

**APPLICATION FOR A FIVE-YEAR PROGRAMMATIC PERMIT  
FOR SMALL TAKES OF  
MARINE MAMMALS INCIDENTAL TO  
LAUNCHING OF SPACE LAUNCH VEHICLES,  
INTERCONTINENTAL BALLISTIC AND SMALL MISSILES,  
AND AIRCRAFT AND HELICOPTER OPERATIONS AT  
VANDENBERG AIR FORCE BASE, CALIFORNIA**

*Submitted to:*

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

*and*

NOAA National Marine Fisheries Service  
Southwest Regional Office  
501 West Ocean Boulevard  
Long Beach, CA 90802-4213

*Submitted by:*

United States Air Force  
30th Space Wing – 30 CES/CEA  
1028 Iceland Avenue  
Vandenberg Air Force Base, CA 93437-6010

*Prepared by:*



MARINE MAMMAL CONSULTING GROUP, INC.

Marine Mammal Consulting Group  
389 North Hope Avenue  
Santa Barbara, CA 93110-1572

*and*



Science Applications International Corporation (SAIC)  
5464 Carpinteria Avenue, Suite K  
Carpinteria, CA 93013

August 2013

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## a. Executive Summary

Vandenberg Air Force Base, California (VAFB) in Santa Barbara County is submitting an application to renew an “Application for a Five-Year Programmatic Permit for Small Takes of Marine Mammals Incidental to Launching of Space Launch Vehicles, Intercontinental Ballistic and Small Missiles, and Aircraft and Helicopter Operations.” “Take,” as defined in the Marine Mammal Protection Act, may occur, but it is not expected to exceed “Level B.”

This application is further intended to incorporate an Incidental Harassment Authorization previously issued to VAFB “tenant” organization the United Launch Alliance (ULA), and also incorporate renewed activities at two facilities that have not been used in several years, Space Launch Complex 4 (operated by Space Exploration Technologies, Inc. or “SpaceX” and Test Pad 01. With these additions, there will be five active missile launch facilities and six active space launch facilities on the 99,000 acre installation. Launch frequency is expected to not exceed 15 missile and 35 rocket launches per year of the five-year period. Activities the Air Force is incorporating into this application from ULA are described and analyzed in appendix A of the application.

Numerous monitoring and effects minimization measures are included within the application. The following species and number of individual marine mammals may be affected as a result of all VAFB activities, including government and tenant actions:

Pacific harbor seals (*Phoca vitulina richardsi*) – 400 maximum animals at VAFB 200 maximum animals at NCI, plus 27 affected by actions from ULA. A maximum 627 animals as a result of all activities described in this application.

California sea lions (*Zalophus californianus*) – 300 animals at VAFB, 9000 at NCI and 129 by ULA. A maximum of 9429 animals as a result of all activities described in this application.

Northern elephant seals (*Mirounga angustirostris*) – 100 at VAFB, 1500 at NCI and 24 by ULA. A maximum of 1624 animals as a result of all activities described in this application.

Steller sea lions (*Eumetopias jubatus*) – 36 at VAFB, 0 at NCI and 24 by ULA. A maximum of 60 animals as a result of all activities described in this application.

Northern fur seal (*Callorhinus ursinus*) – 0 on VAFB, 1250 on NCI and 0 from ULA. A maximum of 1250 from as a result of all activities described in this application.

Guadalupe fur seal (*Arctocephalus townsendi*) – 0 on VAFB, “few” on NCI and none by ULA. An indeterminate, but very low number of animals affected as a result of all activities described in this application.

# 1 Operations with Potential to Result in Incidental Takes

*Note:* Each of the 14 items required by the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) for authorization requests is included as a bulleted topic at the beginning of each section. Some sections include more than one bulleted item. This was done in response to NOAA’s request to reduce the size of submittal documents.

- Detailed description of specific activity or class of activities expected to result in incidental taking of marine mammals.

Vandenberg Air Force Base (VAFB), 30th Space Wing, operates the base itself, which is in California, and its associated Western Range (Section 2; Figure 1). VAFB supports launch activities for the U.S. Air Force, Department of Defense, National Aeronautics and Space Administration, and commercial contractors. It is the main west coast launch facility for placing commercial, government and military satellites into polar orbit on expendable, unmanned launch vehicles, and for the testing and evaluation of intercontinental ballistic missiles (ICBMs) and sub-orbital target and interceptor missiles. In addition to space vehicle and missile launch activities at VAFB, helicopter and aircraft operations involve search-and-rescue, delivery of space vehicle components, launch mission support, security reconnaissance, and training flights.



Figure 1. VAFB and the Western Range

The following sections describe the launch vehicles and aircraft that have the potential to incidentally take marine mammals. Launch vehicles may disturb pinnipeds with launch noises, sonic booms, and at close range, the sight of the vehicles being launched. Aircraft that are noisy and/or flying at low altitudes can also disturb pinnipeds. Such impacts have been measured and monitored many times at VAFB over the past 20 years, resulting in some 100 reports by numerous qualified, independent researchers. These reports, covering from 1991 through 2011, were recently reviewed and summarized in two documents (MMCG and SAIC 2012a).

## 1.1 Space Vehicle Launches

There are currently six active facilities at VAFB used to launch satellites into polar orbit (Table 1). These facilities support launch programs for the Atlas V, Delta II, Delta IV, Falcon 9, Minotaur, and Taurus. The Falcon 9 has not yet been launched from VAFB, but the first launch is scheduled for September 2013. Various booster and fuel packages can be configured to accommodate payloads.

**Table 1. Space Launch Vehicles (Rockets) and Nearest Haul-out Sites**

| Rocket   | Facility | Nearest Pinniped Haul-out | Distance from Nearest Haul-out |
|--|----------|---------------------------|--------------------------------|
| Atlas V  | SLC-3E   | North Rocky Point         | 9.9 km                         |
| Delta II   | SLC-2W   | Purissima Point           | 2.3 km                         |
| Delta IV and Delta IV Heavy  | SLC-6    | North Rocky Point         | 2.3 km                         |
| Falcon 9   | SLC-4E   | North Rocky Point         | 8.2 km                         |
| Minotaur   | SLC-8    | North Rocky Point         | 1.6 km                         |
| Taurus   | LF-576E  | Spur Road                 | 0.5 km                         |
| Abbreviations:<br>SLC = Space Launch Complex; LF = Launch Facility; E = East; W = West |          |                           |                                |

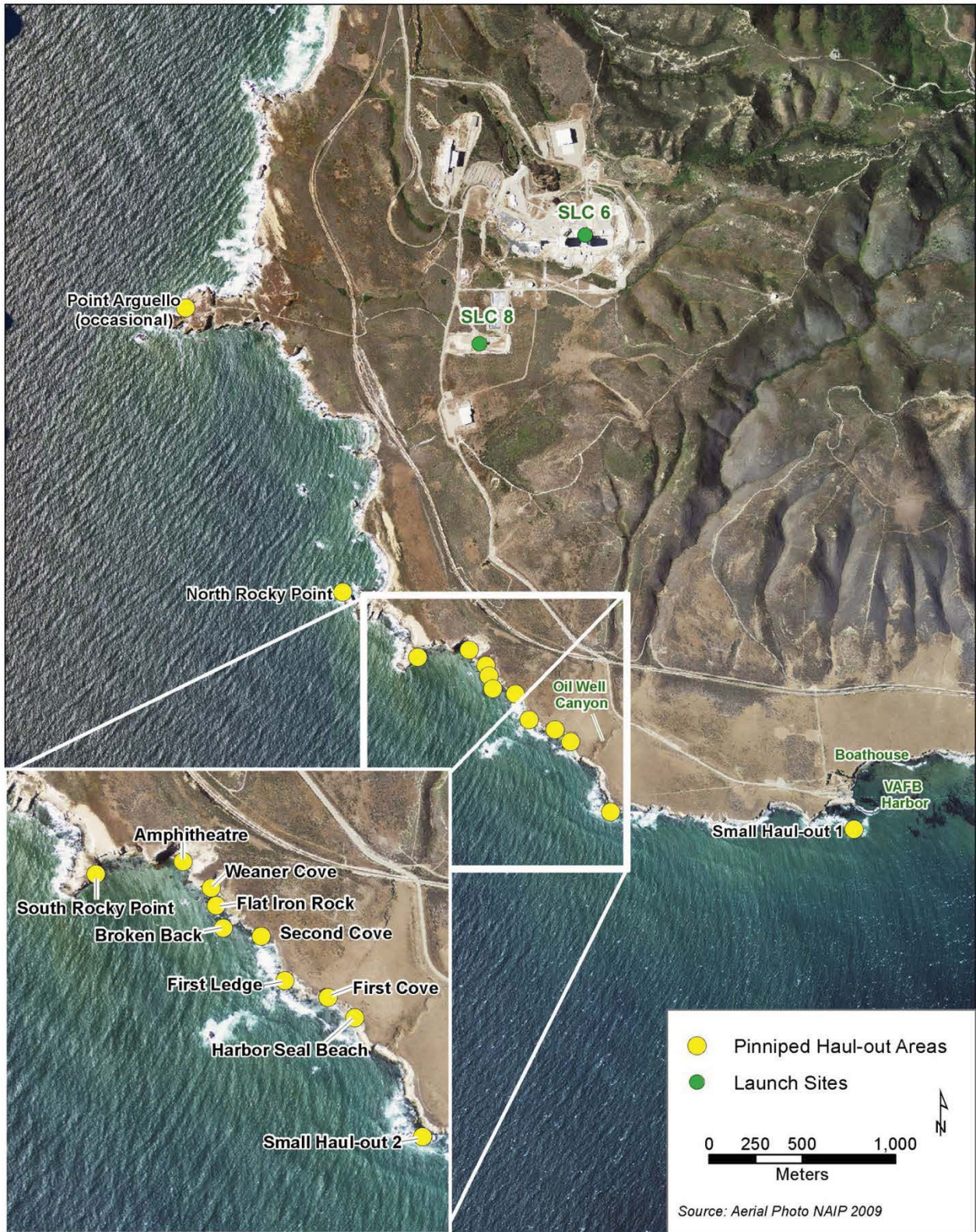
The location of the launch sites in relation to specific pinniped haul-out and rookery areas at VAFB is shown in Figures 2 and 3. On figure 2, launch complexes 3 and 4-E are both about 5.5 kilometers north of SLC-6 (additional figure available upon request). Recorded sound levels are shown in Table 2.

## 1.2 ICBM and MDA Launches

A variety of small missiles is launched from various facilities on north VAFB, including the Minuteman III, an Intercontinental Ballistic Missile (ICBM) which is launched from underground silos. In addition, several types of interceptor and target vehicles are launched for the Missile Defense Agency (MDA). The MDA develops various systems and elements, including the Ballistic Missile Defense System (BMDS).

The BMDS test plans, including those involving tests from VAFB, are subject to constant change as the BMDS is being developed. Thus, it is difficult for the MDA to predict its launch schedule or number of launches over the next five years. However, due to test resource limitations, MDA does not envision conducting more than three missile tests per quarter (on average) over the next five years from VAFB, and none of the missiles would be larger than the Minuteman III. This limitation (three missiles per quarter and none being larger than the Minuteman III) can be used to establish the extent of potential impacts from MDA testing at VAFB over the next five years.

The primary missile programs and types are described above, but others may be implemented before this permit expires. The Air Force would notify NMFS of any new missile programs that would be implemented at VAFB. Completely new types of missiles would be monitored acoustically and biologically during their first launch if this occurs outside of the harbor seal pupping season, using the NOAA-approved launch monitoring protocols for VAFB. However, configuration changes in existing missiles would only be monitored during the pupping season, as is done for all other missile launches.



**Figure 2. Launch Sites and Pinniped Haul-out Areas on South VAFB**



**Figure 3. Launch Sites and Pinniped Haul-out Areas on North VAFB**



The closest active missile launch facility to a haul-out area is LF-09, about 0.5 km from Little Sal (Figure 3). The most remote facility from any haul-out area is LF-10, about 2.7 km from Lion’s Head, another haul-out site. The trajectories of all missile launches are generally westward; thus, they do not cause sonic boom impacts on the northern Channel Islands (NCI).

