Point Mugu Sea Range Annual Monitoring and Activity Report, July 2022 – July 2023

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For

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

3-D	3-dimensional
ASL	above sea level
ATAR	Autonomous Terrestrial Acoustic Recorder
B807	Building 807
B809	Building 809
CFR	Code of Federal Regulations
cm	centimeter
dB	decibel
dBA	decibel, A-weighted, to emphasize mid-frequencies and to de-emphasize low and high frequencies to which human (and pinniped) ears are less sensitive
F	Fahrenheit
FOV	field of view
ft	feet
FLIR	Forward Looking Infrared
hr	hour
Hz	Hertz
IHA	Incidental Harassment Authorization
in	inches
kg	kilogram
kHz	kilohertz
km	kilometer (1 km = 3281 ft, 0.62 mi, or 0.54 n.mi)
kts	knots or nautical miles per hour
lb	pounds
LOA	Letter of Authorization
m	meter
mi	mile
min	minute
mm	millimeter
MMPA	Marine Mammal Protection Act
M_{pa}	Frequency weighting appropriate for pinnipeds in air (see Gentry et al. 2004; Southall et al. 2007)
NAWCWD	Naval Air Warfare Center Weapons Division
nm	nautical miles
NMFS	National Marine Fisheries Service
PTS	Permanent Threshold Shift
rms	root mean square (a type of average)
s	second
SEL	sound exposure level
SEL-A	A-weighted sound exposure level
SEL-M	M_{pa}-weighted sound exposure level
SNI	San Nicolas Island
SPL	sound pressure level
SPL-f	flat-weighted sound pressure level
TTS	Temporary Threshold Shift
µPa	micropascal

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EXECUTIVE SUMMARY

The U.S. Navy's Point Mugu Sea Range holds a Letter of Authorization (LOA) issued by the National Marine Fisheries Service (NMFS) for the period of July 7, 2022 through July 6, 2029 (Appendix A, 87 FR 408888). The LOA allows for the 'take by harassment' of California sea lions (*Zalophus californianus*), Pacific harbor seals (*Phoca vitulina*) and northern elephant seals (*Mirounga angustirostris*) resulting from missile launches on San Nicolas Island (SNI), California, an island owned and managed by the Navy. Past IHAs and Letters of Authorizations (LOAs) allowed for disturbance of seals and sea lions (pinnipeds) for missile launches from SNI from July 2001 through June 2022 (66 FR 41834, 67 FR 56271, 68 FR 52132, 74 FR 26580, 79 FR 32678, 84 FR 28462, 85 FR 38863, 86 FR 32372). In addition to authorizing the missile launches from SNI, the LOA also authorizes testing and training activities identified as air warfare; electronic warfare; and surface warfare for explosives and vessel use within the special-use air and sea surface space of the PMSR. This report summarizes activities and observations for the monitoring period from July 2022 through July 2023 under the 2022 LOA (87 FR 40888), which is valid from July 2022 through July 2029.

SNI Missiles Launched

From July 2022 through July 2023, five (5) missiles (aerial targets) were launched from SNI representing three (3) launch events[1]. All five (5) of these missiles crossed over SNI's shoreline on the western end of the island.

Explosive Sources Used

From July 2022 through July 2023, explosives were expended from 9 permitted explosive bins within the 36,000 square nautical miles of special-use air and sea surface space of the PMSR. The explosive bin quantities used during this period were well below the allowable limits for each bin and affects from expended explosives did not exceed allowable take levels above Level A Harassment (permanent threshold shift) or Level B Harassment (behavioral or temporary threshold shift).

Monitoring Equipment deployed during Missile Launches

Up to three unattended time-lapse cameras were set up to monitor pinnipeds at different sites near the missile launch trajectory.

Estimated Numbers of Pinnipeds Affected

For each launch, the species and number of pinnipeds affected was estimated using the time-lapse camera photos. When appropriate, extrapolations of the number of pinnipeds affected were made when the field of view of the camera did not include the entire beach being monitored.

Only pinnipeds that moved more than 10 meters or entered the water were counted as being behaviorally "taken" for the purposes of this permit. Take number were assumed based on comparing the number of pinnipeds observed in images taken prior to the launch event to images taken immediately after the launch event. There was no evidence of pinniped injuries, fatalities or pup abandonment related to the monitored launches during this or any other monitoring period since 2001.

Approximately 328 California sea lions, 2 Pacific harbor seals and 3 northern elephant seals were estimated to be "taken" at monitoring sites during the July 2022 through July 2023 monitoring period. These figures are approximate and may include instances where the same individuals were counted more

[1] Multiple missiles fired in rapid succession (e.g. 3-5 seconds apart) are considered one launch event.

than once at different times and/or different days. These estimates correspond to an average rate of 109.3 sea lions, 0.67 harbor seals and 1 elephant seals affected per launch event at all monitored reference sites.

