

**Request for 12 November 2012 to 11 November 2015
(Year 3 to 5)**

Renewal

**Of The
Letter of Authorization Under
The Marine Mammal Protection Act
For Incidental Harassment Of Marine Mammals Resulting From**

**U.S. Navy Training Activities In The
Northwest Training Range Complex**

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**July, 1 2012
FINAL**

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1. INTRODUCTION AND ACTIVITY

Under Section 101(a)(5)(A) of the Marine Mammal Protection Act of 1972, this document is the annual renewal application to the National Marine Fisheries Service (NMFS) for a Letter of Authorization from U.S. Navy training and research activities in the Northwest Training Range Complex. This Letter of Authorization renewal application is being sought to cover the multi-year period from 12 November 2012 to 11 November 2015 to cover the taking of marine mammals, as described by the Marine Mammal Protection Act, incidental to training within the Northwest Training Range Complex.

Table 1-1 below shows the Marine Mammal Protection Act permit documentation applicable to the Northwest Training Range Complex and NMFS's authorization. Information contained in these references provide a complete description of the background for the Navy's request, overview of the Northwest Training Range Complex, and description of the specified activities, description of marine mammals in the area, discussion of potential effects or lack of effects of specified activities on marine mammal, mitigation, marine mammal monitoring, and associated reporting. The descriptions contained in these references have not changed, except as where noted in this application renewal.

Table 1-1. Northwest Training Range Complex Marine Mammal Protection Act documents.

Timeline Date	From	Event	As cited in this renewal
Sep 2008	Navy	Letter Of Authorization Application (request for Incidental Harassment For the Northwest Training Range Complex) submitted to NMFS Office of Protected Resources	Navy 2008
24 Feb 2009	Navy	Letter Of Authorization Application Addendum	Navy 2009
10 Nov 2010	NMFS	Final Rule: Taking and Importing Marine Mammals; U.S. Navy Training In Northwest Training Range Complex 75FR69296	NMFS 2010a
12 Nov 2010	NMFS	Letter of Authorization for the Northwest Training Range Complex	NMFS 2010b
1 July 2011	Navy	Letter Of Authorization Application Renewal (request for Incidental Harassment For the Northwest Training Range Complex) submitted to NMFS Office of Protected Resources	Navy 2011
9 Nov 2011	NMFS	Letter of Authorization for the Northwest Training Range Complex 12 Nov 2011 to 11 Nov 2012	NMFS 2011
1 Feb 2012	NMFS	Final Rule: Taking and Importing Marine Mammals: U.S. Navy Training in 12 Range Complexes and U.S. Air Force Space Vehicle and Test Flight Activities in California 77FR4917	NMFS 2012

There are no further changes to Chapter 1 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1). Subsequent chapters without change are indicated in light gray underlined text.

Unless otherwise noted, there will not be a substantial modification to the described work, mitigation or monitoring undertaken during the upcoming requested authorization period. Monitoring reports required by 50 C.F.R. §218.115(a) through (j) will be submitted to NMFS no later than 1 July of each year of the requested authorization.



2. DURATION AND LOCATION OF ACTIVITIES

There are no further changes to Chapter 2 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1) (Figure 2-1).