Table 2: Sound levels from launches on VAFB, as measures by the digital audio tape recorder near the south VAFB marine mammal haul-out site.

| Launch Vehicle | Satellite    | Launch Complex | Launch Date | Dist. to Haul-out (km) | TSEL (dB) | CSEL (dB) | ASEL (dB) | TPeak (dB) | Lmax (dB) |
|----------------|--------------|----------------|-------------|------------------------|-----------|-----------|-----------|------------|-----------|
| Delta IV       | DMSP-17      | SLC-6          | 4-Nov-06    | 2.7                    | 131.3     | 127.5     | 111.3     | 129.0      | 102.6     |
| Titan IV       | B-34         | SLC-4E         | 5-Oct-01    | 8.5                    | 130.2     | 124.2     | 104.5     | 125.0      | 100.6     |
| Athena II      | Ikonos-1     | SLC-6          | 27-Apr-99   | 2.8                    | 127.9     | 123.7     | 107.3     | 125.6      | 99.9      |
| Delta IV       | NROL-22      | SLC-6          | 27-Jun-06   | 2.7                    | 127.7     | 122.9     | 106.2     | 130.0      | 103.1     |
| Titan IV       | B-12         | SLC-4E         | 22-May-99   | 8.5                    | 127.6     | 121.9     | 103.6     | 123.7      | 97.0      |
| Athena I       | Lewis        | SLC-6          | 22-Aug-97   | 2.8                    | 127.0     | 121.3     | 107.3     | 126.8      | 101.0     |
| Titan IV       | B-28 NRO     | SLC-4E         | 17-Aug-00   | 8.5                    | 126.8     | 119.9     | 99.0      | 123.5      | 91.5      |
| Athena II      | Ikonos-2     | SLC-6          | 24-Sep-99   | 2.8                    | 125.9     | 123.4     | 107.8     | 124.6      | 102.2     |
| Titan IV       | A-18         | SLC-4E         | 23-Oct-97   | 8.5                    | 125.9     | 119.0     | 96.6      | 121.8      | 88.2      |
| Atlas IIAS     | AC-141 Terra | SLC-3E         | 18-Dec-99   | 9.9                    | 124.2     | 113.6     | 87.3      | 120.3      | 76.4      |
| Minotaur       | MightySat    | SLC-8          | 19-Jul-00   | 2.3                    | 122.9     | 117.9     | 107.0     | 122.0      | 101.7     |
| Titan II       | G-7          | SLC-4W         | 19-Jun-99   | 8.5                    | 120.3     | 112.3     | 87.7      | 121.4      | 79.1      |
| Minotaur       | JAWSAT       | SLC-8          | 26-Jan-00   | 2.3                    | 119.4     | 116.6     | 105.4     | 125.0      | 103.4     |
| Titan II       | G-12         | SLC-4W         | 13-May-98   | 8.5                    | 119.3     | 115.0     | 95.4      | 113.0      | 85.9      |
| Delta II       | MS-9         | SLC-2          | 17-May-98   | 22.0                   | 118.1     | 103.1     | 72.4      | 113.9      | 61.8      |
| Atlas IIAS     | MLV-10       | SLC-3E         | 8-Sep-01    | 9.9                    | 118.0     | 112.1     | 88.5      | 112.6      | 80.8      |
| Titan II       | G-6          | SLC-4W         | 4-Apr-97    | 8.5                    | 116.5     | 112.4     | 88.5      | 111.3      | 76.1      |
| Titan II       | G-13         | SLC-4W         | 21-Sep-00   | 8.5                    | 116.3     | 109.6     | 83.5      | 109.5      | 74.9      |
| Taurus         | KOMPSAT      | SLC-576        | 20-Dec-99   | 20.3                   | 106.4     | 101.3     | 76.4      | 102.9      | 65.0      |

Notes: km = kilometers; TSEL = unweighted SEL; dB = decibels; CSEL = C-weighted SEL; ASEL = A-weighted SEL; Tpeak = unweighted peak sound level; Lmax = maximum fast A-weighted sound level.

### 1.3 Aircraft Operations

The VAFB airfield, located on north VAFB, supports various aircraft operations further described below. Aircraft operations include tower operations, such as take-offs and landings (training operations), and range operations such as overflights and flight tests. Over the past four years, an average of slightly more than 600 flights has occurred each year.

#### 1.3.1 Fixed-wing Aircraft Operations

Fixed-wing aircraft use VAFB for various purposes, including delivering rocket or missile components, high-altitude launches of space vehicles (e.g., Pegasus) and emergency landings. VAFB is also used for flight testing, evaluation of fixed-wing aircraft and training exercises, including touch and goes. Three approved routes are used that avoid established pinniped haul-out sites. Aircraft flown through VAFB airspace and supported by 30th Space Wing include, but are not limited to, B-1 and B-2 bombers, F-15, F-16 and F-22 fighters, V/X-22s, Unmanned Aerial Vehicles, and KC-135 tankers.

#### 1.3.2 Helicopter Operations

The number of helicopter operations at VAFB has decreased considerably since 2008 with the deactivation of the VAFB helicopter squadron. Other squadrons and units sometimes use VAFB for such purposes as transiting through the area, exercises and launch mission support. Emergency helicopter operations, including but not limited to Marine Search and Rescue and wildfire containment actions are somewhat common.

## 2 Dates, Durations and Region of Operations

- Dates, Frequency and Duration of activities and specific geographical region where they will occur.

### 2.1 Dates, Frequency and Durations of Operations

Launch and aircraft operations could occur at any time of the day or night during the period to be covered under this permit (7 February 2014 through 6 February 2019). The Air Force anticipates that no more than 15 missile and 35 rocket launches would occur in any year. This number is far higher than launch activity in previous years, but one new facility (Space Launch Complex 4) is being reactivated with intent to increase “commercial launch” activity, and Test Pad-01 is being renovated. 5 year launch activity shall not exceed 75 missile and 175 rocket launches without additional coordination with NMFS.

All launch operations would occur at VAFB, potentially resulting in launch noise and visual impacts there. Potential sonic boom impacts from space launch vehicles could occur over the NCI. Missiles are launched in a westerly trajectory and do not impact the NCI. Aircraft operations would occur only at VAFB.

### 2.2 Area of Operations

VAFB is composed of approximately 99,000 acres of land and approximately 40 miles (65 km) of coastline, all within Santa Barbara County on the southern central coast of California. From here, space vehicles are launched into polar orbits on azimuths from 147 to 201 degrees, with sub-orbital flights to 281 degrees. Missile launches are directed west toward Kwajalein Atoll in the Pacific. This over-water sector, from 147 to 281 degrees, comprises the Western Range. Part of the Western Range encompasses the NCI (Figure 1).

The NCI include San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands, and all are part of Channel Islands National Park. The waters out to six nautical miles offshore from the islands comprise Channel Islands National Marine Sanctuary. The closest part of the NCI (Harris Point, San Miguel Island) is located more than 30 nautical miles south-southeast of the nearest launch facility. Potential impacts of sonic booms from space launch vehicles launched from VAFB are a matter of concern to the regulatory agencies, particularly at San Miguel Island. Sonic booms could also impact the other three NCI, although the booms are generally less intense farther east along the chain of islands.

## 3 Marine Mammals in Operations Area

- Species and numbers of marine mammals likely to be found within the activity area.

### 3.1 VAFB

Of the six species of pinnipeds known to occur in this region, two species of pinnipeds regularly haul out at VAFB. Two other species appear to be seasonal transients, while the remaining two —both fur seals— are known along this part of the mainland coast only from strandings (MMCG and SAIC 2011a and b; 2012a and c). All six species are discussed in this section.

#### 3.1.1 Pacific Harbor Seals

Pacific harbor seals (*Phoca vitulina richardsi*<sup>1</sup>) are the most common marine mammals at VAFB. Harbor seals generally remain within 20 or 30 nautical miles from their haul-out sites, which consist of offshore

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<sup>1</sup> The subspecies *richardsi* is sometimes spelled *richardii*. We use the most common spelling.

rocks or reefs, and sandy or cobblestone coves. Occasional journeys of some 300 nautical miles have been recorded in some parts of California (Carretta *et al.* 2011).

There are 12 harbor seal haul-out sites on south VAFB. The position of these sites in relation to various Space Launch Complexes (SLCs) is shown in Figure 2. Of these, 10 sites represent an almost continuous haul-out area which is used by the same seals (Figure 2, inset). Four sites exist on north VAFB. The position of these in relation to various SLCs and Launch Facilities (LFs; used for missile launches) is shown in Figure 3. Virtually all of the haul-out sites, both north and south, are used during low tides and are wave-washed or submerged during high tides.

Harbor seal numbers have been estimated by various means over the years. Table 3 compares older estimates with current estimates. The older estimates are shown as they were presented, then as revised in accordance with methods currently used by NMFS for assessing populations.

**Table 3. VAFB Harbor Seal Population Estimates**

| Year   | Maximum Number of Animals Hauled Out | Previous Population Estimate | 1.3X Correction Factor (1996-2008) | 1.54X Correction Factor (2009-2012) |
|--|--------------------------------------|------------------------------|------------------------------------|-------------------------------------|
| 1993 <sup>1</sup>  | 300                                  | 1300                         | 390                                | 462                                 |
| 1999 <sup>1</sup>  | 400                                  | 1300                         | 520                                | 616                                 |
| 2001 <sup>1</sup>  | 500-515                              | 1118                         | 650-670                            | 770-793                             |
| 2009 <sup>2</sup>  | 304                                  | N/A                          | 395                                | 468                                 |
| 2010 <sup>2</sup>  | 249                                  | N/A                          | 324                                | 383                                 |
| 2011 <sup>2</sup>  | 259                                  | N/A                          | 337                                | 399                                 |
| 2012 <sup>2</sup> (January) <sup>3</sup>   | 178                                  | N/A                          | 231                                | 274                                 |
| 2012 <sup>2</sup> (June) <sup>3</sup>  | 59                                   | N/A                          | 77                                 | 91                                  |
| Sources:   |                                      |                              |                                    |                                     |
| 1. Hanan and Beeson 1993, cited in Thorson and Francine 1997; Thorson et al. 2000; Berg et al. 2002; MSRS 2011a and b.           |                                      |                              |                                    |                                     |
| 2. MMCG and SAIC 2011a and b; 2012a and c.   |                                      |                              |                                    |                                     |
| Notes: 3 June is the "usual" high count each year; in 2012, January was apparently an anomaly. All other years show June counts. |                                      |                              |                                    |                                     |

Harbor seal population estimates are usually made during the summer molting season, when the greatest numbers of animals are hauled out. At VAFB, this season peaks in June. However, in 2012, very low numbers of seals were counted, so the highest count of the year, made in January, was included in the table, along with the anomalous low count in June 2012.

The harbor seal population at VAFB has undergone an apparent decline. The primary cause of this decline has been a series of natural landslides at south VAFB, resulting in the abandonment of many haul-out sites. These slides have also resulted in extensive downcurrent sediment deposition, making these sites accessible to coyotes, which are now regularly seen there. Some of the displaced seals have moved to other sites at south VAFB, while others likely have moved to Point Conception, about four miles south of the southern boundary of VAFB. Unusually high numbers of harbor seals have been reported recently at Point Conception and in the kelp beds from south VAFB to east of Point Conception (Laroche 2012). A new haul-out site on south VAFB was discovered at Point Arguello (Figure 2). This consists of a ledge in a deep, protected crack on the north side of the point. Though not a large area, it does offer suitable haul-out for a few seals and is used occasionally.

On north VAFB, coyotes have been regularly observed at two haul-out sites. There, only rocky ledges closest to the ocean and exposed during the lowest tides are utilized by the seals, whereas before the coyotes arrived, much more of the intertidal area was used. In 2012, a new haul-out site, informally dubbed Little Sal, was discovered on north VAFB near LF-06 (Figure 3).

### 3.1.2 California Sea Lions

At south VAFB, California sea lions (*Zalophus californianus*<sup>2</sup>) regularly haul out on north Rocky Point (Figure 2), with numbers often peaking in spring. This site cannot be accurately counted without disturbing the animals, since considerable haul-out area is out of sight from any observation points on land. Previous and current counts are underestimates, with about 150 animals being the highest figure consistently noted over the years. From an aerial survey, it was estimated that 1½ to 2 times as many animals haul out there than can be seen from land (MMCG and SAIC 2012a), so a maximum estimate would be from 225 to 300 California sea lions. During the 2003 pupping season, five pups were born at north Rocky Point but were abandoned shortly after birth (MMCG and SAIC 2012a).

California sea lions have been reported at Point Arguello and Point Pedernales (both on south VAFB) in the past, although none have been noted there over the past several years. In 2002, small numbers hauled out on the VAFB harbor jetty when large numbers of bait fish had moved close to shore there (MMCG and SAIC 2012a). Individual sea lions have been noted hauled out throughout the VAFB coast; these were transient or stranded specimens. California sea lions occasionally haul out on Point Conception itself, south of VAFB. They regularly haul out on Lion Rock, north of VAFB and immediately south of Point Sal.

### 3.1.3 Northern Elephant Seals

Northern elephant seals (*Mirounga angustirostris*) sometimes haul out at VAFB. In 2004, a record count of 188 animals was made, mostly newly weaned seals (MMCG and SAIC 2012a). Since that time, only a few elephant seals have been reported yearly, mostly “weaners” and subadults, although adults have been noted occasionally. The nearest regularly used haul-out site on the mainland coast is at Point Conception.

### 3.1.4 Steller Sea Lions

In April and May of 2012, Steller sea lions (*Eumetopias jubatus*) were observed for the first time at VAFB. Up to 16 adults were noted among the California sea lions at north Rocky Point. Some individuals with distinctive scars were observed on several occasions over a several-week period, indicating that this site was being used over time rather than as a brief rest stop (MMCG and SAIC 2012a and c). Several animals returned in February 2013 (unpublished data). North Rocky Point is checked during monthly marine mammal surveys, so if Steller sea lions return to this site, they will be reported.

### 3.1.5 Fur Seals

Two species of fur seals exist in the region: the northern fur seal (*Callorhinus ursinus*) and the Guadalupe fur seal (*Arctocephalus townsendi*). No haul-out or rookery sites exist for fur seals on the mainland coast. The only specimens that do appear on mainland beaches are stranded animals. Only one fur seal stranding has been reported at VAFB. This involved a northern fur seal that came ashore at Surf Beach. (This beach is on VAFB property but is accessible to the public.) This seal, a nine-month old male, was rescued by the Santa Barbara Marine Mammal Center (SBMMC) on 11 March 2012 (SBMMC 2012).

## 3.2 NCI

Several species of pinnipeds inhabit the NCI and are discussed island-by-island in detail below.

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<sup>2</sup> The California sea lion has recently been recognized as a separate species, *Zalophus californianus*, rather than the subspecies *Zalophus californianus c.*, because the other two subspecies of *Z. californianus* are now recognized as separate species.

**Table 4. NCI Pinniped Population Estimates**

| Species                | San Miguel Island                     | Santa Rosa Island  | Santa Cruz Island    | Anacapa Island     |
|------------------------|---------------------------------------|--------------------|----------------------|--------------------|
| Pacific harbor seal    | 900                                   | 1,000              | 1,000                | 100                |
| California sea lion    | 32,000 pups born in 2012 <sup>1</sup> | 500 <sup>2</sup>   | 1,200 <sup>2</sup>   | 1,000 <sup>2</sup> |
| Northern elephant seal | ±10,000 pups yearly                   | ±2,000 pups yearly | Occasional transient | Rare transient     |
| Steller sea lion       | Rare transient                        | None               | None                 | None               |
| Northern fur seal      | 9,968                                 | None               | None                 | None               |
| Guadalupe fur seal     | Rare transient                        | None               | None                 | None               |

Sources: Carretta et al. 2011 and 2012; Allen and Angliss 2011 and 2012

1. No estimate is available for the total sea lion population on each main rookery island. Instead, pup counts are made at various breeding areas, and from this count, an estimate is made of the stock size, which includes pups, subadults and adults.
2. Regular surveys are not conducted of these islands, and pupping is very sporadic and minimal there. These are estimates of the total number of sea lions at these islands.