The data collected during this monitoring period and pinniped monitoring data collected at SNI since 2001 suggest that any effects of the launch operations were minor, short-term, and localized. It is not likely that any of the pinnipeds on SNI were adversely affected by behavioral reactions to missile launches from the island.

The types of missiles launched during this monitoring period were the same as those launched in previous years and the missile sound levels have been monitored and recorded at least three times in previous monitoring reports (U.S. Navy 2020, Burke 2017, Ugoretz 2015, Ugoretz 2014, Ugoretz 2013, Holst et al. 2011). Only one launch site was used during this reporting period, which has been used in all previous reporting periods since 2001.

1. MONITORING PROGRAM AND MISSILE LAUNCHES

1.1 Monitoring Program

San Nicolas Island (SNI) is located approximately 65 miles (m) (~100 kilometers (km)) from the mainland coast of southern California (Fig. 1.1). Missiles were launched from one of two land-based launch complexes on the western part of SNI. Building 807 (B807) Launch Complex is located on the west end of SNI, approximately 35 feet (ft) (11 meters [m]) Above Sea Level (ASL), and the Alpha Launch Complex is located approximately 625 ft (190.5 m) ASL on the west-central part of SNI (Fig. 1.2). The missiles pass over or near pinniped haul-out sites located around the northwestern periphery of SNI. The pinniped species that commonly occur on SNI include California sea lions (*Zalophus californianus*), Pacific harbor seals (*Phoca vitulina*) and northern elephant seals (*Mirounga angustirostris*).

The U.S. Navy holds a Letter of Authorization (LOA) issued by the National Marine Fisheries Service (NMFS) for the period of July 7, 2022 through July 6, 2029 (Appendix A, 87 FR 40888). The LOA allows for the 'take by harassment' of California sea lions, Pacific harbor seals and northern elephant seals, resulting from missile launches on San Nicolas Island (SNI), California, an island owned and managed by the Navy. Past IHAs and LOAs allowed for disturbance of seals and sea lions (pinnipeds) for missile launches from SNI from July 2001 through June 2022 (66 FR 41834, 67 FR 56271, 68 FR 52132, 74 FR 26580, 79 FR 32678, 84 FR 28462, 85 FR 38863, 86 FR 32372).