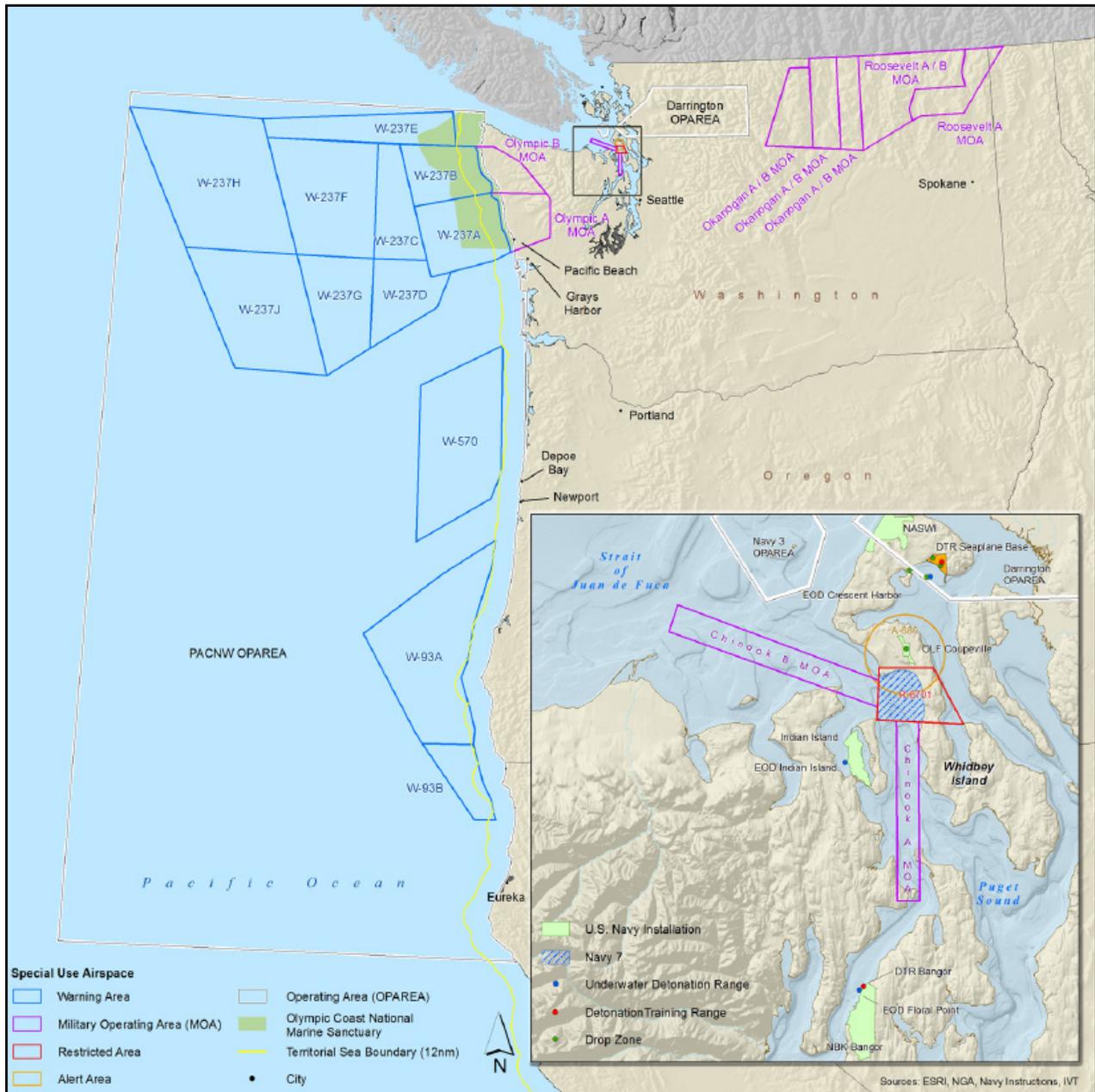


Figure 2-1. Spatial extent of the Navy’s Northwest Training Range Complex.



3. MARINE MAMMAL SPECIES AND NUMBERS

There are no further changes to Chapter 3 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1) except as noted below.

NMFS Stock Assessment Report update

Newest information on marine mammal populations and stocks NMFS is contained in the latest Stock Assessment Report from the NMFS which published the availability of the 2011 Final version on 21 May 2012 (77FR29969) (Carretta et al. 2012).

<http://www.nmfs.noaa.gov/pr/sars/region.htm>

Typically Pacific Stock Assessment Reports estimate marine mammal abundance for the entire U.S. West Coast and Hawaii, and may not reflect regional abundance at smaller geographic areas within the Northwest Training Range Complex.

4. AFFECTED SPECIES STATUS AND DISTRIBUTION

There are no further changes to Chapter 4 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

NMFS Designation of Marine Mammal Critical Habitat or New Endangered Species Act Species Listings Within Northwest Training Range Complex

To the best of the Navy's knowledge, since 1 July 2011, the submission date of the Navy's previous renewal request, there was no designation of any new marine mammal critical habitat within the Northwest Training Range Complex, no listing of new Candidate¹ marine mammal species, and no listing of new Proposed² marine mammal species. On April 18, 2012, NMFS did publish a Proposed Rule recommending delisting of the Eastern Distinct Population Segment of Steller sea lion (77FR23209). NMFS solicited public comments to the Proposed Rule through June 18, 2012.

