



***Gulf of Alaska Navy Training Activities:
Environmental Analysis for
Northern Edge 2015***



9 June 2015

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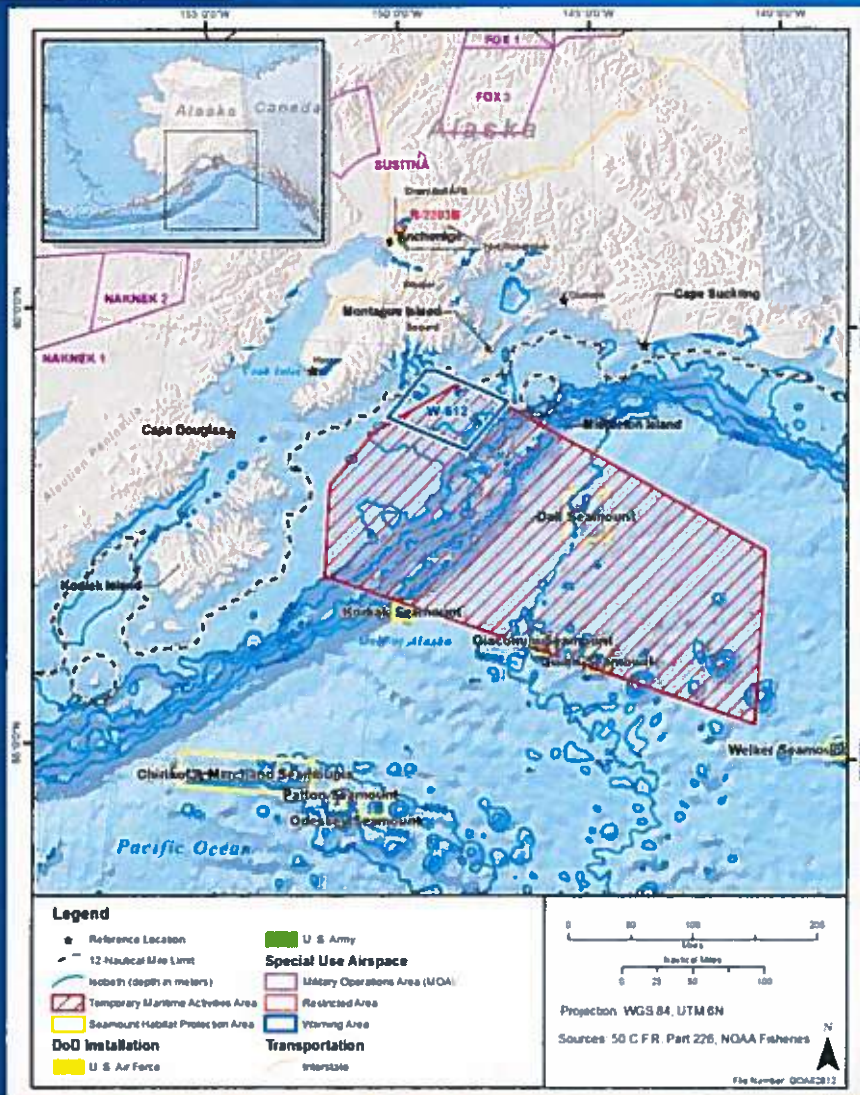
Training to Threats in Realistic Environment

- 40+ Countries have 400+ Submarines World Wide that have capabilities to use torpedoes
 - In 2010, North Korea sunk the ROKS Cheonan in an unprovoked torpedo attack that killed 46 sailors
- Must train to counter very quiet diesel submarines
 - » Use of both passive and active sonar
 - » Perishable skills that must be maintain proficiency
 - » Practice to ensure accuracy and instill confidence
- Navies have ability to lay in-water mines
 - Desperate acts of desperate regimes: Gadhafi mining harbor in 2011
- Real threats to global commerce and national security





GOA Temporary Maritime Activities Area (TMAA)



- Area established in conjunction with FAA during exercise
- Except for point near Cape Cleare on Montague Island (12 NM away), nearest shoreline (Kenai Peninsula) is 24 NM north of TMAA northern Boundary.
- Cordova is approximately 80 NM from the nearest edge of the TMAA
- Middle of TMAA is 140 NM offshore
- W-612 established for Air Force and USCG use. NO Navy training occurs in portion outside of TMAA.
- Seamounts (Yellow boxes) are noted and no SINKEX will occur around those Seamounts.