### 3.2.1 San Miguel Island

San Miguel Island is the largest and most diverse pinniped rookery on the west coast. Four species of pinnipeds regularly breed there, including California sea lions, northern elephant seals, northern fur seals, and Pacific harbor seals. Steller sea lions bred in the past on San Miguel Island (Allen and Angliss 2011 and 2012). They disappeared from San Miguel Island after the 1982-1983 El Niño and have been sighted only occasionally since then, thus far as individual animals. Guadalupe fur seals are reported occasionally at San Miguel Island, and in 1998, a pup was successfully weaned there (Melin and DeLong 1999).

Pinnipeds are found throughout the San Miguel Island coastline. The main rookeries for California sea lions and northern elephant seals are on Point Bennett. California sea lions also breed on Castle Rock, and are sometimes seen at Richardson Rock. Northern fur seals have small rookeries at Point Bennett and on Castle Rock. Pacific harbor seals occur along the north coast, at Tyler Bight and from Crook Point to Cardwell Point.

### 3.2.2 Santa Rosa Island

Three species of pinnipeds frequent Santa Rosa Island: Pacific harbor seals, California sea lions and northern elephant seals. Harbor seals are scattered throughout the island. Sea lions haul out at the west end, at Ford Point and at Carrington Point. A few California sea lions have been born on Santa Rosa, but no rookery has been established. Northern elephant seals mostly stay near the west end of the island, where they pup and breed.

### 3.2.3 Santa Cruz Island

Pacific harbor seals inhabit small coves and rocky ledges along much of the coast of Santa Cruz. California sea lions haul out from Painted Cave almost to Fraser Point, on the west end. Fair numbers haul out at Gull Island, off the south shore near Punta Arena. Pupping appears to be increasing there. Sea lions also haul out near Potato Harbor, on the northeast end of the island.

### 3.2.4 Anacapa Island

Pacific harbor seals haul out on rocky ledges, caves and cobble beaches in small numbers at Anacapa Island. California sea lions haul out by the hundreds on the south side of East Anacapa.

## 4 Marine Mammal Status and Distribution in Area

- Description of the status, distribution, and seasonal distribution of affected species or stocks of marine mammals likely to be affected by such activities.

The status and population of each stock is provided in the table below.

**Table 5. Pinniped Stock Status**

| Species                | Protected Status  | Stock                                  | Stock Size and Status                         |
|------------------------|---|--|---|
| Pacific harbor seal    | MMPA  | California                             | 30,196; slowly increasing                     |
| California sea lion    | MMPA  | U.S. Stock                             | 296,750; increasing, with occasional declines |
| Northern elephant seal | MMPA  | California breeding stock              | 124,000; slowly increasing                    |
| Steller sea lion       | MMPA depleted & strategic; ESA threatened (proposed delisting)                  | Eastern U.S.                           | 58,344-72,223; slowly increasing              |
| Northern fur seal      | MMPA  | San Miguel Island                      | 9,968; increasing                             |
| Guadalupe fur seal     | MMPA depleted & strategic; ESA threatened; CA Dept. Fish & Game fully protected | Guadalupe Island Stock (no U.S. stock) | 7,408; reportedly increasing                  |

Sources: Carretta et al. 2011 and 2012.; Allen and Angliss 2011 and 2012  
 Abbreviations:  
 MMPA = Marine Mammal Protection Act of 1972 and its amendments; ESA = Endangered Species Act of 1973 and its amendments.

### 4.1 Pacific Harbor Seal (California Stock)

#### 4.1.1 Distribution

Harbor seals haul out on intertidal sandbars, rocky shores and beaches along the California coast and islands. From 400 to 600 haul-out sites exist (Carretta *et al.* 2011 and 2012). From a few animals to several hundred occupy each of these sites. In the Channel Islands, harbor seals generally haul out in greatest numbers during the afternoons, when it is usually warmest. Considerable beach area is often available irrespective of tides at the some of the islands, especially at San Miguel and San Nicolas. On the mainland, however, harbor seals usually haul out during low tides in areas closest to the water because of threats from land. In some populated areas, they have switched to a nighttime haul-out pattern to avoid being disturbed (Howorth 1995).

#### 4.1.2 Seasonal Distribution

Harbor seals generally forage locally but may travel up to 300 nautical miles on occasion, either to find food or suitable breeding areas. The greatest numbers haul out during the molting season, from May into August throughout the state (Carretta *et al.* 2011 and 2012). In general, both molting and pupping seasons occur earlier in Southern California and later farther north. In Southern California, the pupping season peaks from mid-February through April; at VAFB, it extends from March through June. Molting season follows, sometimes overlapping the pupping season. At VAFB, the greatest numbers of harbor seals usually haul out in June.

## **4.2 California Sea Lion (U.S. Stock)**

### **4.2.1 Distribution**

In the U.S., the breeding range of the California sea lion extends from the Channel Islands as far north as Año Nuevo Island in central California (Carretta *et al.* 2011 and 2012). San Miguel and San Nicolas islands are the main breeding areas for the California sea lion.

### **4.2.2 Seasonal Distribution**

The pupping season begins in late May, reaching the peak about the third week of June. By July, most pups have been born. Females stay with the pups for the first few days, then begin going to sea for progressively longer foraging trips, returning periodically to nurse their pups. Mating takes place as the females come and go. The pups begin to catch their first fish at about three months of age, but will nurse as long as the mother allows it and provided they are not separated. This continues for about 8 to 12 months, usually no later than just before the next pup is born (Carretta *et al.* 2011 and 2012).

Females usually range from the Mexican border to as far north as San Francisco. If prey is scarce, particularly during El Niños, they have been known to wander into Oregon. Adult males claim their breeding territories in late May, usually leaving by August, with most animals moving north. Adult males may venture as far north as British Columbia or Southeast Alaska.

## **4.3 Northern Elephant Seal (California Breeding Stock)**

### **4.3.1 Distribution**

The California breeding stock of the northern elephant seal extends from the Channel Islands to the southeast Farallon Islands (Carretta *et al.* 2011 and 2012). Pupping occurs from December through March, with peak breeding in mid-February. Pups are weaned at three to four weeks of age, then abandoned. The “weaners” then undergo their first molt, which can take several weeks. Afterwards, they venture seaward. Both pups and weaners can be washed out from rookery beaches and may end up almost anywhere along the California coast, usually from February through April.

### **4.3.2 Seasonal Distribution**

Females and juveniles feed from California into Washington, while males travel as far as Alaska and the Aleutians. Both males and females return from March through August to molt.

## **4.4 Steller Sea Lion (Eastern U.S. Stock)**

### **4.4.1 Distribution**

The eastern U.S. stock of Steller sea lions ranges from Cape Suckling, Alaska, to California (Cape Suckling is almost at the northernmost part of the Gulf of Alaska, at 140° west longitude.) Año Nuevo Island, in central California, is now the southernmost known breeding colony for Steller sea lions (Carretta *et al.* 2011 and 2012), although they did breed at San Miguel Island up until the 1982-1983 El Niño. Sightings were rare after that, but from 2010 to 2012, individual Steller sea lions have shown up along the mainland coast of the Southern California Bight, often hauled out on navigation buoys.

#### **4.4.2 Seasonal Distribution**

At Año Nuevo Island, Steller sea lions bear their young from May through July. Females alternate between foraging at sea and nursing their pups. Females continue this pattern, with the pups accompanying them to sea as they get older. Small numbers of juveniles and sub-adult males may be present at the rookery throughout the year. Pups can nurse up to a year, with some individuals continuing to nurse until they are two or three years old. Adult males remain at the rookery throughout the breeding season, then leave by September, migrating north to forage. It is worth noting that by the end of May 2012, all of the Steller sea lions at VAFB had left (MMCG and SAIC 2012a).

### **4.5 Northern Fur Seal (San Miguel Island Stock)**

#### **4.5.1 Distribution**

Northern fur seals range from Southern California to the Bering Sea and west to the Okhotsk Sea and Japan. About 74 percent of the breeding population is found on the Pribilof Islands of the southern Bering Sea. The San Miguel Island stock, though separate, comprises less than one percent of the population. While at sea, northern fur seals range throughout the North Pacific (Carretta *et al.* 2011 and 2012).

#### **4.5.2 Seasonal Distribution**

Adult males stay from May through August, with some non-breeding specimens remaining until November. Adult females generally stay from June to as late as November. Peak pupping is in early July. The pups are weaned at three to four months. Some juveniles are present year-round, but most juveniles and adults head for the open ocean and a pelagic existence until the next year.

### **4.6 Guadalupe Fur Seal (Guadalupe Island Stock)**

#### **4.6.1 Distribution**

Guadalupe fur seals pup and breed mostly on Isla Guadalupe. All other Guadalupe fur seals are considered descendants of one breeding colony on the island, so only a single stock is recognized. In 1997, a new colony was discovered on Isla Benito del Este, off the west coast of Baja California. Guadalupe fur seals also are occasionally seen on San Miguel and San Nicolas islands, almost always as individual animals. Single adult males twice established territories on San Nicolas Island which lasted a few years each time, but no females arrived (Carretta *et al.* 2011 and 2012). Melin and DeLong (1999) reported that a pup was born and successfully weaned on San Miguel Island in 1998.

#### **4.6.2 Seasonal Distribution**

Males arrive at the rookeries in late May or early June and remain for one to four months. After breeding, they head out to sea. Females give birth in June and July, with most births in mid-June. Pups are nursed for five to six months, although the females can lactate up to eleven months. Little is known of their seasonal distribution at sea.

## **5 Request for Five-year Permit for Incidental Take**

- Type of incidental taking authorization being requested and the method of incidental taking.



Vandenberg Air Force Base (VAFB), 30<sup>th</sup> Space Wing (30 SW) requests a five-year permit and LOA for the harassment by Level B take of small numbers of marine mammals incidental to space vehicle and missile launches and aircraft operations. Under the Marine Mammal Protection Act of 1972 (MMPA) and its amendments, Level B harassment is defined as having “...the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.”

Recent discussions between NMFS and the U.S. Navy have determined that multiple year LOAs are beneficial to both the Navy and NMFS; VAFB has also expressed an interest to NMFS to request multiple-year LOAs, perhaps starting as early as calendar year 2014. The applicant understands that annual reports will still be necessary.

The five-year period is consistent with new regulations which allow for longer periods of validity for such authorizations. A five-year programmatic permit and Letter of Authorization (LOA) is requested because no potential for serious injury or mortality exists, or such potential can be negated by mitigation requirements. VAFB has complied with yearly incidental harassment LOAs issued over the past 20-some years, as well as with the current LOA (valid 7 February 2013 through 6 February 2014; NOAA, NMFS 2013). VAFB has also followed the conditions of the current five-year permit (NOAA, NMFS 2009), as well as with previous five-year permits issued over the past 20 years. No serious injuries or mortalities of marine mammals have ever resulted from VAFB operations. VAFB will continue to submit annual reports on its mitigation efforts, including reports on its monthly marine mammal surveys and on studies conducted under Scientific Research Permit (SRP) Number 14197 (valid 25 June 2009 through 30 June 2014; Section 7.1) and future SRPs. In addition, VAFB will submit marine mammal monitoring reports following each launch during which such monitoring was required.

## 6 Potential Number and Causes of Takes from Operations

- Age, sex, and reproductive condition, number of marine mammals by species that may be taken by each type of taking, and number of times such takings by each type of taking are likely to occur.

On 1 February 2012, NOAA published its final rule concerning the incidental taking by Level B harassment of marine mammals at VAFB (Federal Register, Vol. 77, No. 21; NOAA, NMFS 2009). The Final Rule of 2012 amended an earlier rule that went into effect on 6 February 2009, in which VAFB was allowed to take marine mammals for a period of five years, or up to 2014. The main purpose of the 2012 amendments was to allow greater flexibility in the types and numbers of missile and rocket launches at VAFB. The 2009 rule allowed for up to 20 missile and 30 rocket launches a year. This was amended to allow for 15 missile and 35 rocket launches a year. Under the Final Rule, VAFB was still required to apply for LOAs and to report on marine mammal monitoring activities to ensure compliance with regulations designed to protect marine mammals.

### 6.1 VAFB

Table 6 below lists the limits of incidental take by Level B harassment per year over the five-year period requested in this permit application. No Level A takes are anticipated. Disturbances from individual launch events last no longer than one hour per event (with the exceptions of harbor dredging and routine boat operations); therefore the prior year attempt to quantify harassment “animal days” is no longer considered by the Air Force to be a useful strategy.

**Table 6. Allowable Incidental Level B Take of Pinnipeds at VAFB**

| Species                | Age groups       | Sex  | Reproductive condition  | Takes per launch from noise or visual disturbance | Takes from aircraft operations |
|------------------------|------------------|------|---|---|--------------------------------|
| Pacific harbor seal    | All              | Both | Pupping and breeding March through June                                 | 0-400   | None                           |
| California sea lion    | All              | Both | Pupping and breeding June through July, but no pupping expected at VAFB | 0-300   | None                           |
| Northern elephant seal | All              | Both | No pregnant or breeding animals expected; mostly "weaners"              | 0-100   | None                           |
| Steller sea lion       | All              | Both | No pupping or breeding at VAFB  | 0-36  | None                           |
| Northern fur seal      | Mostly juveniles | Both | Only stranded animals   | None  | None                           |
| Guadalupe fur seal     | Juveniles        | Both | Only stranded animals   | None  | None                           |

Possible increases in pinniped stocks at VAFB over the next five years were allowed for in selecting the number of takes from launches that could possibly occur.

Aircraft are still required to maintain a 1000-foot "bubble" around pinniped haul-out and rookery areas except in emergency circumstances, such as Search and Rescue. No disturbances to any species of pinnipeds have been reported from aircraft, so we did not request any takes from such operations.

