin development of revisions/updates to both existing region-specific plans and the ICMP. Discussions at that meeting, and at the U.S. Navy/NMFS annual adaptive management meeting in October 2010, established a way forward for continued refinement of the U.S. Navy monitoring program. This process included establishing a SAG composed of leading marine mammal scientists, with the initial task of developing recommendations that would serve as the basis for a Strategic Planning Process for marine species monitoring.

In June 2011, the U.S. Navy hosted a Marine Mammal Monitoring Workshop with guidance and support from NMFS, which included scientific experts and representatives of environmental non-governmental organizations (SAG 2011). The purpose of the workshop was to present a consolidated overview of monitoring activities accomplished in 2009 and 2010 pursuant to the MMPA Final Rules currently in place, including outcomes of selected monitoring-related research and lessons learned, and to seek feedback on future directions. A significant outcome of this workshop was to continue consolidating monitoring efforts from individual Range Complex plans in order to improve the return on investment by focusing on specific objectives and projects that can most efficiently and effectively be addressed throughout the U.S. Navy's Range Complexes.

The SAG was established in 2011 with the initial task of evaluating current naval monitoring approaches under the ICMP and existing LOAs to develop objective scientific recommendations (SAG 2011). While recommendations were fairly broad from a geographic perspective, the SAG did provide specific programmatic recommendations that serve as guiding principles for the continued evolution of the U.S. Navy monitoring program. Notable keystone recommendations from the SAG include:

- Working within a conceptual framework of knowledge, from basic information on the occurrence of species within each range complex, to more specific matters of exposure, response, and consequences.
- Striving to move away from a "box-checking" mentality — monitoring studies should be designed and conducted according to scientific objectives, rather than on merely cataloging effort expended.

- Approaching the U.S. Navy monitoring program holistically and selecting projects that offer the best opportunity to advance understanding of the issues, as opposed to establishing range-specific requirements.
- Facilitating collaboration among researchers in each region, with the intent to develop a coherent and synergistic regional monitoring and research effort.

In addition to broader programmatic and conceptual recommendations, the SAG evaluated each range complex for a series of factors including level of U.S. Navy activity; diversity and density of marine mammals; need for information on basic occurrence, presence of species of concern; and ability to most effectively address questions related to exposure, response, and consequences.

The objective of the Strategic Planning Process is to continue the evolution of U.S. Navy protected marine species monitoring towards a single integrated program, incorporating expert review and recommendations, and establishing a more transparent framework for evaluating and implementing monitoring work across the U.S. Navy Range Complexes and study areas. The Strategic Planning Process is intended to be a primary component of the ICMP and to provide a "vision" for U.S. Navy monitoring across geographic regions—serving as guidance for determining how to most efficiently and effectively invest the marine species monitoring resources to address ICMP top-level goals and satisfy MMPA LOA regulatory requirements.

The Strategic Planning Process has five major implementation steps:

- Identify overarching intermediate scientific objectives
- Develop individual monitoring project concepts
- Evaluate, prioritize, and select monitoring projects
- Execute selected monitoring projects
- Report and evaluate progress and results.

These steps serve three primary purposes: 1) to facilitate the U.S. Navy in developing specific projects addressing one or more intermediate scientific objectives; 2) to establish a more structured and collaborative framework for developing, evaluating, and selecting monitoring projects across all areas where the U.S. Navy conducts training and testing activities; and 3) to maximize the opportunity for input and involvement across the research community, academia, and industry.

This Strategic Planning Process will serve as the single marine species monitoring requirement for all U.S. Navy testing and training activities under the Atlantic Fleet Training and Testing (AFTT) MMPA LOA, which will supersede the current LOAs for Atlantic Fleet Active Fleet Sonar Testing and East Coast and Gulf of Mexico Range Complexes beginning in 2014. This process includes mission activities conducted in the NSWC PCD Study Area. Along with the ICMP, it clearly identifies the goals and objectives of the U.S. Navy monitoring program, presents the guidance and expert review that will be used to direct efforts, and defines the process for evaluating and selecting how the U.S. Navy monitoring program budget is invested.

Future NSWC PCD protected marine species monitoring will be aligned to the requirements of the AFTT MMPA LOA. Monitoring commitments are still to be determined.

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