Northern Edge 2015 Overview

Training Ordnance or Expended Materials	Maximum Authorized per year in 2011 Final EIS/OEIS (for 2 events at 3 weeks each)	Northern Edge 2015 Proposed in TMAA
Bombs	360	0
Missiles	66	0
Naval Gunshells (Various Types)	26,376	1,600 (45 surface water detonations; all other inert/non-explosive)
Small Arms Rounds	11,400	2,100
Pyrotechnics	156	5 (signal flares)
Targets	94	6 ("Killer Tomato" floating target)
Sonobuoys	1,587 (80 explosive)	250 (all non-explosive)
Portable Undersea Training Range (PUTR)	7 (Anchors on Sea Floor)	0; Not Installed
Ordnance used during SINKEX (Various Types)	858	0



Environmental Planning for Northern Edge 2015

- **2011: Navy/NMFS completed Gulf of Alaska EIS/OEIS for training from 2011-2016**
 - Extensive Public Process that included:
 - Notices in Newspapers, Public Service Announcements, Stakeholder letters, Fliers (45 Locations) and Postcard mailers to **691** individuals.
 - Public Meetings (Scoping) in April 2008 - Kodiak, Anchorage and Cordova
 - Public Hearings (Draft EIS/OEIS) in January 2010 - Anchorage, Kodiak, Homer, Juneau and Cordova.
 - Public comments from **213** individuals or organizations, responses provided in the Final EIS/OEIS
- **Navy & NMFS thoroughly analyzed impacts to fish, fish habitat and fishing through following environmental review processes:**
 - Letter of Authorization/Final Rule for Marine Mammal Protection Act compliance from National Marine Fisheries Service (NMFS) (5 year)
 - Biological Opinion from NMFS for Endangered Species Act (ESA) compliance
 - Completed consultation for Essential Fish Habitat compliance with NMFS
 - Completed consultation for ESA compliance with U.S. Fish and Wildlife Service
 - Completed compliance with Coastal Zone Management Act with State of Alaska



Environmental Planning for Northern Edge 2015

- 2011 Final EIS/OEIS analyzed the impacts of maximum level of activities that could potentially be conducted in study area
- Record of Decision authorized a maximum limit
 - Agency can execute less than what is authorized under Record of Decision.
- Navy has executed less than permitted
 - 2011 – Northern Edge conducted in June under 2011 Final GOA EIS/OEIS and associated Authorizations and permits
 - 2012 – No training
 - 2013 – Cancelled due to fiscal constraints (sequestration)
 - 2014 – No training
- Northern Edge 2015 will conduct fewer activities than analyzed in the 2011 Final EIS/OEIS



Environment Considered

Resources Analyzed



- Air Quality
- Water Resources
- Airborne Sound
- Marine Plants and Invertebrates
- Fish
- Sea Turtles
- Marine Mammals
- Birds
- Cultural Resources
- Transportation and Circulation
- Socioeconomics
- Environmental Justice and Protection of Children
- Public Safety
- Cumulative Impacts