### 6.1.1 Harbor Seals

Whether any harbor seals would be affected by launches depends upon several factors:

- If the tide is sufficiently high, few if any seals will likely be taken because virtually all haul-out areas at VAFB are used only during low tides;
- Few if any harbor seals will be present when high surf, strong winds and heavy spray are present. Such conditions can also mask launch noises;
- Haul-out areas nearest launch sites are most likely to be impacted, whereas distant sites may not be impacted at all and;
- Not all harbor seals at a given site will necessarily react to a launch.

### 6.1.2 California Sea Lions

California sea lions haul out regularly at VAFB only at north Rocky Point. Both juveniles and adults of both sexes have been observed. The greatest numbers (possibly up to 300) usually appear in late spring and summer, although some are usually present year-round (MMCG and SAIC 2011a and b; 2012a and c). During very high tides and strong winds, when spray is heavy, the sea lions often leave this site. Launches from SLC-6 and SLC-8, which are closest to north Rocky Point, would be the most likely to result in launch noise and visual impacts. Launches from SLC-3E and SLC-4E, both farther inland and some four times the distance, are less likely to impact sea lions at north Rocky Point. Launches from north VAFB are not likely to affect the sea lions.

### 6.1.3 Northern Elephant Seals

Since newly weaned elephant seals occur in numbers some years on mainland beaches in the spring (MMCG and SAIC 2012a), an allowance was made for this when requesting a take of 100 animals. Juveniles or adults of both sexes may also occasionally haul out at VAFB for a few days to rest.

### 6.1.4 Steller Sea Lions

Steller sea lions have only been noted at VAFB in April and May of 2012 (MMCG and SAIC 2012c). They returned in February – April 2013 (unpublished data). Numbers were very small (up to 16), thus level B take of up to 36 animals is requested.

### 6.1.5 Fur Seals

Only one northern fur seal has been reported at VAFB over the past 20 years (SBMMC 2012); therefore it is extremely unlikely that any will be taken. Guadalupe fur seals have yet to be reported at VAFB. The chances of any being taken are nil.

## 6.2 NCI

The number of pinnipeds taken will depend on the intensity, frequency range and duration of the sonic boom or booms received by the pinnipeds. Often a double boom occurs from one launch (Table 7), and occasionally, a third, reflected boom. How many pinnipeds are present where the boom strikes is also a significant factor. For example, on one occasion pinnipeds on one side of San Miguel Island, reacted to a boom, while animals four miles away on the other side never heard it, nor was it detected there by acoustic instruments (MMCG and SAIC 2012a).

The take table below is based on more than 20 years of observations during launches and considers the number of pinnipeds of each species expected to be present and each species' observed sensitivity to sonic booms (MMCG and SAIC 2012a). No Level A takes are anticipated.

**Table 7. Allowable Incidental Level B Take of Pinnipeds at the NCI**

| Species                | Age groups       | Sex  | Reproductive condition   | Takes per launch from sonic booms            |
|------------------------|------------------|------|--|--|
| Pacific harbor seal    | All              | Both | Pupping and breeding March through June                        | 0-200  |
| California sea lion    | All              | Both | Pupping and breeding June through July                         | 0-6,000 pups<br>0-3,000 juveniles and adults |
| Northern elephant seal | All              | Both | Pupping December through March                                 | 0-500 pups<br>1,000 juveniles and adults     |
| Steller sea lion       | Adult            | Both | No pupping or breeding at NCI                                  | None; virtually no presence on San Miguel    |
| Northern fur seal      | Mostly juveniles | Both | Pupping and breeding in June and July                          | 0-250 pups<br>0-1,000 juveniles and adults   |
| Guadalupe fur seal     | Juveniles        | Both | Only one pup noted in more than a century (summer & fall 1998) | None; virtually no presence on San Miguel    |

## 7 Impacts on Marine Mammal Habitats and Stocks

Anticipated impact of the activity upon stock;

- Anticipated impact of activities upon the habitat of marine mammal populations, and likelihood of restoration of affected habitat and;
- Anticipated impact of loss or modification of the habitat on the marine mammal populations involved.

No adverse impacts are anticipated on marine mammal stocks or populations. No impacts, losses or modifications are anticipated on marine mammal habitats; therefore, no restoration of marine mammal habitats would be necessary.

- Anticipated impact of the activity upon species.

Pinnipeds will be taken only by incidental harassment from noise or visual disturbances from rocket and missile launches. Reactions of pinnipeds to launch noise and sonic booms have run the gamut from no response to heads-up alerts, from startle responses to some movements on land, and finally from some movements into the water, and occasionally, to stampedes, especially involving California sea lions at the NCI. As an example, during the 12 May 1996 launch of a Titan IV, all 800 sea lions in a focal group being observed by researchers stampeded into the water following a sonic boom (MMCG and SAIC 2012a).

### 7.1 Anticipated Impacts from Launch Noise

From more than two decades of pinniped monitoring by numerous qualified, independent researchers, we know that at VAFB, harbor seals generally alert to nearby launch noises, with some or all of the animals going into the water. Usually as many or more animals haul out again than are present at the time of each launch. This occurs from within minutes to two hours or so of each launch, unless rising tides, breakers or other disturbances are involved. When launches occur during high tides at VAFB, no impacts occur because the haul-out sites are submerged (MMCG and SAIC 2012a). We anticipate that such patterns will continue.

In addition to monitoring pinniped haul-out sites before, during and after launches, researchers have captured harbor seals at VAFB and at Point Conception to test their sensitivity to launch noises. The goal is to determine whether launch noise affects the hearing of pinnipeds (MMCG and SAIC 2012a). The low frequency sounds from launches can be intense, with the potential of causing a temporary [hearing] threshold shift (TTS), in which part or all of an animal's hearing range is temporarily diminished. This can last from minutes to days, but eventually, hearing returns to normal. Meanwhile, TTS has the potential to compromise the survival of the animal. A permanent [hearing] threshold shift (PTS) could occur if the sound is sufficiently loud. PTS is considered Level A take under the MMPA and are not authorized under the Final Rule, IHA or LOA.

To determine the sensitivity of harbor seals to launch noises, Auditory Brainstem Response (ABR) testing is employed under the authority of SRP Number 14197 (Section 5). ABRs are electrical potentials generated by the discharge of neurons in major cell groups in the brainstem when the ear is stimulated by sound. At present, ABR testing is required to occur related to at least one more launch from SLC-6. Testing has been completed in relation to two prior launches, with no TTS or PTS detected.

To perform an ABR test, a seal is captured, then restrained, usually at Vandenberg Harbor, south of the space launch complexes. Restraining “boards” are used for this purpose; this technique is so gentle that seals sometimes fell asleep during testing. If the seals remain agitated under restraint, which is not often, sedatives are administered. Headphones are then placed over the ears of the seals. Sound stimuli in the form of clicks and bursts are broadcast through the left earphone; low level white noise in the right to reduce electrical potentials from the right ear. The sound stimuli are delivered at levels sufficient to record reliable waveforms (60-70 decibels [dB]), then diminished 5 to 10 dB at a time until the response from the seal is no longer definite. At this point, the levels are increased in the same increments until the original level is reached. Current testing techniques involve broadband clicks from 1000 to 4000 Hz. These are designed to measure general hearing function. Tone bursts of 8000 Hz are also administered to assess hearing function in higher frequencies. Responses are measured through sterile electrodes inserted under the skin.

The first testing is performed before each launch. A second one is administered after the launch to determine whether any changes occur in the ability of the animal to hear the faintest sounds. Following testing, the animals are allowed to recover from the effects of sedatives (if any), tagged on the hind flippers, then released.

ABR tests have been performed under five-year SRPs since 1997. So far, none of the tested seals have shown any signs of TTS or PTS, although in one case, access to the test animals was not allowed until two hours after launch because of personnel safety concerns. The researchers stated that the animals could have experienced TTS but recovered fully by the time they were retested (MMCG and SAIC 2012a).

Based on 15 years of ABR research, we anticipate no impacts from launch noises on harbor seal hearing.

## **7.2 Anticipated Impacts from Sonic Booms**

At the Channel Islands, California sea lions react more strongly to sonic booms than most other species. Pups sometimes react more than adults, either because they are more easily frightened or because their hearing is more acute. Harbor seals also appear to be more sensitive to sonic booms than most other pinnipeds, often startling and fleeing into the water. Northern fur seals generally show little or no reaction. Northern elephant seals generally exhibit no reaction at all, except perhaps a heads-up response or some stirring, especially if sea lions in the same area or mingled with the elephant seals react strongly to the boom. Post-launch monitoring generally reveals a return to normal patterns within minutes up to an hour or two of each launch, regardless of species.

Table 8 summarizes monitoring efforts at San Miguel Island during which acoustic measurements were successfully recorded simultaneously with observations of the animals’ reactions to the booms.

The table shows that little or no reaction from the four species usually occurred when overpressures were below 1 pound per square foot (psf). In general, elephant seals did not react unless other animals around them reacted strongly or if the sonic boom was extremely loud. Northern fur seals seemed to react similarly. From limited data about the reactions of harbor seals, it appears likely that they were quite sensitive to sonic booms (MMCG and SAIC 2012a and c). Their reactions to launch noise at VAFB seem to suggest a sensitivity to low frequency sounds as well.

In summary, impacts have been considered minimal and temporary by various researchers. No evidence has been presented of abnormal behavior as a result of the launches, nor were any injuries or mortalities attributed to any launches. No pups were abandoned as a result of sonic booms. These findings came as a result of more than two decades of research by numerous qualified, independent researchers, from March 1991 through September 2012 (MMCG and SAIC 2012a and c). We anticipate that such patterns will continue. Therefore, 30CES would like to discuss with NMFS a possible decrease (perhaps with

seasonal variables) in the monitoring requirement (for example, only monitor sonic booms predicted to be greater than 1.5 psf between March and September, or above 2.0 psf at other times of the year).

**Table 8. Sonic Booms and Pinniped Reactions at San Miguel Island**

| Launch Date | Vehicle   | psf                      | (dB re 20 $\mu$ Pa)          | Reaction  | Location            |
|-------------|-----------|--------------------------|------------------------------|---|---------------------|
| 7 Nov 91    | Titan IV  | 1.2 & 1.8 <sup>1</sup>   | 129.5-133.0 <sup>1</sup>     | Z.c. Heads-up<br>M.a. None  | Pt. Bennett         |
| 12 May 96   | Titan IV  | 8.92 <sup>2</sup>        | 146.6 <sup>2</sup>           | P.v. All 5 into water<br>M.a. 60 of 67 heads-up   | Crook Pt.           |
| 27 Apr 99   | Athena II | 1.0                      | 127.2                        | Z.c. 866 alerted; 232 into water<br>M.a. & C.u. Alerted but no other response                                       | Adam's Cove         |
| 24 Sep 99   | Athena II | 0.95                     | 127.2                        | Z.c. 12 of 600 into water<br>M.a. & C.u. Alerted; otherwise no response   | Pt. Bennett         |
| 20 Nov 00   | Delta II  | 0.4                      | 119.6                        | Z.c. 60 pups into water; no reaction from focal group<br>M.a. No reaction   | Pt. Bennett         |
| 8 Sep 01    | Atlas II  | 0.75 & 0.35 <sup>1</sup> | 125.1 & 118.6 <sup>1</sup>   | Z.c. Group 1: 1200-no reaction<br>Z.c. Group 2: 247-no reaction<br>M.a. 25-37-no reaction<br>P.v. 2 of 4 into water | Cardwell Pt.        |
| 11 Feb 02   | Delta II  | 0.47 & 0.64 <sup>1</sup> | 121.08 & 123.08 <sup>1</sup> | Z.c. & C.u. 485 in 3 groups-no reaction<br>M.a. 424 in 2 groups-no reaction   | Pt. Bennett         |
| 2 Dec 03    | Atlas II  | 0.88                     | 126.4                        | Z.c. Number unknown (night launch); 4 moved toward water, 40% heads-up<br>M.a. No reaction                          | Pt. Bennett         |
| 15 Jul 04   | Delta II  | 0.79 & 1.34 <sup>1</sup> | 125.5 & 130.12 <sup>1</sup>  | Z.c. Number unknown (night launch); 10% heads-up  | Adam's Cove         |
| 13 Mar 08   | Atlas V   | 1.24                     | 129.4                        | M.a. No reaction from 109 pups  | Cardwell Pt.        |
| 5 May 09    | Delta II  | 0.76                     | 125.2                        | Z.c. 784 animals-no reaction  | West of Judith Rock |
| 14 Apr 11   | Atlas V   | 1.01                     | 110.0                        | M.a. 445-no reaction (night launch)   | Cuyler Harbor       |
| 13 Sep 12   | Atlas V   | 2.10                     | 122.8                        | Z.c. 460-no reaction<br>M.a. 68-no reaction<br>P.v. 20 of 36 into water   | Cardwell Pt.        |

Sources: MMCG and SAIC 2012a and 2012c.

Abbreviations:

**Psf** = Pounds per square foot (maximum overpressures of sonic booms); **dB re 20  $\mu$ Pa** = Decibels referenced to 20 micropascals (peak airborne intensities of sonic booms); **Z.c.** = *Zalophus californianus*, the California sea lion; **M.a.** = *Mirounga angustirostris*, the northern elephant seal; **C.u.** = *Callorhinus ursinus*, the northern fur seal; **P.v.** = *Phoca vitulina richardsi*, the Pacific harbor seal

1. When two acoustic measurements are presented, they represent a double sonic boom.

2. This was a rare, focused sonic boom.

### 7.3 Anticipated Impacts from Aircraft

Following the establishment of the 1000-foot “bubble” around pinniped haul-out and rookery sites at VAFB many years ago, no instances of pinnipeds reacting to aircraft have been reported there; thus, no impacts from aircraft are anticipated (MMCG and SAIC 2012a).

## 8 Minimizing Potential Impacts to Marine Mammals

- Suggested means of accomplishing necessary monitoring and reporting that will result in increased knowledge of species, decreased levels of taking or impacts on populations of marine mammals expected to be present during activities.

### 8.1 Air Force Operations

#### 8.1.1 Launches

The myriad of operations and requirements associated with each rocket and missile launch preclude the ability to alter or modify launch schedules. Launch dates are often scheduled months or years in advance. As each date approaches, technical issues and concerns frequently create short-term alterations to the launch schedule or delay launches for longer periods. Thus, it is not practical to modify launch schedules. Proven procedures, monitoring and research efforts designed for marine mammal protection (described below), help minimize potential impacts to marine mammals at VAFB and the NCI.