¹ Candidate species (69FR19975 and 71FR61022) are petitioned species that are actively being considered for listing as endangered or threatened under the Endangered Species Act, as well as those species for which NMFS has initiated an Endangered Species Act status review that it has announced in the Federal Register.

² Proposed species are those candidate species that were found to warrant listing as either threatened or endangered and were officially proposed as such in a Federal Register notice after the completion of a status review and consideration of other protective conservation measures.



5. HARASSMENT AUTHORIZATION REQUESTED

There are no further changes to Chapter 5 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1) except as noted below.

As discussed in the next section, annual use of authorized sonar systems and explosive use this reporting year resulted in a lower amount of potential take as authorized in NMFS' Letters of Authorization for the Northwest Training Range Complex (Table 1-1). The subsequent annual post-calculation/estimation of species-specific potential exposures as required by NMFS is provided in Table 6-1. **The amount of annual harassment authorization requested by the Navy for the Northwest Training Range Complex in this Letter of Authorization renewal application for the period November 2012 to November 2015 remains the same as annually authorized previously by NMFS (see Table 5-1).**

Table 5-1. NMFS previous take authorization for the Northwest Training Range Complex, and Navy requested annual take authorization for the period November 2012 to November 2015.

Species authorized in NMFS Northwest Training Range Complex Letter of Authorization 12 Nov 2010 §5(b)	NMFS Final Annual Take Authorization		
	Level B Harassment	Level A Harassment	Mortality
(1) Mysticetes:			
(i) Humpback whale	15	0	0
(ii) Fin whale	69	1	0
(iii) Blue whale	17	0	0
(iv) Minke whale	9	0	0
(v) Gray whale	4	0	0
(vi) Sei whale	1	0	0
(2) Odontocetes:			
(i) Sperm whale	127	1	0
(ii) Killer whale	14	0	0
(iii) Pygmy or dwarf sperm whales	4	0	0
(iv) Mesoplodon spp. beaked whales	15	0	0
(v) Cuvier's beaked whale	14	0	0
(vi) Baird's beaked whale	13	0	0
(vii) Striped dolphin	40	0	0
(viii) Risso's dolphin	100	0	0
(ix) Northern right whale dolphin	741	1	0
(x) Pacific white-sided dolphin	571	0	0
(xi) Short beaked common dolphin	1,256	2	0
(xii) Short finned pilot whale	2	0	0
(xiv) Dall's porpoise	4,752	3	0
(xv) Harbor porpoise	119,274	1	0
(3) Pinnipeds:			
(i) Pacific harbor seal	586	1	0
(ii) California sea lion	286	0	0
(iii) Northern fur seal	1,365	1	0
(iv) Steller sea lion	120	0	0
(vi) Northern elephant seal	378	2	0



6. NUMBERS AND SPECIES TAKEN

There are no further changes to Chapter 6 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

As detailed in the 2012 Classified Northwest Training Range Complex Annual Exercise Report submitted to NMFS, no individual category of authorized system or training event exceeded authorized quantities of sonar and explosives within the Northwest Training Range Complex. All Navy authorized sources were well below those authorized in NMFS's 2011 annual Letter of Authorization.

A species-specific 2011-2012 post-calculation/estimation was conducted for this Letter of Authorization renewal application as required in §5 (a)(1) to assess potential takes in terms of annual takes originally authorized by NMFS (Table 5-1). Table 6-1 shows the results from this assessment.

Post-Calculation\Estimation³

The post-calculation exposure assessment presented in Table 6-1 shows that Navy training over the reporting period in the Northwest Training Range Complex potentially resulted between 0 (zero) to 21% of any individual species annual authorized takes (Table 6-1).

As a conservative, over predictive assessment of exposure and potential takes under this authorization renewal request, the U.S. Navy requests the same level of takes as NMFS has authorized previously (*see previous Chapter 5*).

Therefore, annual potential exposures and resulting authorizations are anticipated to remain the same for this renewal application covering the period from November 2012 to November 2015 (Table 5-1).

³ This post-calculation is only a look at takes based solely on the assumption that use of a given system as reported in the classified Exercise Report could potentially generate certain species-specific modeled exposures that NMFS equates to "takes" under the MMPA. Model limitations as discussed in the Navy's Northwest Training Range Complex Environmental Impact Statement and previous Letter of Authorization applications do not factor in small scale animal movement, regional distribution other than potential presence, or exposure limiting effects from Navy mitigation measures or location of actual training in one part of the range vice another.