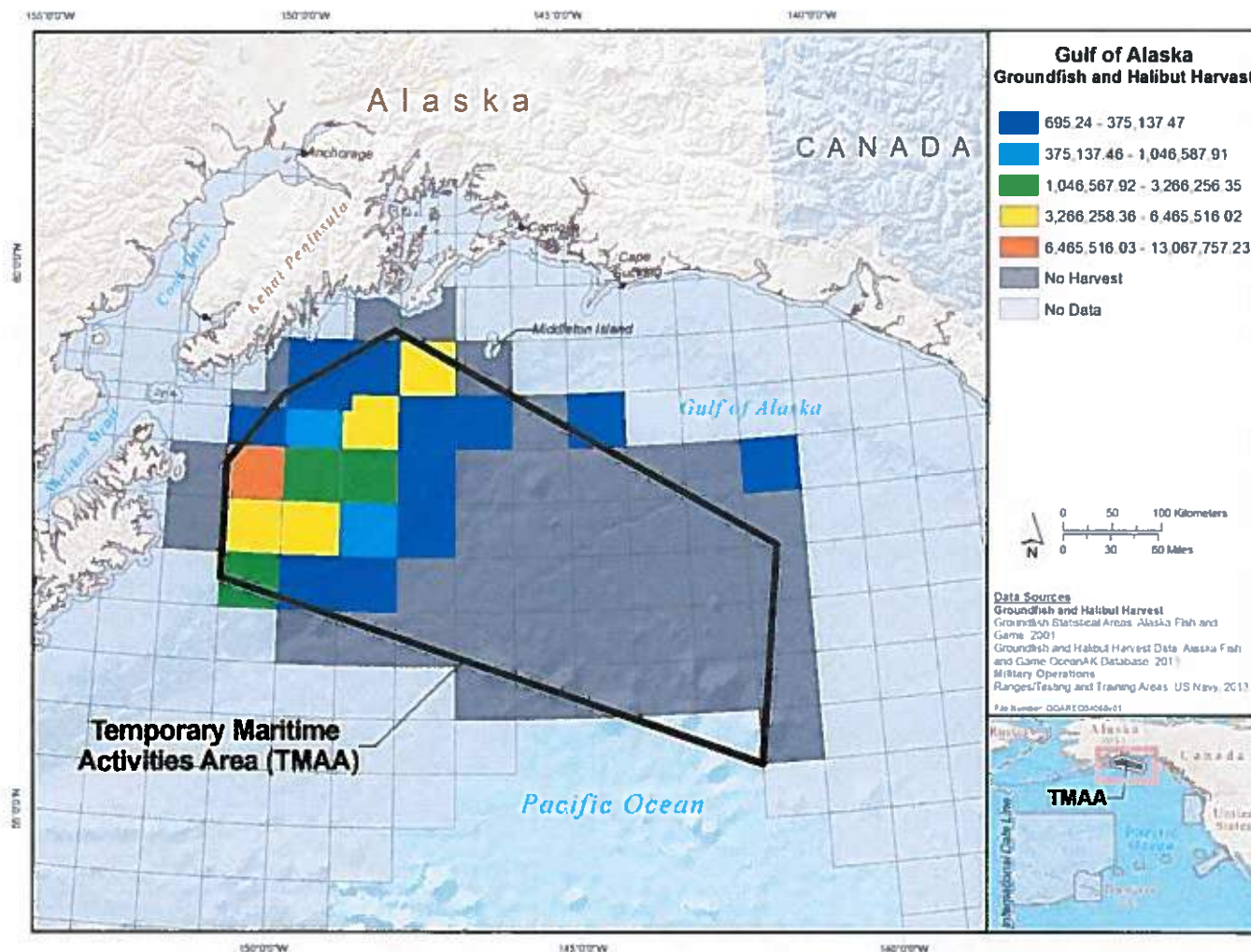


Analysis of Fish & Essential Fish Habitat

- **Three documents included fish analysis for Navy Training in GOA:**
 - 2011 Final EIS/OEIS, Essential Fish Habitat Assessment (analyzed impacts to all commercially managed fish species & their habitat), and Biological Evaluation (for ESA listed fish species that could occur in the Gulf of Alaska)
- **NMFS is required to provide non-mandatory EFH Conservation Recommendations in consultation**
- **Navy accepted 2 out of 4 of NMFS recommendations**
 - 1-Navy agreed to not conduct SINKEXs within the EFH Habitat Areas of Particular Concern
 - 2-Navy agreed to coordinate the exercises with NOAA and fisheries researchers so to not displace or effect known research activities taking place in the TMAA
- **Recommendations not carried forward:**
 - 3-Develop & implement a long-term monitoring plan addressing fate, transport, & effects of expended materials on EFH in GOA
 - 4-Develop a fish mortality reporting plan & provide a noise catalog of Navy activities