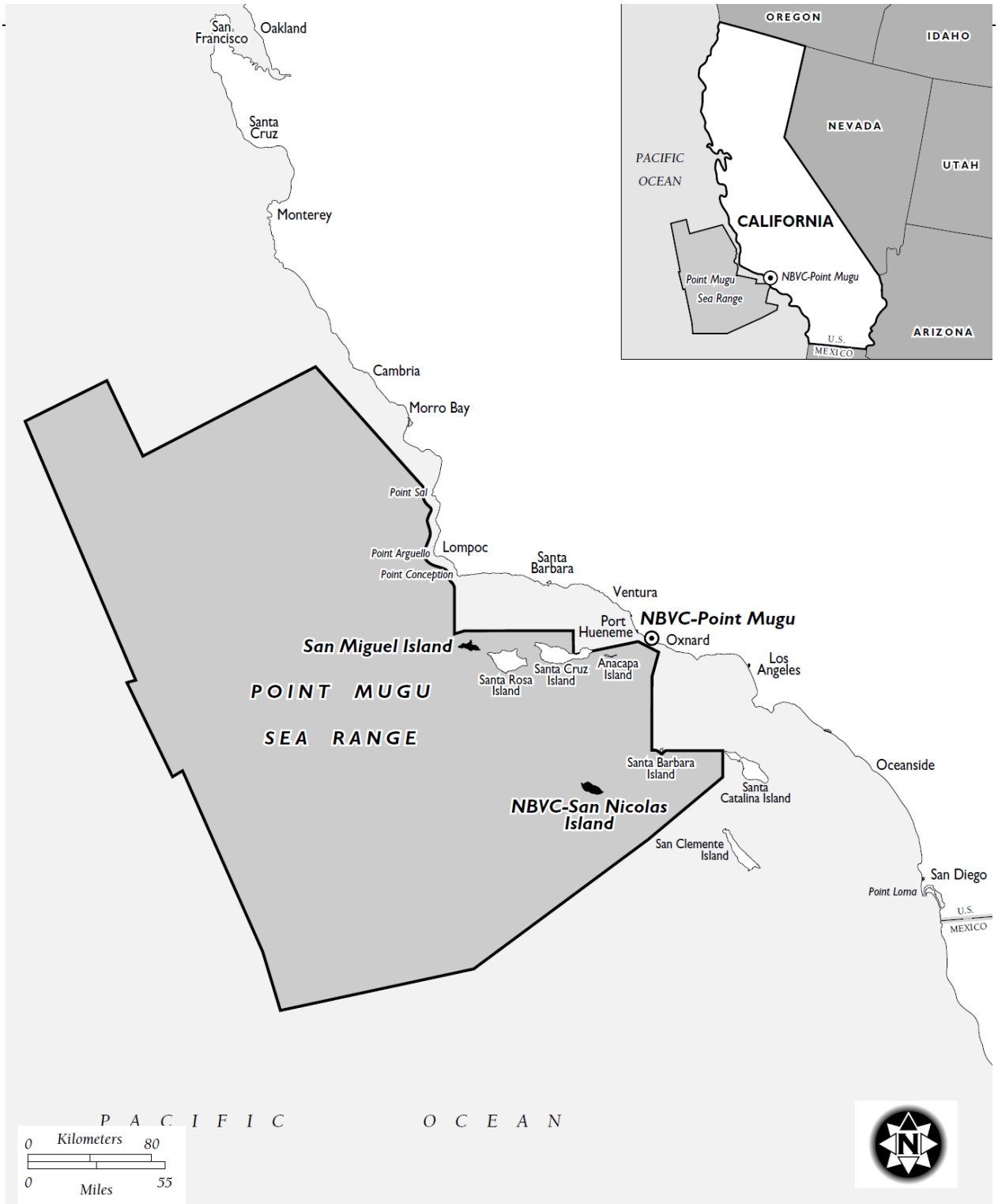

FIGURE 1.1. Regional site map of the Point Mugu Sea Range and San Nicolas Island, California

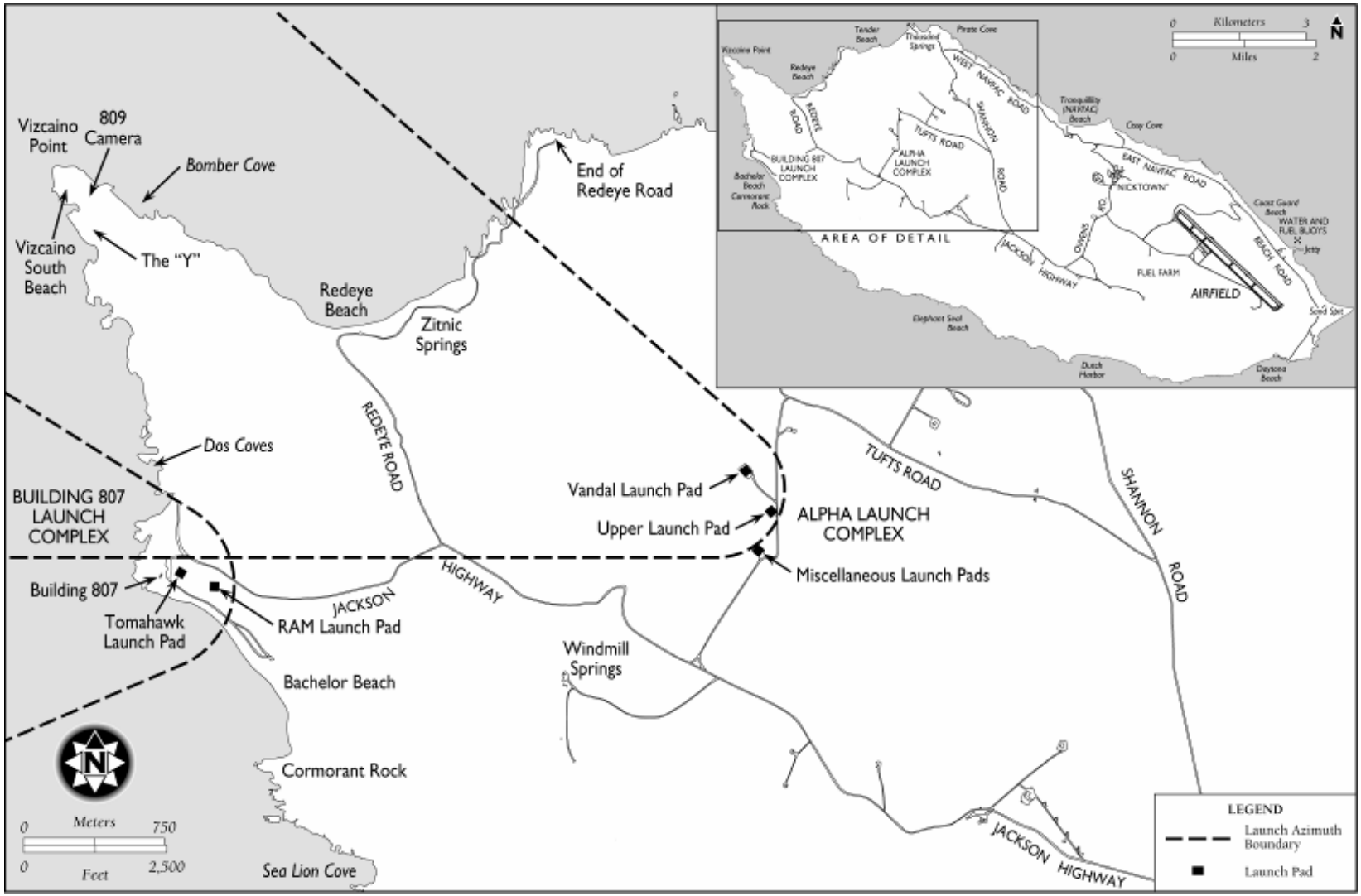

FIGURE 1.2. Map of San Nicolas Island, California, and the general launch azimuths (dashed lines) for each launch complex. These launch azimuths are typical, although occasionally launch paths could pass outside these boundaries.