Table 6-1. Navy post-calculation and estimation of potential model based exposures based on actual training that occurred in the past year for the Northwest Training Range Complex.

Species authorized in NMFS Northwest Training Range Complex Final Rule and Letters of Authorization	NMFS Authorized Level B Takes From Table 5-1	2011-2012 Predicted Level B Takes Based on Reported Navy Training	
		Level B	% of potential takes as compared to authorized takes
(1) Mysticetes:			
(i) Humpback whale	15	2	13 %
(ii) Fin whale	69	8	12 %
(iii) Blue whale	17	2	18 %
(iv) Minke whale	9	1	11 %
(v) Gray whale	4	0	0 %
(vi) Sei whale	1	0	0 %
(2) Odontocetes:			
(i) Sperm whale	127	18	14%
(ii) Killer whale *	14	2	14%
(iii) Pygmy or dwarf sperm whales	4	0	0%
(iv) Mesoplodon spp. beaked whales	15	2	13%
(v) Cuvier's beaked whale	14	2	14%
(vi) Baird's beaked whale	13	2	15%
(vii) Striped dolphin	40	8	20%
(viii) Risso's dolphin	100	18	18%
(ix) Northern right whale dolphin	741	154	21%
(x) Pacific white-sided dolphin	571	113	20%
(xi) Short beaked common dolphin	1,256	258	21%
(xii) Short finned pilot whale	2	0	0%
(xiv) Dall's porpoise	4,752	992	21%
(xv) Harbor porpoise	119,274	25,624	21%
(3) Pinnipeds:			
(i) Pacific harbor seal	586	109	19%
(ii) California sea lion	286	57	20%
(iii) Northern fur seal	1,365	272	20%
(iv) Steller sea lion	120	17	14%
(v) Northern elephant seal	378	72	19%

* Due to difficulty in determining particular stock densities of killer whales, all stocks of killer whales were combined for modeling exposures. This included offshore, transient, and southern resident killer whale stocks. While overly conservative, for model assessment purposes all killer whale exposures including those in this post-calculation table were assumed to belong to southern resident killer whale stock. However, given the more offshore use of surface ship sonar and sonobuoys, it is likely that most if not all exposures would have been to either transient or offshore killer whales.



7. IMPACTS TO MARINE MAMMAL SPECIES OR STOCKS

There are no further changes to Chapter 7 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

8. IMPACT ON SUBSISTENCE USE

There are no further changes to Chapter 8 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

9. IMPACTS TO THE MARINE MAMMAL HABITAT AND THE LIKELIHOOD OF RESTORATION

There are no further changes to Chapter 9 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

10. IMPACTS TO MARINE MAMMALS FROM LOSS OR MODIFICATION OF HABITAT

There are no further changes to Chapter 10 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

11. MEANS OF EFFECTING THE LEAST PRACTICABLE ADVERSE IMPACTS – MITIGATION MEASURES

There are no further changes to Chapter 11 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).

12. SUBSISTENCE EFFECTS AND PLAN OF COOPERATION

There are no further changes to Chapter 12 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1).



13. MONITORING AND REPORTING MEASURES

There are no further changes to Chapter 13 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1) except as noted below.

Unless otherwise noted herein, there will not be a substantial modification to the described work, mitigation or monitoring undertaken during the upcoming authorization period. Monitor reports required by 50 C.F.R. §218.115(a) through (j) will be submitted no later than 1 July of each year.

Navy-funded Northwest Training Range Complex Year 2 Marine Mammal Monitoring Accomplishments From 2 May 2011 to 1 May 2012

As outlined below, the Navy met its current Northwest Training Range Complex monitoring obligations as specified in the NMFS Final Rule and NMFS' subsequent annual Letters of Authorization. More detailed description of Navy funded monitoring is contained in the Navy's Year 2 Monitoring Report for 2012 (Navy 2012).

Passive Acoustic Monitoring:

Two High-frequency Acoustic Monitoring Packages (HARP) from the Scripps Institute of Oceanography were deployed and conducted continuous monitoring within the offshore marine waters of Washington State (Figure 13-1).

http://cet.usc.edu/technologies_AutonomousRecorders.html

One HARP was deployed in January 2011 approximately 25 nm from the coast of Washington State in the southern part of NOAA's Olympic Coast National Marine Sanctuary. Scripps has deployed HARPs in the same approximate location periodically since 2004 (Oleson et al 2009, Oleson and Hildebrand 2012). A second HARP under the Northwest Training Range Monitoring Plan was deployed in May 2011 near the edge of an underwater canyon west of the Olympic Coast National Marine Sanctuary boundary (Širović et al. 2012 as appendix in Navy 2012). These devices placed on the ocean floor record marine mammal vocalizations and anthropogenic sounds on internal hard drives that must be retrieved during field service calls approximately every 8-9 months.