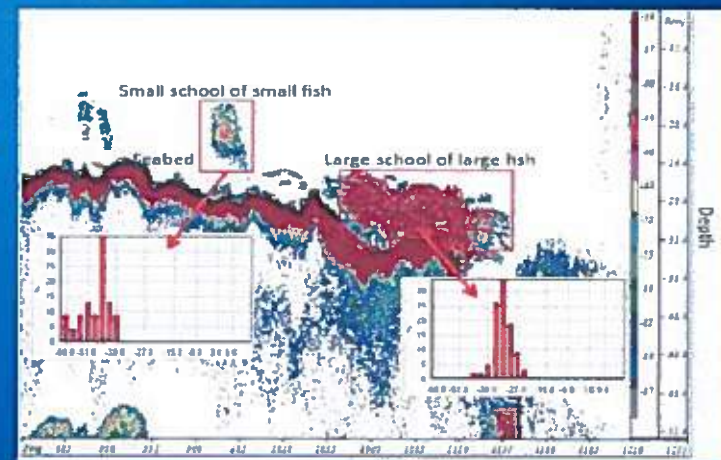
Catch Data in the Gulf of Alaska (Groundfish and Halibut)





Uses of Sonar

- **Not all sonar is created equal, different applications**
 - Navy sonar
 - Fish finders, fathometers
 - Fisheries management
 - Medical imaging (ultrasound for babies)
 - Wildlife navigation & prey detection (e.g. dolphins, bats)
- **Fisheries Scientists use active sonar to estimate fish biomass and distribution**





Fish Hearing

Generalists: majority of marine fish species



Cod



Rockfish



Salmon



Pacific Halibut

Specialists:



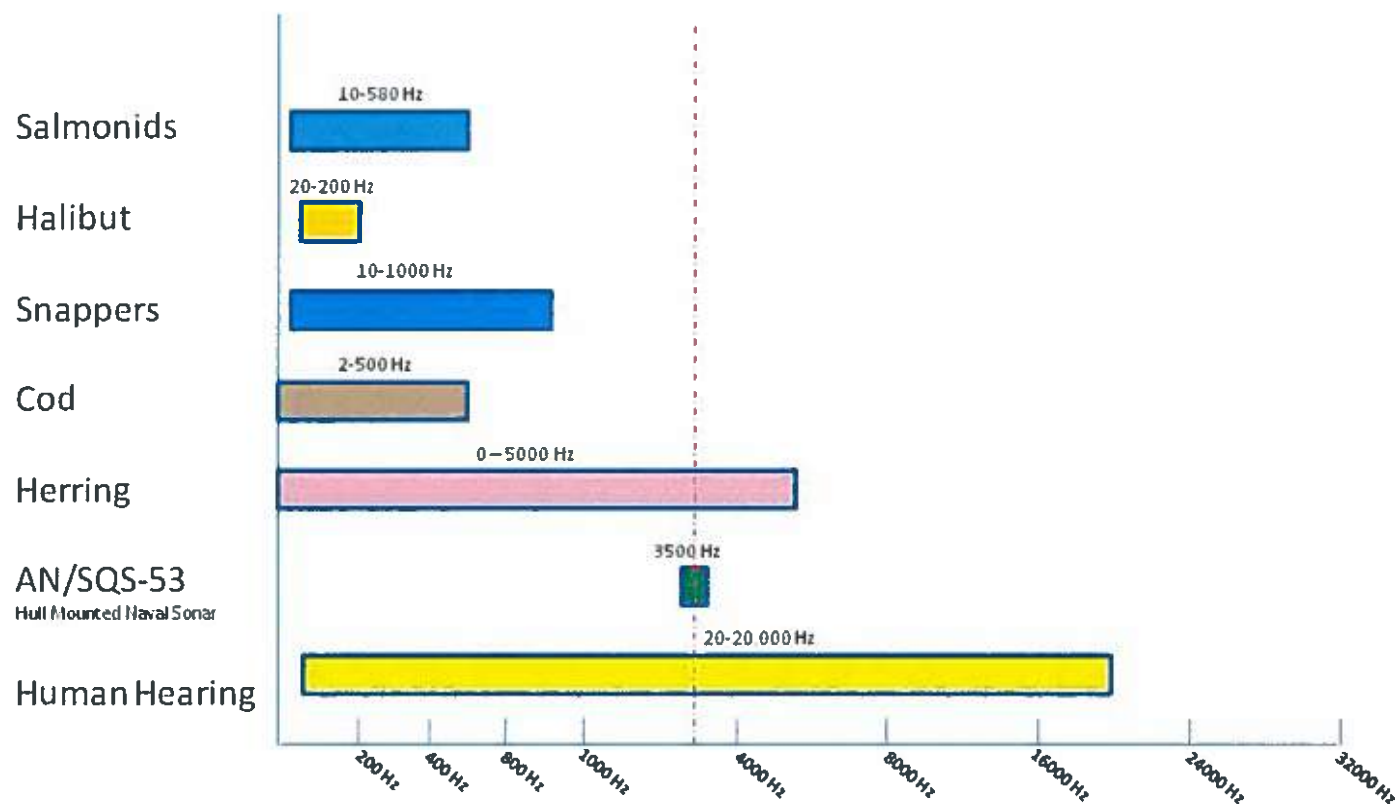
Herring

Photos courtesy of ADFG & Divernet.com



Fish Hearing & Sonar

FISH HEARING AND NAVAL SONAR





Effects of Sonar on Fish Hearing

- Studies by Dr. Arthur N. Popper and others, including the best available science, is incorporated into Navy Environmental Planning documents
- Most fish species found in the TMAA are hearing “generalists” which do not hear sound in the mid-frequency range.
- **Specialists**
 - Recent work by Silve et al. (2015) concluded that the use of naval sonar poses little risk to populations of herring even when the herring are aggregated during sonar. This is consistent with the analysis in the 2011 EIS and the current Supplemental EIS being developed.

Naval training in Alaska does not compromise productivity of fish or affect their habitat. Users of the area will see no change from past use of the area.



Effects of Sound on Fish Physiology

- **No physiological effects to fish from sonar**
 - No injury to fish tissues
- **Explosives are impulsive sounds that can cause effects**
- **Effects depend on a variety of factors:**
 - Injury/Mortality only likely to occur if fish are close to sound source
 - Injury/Mortality declines with distance from source
 - Smaller fish more affected than larger fish
 - Less effects to fish without swim bladders or poorly developed swim bladders (e.g. flatfish, sablefish, lingcod, sharks, skates, rays)



Effects of Gunnery Activities on Fish in Northern Edge 2015

- **Potential for injury is only very close to the in-water explosive source**
- **Gunnery explosion occurs from surface to 3 feet subsurface**
- **Only fish at the surface to 3 feet subsurface may be exposed to sounds from gunnery activities**
- **Fish deeper in water column or at seafloor would not be affected by these activities**



Analysis of Impacts from Military Expended Materials

- **As conservative estimate from the analysis of maximum activities presented in the 2011 FEIS, concentration of military expended materials (MEM) would be 4.9 items per nm²**
 - More than **91%** of these items would be gunshells and small caliber rounds
 - Except for rounds from small arms, this MEM use would occur in deep water well off the shelf
- **Research since 2009 at deep-water munition disposal sites in the Hawaiian Islands.**
 - Conclusions are that munitions have less of an effect on the environment than previously thought. Specifically, the concentrations of these metals were not significantly higher at underwater WWII discarded military munitions sites as compared to control sites
 - Munitions were providing habitat for "hard substrate species" that would not have otherwise colonized the area
 - No measurable bioaccumulation of munitions-related chemicals for the species sampled
- **Studies and assessments at marine areas used for decades (SOCAL, Hawaii, Nanoose (BC), Hood Canal (WA), Dahlgren (VA), Chesapeake Bay, Vieques (PR)) show no significant impacts to the environment or aquatic life from long term use of various MEM**



Fish Mitigation & Monitoring

- Must understand the potential effects of sound on fish to determine whether mitigation is necessary
- Best way to determine the degree of mitigation required is to understand how various sound levels affect fish
- Determining effects of sounds on fish requires controlled studies
 - Known sound source, propagation characteristics, received level at the fish, external & internal exam (in a lab by scientists)
 - Navy has funded acoustic propagation studies of underwater detonations in Atlantic and Pacific projects
- Mitigation is not always necessary
- Analysis in 2011 Final EIS/OEIS indicates that the effects on fish from training in the GOA TMAA are minimal (Northern Edge 2015 even smaller than level analyzed in EIS/OEIS)



Analysis of Impacts from Sonar to Marine Mammals

- **Since 2006, scientific monitoring and research completed in and around ocean areas in the Atlantic and Pacific oceans where the Navy has been training and testing**
 - Before, during, and post-exercise surveys by independent aerial and shipboard observers
 - Behavioral response studies
 - Marine mammal surveys and passive acoustic monitoring
 - Tagging studies
- **In general, the findings include:**
 - Numbers of marine mammals present on Navy ranges has increased over time
 - Recovery of some species (ESA de-listing) inhabiting training areas
 - Documented presence and site fidelity of species and long-term residence by individual animals of some species
 - Use of training and testing areas for breeding and nursing activities by multiple species



Questions ?