#### 8.1.2 Flight Operations

The use of approved aircraft routes for testing and evaluation, as well as a requirement to remain outside of a 1,000-foot bubble around pinniped rookeries or haul-out sites (except in emergencies), ensures minimal impacts from aircraft operations to marine mammals and their habitats on VAFB.

### 8.2 Marine Mammal Monitoring

Impacts to marine mammals at VAFB and the NCI are monitored in several ways described in detail below. Such monitoring ensures that any impacts from existing rockets and missiles are observed and documented as required. It also ensures that impacts from new rockets and missiles are assessed and monitored. Finally, when significant alterations are made to rockets or missiles that could change the potential for impacts, then the impacts from such vehicles are also assessed and monitored.

The monitoring and reporting protocols proposed in this application are similar to those used during the former five-year programmatic permit and meet all requirements of the current LOA.

#### 8.2.1 VAFB Launch Monitoring

Acoustic and biological monitoring will be conducted at least one more time for certain launches from SLC-6. Specialized acoustic instruments will be used to record sounds generated during launches from VAFB. The recordings will then be analyzed to determine the intensity, duration and frequency of launch noise so this can be compared with levels considered potentially harmful to marine mammals.

The biological monitoring for new or reconfigured vehicles will follow the protocols discussed below. Rockets and missiles that have already been analyzed acoustically and monitored during the initial three launches are *not* monitored except during the harbor seal pupping season (1 March through 30 June), whereas new vehicle launches are monitored regardless of season. Also, if new vehicle launches are monitored outside of the harbor seal pupping season, then the two-week follow-up pup survey (described below) will not be required.

For launches that occur during the harbor seal pupping season (1 March to 30 June), monitoring will be conducted by at least one NMFS-approved marine mammal observer trained in marine mammal science.

Monitoring at the haul-out site closest to the facility where the vehicle will be launched will begin at least 48 hours prior to the launch and continue until at least 48 hours after the launch. A follow-up survey will be made within two weeks of the launch to ensure that there were no adverse effects to pups. For launches that occur during daylight, time-lapse video recordings will be made of the reactions of the seals to each launch. This is necessary because access to observation points near launches is not allowed during the launches themselves because of personnel safety issues. For monitoring on south VAFB, another person will accompany the monitor for safety reasons because the bluffs overlooking the haul-out sites are dangerously unstable and landslides are frequent. In case of accident, the safety person can radio for help.

Monitoring for each launch will include multiple surveys each day that record, when possible, the species, number of animals, general behavior, presence of pups, age class, gender, and reaction to launch noise, or to natural or other human-caused disturbances. Environmental conditions will also be recorded, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction. A launch monitoring report containing all of the required information in an approved format will be submitted to NMFS within its deadlines. An annual report describing all of the launches during each year will also be submitted to NMFS within its deadlines and in an approved format.

### **8.2.2 VAFB Monthly Monitoring**

Marine mammal species of concern at VAFB listed in the past and current LOAs include Pacific harbor seals, California sea lions and northern elephant seals. The main focus is on harbor seals along the VAFB coastline, especially during pupping season. However, discoveries of California sea lion pupping on VAFB in 2003 (Section 3.1.2) and reports of substantial numbers of northern elephant seals hauling out on the VAFB coastline in 2004 (Section 3.1.4) indicated the need for a baseline assessment of VAFB's pinniped population. Should local populations continue to increase, the numbers and species of marine mammals included in the LOA may require adjustment to ensure that incidental take protections are adequate for MMPA compliance.

Another goal of the monthly surveys is to gather information as to the relative abundance of pinnipeds at peak haul-out times, usually during the lowest tides. Launches are not scheduled around the tides. If a launch occurs during a high tide, no animals are usually present because the haul-out areas are submerged. An erroneous assumption could be made that a launch affected haul-out patterns when in fact only a high tide affected them. The monthly surveys allow researchers to assess haul-out patterns and relative abundance over time, presenting a better picture of pinniped population trends at VAFB and whether Air Force operations are having cumulative impacts.

Monthly marine mammal surveys will be conducted to monitor the abundance, distribution and status of pinnipeds at VAFB. Whenever possible, the monthly marine mammal surveys will be timed to coincide with the lowest daytime tides of each month, when the greatest numbers of animals will usually be hauled out. This timing is not always possible if the tides occur too close to sunrise or sunset, since about two hours is required for surveying each half of VAFB (north and south), for a total of four hours of surveys, starting two hours before the low tide and ending two hours afterwards. Monitoring during nighttime low tides is not possible because of the dangerously unstable nature of the bluffs overlooking many of the observation points. Occasional base or area closures also sometimes preclude monitoring on a given day, in which case the next best day will be selected.

During the monthly surveys, a NOAA-approved monitor, as required in the LOA, will visit each site. In addition, another person will accompany the monitor for safety reasons. Counts will be made and recorded at each site, then the team will move to the next site.



Data gathered will include the species, number of animals, general behavior, presence of pups, age class, gender, and any reactions to natural or human-caused disturbances. Environmental conditions will also be recorded, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction. Quarterly reports will be submitted to VAFB and an annual report, describing all of the monthly surveys each year, will also be submitted to NMFS within its deadlines and in an approved format.

### **8.2.3 NCI Sonic Boom Modeling**

Sonic boom modeling will be performed prior to all rocket launches. Modeling will not be required for launches of currently deployed missiles because of their trajectories west of SMI and the previously well-documented acoustic properties of the missiles. PCBoom, a commercially available modeling program, or an acceptable substitute, will be used to model sonic booms from new vehicles. Launch parameters specific to each launch will be incorporated into each model. These include launch direction and trajectory, rocket weight, length, engine thrust, engine plume drag, and launch profile (vehicle position versus time from launch to first-stage burnout), among other aspects. Various weather scenarios will be analyzed from NOAA weather records for the region, then run through the model. Among other factors, these will include the presence or absence of the jet stream, and if present, its direction, altitude and velocity. The type, altitude, and density of clouds will also be considered. From these data, the models will predict peak amplitudes and impact locations. Should a model indicate that a peak overpressure of 1 pound per square foot (psf) or greater could impact the NCI, then acoustic and biological monitoring, described in the next section, will be implemented.

### **8.2.4 NCI Launch Monitoring**

Acoustic and biological monitoring will be conducted on the NCI if the sonic boom model indicates that pressures from a boom will reach or exceed 1 psf (see above). The monitoring site will be selected based upon the model results. Emphasis will be placed on selecting a location on one of the islands where the maximum sound pressures are reached and where suitable assemblages of pinnipeds are present.

Specialized acoustic instruments will be used to record sonic booms generated during launches from VAFB. The recordings will then be analyzed to determine the intensity, duration and frequency of sonic booms so this can be compared with levels considered potentially harmful to marine mammals. The analysis can also be used to validate the efficacy of the model.

Biological monitoring will be conducted at the closest significant haul-out site to the modeled sonic boom impact area. Emphasis will be placed upon selecting a site where pinnipeds are present that are most sensitive or least understood when it comes to reactions to sonic booms. At present, monitoring the reactions of northern fur seals and Pacific harbor seals to sonic booms is more important than monitoring those of California sea lions and northern elephant seals, which have already been monitored more often (Table 8). Monitoring the reactions of mother-pup pairs of any species is also important, however.

Considering the large numbers of pinnipeds found on some island beaches—sometimes thousands—smaller focal groups will be monitored instead. Estimates of the entire beach population will be made and their reactions to the launch noise noted. Photos and/or video recordings can help with this task if feasible. This is not always practical when visibility is reduced, not all animals are in sight from one observation point, the glare is severe, or any number of other factors.

Monitoring will be conducted by at least one NMFS-approved marine mammal observer, trained in marine mammal science. Another person will accompany the monitor for safety reasons. Monitoring will commence at least 48 hours prior to the launch, during the launch and at least 48 hours after the

launch, unless no sonic boom is detected by the monitors and/or by the acoustic recording equipment, at which time monitoring would be stopped. If the launch occurs in darkness, night vision equipment will be used. Monitoring for each launch will include multiple surveys each day that record, when possible, the species, number of animals, general behavior, presence of pups, age class, gender, and reaction to sonic booms or natural or human-caused disturbances. Photos and/or video recordings will be taken when feasible.

Environmental conditions will also be recorded, including visibility, air temperature, clouds, wind speed and direction, tides, and swell height and direction. A launch monitoring report containing all of the required information and in an approved format will be submitted to NMFS within its deadlines. An annual report describing all launch monitoring during each year will also be submitted to NMFS within its deadlines and in an approved format.

### **8.3 Scientific Research**

During the first three launches of any new rocket or missile, or substantially reconfigured rocket or missile, ABR tests are performed on seals at VAFB. The methods and results of 15 years of ABR tests are discussed in Section 7.1. Such tests will continue to be taken under the current SRP to determine whether launch noises have affected the seals' hearing. At this time, VAFB does not intend to renew our SRP that expires in 2014.

### **8.4 Coordination of Reporting Requirements**

- Suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to other persons conducting such activity.

Each monitoring task has its own reporting requirements. Monitoring tasks at VAFB are conducted by various qualified, independent consulting firms selected by the Air Force, or in some cases, privately through the launch proponent (e.g., United Launch Alliance). Task-specific reports, such as a monitoring reports for a specific launch or quarterly reports on monthly surveys, are submitted to natural resource managers in the 30<sup>th</sup> Civil Engineering Squadron, then to NMFS. At the end of each reporting period, annual reports are prepared by qualified, independent consulting firms. Descriptions of various tasks in the annual reports are based on data from specific monitoring efforts over the year and often contain information about work conducted by other firms. This eliminates duplication of efforts and allows for a more objective approach in the annual reports.

### **8.5 Coordination of Research Activities**

- Suggested means of learning of, encouraging and coordinating research opportunities, plans and activities related to reducing such incidental taking and evaluating its effects.

Monitoring tasks at VAFB are conducted by various qualified, independent consulting firms. New findings, such as the recent discovery of Steller sea lions at VAFB, are promptly reported to NMFS.

In some cases, one firm may not only perform the launch monitoring but also may simultaneously conduct ABR tests under SRP Number 14197. In other cases, a five-day launch monitoring effort may bracket a period of low tides needed for the monthly surveys. If two different firms have been selected for these separate tasks, such firms will coordinate with the natural resource managers in the 30<sup>th</sup> Civil Engineering Squadron. This means that one firm will share data needed by another firm so that a duplication of efforts does not occur. This reduces the potential for impacts from the research efforts by avoiding too many observers on the scene. As an example, a firm observing pinnipeds at Lion's Head to fulfill the five-day

launch monitoring requirement will share its data with another firm conducting a monthly survey. The data applied to the monthly survey results will be obtained for the same day as the rest of the monthly survey is performed to ensure consistent data gathering. Since both firms will employ qualified biologists and utilize approved monitoring protocols, the LOA requirements can be satisfactorily met.

Ongoing research at VAFB on sea otters (*Enhydra lutris nereis*) is authorized by the U.S. Fish and Wildlife Service. A variety of government agencies and universities participate in this research. Often such research takes biologists into areas not censused during launch monitoring efforts or monthly marine mammal surveys. Good communications between the researchers ensure that findings of interest to other researchers are shared. As one example, the presence of increased numbers of harbor seals at Point Conception and in nearby kelp beds (Laroche 2012) was of interest to researchers conducting monthly surveys at VAFB. In other cases, dead sea otters that have washed ashore in areas monitored during launches or during monthly surveys are immediately brought to the attention of appropriate parties. When possible, researchers on the scene have collected the carcasses for pickup and detailed necropsies by authorized sea otter researchers. This has ensured that such carcasses are recovered before they begin to deteriorate, become washed away by a high tide, or scavenged by predators such as coyotes (*Canis latrans*) or turkey vultures (*Cathartes aura*). Each carcass is important, and fresh specimens are much more valuable because of what can be learned from them.

Research on western snowy plovers (*Charadrius nivosus*), federally listed as threatened, and California least terns (*Sternula antillarum browni*), listed as endangered, is carried out in season on various sandy beaches throughout VAFB. Purisima Point happens to host colonies of these listed birds as well as being a haul-out and rookery area for harbor seals. Marine mammal consulting firms avoid conflicts by viewing harbor seals a safe distance from the birds with a powerful spotting scope, or by providing monitors that also are qualified to work with both species of birds.

When launch monitoring is required at the NCI, notification is provided to Channel Islands National Park. In turn, checks are made to ensure that using a prospective launch monitoring site would not interfere with ongoing research on the island by others, especially NMFS researchers from the National Marine Mammal Laboratory in Seattle, who have a field station on San Miguel Island, and other researchers from NMFS Southwest Fisheries in La Jolla. Launch monitors at San Miguel sometimes utilize the ranger station above Cuyler Harbor or the NMFS field station above Point Bennett as a base of operations. This is done on an as-available basis in a way that does not conflict with other island research activities. Launch monitors also coordinate travel to and from the NCI with the National Park Service and other researchers, both in terms of personnel transportation and transportation of supplies.

## 9 Potential Impact of Operations on Subsistence Uses

- Anticipated impact of activities on availability of species or stocks of marine mammals for subsistence uses;
- Availability and feasibility of equipment, methods, and manner of conducting activity or other means of effecting the least practicable adverse impact upon affected species or stocks, their habitat, availability for subsistence uses and;
- Plan of cooperation or information on measures taken to minimize adverse effects on availability of marine mammals for subsistence uses where proposed activity would take place in or near traditional arctic subsistence hunting area and/or affect the availability of species or stocks of marine mammals for arctic subsistence uses.

In summary, no subsistence use of marine mammals exists in or near this area of Air Force operations; thus, no impacts to such uses would occur.

## **10 Section 7 Consultations and Biological Opinions**

Section 7 consultations for the southern sea otter (*Enhydra lutris nereis*) were completed with the U.S. Fish and Wildlife Service. Biological Opinions are in effect for current launch programs on VAFB with the potential to affect southern sea otters.