Both HARPs were field serviced in early December 2011. Data was collected from the HARPs and returned to Scripps for analysis, and the HARPs redeployed at the same locations.

Passive acoustic analysis from two Navy-funded Northwest Training Range Complex monitoring HARPs is presented in the Navy's Year 2 Monitoring Report (2012). The report covers the period from January 2011 to November 2011. Over 10,617 hours of passive acoustic data was recorded (6,552 hours at HARP-QC and 4,065 hours at HARP-CE) (Širović, A. personal communication). Subsequent analysis confirmed detection of three baleen whale species to include blue whales, fin whales, and humpback whales; nine toothed whale species; and anthropogenic sounds dominated by shipping noise (Širović et al. 2012 as appendix in Navy 2012).





Figure 13-1. Location of Navy funded HARPs off Washington State continuously deployed since January and May 2011.

(Picture of HARP courtesy of Scripps Institute of Oceanography)



Satellite tagging

Under the previous year's monitoring, the Navy purchased 10 satellite tracking tags suitable for deployment by Cascadia Research Collective on a suite of marine species within the offshore waters of the Northwest Training Range Complex.

The tags used were the Andrews-style LIMPET (Low Impact Minimally Percutaneous External Transmitter), in either the location-only Spot5 configuration or the location/dive data Mk10-A configuration (Wildlife Computers, Redmond, Washington) (Schorr et al. 2012 as appendix in Navy 2012). Tags were programmed to species-specific, transmission schedule-based surfacing behavior and transmission data from previous deployments. Tags transmit animal movement data via the Argos satellite system. The commercial Argos system consists of data acquisition and relay equipment attached to National Oceanic and Atmospheric Administration (NOAA) low-orbiting weather satellites and ground-based receivers and data processing systems.

The Navy purchased these satellite tracking tags as part of the Northwest Training Range Complex monitoring. However, the tags were deployed opportunistically during field efforts associated with a grant from the NOAA/Alaska Regional Office for fin whale research, a collaborative project with the Washington Department of Fish and Wildlife (WDFW) addressing marine mammal distribution and habitat use off Oregon and Washington (Schorr et al. 2012 as appendix in Navy 2012).

The species of interest in this 3-year joint field project are endangered cetaceans such as blue whales, fin whales, humpback whales, and sperm whales, but may also include high priority cetaceans such as beaked whales, in the event they are encountered in favorable tagging conditions. Other species of interest for tagging could also include seasonal resident gray whales and transient or offshore killer whales.

During this reporting period, three fin whales and one humpback whale were tagged using Navy funded tags off the Washington coast in 2011. A total of approximately 43 days of animal movement data was obtained. The Navy's Year 2 Northwest Training Range Complex Monitoring Report (2012) shows the tagging results for May 2011 to May 2012 field work (Schorr et al. 2012 as appendix in Navy 2012).



Proposed Year 3 Monitoring (May 2012 to May 2013)

The NMFS has acknowledged that the Northwest Training Range Complex monitoring will enhance the understanding of marine mammal distributions within the offshore waters of northern California, Oregon, and Washington. Additionally, NMFS also pointed out that information gained from the investigations associated with the Navy’s monitoring may be used in the adaptive management of mitigation or monitoring measures in subsequent NMFS authorizations, if appropriate. Therefore, the Navy’s adaptive management of Northwest Training Range Complex monitoring under its Marine Mammal Protection Act responsibilities involves close coordination with NMFS to align marine mammal monitoring with the overall objectives stated within the Introduction to this report. To the best extent practical, the Northwest Training Range Complex monitoring aligns with U.S. Ocean Policy⁴. To date, 2011-2012 monitoring within the Northwest Training Range Complex represents Year 2 of a planned five year effort. As such, it would be premature to draw detailed conclusions or initiate comprehensive monitoring changes without further consultation with NMFS.