Additional/Backup Slides



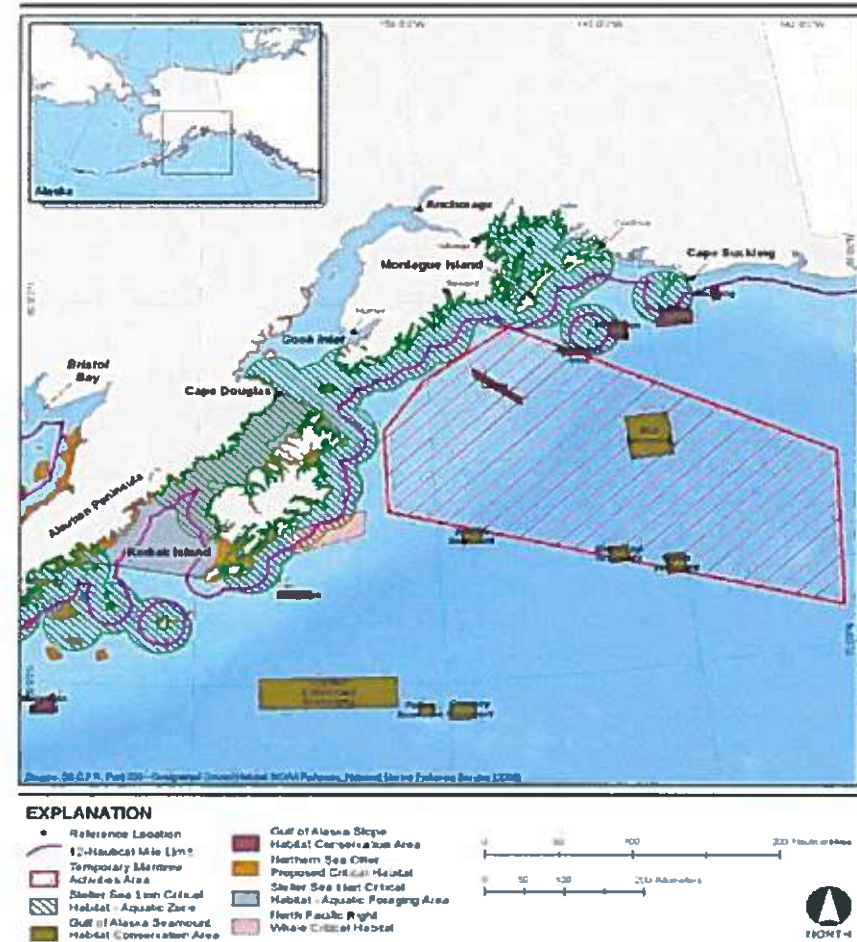
Mitigation Measures - General

- **All Participants (Ships, aircraft, small boats) receive direction for environmental considerations while conducting Northern Edge**
 - Required completion of NMFS-Approved Marine Species Awareness Training
 - Lookouts receive extensive training as watch standers and training in most effective scanning methodology and means for quick communication if marine species are spotted
 - Ships make use of marine species detection cues and information to limit interaction to maximum extent possible consistent with safety of ship
 - When underway, at least two lookouts with binoculars on surface vessels; at least one on surfaced submarines.
 - Big Eye" (20x110) binoculars used to assist detection
 - In transit, vessels use extreme caution and proceed at safe speed to avoid collision with marine animals and to ensure can stop according to prevailing circumstances
 - Vessel maneuver to keep at least 500 yards away from any observed whale and avoid approaching head-on
 - Ships have discharge restrictions for plastics, garbage and other discharges incidental to ship operation.