As a result of the Navy's 2022 7-year LOA, the provisions to monitor missile launches and their affects to pinnipeds hauled-out on SNI no longer require the Navy to monitor every launch event with acoustic and video equipment. The pinniped species monitored on SNI remained the same as those monitored in past reports.

Past monitoring plans required that, for all missile events at SNI, simultaneous autonomous audio recording of launch sounds and video recording of pinniped behaviors occur. The acoustic monitoring, using Autonomous Terrestrial Acoustic Recorders (ATARs), recorded the sound levels observed from the haul-out locations and measured for Temporary Thresholds Shift (TTS) and Permeant Threshold Shift (PTS) in pinnipeds exposed to the launch sound. The visual monitoring was observed with video camera recorders capturing video of pinniped behaviors before, during and after the launch event at the same haul-out sites as the ATAR devices. Additional information regarding the acoustic and visual monitoring methods used in pervious monitoring reports can be found in the 2021-2022 San Nicolas Island monitoring report (U.S. Navy 2022).

In consultation with NMFS, the PMSR developed a monitoring plan using time-lapse cameras to analyze for potential long-term affects to pinniped abundance from launch events. The new monitoring plan requires the Navy to continue monitoring pinniped disturbance during launch events from SNI by either using the time-lapse cameras for old launch events[2] or video and acoustic equipment for new launch events[3]. The new monitoring plan presented to NMFS was approved in April 2023 and continues to be updated and improved through the adaptive management process as it continues to be implemented. Because the new monitoring plan was recently approved, this report will not present results on the long-term pinniped abundance analysis, instead this report will summarize the launch events, take numbers and sources used during the 2022-2023 monitoring period.

During the 2022-2023 monitoring period, three launch events occurred from San Nicolas Island. All of the pinniped take numbers were evaluated using time-lapse cameras as all the launch events had been monitored at least three times in the past.

1.1.1 Time-Lapse Cameras

Three time-lapse cameras were located at three different haul-out sites around SNI. The time-lapse camera locations do not rotate to different haul-out sites as they are constantly collecting images for long-term pinniped abundance analysis. The three stationary haul-out sites were carefully selected, among other pinniped haul-out sites around the island, as representative sites for sensitive pupping and molting seasons for all three pinniped species: California sea lion, Pacific harbor seal, and northern elephant seal.

Objectives of the time-lapse camera monitoring included:

1. Identify and document any change in behavior or movements that occurred at the

[2] Old launch events are launches from San Nicolas Island that have been video and acoustically monitored for at least three times.

[3] New launch events are launches from San Nicolas Island that have not been video and acoustically monitored for at least three times.

time of the launch event;
2. Quantify the number of pinnipeds and pinniped behavior minutes after to an hour after the launch event;
3. Ascertain periods or launch conditions when pinnipeds are most and least responsive to launch activities; and
4. Document number of pinnipeds disturbed by launch events and any evidence of injury or mortality associated with an event.

1.2 "Take" Estimates

The monitoring program for the missile launches on SNI was designed, in part, to provide data necessary to estimate the number of pinnipeds "taken" by launches and the manner in which they were affected. For military readiness activities, the MMPA defines harassment as:

"1) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild; or, (2) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered." [10 USC Ch. 631§7235]

In this report, consistent with previous monitoring reports, the Navy and NMFS agreed that only those animals that met the following criteria count as "taken" by launches:

1. Pinnipeds injured or killed during launch events, if any[4] (e.g., by stampedes);
2. Pinnipeds exposed to launch sounds strong enough to cause TTS or PTS; or
3. Pinnipeds that left the haul-out site, or exhibited prolonged movement[5] or behavioral changes (such as pups separated from mothers) relative to their behavior immediately prior to the launch.

No pinnipeds are known to have been injured or killed since the launch monitoring began in August 2001, and few, if any, are believed to have received sounds strong enough to elicit TTS or PTS (Holst, et al. 2011). Thus, the number of pinnipeds counted as potentially "taken" during the 2022-2023 monitoring period was based on criterion 3 above: The number that left the haul-out site, or exhibited prolonged movement or other behavioral changes relative to their behavior immediately prior to the launch. Following NMFS guidance [2002], subtle behavioral reactions persisting for only a few minutes are considered unlikely to have biologically significant consequences for the pinnipeds. Pinnipeds that move into the water or greater than 10 m (33 ft) along the beach are considered to have been behaviorally "taken" (by Level B Harassment).

[4] Note that the LOA issued to the Navy did not allow for injury or mortality. Any evidence of injury or mortality of pinnipeds associated with a launch event was to be reported to NMFS and conditions of the permit would be reevaluated.