The Navy proposes to keep the same level of monitoring effort in the Northwest Training Range Complex as was committed and accomplished in Year 2 (2 May 2011 to 1 May 2012). Table 1 highlights these goals. The Navy is committed to structuring the Northwest Training Range Complex monitoring to address both NMFS regulatory required monitoring under the Northwest Training Range Complex Letter of Authorization while at the same time making significant contributions to the greater body of marine mammal science.

Table 13-1. Navy’s proposed Year 3 monitoring goals for the Northwest Training Range Complex from 2 May 2012 to 1 May 2013.

Monitoring Technique	Implementation
Passive Acoustic Monitoring	Maintain and present data analysis from two Navy funded passive acoustic monitoring devices
Marine Mammal Tagging	Report results from marine mammal tagging for remaining tags available that were not deployed between May 2011 and May 2012, leveraging existing field efforts where possible in the May 2012 to May 2013 timeframe
<p>NO metric changes are envisioned in Year 3 (2012-2013) from the level of effort and funding performed in Year 2 (2011-2012) TOTAL Navy Year 3 Goal: <i>2 PAM devices and analysis; present results from tag deployments</i></p>	

⁴ U.S. Ocean Policy- On 19 July 2010, the President signed a new Executive Order on Stewardship of the Ocean, Our Coasts, and the Great Lakes which adopted the final recommendation of the Interagency Ocean Policy Task Force. Key recommendations include “Use the best available science and knowledge to inform decisions affecting the ocean...” and “Increase scientific understanding of ocean...” (EO 2010, CEQ 2010). Another integral part of these policy directions was to instill a collaborative spirit within the Federal Government in the planning, management, and program execution of ocean science projects. Both of these tenants, improved and using best available science along with increased collaboration, are similar to preceding recommendations of the Joint Subcommittee on Ocean Science and Technology (JSOST) on “Addressing the Effects of Human-Generated Sound on Marine Life: An Integrated Research Plan for U.S. federal agencies “(Southall et al. 2009).



14. RESEARCH

There are no further changes to Chapter 14 of this renewal request from information submitted previously by the Navy and authorized by the NMFS (Table 1-1) except as where noted below.

The Office of Naval Research, Marine Mammals and Biology Program, has an ongoing research program to support basic and applied research and technology development related to understanding the effects of sound on marine mammals, including physiological, behavioral, ecological effects and population-level effects. Current program thrusts include, but are not limited to: Monitoring & Detection ; Integrated Ecosystem Research (including Sensor and Tag Development) ; Effects of sound on marine life: Hearing , Behavioral Response Studies, Physiology (Diving & Stress), Population Consequences of Acoustic Disturbance (PCAD) ; and Models and Databases for Environmental Compliance.

<http://www.onr.navy.mil/Science-Technology/Departments/Code-32/All-Programs/Atmosphere-Research-322/Marine-Mammals-Biology.aspx>

Specific Navy funded projects under the Office of Naval Research applicable to the Pacific Northwest include:

USE OF ELECTRONIC TAG DATA AND ASSOCIATED ANALYTICAL TOOLS TO IDENTIFY AND PREDICT HABITAT UTILIZATION OF MARINE PREDATORS- Daniel Costa, Barbara Block, and Patrick Robinson (University of California, Santa Cruz)

FACTORS INFLUENCING THE ACOUSTIC BEHAVIOR AND NEARSHORE RESIDENCE OF THE GRAY WHALE (*ESCHRICHTIUS ROBUSTUS*) ALONG THEIR MIGRATION ROUTE- Timothy Cowles, Kelly Benoit-Bird, and David Mellinger (Oregon State University)

IMPROVED SATELLITE-MONITORED RADIO TAGS FOR LARGE WHALES: DEPENDABLE ARGOS LOCATION-ONLY TAGS AND A GPS-LINKED ARGOS TO REVEAL 3- DIMENSIONAL BODY ORIENTATION AND SURFACE MOVEMENTS- Bruce Mate (Oregon State University, Marine Mammal Institute)

PASSIVE AUTONOMOUS ACOUSTIC MONITORING USING SEAGLIDER™- Neil Bogue, James Luby, Geoffrey Shilling, William Jump, Trina Litchendorf, David Mellinger*, Holger Klinck* (Applied Physics Laboratory, University of Washington and *Cooperative Institute for Marine Resources Studies, Oregon State University)