Mitigation Measures-General

- Aircraft shall conduct and maintain surveillance for marine mammals and report to Aircraft Control Unit to disseminate information to ships in vicinity
- **Avoidance of Critical Habitat of Stellar Sea Lions in the GOA**
 - Aircraft ensure comply with minimum aircraft elevations (3,000 feet above terrestrial zone of each rookery/haul out)
 - Not hover or take action to cause marine mammals to change behaviors
- **Reporting of any marine mammal incidents**
- **Required NMFS report post-exercise of all sightings, use of sonar**





Mitigation – Northern Edge 2015 Activity Specific

- **Measures during Anti-Submarine Warfare using Mid-Frequency Active Sonar**
 - 3 watch standers observing the water surface around vessel + 2 additional Lookouts
 - Must report all objects/disturbance in water
 - » Trash, Marine mammals, Periscope, Surface disturbance, Discoloration
 - If using passive acoustic sonar, must monitor for vocalizations and report detections to be disseminated
 - Use all available sensors and optical systems (night vision goggles) to aid in detection
 - Sonobuoy deployment – only deploy passive capability when marine mammal detected within 200 yards.
- **Safety Zone implemented when marine mammals detected by Aircraft or Ship lookouts**
 - » **Within 1,000 yards of sonar dome-** limit active transmission at least 6 dB below normal operating level until seen to leave 1,000 yard area, not detected 30 minutes, or ship transited more than 2,000 yards from detection
 - » **Within 500 yards of sonar dome-** limit active transmission at least 10 dB below normal operating level until seen to leave 500 yard area, not detected 30 minutes, or ship transited more than 2,000 yards from detection
 - » **Within 200 yards of sonar dome-** active sonar transmission shall cease. Not resume until animal seen to leave 200 yard safety zone and then apply above as required, not detected 30 minutes, or ship transited more than 2,000 yards from detection.
 - Prior to start up or restart of active sonar, operators check that Safety Zone radius is clear of marine mammals.



Mitigation – Northern Edge 2015 Activity Specific

- **Surface to Surface Gunnery**

- 600 yard radius buffer established around intended target
- To conduct event: Buffer zone must be visible and no marine mammals within target area and buffer zone
- Trained lookouts survey buffer zone prior to commencement and during exercise
- Towed Target- lookout; if marine mammal sighted then firing vessel is notified to suspend until clear.
- Detection of Birds- if within 700 yards of target area, exercise must be delayed.
 - » Only resume after 30 minutes birds are not re-sighted or observed to move outside 700 yard safety buffer or exercise relocated outside.

- **Surface to Air Gunnery**

- Orient geometry of gunnery exercise to prevent debris in area of sighted marine mammals
- Expedite attempt to recover parachute deploying aerial targets to reduce potential for entanglements
- Towed targets- lookout; if marine mammal sighted then firing vessel is notified to suspend until clear.
- Detection of Birds- if within 700 yards of target area, exercise must be delayed.
 - » Only resume after 30 minutes birds are not re-sighted or observed to move outside 700 yard safety buffer or exercise relocated outside.



Mitigation – Northern Edge 2015 Activity Specific

- **Small Arms Training**
 - Lookouts survey for marine mammals
 - No firing in direction of known/observed marine mammals
- **Deployment of Non-Explosive Devices**
 - 200 yard radius exclusion zone where no marine mammals visible



Post Exercise Reporting & Monitoring

- **Exercise Report (Unclassified and Classified) Submitted to NMFS includes:**
 - Exercise information
 - Marine mammals sighted and Mitigation measures applied
 - Summary of hours of sonar used and cumulative impact report
 - Information on any SINKEX conducted
 - Summary of Improved Extended Echo Ranging Sonobuoy events
 - Summary of Explosives used
- **Annual Monitoring Reports Submitted to NMFS between 2011-2014**
 - Deployment of Passive Acoustic Monitoring devices
 - » 2011-12- **two** devices
 - » By 2013-2014- **five** High-frequency Acoustic Recording Packages (HARPs) deployed to gain 33,706 hours over 1,404 days
 - » 2014-2015- **two** devices and Ocean Glider Deployment (Jun/July 2015)
- <http://www.navy-marine-species-monitoring.us/reading-room/pacific/>