[5] Prolonged movement, for the purpose of the monitoring and this report, "prolonged movement" is defined as one or more animals moving in a directed manner either more than 10 m (33 ft) onshore or moving any distance from the shore and entering the ocean.

1.3 Launch Dates and Information

From July 2022 through July 2023, five (5) missiles (aerial targets), two of which were "dual launches", were launched from SNI representing three (3) launch events[6] (Table 1.1). All five (5) of these missiles crossed over SNI's shoreline on the western end of the island.

TABLE 1.1. Launch data for July 2022 through July 2023.

Launch Date	Launch Time (local)	Number of Missiles	Launch Complex	Pinniped Monitoring Locations		
07/18/2022	11:13	Single Launch (1)	Alpha	Dos Coves	Red Eye West	Phoca Reef
07/19/2022	11:35	Dual Launch (2)	Alpha	Dos Coves	Red Eye West	Phoca Reef
11/18/2022	10:34	Dual Launch (2)	Alpha	Dos Coves	Red Eye West	Phoca Reef

[6] Multiple missiles fired in rapid succession (e.g. 3-5 seconds apart) are considered one launch event.

2. PINNIPED BEHAVIOR DURING MISSILE LAUNCH EVENTS

2.1 Introduction

Three species of pinnipeds are common on SNI beaches – California sea lion, Pacific harbor seal, and northern elephant seal. No other pinniped species were observed at monitoring sites during this or previous monitoring periods since August 2001 (Ugoretz 2016, Ugoretz 2015, Holst et al. 2011).

California sea lions often show startle responses to launches and movement along the beach. In most cases, sea lion behavior returns to pre-launch levels within seconds or minutes following the launches (Holst et al. 2011). Behavior as well as numbers of sea lions hauled-out several hours after a launch appears similar to the behavior and numbers observed before a launch.

In contrast, Pacific harbor seals often react strongly to launch sound. They commonly leave their haul-out sites to enter the water. Early monitoring reports suggested that harbor seals did not return to a haul-out site for several hours or the next tide cycle (Holst et al. 2011). Holst and Lawson (2002) noted that the behavior and numbers of Pacific harbor seals hauled-out on the day following a launch were similar to those on the day of the launch. Focused monitoring of Pacific harbor seals during the 2020-2021 monitoring period indicated that harbor seals can return to their haul-out site within minutes of a launch (U.S. Navy 2021). Distribution and abundance of harbor seals at the sites monitored were strongly influenced by the height of the tide.

Northern elephant seals are often startled by missile launch sounds but have otherwise shown little or no reaction to missile launches. During this monitoring period, elephant seals were present on many of the monitored haul-outs along with other species and were included in the camera's field of view. Elephant seal reactions were similar to those in the past (generally no movement or very minor movement down the beach) reconfirming their relative lack of reaction to missile launches.

2.2 Visual Field Methods

Time-lapse cameras were added to the monitoring effort during the 2020-2021 monitoring period and remained in use for the 2021-2022 monitoring period and were fully incorporated into the monitoring plan for the 2022-2023 monitoring period. Previously, the time-lapse cameras were used as an alternative method to measure pinniped disturbance when the video cameras either failed, due to technical difficulties, or lens fouling obstructed accurate take counts. The time-lapse camera systems included a Canon Rebel single lens reflex camera housed in a Pelican case and mounted onto a tripod. A solar panel and light sensor allowed for the cameras to be continuously deployed capturing photos during all daylight hours. Photos were captured in intervals of one to five minutes. The time-lapse cameras were deployed at locations overlooking haul-out sites. Prior to each launch event, the time-lapse camera lens was cleaned and the capture interval was changed from five minutes (the normal capture interval for long-term monitoring) to one minute to capture the launch event.

2.2.1 Time-Lapse Analysis

Images taken from the time-lapse cameras were analyzed and classified for age class and pinniped species using the off-the-self DotDotGoose[7] platform created by the American Museum of Natural History. The images were reviewed by an experienced biologist on a high-resolution color monitor. The images one minute before, immediately after/during and minutes to an hour after each launch event were analyzed for pinniped take numbers, general behavioral observations, and age class (adult or pup - where determinable). Because the images were taken at intervals of every one minute, there was limited confidence in determining if specific individuals in one image were the same individuals in the following image. In result, assumptions were made to estimate the pinniped take numbers.

Assumptions:

1. Take numbers were calculated by taking the difference between the numbers of individuals observed in the image captured 1 minute before the launch event to the numbers of individuals observed immediately after/during the launch event.
2. If the numbers of individuals observed in the image immediately after/during the launch event was less than the numbers of individuals observed in the image 1 minute prior to the launch event, than it is assumed that those individuals entered the water and are considered to be taken.
3. If the numbers of individuals observed in the image immediately after/during the launch event was more than the numbers of individuals observed in the image 1 minute prior to the launch event than it is assumed that those individuals moved more than 10 meters from a location not in the field of view to a location in the field of view.