Future Office of Naval Research Field Efforts in the Pacific Northwest for 2012

One technology under development is the use of passive acoustic detectors deployed on unmanned underwater gliders that can be set for extended at-sea missions. A Navy funded (Office of Naval Research) glider will be tested and field validated in the offshore waters of Washington State (see *PASSIVE AUTONOMOUS ACOUSTIC MONITORING USING SEAGLIDER* above). Specifically, two Applied Physics Laboratory, University of Washington Seagliders™ each equipped with single-hydrophone passive autonomous acoustic monitoring systems, will deploy in June 2012 for a two-month marine mammal survey mission. The Seagliders will be recovered in late-July 2012 or early-August 2012 (Figure 14-1). In addition, beaked whale detectors will be run onboard these systems during the mission, and all data will be recorded for future analysis.



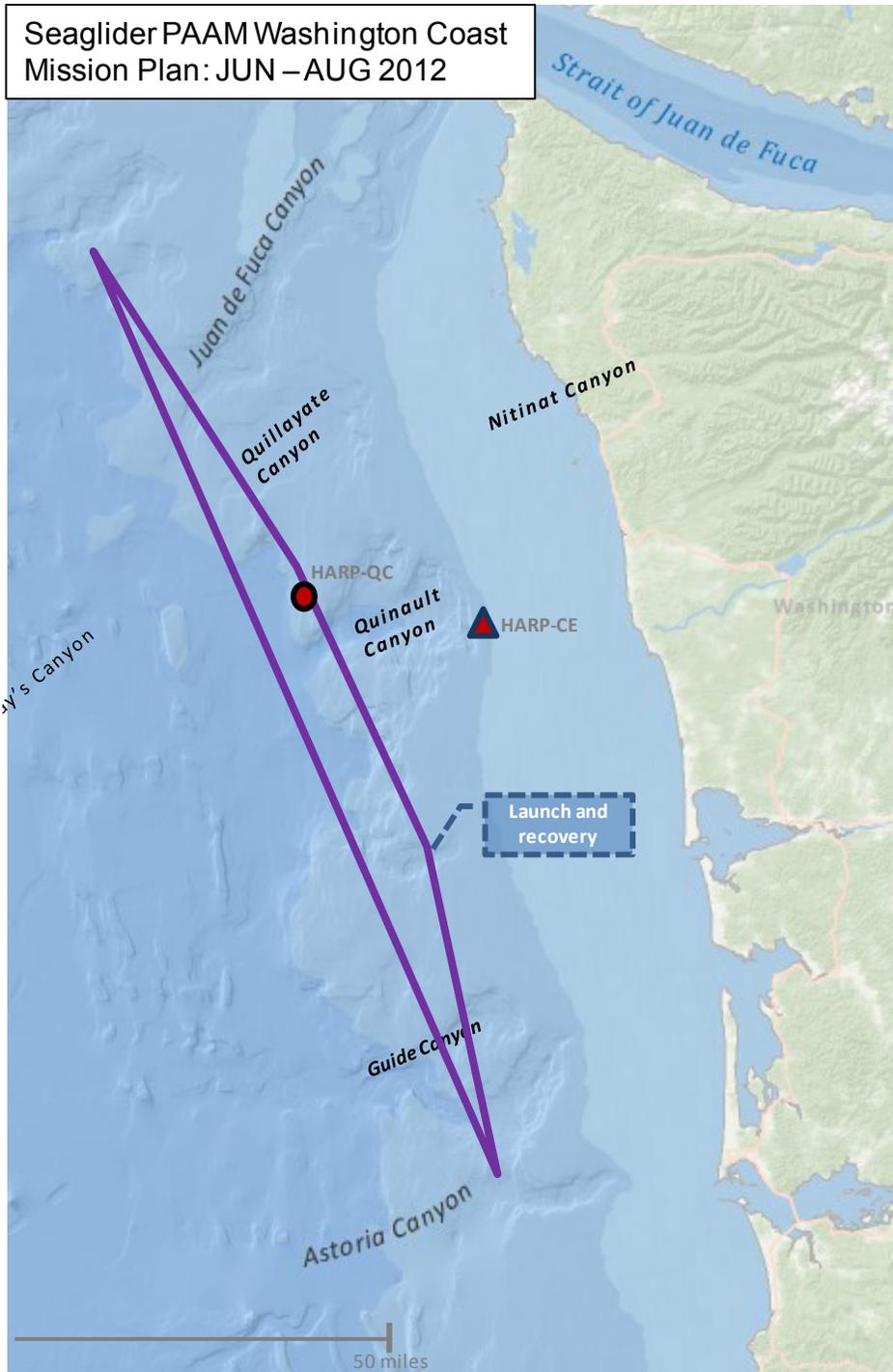


Figure 14-1. Offshore route for June to August 2012 glider deployment.
(Applied Physics Laboratory, University of Washington and Cooperative Institute for Marine Resources Studies, Oregon State University)