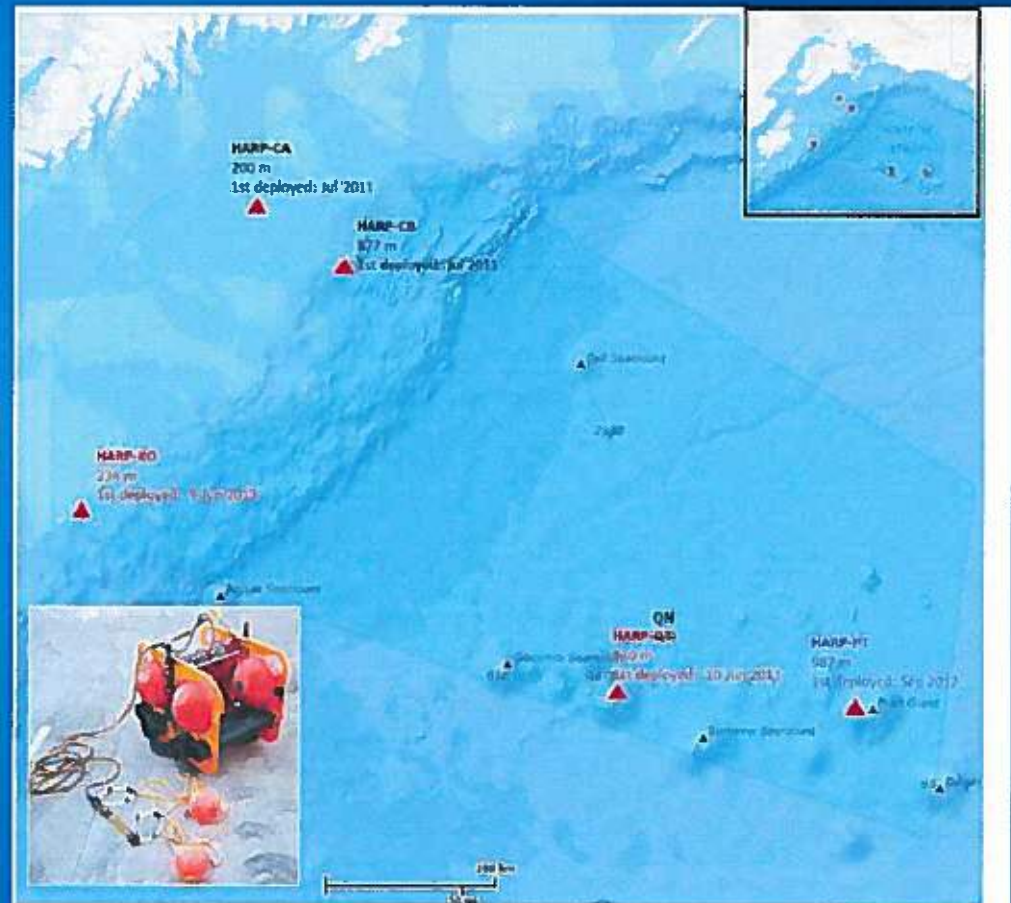


Figure 1. Location of five Navy funded HARPs in the Gulf of Alaska 2013-2014. (Picture of HARP courtesy of J. Hildebrand, Scripps Institute of Oceanography; site "QN" originally mislabeled "QT" in original figure)



Environmental Planning for Navy Training in Gulf of Alaska – 2016 - future

- **Supplement to Gulf of Alaska Navy Training Activities EIS/OEIS in progress**
 - No changes to Proposed Action or alternatives evaluated in 2011 EIS/OEIS
 - Supplement is reviewing the analysis/findings from all resource areas from 2011 EIS/OEIS with focus on areas where there has been new relevant information, most particularly marine mammals.
 - » Incorporation of Best Available Science is ongoing
 - » Most other resource area analysis/conclusions remain unchanged, but all areas are being reevaluated
- **Draft Supplemental EIS/OEIS released August 2014**
 - Public meetings held in Kodiak, Anchorage, Homer, Juneau and Cordova in September 2014
- **Final Supplemental EIS/OEIS projected in early 2016**
 - Currently still in development
 - 30 day Wait period prior to Record of Decision
- **Record of Decision anticipated April 2016**