2.2.2 Image Perimeters

For all three haul-out locations, the time-lapse camera's field of view stayed stationary year-round with the entire beach within the field of view. Two of the three haul-out locations had additional surrounding haul-outs in the background of the image. Accurate classification could only be performed for the pinnipeds hauled-out on the beach as opposed to pinnipeds in the distant surrounding areas. To ensure the same area was counted for each analysis, perimeters were outlined for two (Figure 2.1 and Figure 2.2) of the three haul-out sites. The third haul-out site had no surrounding distant haul-outs in the field of view. Only pinnipeds within these perimeters were classified and counted for take numbers.

[7] DotDotGoose platform: https://biodiversityinformatics.amnh.org/open_source/dotdotgoose/

Figure 2.1. Dos Coves Perimeter. Pinnipeds were counted and classified by age class and sex for take numbers within the red perimeter outline.

Figure 2.2. Redeye West Perimeter. Pinnipeds were counted and classified by age class and sex for take numbers within the red perimeter outline.

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2.3 Descriptions of Pinniped Behavior during Specific Launches

The following are brief summaries of the observations made from viewing the time-lapse data collected at monitoring sites during the 2022-2023 monitoring period.

2.3.1 Launch from Alpha: July 18, 2022 (1113hrs)

- **Dos Coves**
    - 1 minute prior to the launch event: The entire beach was within the field of view of the camera with approximately 241 sea lions and 2 elephant seals hauled-out on the beach. The majority of the sea lions were pups and all of the pinnipeds appeared to be resting/laying on the beach.
    - Immediately after/during the launch event: All the pinnipeds on the beach seemed to have had a startle response, their heads were all lifted and they were all standing compared to their pervious laying down position. There were only 231 sea lions still on the beach and still 2 elephant seals in the field of view. Ten (10) sea lions were assumed to be taken.
    - 1 hour after the launch event: The majority of animals on the beach were resting/laying down with a few sea lion pups and adult sea lions walking around. There were 265 sea lions with the majority being sea lion pups and 2 elephant seals on the beach.
- **Red Eye West**
    - 1 minute prior to the launch event: The entire beach was within the field of view of the camera with approximately 350 sea lions and no elephant seals on the beach. All of the sea lions were resting on the rocks surrounding the water.
    - Immediately after/during the launch event: All of the animals had their heads up and seemed to have had a startle response in response to the launch event. There were only 302 sea lions still on the beach and it is assumed that 48 sea lions went into the water and were taken.
    - 1 hour after the launch event: The majority of the pinnipeds were resting on the rocks at the water's edge with a few resting on the sand above the rocks. There were 331 sea lions and no elephant seals in the field of view.
- **Phoca Reef**
    - This reef was used exclusively by harbor seals. At the time of the launch, the entire reef was exposed. No harbor seals were hauled-out on the reef before, during or 1 hour after the launch event.

2.3.2 Launch from Alpha: July 19, 2023 (1135hrs)

- **Dos Coves**
    - 1 minute prior to the launch event: The entire beach was within the field of view of the camera. Approximately 60 adult sea lions, 152 sea lion pups and 1 elephant seal were observed on the beach prior to the launch event. About half of the animals were resting on the beach and the other half were either walking around or standing with their heads up.

- Immediately after/during the launch event: All of the animals were standing with their heads up as if they were startled in response to the launch noise. There were a total of 230 sea lions in the field of view and 2 elephant seals. In this image there were 18 more sea lions and 1 more elephant seal than in the image taken 1 minute before the launch event. It is assumed that these additional animals moved from a location outside the field of view to a location within the field of view, meaning that they most likely moved more than 10 meters. Eighteen (18) sea lions and 1 elephant seal were taken.
- 1 hour after the launch event: The majority of all the pinnipeds were resting near the water's edge on the beach. Some territorial male sea lions are seen standing, surrounded by female sea lions. There were 44 adult sea lions, 136 sea lion pups and 2 elephant seals observed hauled-out on the beach.

- **Red Eye West**
  - 1 minute prior to the launch event: All of the pinnipeds on the beach were located on the rocks at the water's edge. There were 198 adult sea lions, 131 sea lion pups and no elephant seals hauled-out.
  - Immediately after/during the launch event: It appeared that all the animals that were previously resting on the beach were now standing with their heads up as if they were startled by the launch noise. There were 65 adult sea lions and 189 sea lion pups in the field of view. It seemed that 133 adult sea lions entered the water in response to the launch event and about 58 sea lion pups moved from a location outside the field of view to a location within the field of view. In total there were 191 sea lions assumed taken.
  - 1 hour after the launch event: All of the animals on the beach appeared to be resting at the water's edge by the rocks. There were approximately 131 adult sea lions, 107 sea lion pups and no elephant seals.

- **Phoca Reef**
  - 1 minute prior to the launch event: This reef was used exclusively by harbor seals. This reef was entirely exposed during the time of the launch. Approximately 2 harbor seals were hauled-out on the reef right before the launch.
  - Immediately after/during the launch event: Both harbor seals entered the water after the launch event and there were no harbor seals hauled-out on the reef.
  - 1 hour after the launch event: There were 7 harbor seals hauled-out on the reef.