The eastern U.S. stock of Steller sea lions is listed as threatened under the Endangered Species Act of 1973. This stock has been proposed for delisting. At the time of the preparation of this application, Steller sea lions had been seen at VAFB in very small numbers (up to 16) in April and May 2012, again in early 2013, but at no other time since monitoring began more than 20 years ago. Unless their presence becomes regular, either as a late spring seasonal occurrence or year-round, these sightings should be considered an anomaly rather than a seasonal or permanent presence. The site at which the Steller sea lions were observed will be included in the monthly surveys, and should their presence become more regular, VAFB will confer with NMFS.

## **11 Equipment, Methods and Activities to Minimize Adverse Impact upon Affected Species or Stocks and Their Habitat**

The myriad of operations and requirements associated with each SLV and missile launch preclude the ability to easily alter or modify launch schedules. Launch dates are often scheduled months or years in advance. Prior discussions of, for example, avoiding scheduling launches “when possible” during pupping season have little realistic value.

As the launch date approaches, small technical issues and concerns frequently create short-term alterations to the launch schedule, or delay launches for long periods. Therefore, it is not practicable to modify launch schedules. Required monitoring and procedures in place for marine mammal protection ensure the least practicable adverse impacts from launches to marine mammals and their habitats on VAFB and the NCI.

Unless constrained by human safety, national security, or launch trajectories, the Air Force shall ensure the least practicable adverse impacts on Pacific harbor seals, California sea lions, northern elephant seals, Steller sea lions and northern fur seals, by:

(A) Ensuring that all aircraft and helicopter flight paths maintain a minimum distance of 1,000 ft (305 m) from recognized seal haul-outs and rookeries (e.g., Point Sal, Purisima Point, Rocky Point), except in emergency situations such as Law Enforcement response or Search and Rescue operations;

(B) Avoiding, whenever possible, launches that will produce a sonic boom over the Northern Channel Islands during the peak pinniped pupping season of March through June; and

(C) Reviewing the launch procedure and monitoring methods. In cooperation with NMFS, if any incidents of injury or mortality of a pinniped discovered during post-launch surveys or indications of affects to the distribution, size, or productivity of the affected pinniped populations as a result of the authorized activities are thought to have occurred. If necessary, appropriate changes must be made through modification to this Authorization prior to conducting the next launch of the same vehicle.

### **11.1 Summary of Monitoring Protocols for VAFB**

For launches that occur during the harbor seal pupping season (1 March to 30 June), monitoring will be conducted by at least one NOAA NMFS-approved marine mammal observer, trained in marine

mammal science, at each appropriate pinniped monitoring location, to record the effects of launches on pinniped populations.

- Monitoring at the haul-out site closest to the appropriate launch facility will commence at least 72 hours prior to the launch and continue until at least 48 hours after the launch.
- During the pupping season, a follow-up survey will be made within two weeks of the launch to ensure that there were no adverse effects to marine mammals.
- During the pupping season, and for launches that occur during daylight, the above monitoring will be supplemented with video recording of mother-pup seal responses to the launch.
- Acoustic and biological monitoring will be conducted for new SLVs and ICBMs during at least the first launch, whether it occurs within the pupping season or not.
- Monitoring for each launch will include multiple surveys each day that record, when possible, the species, number of animals, general behavior, presence of pups, age class, gender, and reaction to launch noise (only during the harbor seal pupping season), sonic booms, or other natural or human-caused disturbances. Environmental conditions such as tide, wind speed, air temperature, and swell will also be recorded.
- A report detailing the collected information will be submitted to the NOAA NMFS within 120 days of each monitored launch.

## **11.2. Summary of Monitoring Protocols for the NCI**

Using a sonic boom prediction model to determine the location of sonic booms in the vicinity of the NCI, biological and acoustic monitoring will be conducted on the NCI (San Miguel, Santa Cruz, and/or Santa Rosa Islands) whenever a sonic boom greater than 1.0 psf is predicted to impact one of the islands between 1 March and 30 June; a sonic boom greater than 1.5 psf between 1 July and 30 September; or a sonic boom greater than 2.0 psf between 1 October and 28 February (subject to discussion and authorization from NMFS; other variables and timing can be considered).

- Monitoring will be conducted at the closest significant haul-out site to the sonic boom impact area.
- Monitoring will be conducted by at least one NOAA NMFS-approved marine mammal observer, trained in marine mammal science.
- Monitoring will commence at least 72 hours prior to the launch and continue until at least 48 hours after the launch, unless no sonic boom is detected by the monitors and the acoustic recording equipment, at which time monitoring would be stopped.
- Monitoring for each launch will include multiple surveys each day that record, when possible, the species, number of animals, general behavior, presence of pups, age class, gender, and reaction to launch noise, sonic booms or other natural or human-caused disturbances. Environmental conditions such as tide, wind speed, air temperature, and swell will also be recorded. Due to the large numbers of pinnipeds found on some beaches of SMI, smaller focal groups should be monitored in detail rather than the entire beach population. A general estimate of the entire beach population should be made once a day and their reaction to the launch noise noted.
- During the pupping season, and for launches that occur during daylight, the above monitoring will be supplemented with photography or video recording of mother-pup seal responses to the launch.
- During the pupping season of any species affected by a launch (Table 7), a follow-up survey will be made within two weeks of the launch to ensure that there were no adverse effects on any marine mammals.
- A report detailing the collected information will be submitted to the NOAA NMFS within 120 days of each monitored launch.



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## **AMMENDMENT A: Actions conducted by United Launch Alliance**

The United States Air Force requests that the following material be incorporated into their February, 2013 “Application for a Five-year Programmatic Permit for Small Takes of Marine Mammals Incidental to the launching of Space Launch Vehicles, Intercontinental Ballistic and Small Missiles and Aircraft and Helicopter Operations at Vandenberg Air Force Base, California.”

In prior years (most recently 2012), the United Launch Alliance (ULA) has requested an Incidental Harassment Authorization (IHA) to allow the unavoidable incidental take of marine mammals resulting from *Delta Mariner* operations, cargo unloading activities, and harbor maintenance dredging at Vandenberg Air Force Base (VAFB). These activities are in support of Delta IV/EELV launch activity from Space Launch Complex 6 (SLC-6) at VAFB (Figure 1-1).

All activities previously covered by the IHA issued to ULA will now be incorporated into the Air Force Letter of Authorization. All activities previously covered by the IHA will take place in or near the VAFB harbor. Marine mammals that are typically present in the area are the Pacific harbor seal (*Phoca vitulina richardsi*) and, less frequently, the California sea lion (*Zalophus californianus*). Harbor seals haul out on the rocks outside the harbor breakwater, approximately 200 yards from the dock. Typically the seals only use this haul-out area when tides are +1 foot Mean Sea Level (MSL) or lower. At higher tides, the flat rocks where the seals prefer to haul out are awash or submerged.

Northern elephant seals (*Mirounga angustirostris*) have been observed in the area on rare occasions, and Steller sea lions (*Eumetopias jubatus*) have increasingly been observed on North Rocky Point, approximately 1.4 miles west-northwest of the VAFB harbor.

The primary mission of ULA at SLC-6 is operations associated with the Delta IV/EELV launch vehicle, which is comprised of a common booster core (CBC), an upper stage, and a payload fairing. The size of the CBC requires it to be transported to the launch site by a specially designed vessel, the *Delta Mariner*. The *Delta Mariner* docks at the harbor on south VAFB. To allow safe operation of the *Delta Mariner* within the harbor, maintenance dredging is required on a periodic basis.

All activities discussed in this application have been discussed in the documents required for National Environmental Policy Act compliance:

- *Final Environmental Impact Statement for the Evolved Expendable Launch Vehicle Program* - April 1998 (Record of Decision - June 1998) – United States Air Force (USAF) 1998.
- *Final Supplemental Environmental Impact Statement* (provides analysis of larger solid rocket motors) - March 2000 (Record of Decision - May 2000) – USAF 2000.
- *Final Environmental Assessment (EA) for Harbor Activities Associated with the Delta IV Program at VAFB* - July 2001 (Finding of No Significant Impact August 2001) – ENSR International (ENSR) 2001a.

- *Biological Opinion for the EELV Program at VAFB, Santa Barbara County* (1-8-99-F-27)

All noise measurements specified in this document were obtained in air and expressed as A-weighted decibels (dBA).

### 1.1 *Delta Mariner* Operations

The *Delta Mariner* was specially designed to transport the oversized Delta IV/EELV launch vehicle components. The vessel is 312 feet in length and 84 feet wide. It has an all steel welded hull built for ocean-going service. It is a roll-on, roll-off, self-propelled ship with a totally enclosed, watertight cargo area, superstructure forward, and a stern ramp. The vessel is capable of operating at an 8-foot draft.

Vessel speed reduces to 1.5 to 2 knots once the vessel is within 3 miles of the harbor. The vessel enters the harbor stern first, approaching the wharf and “dolphins” (mooring devices) at less than 0.75 knot. At least one tugboat always accompanies the *Delta Mariner* during visits to the VAFB harbor. The vessel enters the harbor during daylight hours at high tide. Departure occurs under the same conditions.

*Delta Mariner* associated noise sources are ventilating propellers used for maneuvering vessel into position and the sound the cargo bay door makes when making contact with the dock ramp (no actual measurements have been taken outside the vessel).

### 1.2 Harbor Maintenance Dredging

Dredging the harbor involves considerable activity and the use of noisy, heavy equipment. The noise levels expected from the dredging and other construction equipment, as well as the background noise measured at the dock area, are presented in Table 1.2-1. Noise intensity decreases proportional to the square root of the distance from the source. A dredging crane at the end of the dock producing 88 dBA of noise would still be quite noisy (approximately 72 dBA) at the nearest beach or the end of the breakwater, roughly 250 feet away (Figure 1.2-1). Thus, an animal hauled out on the beach or breakwater could hear the dredge quite clearly.

**Table 1.2-1: Noise Levels of Heavy Equipment**

| Type of Equipment                  | Range of Typical Noise Levels (dBA) at 50 feet | Range of Max. Noise Level (dBA) at 250 ft. |
|------------------------------------|--|--|
| Backhoe                            | 84-93  | 70-79                                      |
| Water Truck (3,000 gallons)        | 81-84  | 67-70                                      |
| Clamshell Dredge                   | 75-88  | 61-74                                      |
| Roll-off truck transporter         | 82-95  | 68-81                                      |
| EPT                                | 56-82*   | 43-68                                      |
| Ambient background noise at harbor | 35-48**  |  |

\* Noise level measured within 20 feet from the engine exhaust (Acentech, Inc. [Acentech] 1998).

\*\* Noise level measured at the dock by Acentech (1998) approximately 250 feet from the beach. Source of Noise Levels: Acentech 1998; Environmental Protection Agency (EPA) 1971.



**Figure 1.2-1: Harbor Dredge Area and Harbor Seal Haul-out Location.**

### **1.3 Cargo Movement Activities**

The CBCs are 16.4 feet in diameter and between 161 and 170 feet long. The CBC sits 9 feet above the ground while in the transportation cradle/pallets. It is unfueled in its transportation configuration. The removal of the CBC from the *Delta Mariner* is accomplished using an Elevating Platform Transporter (EPT). The EPT is powered by a diesel engine manufactured by Daimler-Chrysler AG (Mercedes), model OM442A, 340HP. The EPT produces approximately 85 dBA, measured less than 20 feet from the engine exhaust, when the engine is running at mid speed. Prior to movement, the EPT operator sounds the horn to alert personnel in close proximity to the EPT that it is about to operate. The EPT operation procedure requires two short beeps of the horn (approximately 1/3 second each) prior to starting the ignition. Sound level measurements for the horn ranged between 84 and 112 dBA at 25 feet and between 62 and 70 dBA at 200 feet. The highest measurement was taken from the side of the vehicle where the horn is mounted.

Cargo unloading is limited to periods of high tide. It takes approximately 2 hours to remove the first CBC from the cargo bay and 6 hours to remove a complement of three CBCs. Removal of the remaining cargo may take up to 2 additional hours, which may consist of two upper stages, one set of fairings, and one payload attach fitting. The total of 10 hours includes time required to move the flight hardware to the staging area (Figure 1.3-1). Flight hardware items, other than the CBCs, are packaged in containers equipped with retractable casters and tow bars. These containers are towed off the vessel by a standard diesel truck tractor that generates approximately 87 dBA (at a distance of 50 feet) in the operational mode. Noise from the ground support

equipment is muted while inside the cargo bay and audible to marine mammals only during the time the equipment is in the harbor area.

## **2. Dates, Durations, and Affected Geographical Regions**

With approximately 153 square miles of mostly undeveloped land and approximately 42 miles of coastline, VAFB is the largest remaining area of relatively undisturbed coastal habitat in south-central California.

West Ocean Avenue bisects VAFB into two main areas, informally known as North Base and South Base. West Ocean Avenue extends westbound from the city of Lompoc to a public beach on the Pacific coast known as Surf Beach. All activities described in this appendix will take place at the VAFB harbor, located on South Base, approximately 1.43 miles south of Point Arguello (Figure 2.1).

Maintenance dredging, vessel operations and cargo off-loading will be performed periodically as required for launch support.