Other Regional Navy Funded Monitoring Efforts

The below ongoing activities are being conducted by the Navy outside of and in addition to the Navy's commitments to the National Marine Fisheries Service for the Northwest Training Range (*as discussed in Chapter 13*):

Puget Sound Pinniped Surveys: In order to better understand marine mammal presence in the Puget Sound Region, the Navy has been conducting presence/absence surveys of sea lions at known haulout sites on specific Puget Sound Navy installations, as well as opportunistic marine mammal density surveys in the waters adjacent to certain installations. Biologists located at Naval Base Kitsap at Bangor and the Puget Sound Naval Shipyard have been conducting counts of sea lions hauled out on submarines and on floating security fences. In the case of Naval Base Kitsap at Bangor, these counts are conducted daily (excluding weekends) and involve identifying the sea lions to species and counting the numbers hauled out on floating security fences and submarines. For Puget Sound Naval Shipyard, sea lion counts are collected during a monthly water quality sampling program. This information has shown seasonal use of each site, as well as trends in the number of animals using the fence. Additional Navy sites, such as Naval Station Everett, will initiate weekday surveys of the floating security fences and adjacent haulout locations (such as the floating log rafts) beginning in the summer of 2012 and continuing over subsequent years.

Marine Mammal Surveys In Hood Canal and Dabob Bay: The Navy conducted an opportunistic marine mammal density survey in Hood Canal and Dabob Bay during September and October 2011. In the Hood Canal, the surveys followed a double saw-tooth pattern to achieve uniform coverage of the entire Naval Base Kitsap at Bangor waterfront. Transects generally covered the area from Hazel Point on the south end of the Toandos Peninsula to Thorndyke Bay. Surveys in the adjacent Dabob Bay followed a slightly different pattern and generally followed more closely to the shoreline while completing a circular route through the Bay. A large exclusion zone surrounding a Navy ship moored semi-permanently in Dabob Bay made it difficult to perform zigzag transects across the bay; therefore, early attempts at surveys in Dabob did not follow a zigzag pattern, and switching to this survey pattern later in the project would have made density information collected during early "loop pattern" surveys incompatible with later data. Therefore, this loop pattern was followed during all subsequent baseline surveys in the bay. These surveys had a dual purpose of collecting marine mammal and marbled murrelet (bird species) data, and shoreline surveys tended to yield more marbled murrelet sightings. During surveys, the survey vessels traveled at a speed of approximately five knots when transiting along the transect lines. Two observers recorded sightings of marine mammals both in the water and hauled out. Marine mammal sightings data included species identification, GPS animal locations relative to vessel position, and detailed behavioral notes. Data from the line transect surveys can be used to improve estimates of marine mammal density in Hood Canal and Dabob Bay.



In summary, there were 11 survey days for Hood Canal and 10 survey days for Dabob Bay. For Hood Canal, a total of 443.5 km² (129.3 nm²) were covered during 60:13 hours of surveys. The total trackline length was 471.3 km (254.5 nm). For Dabob Bay, a total of 91.8 nm² (315 km²) were covered during 29:40 hours of surveys. The total trackline length was 211.7 nm (392.1 km).

For Hood Canal, a total of 266 sightings were made with the most commonly seen species being the harbor seal (n=197, 74 percent), followed by harbor porpoise (n=34, 13 percent) and California sea lion (n=33, 12 percent). For Dabob Bay, a total of 320 sightings were made with the most commonly seen species being the harbor seal (n=302, 94 percent), followed by the harbor porpoise (n=12, 4 percent) and the California sea lion (n=5, 2 percent). A single sighting of an unknown pinniped was also noted. Throughout Dabob Bay, harbor porpoise had the highest number of individuals seen per sighting at 2.5, followed by the harbor seal (1.5), and the California sea lion (1.4).



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