2.3.3 Dual Launch from Alpha: November 18, 2022 (1034hrs)

- **Dos Coves**
  - 1 minute prior to the launch event: The entire beach was within the field of view of the camera. The lens was fouled and made it extremely difficult to see the animals or correctly identify them. There were approximately 107 sea lions and 27 elephant seals hauled-out on the beach prior to the launch.
  - Immediately after/during the launch event: It appeared the animals responded to the launch noise by lifting their heads from a previous resting position. There were only 70 sea lions still hauled-out on the beach after the launch event. There were a total of 37 sea lions taken and no elephant seals taken.

- 1 hour after the launch event: As the day went on, the lens fouled so much that it was almost impossible to count the number of pinnipeds hauled-out on the beach. There were more than 100 pinnipeds hauled-out.

- **Red Eye West**
  - 1 minute prior to the launch event: There was some fouling on the camera lens, making it difficult to classify some of the distant pinnipeds. The majority of the animals were located resting near the water at the bottom of the sand hill. There were also about 100 cormorants also resting at the bottom of the sand hill. There were about 50 sea lions and 29 elephant seals in the field of view.
  - Immediately after/during the launch event: All the animals that were resting at the bottom of the sand hill were now standing and located on the rocks right by the water. There were only 26 sea lions and 27 elephant seals so it is assumed that 24 sea lions and 2 elephant seals were taken by entering into the water.
  - 1 hour after the launch event: All of the animals were still located on the rocks by the water's edge. There were 52 sea lions and 27 elephant seals hauled-out on the beach.

- **Phoca Reef**
  - This reef was used exclusively by harbor seals. This reef was entirely exposed during the time of the launch. There were no harbor seals hauled-out before, during or 1 hour after the launch event.

3. IMPLEMENTATION OF MITIGATION MEASURES

Table 3.1 provides a summary of the mitigation measures that were specified by NMFS in the LOA, and how they were implemented during the July 2022 through July 2023 monitoring period.

TABLE 3.1. Implementation of mitigation measures.

Mitigation Measure	Implementation
Personnel must not enter pinniped haul-outs. Personnel may be adjacent to haul-outs prior to and following a launch for monitoring purposes.	Personnel on San Nicolas Island were prohibited from entering pinniped haul-out areas. Monitoring personnel cleaned and accessed the time-lapse cameras near haul-outs without disturbing pinnipeds.
Missile must not cross over pinniped haul-outs at [altitudes] less than 305 meters (m) (1000 feet).	No missiles crossed over pinniped haul-outs at less than 1000 feet.
The Navy may not conduct more than 10 launch events at night.	No launches were conducted at night during this period
Launches must not occur February through April, to the maximum extent practicable.	Zero (0) launch events were conducted between February and April during this monitoring period.
Launches must be limited January through February and June through July, to the maximum extent practicable.	No launch events were conducted January through February. There were 2 launch events conducted June through July. The female sea lions and pups reacted to launches but there was no indication of pup abandonment or mortality.
All aircraft and helicopter flight paths must maintain a minimum distance of 305 m from recognized seal haul-out and rookeries, to the maximum extent practicable.	All aircraft maintained a minimum distance of 305 meters from recognized seal haul-out and rookeries.
For a species for which authorization has not been granted, or for a species for which authorization has been granted but authorized takes are met, the Navy must consult with NMFS before the next launch event.	No species for which authorization was not granted (e.g. Guadalupe fur seal, Steller sea lion) was observed during this period. Authorized take for other species not met.
The Navy must review launch procedure and monitoring methods, in cooperation with NMFS, if any injuries or mortality of a pinniped are discovered during post-launch surveys, or if surveys indicate possible effects to the distribution, size or productivity of the affected pinniped populations as a result of the specified activities.	No injured or dead pinnipeds were observed in post launch observations during the monitoring period. No evidence of effects to the distribution, size or productivity of affected pinniped populations.

4. TOTAL ESTIMATED NUMBERS OF PINNIPEDS "TAKEN"

Table 4.1 summarizes the estimated "take" estimates for each launch event and monitoring location. Table 4.2 compares estimated "take" estimates with the estimated take allowed in the 2022-2023 LOA.

TABLE 4.1. Estimated number of pinnipeds affected by launches July 2022 - July 2023

Date/Time Location	Monitoring Locations	Species	Observed	Reacted[8]	Percent Reacted	Multiple[9]	Total
07/18/2022 1113hrs Alpha	Dos Coves	Sea Lion	241	10	4%	1	10
		Elephant Seal	2	0	0%	1	0
	Red Eye West	Sea Lion	350	48	14%	1	48
	Phoca Reef	Harbor Seals	0	0	0%	1	0
07/18/2022 1135hrs Alpha	Dos Coves	Sea Lion	212	18	8%	1	18
		Elephant Seal	1	1	100%	1	1
	Red Eye West	Sea Lion	329	191	58%	1	191
	Phoca Reef	Harbor Seal	2	2	100%	1	2
11/18/2021 1034hrs Alpha	Dos Coves	Sea Lion	107	37	35%	1	37
		Elephant Seal	27	0	0%	1	0
	Red Eye West	Sea Lion	50	24	48%	1	24
		Elephant Seal	29	2	7%	1	2
	Phoca Reef	Harbor Seal	0	0	0%	1	0

[8] "Reacted" defined as an animal moving more than 10 meters and/or entering the water.