### **2.1 *Delta Mariner* Operations**

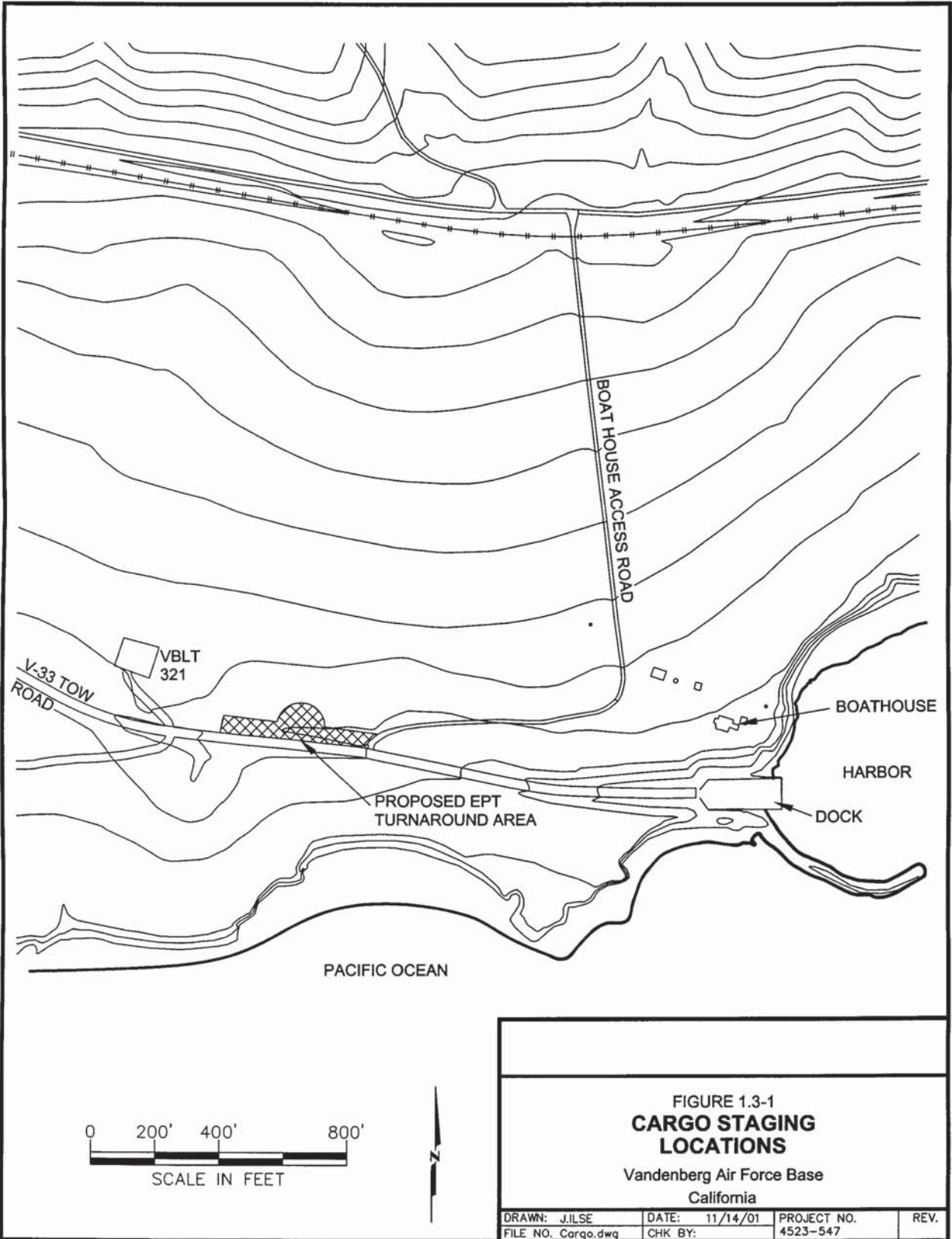
The maximum number of *Delta Mariner* visits is limited to four per year. The first hardware delivery occurred in January 2003. Another delivery occurred in September 2004. There were no deliveries in 2005, 2006, 2007 or 2008. Flight hardware was delivered to the harbor in September of 2009, June of 2010 and October of 2011.

A fully-loaded vessel can be off-loaded in 10 hours; however, the *Delta Mariner* may need to leave the dock and return at another time due to tide and wind extremes that may halt the removal of cargo. The *Delta Mariner* cannot remain in the harbor during periods of low tide due to the shallow harbor depth. The EPT cannot move the CBC if wind gusts exceed 25 miles per hour.

Baseline marine mammal monitoring is performed prior to all *Delta Mariner* deliveries. A copy of the monitoring report is submitted after the completion of every dredge and delivery cycle (dredging is not always required). Flight hardware delivery operations are always accomplished during high tide; therefore, no monitoring is done during the actual delivery operation. Flight hardware deliveries were made and monitoring reports were subsequently submitted in November 2009, July 2010, November 2011 and December 2012.

### **2.2 Cargo Movement Activities**

Described above in Section 2.1.



### 2.3 Harbor Maintenance Dredging

Dredging-related activities normally last between 3 and 5 weeks, including set-up and tear-down activities in the water and on shore. Dredging may proceed 24 hours per day to complete the job as quickly as possible and minimize the disruptive effect on the local animals; however, dredging at VAFB has historically been conducted in the daylight. Sedimentation surveys completed since the initial dredging indicate that maintenance dredging could be required annually, or even twice per year, depending on the hardware delivery schedule. Up to 5,000 cubic yards of sediment are allowed to be removed from the harbor per year by the United States Army Corps of Engineers (ACOE) permit. This quantity may be revised upwards to 10,000 cubic yards during the next renewal of the permit. A survey occurs several months prior to each *Delta Mariner* visit to assess whether the harbor can be safely navigated. The area to be dredged is shown in Figure 1.2-1. The environmental impacts of the dredging were assessed in the Harbor Activities EA (ENSR 2001a).

### 3. Species and Numbers of Affected Marine Mammals

Marine mammals present on and around the VAFB coastline and the Northern Channel Islands include 29 species of cetaceans and six species of pinnipeds. Because they are not typically found in the near vicinity of the harbor, cetaceans are not expected to be impacted by the activities in the harbor area. Commonly documented pinnipeds potentially affected by this action include Pacific harbor seals and California sea lions. Less frequently, Northern elephant seals (*Mirounga angustirostris*) haul out on VAFB, and Steller sea lions (*Eumetopias jubatus*) have been seen occasionally since May of 2012, all at “North Rocky Point.” Northern fur seals (*Callorhinus ursinus*) and Guadalupe fur seals (*Arctocephalus townsendi*) also occur along the California coast and Northern Channel Islands but are not likely to be found on VAFB. The beaches and rocks in the vicinity of the VAFB harbor are only used as haul-outs; no breeding, molting, or mating occurs there.

The Pacific harbor seal is the only species that regularly hauls out near the VAFB harbor area (Figure 1.2-1). Although California sea lions have been observed hauling out on the breakwater, this is thought to be an atypical occurrence. California sea lions occasionally use South Rocky Point as a haul-out, which is approximately 1.1 miles west-northwest of the harbor area (USAF 2008).

During the initial dredging of the VAFB harbor in September 2001, harbor seals were the only pinniped species present. The greatest number of harbor seals present during that dredging was 23, averaging seven seals per observation period over the duration of the activity (ENSR 2001b). During the wharf modification activity in June-July 2002, the number of harbor seals hauling out increased to a maximum of 43 animals, with an average of 21 seals hauled out during periods when tides were at or below +1 foot MSL. During the December 2002 dredging, harbor seals were only present on two of the 10 days of activities, with a maximum of 19 on one day. No dredging occurred again until July 2009, when the maximum number of harbor seals observed hauled out was 28. The most recent dredging event occurred in July-August 2011; the maximum number of harbor seals observed hauled out during this event was 36 (with two additional seals in the water south of the breakwater).

California sea lions also hauled out in small numbers (up to 6 individuals) on the breakwater during the wharf modifications in June-July 2002 (ENSR 2002a). Sea lions had not regularly used the breakwater as a haul-out prior to that time, and were not observed again until the dredging in July 2009, when two California sea lions were documented hauled out. In 2009, starting in June, sea lions were observed regularly in the vicinity of South Rocky Point, with the birth of short-lived pups occurring in late June at North Rocky Point. Increased sea lion observations that year may have been related to the predicted El Niño event for 2009 (National Oceanic and Atmospheric Administration [NOAA] 2009). This would be consistent with observations of increased numbers of sea lions hauling out at VAFB during previous El Niño events (ManTech SRS Technologies, Inc. [MSRS] 2009a). California sea lions were again documented hauled out at the VAFB harbor during the dredging that occurred in July-August 2011. On this occasion, one injured and emaciated weaned sea lion pup was documented hauled out at the breakwater and dock area during dredging activities for 1 day, and a second juvenile sea lion, with slight injuries on its chest and left flipper, was observed on a different day hauled out on the breakwater for approximately 2.5 hours (AECOM 2011a).

On Friday, December 14th, 2012, during bathymetric testing to determine need for dredging in the coming year, an immature male elephant seal (*Mirounga angustirostris*) was observed hauled out on the sandy beach west of the breakwater at the VAFB harbor. The seal was again observed on December 15<sup>th</sup>-18<sup>th</sup> and December 27th. The results of the bathymetric testing were that dredging would not be needed until at least 2014.

This is the first documented instance of an elephant seal hauled out at the VAFB harbor. There has been no verified breeding of northern elephant seals on VAFB or offshore islets; however, some areas of the shoreline are used as haul-outs by juvenile and sub-adult elephant seals, primarily immature males. There are no verified records of elephant seals on VAFB prior to 2003. In April 2003, hauled out elephant seals were first documented at South Rocky Point during the molting season (USAF 2003). A maximum of 188 elephant seals were counted in 2004; however, the numbers observed hauled out since then have been decreasing, with few documented individuals hauled out since 2007 (USAF 2008).

Steller sea lions (*Eumetopias jubatus*) have increasingly been observed on North Rocky Point, approximately 1.4 miles west-northwest of the VAFB harbor. The first sighting of this species in at least 15 years was documented in May of 2012; it and other animals (as many as 6) were seen through mid-June. Monthly surveys from July through October 2012 did not observe this species, but they returned in November 2012 and we have counted as many as 12 each month since that date.

#### **4. Status and Seasonal Distribution of Affected Marine Mammals**

**Pacific Harbor Seal.** The Pacific harbor seal ranges along the west coast of North America from the central Bering Sea off Alaska to Baja California. The California stock of harbor seals is not considered threatened or endangered under the Endangered Species Act, and are not depleted or a strategic stock under the Marine Mammal Protection Act (Carretta *et al.* 2011).

Pacific harbor seals inhabit the entire coast of California, including the offshore islands, forming small stable populations, although they are declining on San Miguel Island. This species is non-migratory, but local movements of short to moderate distances occur in relation to breeding

activities and abundance of food resources (California Department of Fish and Game [CDFG] 1990). They breed along the California coast between March and June, occurring in the greatest numbers on land in late spring and early summer during the molt. The preferred breeding habitat of the Pacific harbor seal includes offshore rocks, sandy beaches, gravelly or rocky beaches, and estuarine mud flats (NOAA National Marine Fisheries Service [NMFS] 1997). Molting does not cause Pacific harbor seals to break from their foraging routine although they spend about 20 percent more time on shore (SRS Technologies, Inc. [SRS] 2001). The molt lasts approximately 6 weeks and is completed before September. Between autumn and winter, Pacific harbor seals adopt a semi-pelagic life and spend less time on land, but remain close to shore while at sea.

The main harbor seal haul-outs on VAFB are near Purisima Point and at Lion's Head (approximately 0.4 mile south of Point Sal) on north VAFB, and between the VAFB harbor north to South Rocky Point Beach on south VAFB (MSRS 2009b). This south VAFB haul-out area is composed of several sand and cobblestone coves, rocky ledges, and offshore rocks. The Rocky Point area is used as breeding habitat; it is approximately 1 mile north of the VAFB harbor (MSRS 2009b). Harbor seals have been reported to haul out on the coast at Sudden Ranch, approximately 0.5 miles south of the harbor.

The minimum harbor seal population in California is 31,600 (Carretta et al. 2011). While harbor seal counts showed a rapid increase from 1972 to 1990, net production rates appeared to decrease from 1982 to 1994 (Carretta *et al.* 2011). This decrease in population coincides with a decrease in human-caused mortality, which may be indicative that the population is approaching its environmental carrying capacity (Carretta *et al.* 2011). The VAFB population in 2002 was estimated at 1,115 seals ([SRS 2003). The harbor seal population on VAFB experienced an annual 4.1 percent increase from 2003 to 2006 and appears to be reaching its carrying capacity, as the population shows little change or slight increases between 2005 and 2008 (MSRS 2009b). The 2004 census indicates that the Channel Islands support an estimated 5,647 harbor seals (Lowry *et al.* 2005).

**California Sea Lion.** The California sea lion ranges from British Columbia south to Mexico. California sea lions are not considered threatened or endangered under the Endangered Species Act, and are not depleted or a strategic stock under the Marine Mammal Protection Act (Carretta *et al.* 2011).

During the breeding season, the majority of California sea lions are found in southern California and Mexico. Rookery sites in southern California are limited to San Miguel Island and to the more southerly Channel Islands of San Nicolas, Santa Barbara, and San Clemente (NMFS 1997). Rocky ledges and sandy beaches on offshore islands are the preferred rookery habitat. Breeding season begins in mid-May. The California sea lion molts gradually over several months during late summer and fall. Since the molt is not catastrophic, the California sea lion can enter the water to feed.

California sea lions exhibit annual migratory movements; in the spring, males migrate southward to breeding rookeries in the Channel Islands and Mexico, and then migrate northward in late summer following breeding season. Females do not appear to migrate but remain near breeding rookeries (CDFG 1990). The greatest population on land occurs in September and October



during the post-breeding dispersal although many of those sea lions, particularly juveniles and sub-adult and adult males may move north away from the Channel Islands.

The minimum population size of the U.S. stock of California sea lions in 2010 was estimated at 141,842 seals, with a maximum growth rate of 6.52 percent annually (Carretta *et al.* 2011). Between 1985 and 1987, population data indicated that most of the individuals on the Northern Channel Islands were on San Miguel Island, with a population ranging from 2,235 to over 17,000. In 1994, at the Channel Island breeding rookeries, an estimated 81,000 sea lions were present (Gilardi and Mazet 1999).

Fewer than 100 sea lions are found seasonally on VAFB (USAF 2008). Sea lions may sporadically haul out to rest when foraging or transiting through the area, but generally spend little time there. Areas used for hauling out include Rocky Point, Point Arguello, and Point Pedernales on south VAFB, and Point Sal just north of VAFB (United States Air Force [USAF] 2008).