[9] A multiplier of greater than 1 was applied when the entire monitored area was not within the field of view of the camera. During this monitoring period, all monitoring sites had the entire monitored area within the field of view of the video camera.

TABLE 4.2. Comparison of July 2022 through July 2023 estimates with LOA allowances for pinniped disturbance

Species	Total Reactions observed	Average/event (3 events)	LOA Average/event	LOA Maximum/year (40 events)
CA Sea Lion	328	109.3	275	11,000
N. Elephant Seal	3	1	0.61 (1)	40
P. Harbor Seal	2	0.67	2.39 (3)	120

SUMMARY

There was no evidence of pinniped injuries or fatalities related to launch noises or other launch operations was evident, nor was it expected based on past measurements and observations. It is also unlikely that any pinnipeds were exposed to received levels of sound energy above levels at which TTS or PTS would occur.

In total, 328 California sea lions, 2 Pacific harbor seals and 3 northern elephant seals are estimated to have been "taken" during the July 2022 through July 2023 monitoring period. These figures are approximate, because they (a) may count some of the same individuals more than once, and (b) exclude pinnipeds on beaches that were not monitored. The pinnipeds included in these estimates are assumed to have entered the water in response to the launch or are assumed to have moved more than 10 meters immediately after a launch through time-lapse camera photo analysis.

The results from the July 2022 through July 2023 monitoring period (and those from previous monitoring periods) suggest that any effects of the launch operations were minor, short-term, and localized. On many of the haul-out locations during this monitoring period, the pinniped numbers hauled-out on the beach 1 hour after the launch event were comparable or higher to the number of pinnipeds hauled-out prior to the launch event. It is not likely that any of the pinnipeds on SNI were adversely affected by such behavioral reactions.

These results are supported by continuing population increases of pinnipeds on SNI. Counts of all three species of pinnipeds have significantly increased on SNI over the past three decades (Barlow, et al., 1997; Fluharty, 1999; Le Boeuf, et al., 1978; Lowry 2002; Lowry and Maravilla, 2005; Lowry, et al., 1996, 2008, 2017, 2020, 2021). This includes increases in pinniped counts in the portions of the island closest to the missile launch trajectories.

5. ANNUAL PMSR STUDY AREA TRAINING AND TESTING ACTIVITY FOR EXPLOSIVE SOURCES

Each year, the Navy is required to submit a detailed explosive sources activity report PMSR (Annual Training and Testing Activity Report) to the Director, Office of Protected Resources, NMFS, within 3 months after the one-year anniversary of the date of issuance of the LOA. The annual report must contain the following information on all sound sources used. The annual report must also contain both the current year's data as well as explosive use quantity from previous years' reports. Since this is the first year of reporting under the 2022 LOA and Final Rule, this report is only provides annual amounts for the 2022 - 2023 reporting period. For this year, the Navy is well within the 2022 LOA permitted allocations for explosive expenditures in the reporting period.

Summary of sources used. This section of the report includes the following information summarized from the authorized sound sources used in all training and testing events:

i. Total annual quantity (per the LOA) of each explosive bin; and

ii. Total annual expended/detonated ordnance (missiles, bombs, *etc*.) for each explosive bin.

Table 5.1. PMSR Permitted and Actual Expenditures for the 2022-2023 Permit Period for Explosives Detonating At or Near the Surface

Bin	Number of Explosive Munitions	
	Permitted Expenditures	Actual Expenditures
E1	28,600	612
E3	5,530	251
E5	1,666	104
E6	104	3
E7	64	36
E8	71	24
E9	63	23
E10	13	0

SUMMARY

Unlike past permits issued by NMFS to the PMSR, this LOA covered at-sea testing and training activities for air warfare, electronic warfare and surface warfare with the use of explosives and vessels on the PMSR, in addition to launch events occurring from SNI. In result, the PMSR was required to annually report a summary of explosive sources used. During this 2022-2023 monitoring and reporting period, the total annual quantity of each explosive bin is well below the allowable amount for each bin. Additionally, the LOA authorized incidental take of marine mammals for Level A and Level B Harassment on the PMSR. Based on all the data collected throughout this monitoring period, there is no evidence of any dead, injured or live stranded marine mammals or ship strikes as a result of the testing and training activities that had occurred on the PMSR.

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United States Navy intern, Isha Patel, analyzed time-lapse camera photos and collected data for this report.

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APPENDIX A:
LETTER OF AUTHORIZATION
07 JULY 2022 – 08 JULY2029