**Northern elephant seal.** The Northern elephant seal is found from Alaska to Baja California, and breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands from December to March. Adults molt on land between March and August and return to feeding areas after molting until the breeding season. The California breeding population is considered a separate stock (Carretta *et al.* 2011). Northern elephant seals are not considered threatened or endangered under the Endangered Species Act, and are not depleted or a strategic stock under the Marine Mammal Protection Act (Carretta *et al.* 2011).

The minimum population size is conservatively estimated at 74,913 individuals (Carretta *et al.* 2011). Pup counts completed at colonies through 2005 indicate that the population continues to grow in California while it is stable or slightly decreasing in Mexico (Carretta *et al.* 2011).

There has been no verified breeding of northern elephant seals on VAFB or offshore islets; however, some areas of the shoreline are used as haul-outs by juvenile and sub-adult elephant seals, primarily immature males. There are no verified records of elephant seals on VAFB prior to 2003. In April 2003, hauled out elephant seals were first documented at South Rocky Point during the molting season (USAF 2003). A maximum of 188 elephant seals were counted in 2004; however, the numbers observed hauled out since then have been decreasing, with few documented individuals hauled out since 2007 (USAF 2008).

**Steller sea lion.** The Steller sea lion (*Eumetopias jubatus*) is a threatened species of sea lion in the northern Pacific. It is the sole member of the genus *Eumetopias* and the largest of the eared seals (*Otariidae*). The range of the Steller sea lion extends from the Kuril Islands and the Sea of Okhotsk in Russia to the Gulf of Alaska in the north, and south to Año Nuevo Island off central California. In the summer, Steller sea lions tend to shift their range somewhat southward.

North Rocky Point was used in April and May 2012 by Steller sea lions. This was the first time this species had been reported at VAFB during any of numerous launch monitoring efforts and monthly surveys conducted over the past two decades. Some individuals with distinctive scars and marks were noted repeatedly over some weeks, indicating that these were not just transients hauled out for a brief rest before continuing on their way. Although both adult males and females were noted, no pups were seen. Up to 16 animals were seen.

Steller sea lions once had two small rookeries on San Miguel Island, but these were abandoned after the 1982-1983 El Niño event. These rookeries once represented the southernmost colonies of the eastern stock of this species. The eastern stock of Steller sea lions, which is currently listed as threatened under the Endangered Species Act of 1973, has been proposed for de-listing.

## **5. Type and Method of Incidental Take Authorization Requested**

VAFB requests the incorporation of a previous IHA issued to United Launch Alliance (ULA), allowing only the unintentional incidental harassment of pinnipeds in the VAFB harbor area, into the subject LOA. Activities in the harbor area may elicit a head alert in nearby Pacific harbor seals and California sea lions, or cause them to approach the water or flush into the water.

## **6. Number and Frequency of Marine Mammals Potentially Affected**

The principal form of incidental take resulting from the VAFB harbor activities associated with the Delta IV/EELV program is expected to be infrequent, incidental, and unintentional harassment of pinnipeds resulting from noise and visual activity generated by the short-term operations of recurring maintenance dredging, *Delta Mariner* operations, and cargo movement. Pinniped mortality is extremely unlikely. Other than periods of elevated noise and visual activity due to the aforementioned activities, no temporary or permanent habitat modifications would occur. No animals would be approached or handled by humans.

Estimates of the numbers of marine mammals that might be affected are based on consideration of the number of animals that could be disturbed appreciably by approximately 43 days of operations. ULA bases these estimates on historical pinniped survey counts from 2001 to 2011 (Table 6-1), and calculates takes by multiplying the average of the maximum abundance by 43 days.

VAFB requests that the LOA authorize ULA to incidentally harass approximately 1,161 Pacific harbor seals (27 animals by 43 days), 129 California sea lions (3 animals by 43 days), 24 northern elephant seals (3 animals by 8 days), and 24 Steller sea lions (8 animals by 3 days)

### ***Requested Incidental Take of Marine Mammals***

| <u>Species</u>          | <u>Estimate of Incidental Take</u> |
|-------------------------|------------------------------------|
| Pacific harbor seal     | 1,161                              |
| California sea lion     | 129                                |
| Northern elephant seals | 24                                 |
| Steller sea lion        | 24                                 |

**Table 6-1: Historical pinniped counts during VAFB Harbor activities by the United Launch Alliance.**

| Historical Monitoring   | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|
| Pacific Harbor Seals    | 23   | 43   | 0    | 0    | 0    | 0    | 22   | 22   | 28   | 14   | 38   |
| California Sea Lions    | 0    | 6    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 0    | 1    |
| Northern Elephant Seals | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

Previous monitoring efforts have yielded limited gender and age data for harbor seals. Reproductive condition is dependent on how near to the breeding season harbor activities occur. The nearest pupping sites occur north of the VAFB harbor area at South Rocky Point, approximately 1.2 miles away. The maximum number of harbor seals present (43 individuals) occurred during the wharf modification in June 2002, and averaged 21 seals per day when tidal conditions were favorable for hauling out (ENSR 2002a). Harbor seals were present in somewhat smaller numbers during the dredging events in 2001, 2002, 2007, 2008, 2009, and 2010, and were closer to the June 2002 numbers in 2011.

The highest number of sea lions present also coincided with the wharf modification in June 2002 when six sea lions were observed, with daily counts ranging between one and six animals (ENSR 2002a). The only other observations of sea lions occurred during the dredging events in 2009 and 2010, when two animals hauled out, and in 2011 when one animal hauled out on two separate occasions.

Northern elephant seals could also be subjected to level B harassment. Elephant seals have been observed near the VAFB harbor area in recent years, but this is typically no more than 3 animals present for periods of about 3 days.

Stellar sea lions could be subjected to minimal level B harassment. This species has recently been observed at North Rocky Point, about 1.4 miles from the Vandenberg harbor. Harbor and boat operations would likely have at most a minimal impact.

## **7. Potential Impacts of the Project on Marine Mammals**

On VAFB, the Delta IV/EELV harbor activities will mainly affect Pacific harbor seals, and to a lesser extent California sea lions and Northern elephant seals, as these two species haul out at these mainland coastal sites only infrequently and in small numbers. Other pinniped species rarely, if ever, haul out on VAFB coastal sites.

The maintenance dredging events are relatively short in duration. Vessel operations and cargo off load operations would occur a maximum of three times per year and are also short in duration. The affected pinnipeds are highly mobile; thus, potential impacts are expected to be short-term and any animals frightened away from the area by the noise and activity should return after the completion of each task. Due to the sporadic nature and short duration of the activities, no cumulative impacts to marine mammals are expected.

Monitoring of harbor seals and sea lions during wharf modification activities and dredging events that occurred between 2001 and 2011 indicate that marine mammals respond to sudden noises or unexpected visual stimuli with a head alert initially and occasionally will flush from the haul-out. Sea lions appear to be much less sensitive to disturbance than harbor seals, even when they were close to the activity. Visual events that invoke harbor seal responses include the sudden swing of the crane boom, and shadows caused by equipment that was backlit during nighttime dredging activities. Nevertheless, seals and sea lions continued to frequent the VAFB harbor area during these activities, despite the presence of noise and activity (ENSR 2001b, 2002a; MSRS 2009a, 2010; AECOM 2011a, 2011b).

Past studies have found that disturbance events that flush seals into the water result in a return to previous numbers only 39 percent of the time (Suryan and Harvey 1999, Allen et al. 1984, Becker et al. 2009). A scientific research program conducted at VAFB to study the haul-out behavior of Pacific harbor seals indicated that the main influence on daily haul-out patterns of harbor seals on south VAFB is the time of day rather than tide height, as the peak number of seals hauled out occurred daily between 1100 and 1700 hours (USAF 2008). Haul-out behavior was also influenced by combinations of high tide and large swell, or high temperature and no wind. Monitoring of pinniped behavior during harbor activities between 2001 and 2011 and post-activity surveys conducted after each disturbance period indicate that the VAFB harbor haul-out site continues to be used and the temporary disturbances do not deter animals from returning to the area after activities conclude (AECOM 2011a, 2011b). The trend indicated by Suryan and Harvey (1999) and Allen et al. (1984) is not repeated with the Delta IV/EELV activities at the VAFB harbor.

The short-term effects of these disturbances on individual animals are likely limited to minor increases in energetic expenditure and stress responses due to increased vigilance and evasive behaviors, and potentially increased time in the water. Alternative haul-out sites occur near the VAFB harbor area away from where disturbances occur during dredging and *Delta Mariner* operations, where displaced animals can haul out if the need is great enough during a specific tide cycle. Whether these short-term effects can accumulate into long-term effects on survival and reproduction depend on the long-term foraging success and nutritional status of individual animals; unless conditions are relatively poor such that an individual has no margin to recoup small energetic losses from disturbance, there should be no significant long-term effects on survival or reproduction.

## **8. Impact on Marine Mammal Availability for Subsistence**

There is no subsistence hunting of marine mammals in the project area; therefore, activities at the VAFB harbor would not be expected to impact marine mammal availability for subsistence.

## **9. Anticipated Impact on Marine Mammal Habitat**

There will be no loss of habitat resulting from Air Force and ULA activities at the VAFB harbor. Harbor seals are known to use offshore rocks, rocky ledges and sandy beaches between South Rocky Point and the boat dock area (USAF 2008).

As indicated in Section 1 of this application, impacts to marine mammal habitat will be limited to occasional brief periods of noise and visual activity presenting a temporary impact to harbor seals and sea lions in the VAFB harbor area. These activities will not result in loss of habitat.

#### **10. Anticipated Impact of Habitat Modification on Marine Mammal Stocks**

There will be no loss of habitat resulting from Air Force and ULA activities at the VAFB harbor; therefore, there would be no impact from habitat loss to marine mammal populations.

#### **11. Mitigation Measures**

Since there will be no long-term or cumulative impacts to marine mammal habitat, there will be no anticipated requirement for mitigation with respect to habitat. Harbor activities described in Section 1 will have no impact on breeding, molting or pupping because those pinniped activities do not occur in the vicinity of the VAFB harbor area.

Past measures implemented during ULA activities at the VAFB harbor have reduced disturbances to pinnipeds present within the vicinity by limiting the level of the disturbance or maintaining a constant level that diminished the intensity of disturbance and the potential for startling reactions from the animals. ULA considers these measures beneficial for the species and will continue to implement such measures. Mitigation measures to be implemented for ULA activities at the VAFB harbor include:

- If activities occur during nighttime hours, lighting will be turned on before dusk and remain on the entire night to avoid startling pinnipeds at night.
- Activities will be initiated before dusk.
- Construction noises will be kept constant (i.e., activities will not be interrupted by periods of quiet in excess of 30 minutes) while pinnipeds are present.
- Start-up of activities (either initially or if activities have ceased for more than 30 minutes) will include a gradual increase in noise levels if pinnipeds are in the area.
- ULA will employ a NOAA-NMFS qualified marine mammal observer to visually monitor the pinnipeds on the beach adjacent to the harbor and on the rocks for any flushing or other behaviors that result from activities at the VAFB harbor. During nighttime activities, the harbor area will be illuminated, and the monitor will use a night vision scope.
- To the extent possible, the *Delta Mariner* and accompanying vessels will enter the harbor only when the tide is too high for pinnipeds to haul out on the rocks. The vessel will reduce speed to 1.5 to 2 knots (1.5-2.0 nm/hr; 2.8-3.7 km/hr) once the vessel is within 3 miles (4.83 km) of the harbor. The vessel will enter the harbor stern first, approaching the wharf and mooring dolphins at less than 0.75 knot (1.4 km/hr).

## **12. Arctic Subsistence Plan of Cooperation**

These activities do not take place in or near any traditional Arctic subsistence hunting area; therefore, a cooperation plan is not required.

## **13. Monitoring and Reporting**

VAFB will notify NOAA-NMFS two weeks prior to the initiation of each activity discussed in Section 1.

Monitoring will be conducted by a sufficient number of biologically-trained, on-site individual(s), approved in advance by the NOAA-NMFS Southwest Regional Office.

Monitoring for any given harbor activity will consist of the following:

- Prior to each day's activities, conduct baseline observations on the number, type(s), location(s), and behavior of marine mammals in the project area.
- Conduct and record observations of harbor seals in the vicinity of the harbor for the duration of the activity occurring when tides are low enough for harbor seals to haul out (+ 2 feet. MSL, or less).
- If sea lions haul out in the harbor vicinity, observations on sea lions will be conducted and recorded for the duration of the activity, regardless of tidal conditions.
- After each day's activities, conduct observations of pinniped haul-outs in the project area and record information on the number, type(s), location(s), and behavior of marine mammals.
- During nighttime activities, the harbor area will be lit and the monitor will observe animals using a night vision scope.

A report will be submitted at the frequency specified by the NOAA-NMFS. This report will include the following:

- Date, time, and duration of activity;
- Weather;
- Tide state;
- Composition (species, gender, and age class) and locations of haul-out group(s);
- Horizontal visibility;
- Results of the monitoring program:
  - Number and species of pinnipeds present on haulout(s) prior to start of activity and behavioral patterns.

- Number and species of pinnipeds that may have been harassed as noted by the number of pinnipeds estimated to have entered the water as a result of noise related to the activity.
- Brief description of any activity/action that causes animal(s) to flush;
- Length of time(s) pinnipeds remained off the haul-out or rookery.
- Noted behavioral modifications by pinnipeds that were likely the result of the activity in the harbor.

#### **14. Planned Research and Learning Activities**

ULA will continue to coordinate monitoring of pinnipeds during activities at the VAFB harbor with VAFB Asset Management natural resources staff and other pinniped monitoring activities occurring on VAFB. All information collected during pinniped monitoring events is submitted to VAFB Asset Management staff for incorporation into the basewide monitoring plan to enhance and assist in the increased knowledge and understanding of pinniped populations that occur on the VAFB coastline. The information collected during these monitoring events, along with the information collected by VAFB for monthly monitoring of pinniped populations and during space vehicle and missile launches is essential for a solid understanding of the trends of these populations of marine mammals and the effects activities on VAFB have on their continued presence.

Data collected during ULA harbor activities will be submitted in the form of an annual LOA report to the NOAA-NMFS Office of Protected Resources (Silver Spring, MD).

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