

**ENVIRONMENTAL ASSESSMENT OF  
THE ISSUANCE OF A SMALL TAKE REGULATIONS  
AND LETTERS OF AUTHORIZATION  
AND  
THE ISSUANCE OF NATIONAL MARINE SANCTUARY  
AUTHORIZATIONS  
FOR  
COASTAL COMMERCIAL FIREWORKS DISPLAYS WITHIN  
THE MONTEREY BAY NATIONAL MARINE SANCTUARY,  
CALIFORNIA**

**National Oceanic and Atmospheric Administration  
National Marine Fisheries Service and Monterey Bay National Marine Sanctuary**

**June, 2006**

## INTRODUCTION

### **A. Summary**

On May 10, 2002, the National Marine Fisheries Service (NMFS) received an application from the Monterey Bay National Marine Sanctuary (MBNMS or the Sanctuary) requesting an Incidental Harassment Authorization (IHA) under section 101 (a)(5)(D) and a Letter of Authorization (LOA) under section 101 (a)(5)(A) of the Marine Mammal Protection Act (MMPA), for the possible harassment of small numbers of several species of marine mammals incidental to coastal commercial fireworks displays approved by MBNMS and occurring along the coastline within the Sanctuary, over California waters. Under the preferred alternative for this action, the LOA would be issued annually under 5-year regulations, which would take effect upon expiration of the one-year IHA. This Environmental Assessment (EA) is intended to jointly address impacts on the environment that would result from the issuance of the 5-year incidental take regulations (under the MMPA) and subsequent issuance of National Marine Sanctuary Authorizations for fireworks displays in the MBNMS (under the National Marine Sanctuaries Act (NMSA)).

### **B. Background**

The MBNMS was designated as the ninth national marine sanctuary in the United States on September 18, 1992. Managed by the National Marine Sanctuary Program (NMSP) within the National Oceanic and Atmospheric Administration (NOAA), the MBNMS adjoins 276 miles (444 km) of central California's outer coastline (overlying 25 percent of state coastal waters), and encompasses 5,300 square miles of ocean waters from mean high tide to an average of 25 miles (40 km) offshore between Rocky Point in Marin County and Cambria in San Luis Obispo County.

Federal regulations governing activities within the MBNMS became effective on January 1, 1993. The MBNMS was the first national marine sanctuary to be designated along urban shorelines and, when first designated, became the largest marine sanctuary in the United States, equal in area to 77 percent of all other Federal marine sanctuaries in existence at the time. As a result of its large size and near proximity to urban areas, the MBNMS has addressed many regulatory issues not previously encountered by the NMSP. Authorization of professional fireworks displays is one such issue that has required a steady refinement of policies and procedures to limit the location, timing, and composition of professional fireworks events as more has been learned about its impacts to the Sanctuary and effects on the environment. The Sanctuary has monitored individual displays over the years to improve its understanding of their characteristics and potential impacts to Sanctuary resources.

Fireworks displays have been conducted over current Sanctuary waters for many years as part of national and community celebrations (such as Independence Day and municipal anniversaries) and to foster public use and enjoyment of the marine environment. The marine venue for this activity is the preferred setting for fireworks in central California in order to optimize public access and avoid the fire hazard associated with terrestrial display sites. Many

fireworks displays occur at the height of the dry season in central California, when area vegetation is particularly prone to ignition from sparks or embers. The MBNMS has worked diligently to balance these needs with its primary mandate for marine resource protection.

## II. PURPOSE AND NEED FOR THE ACTIONS

### A. Request for Incidental Take under the MMPA

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 et seq.) directs the Secretary of Commerce (the Secretary) to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are issued.

Authorization for incidental takings may be granted if the Secretary finds that the taking will have a negligible impact on the species or stock(s); will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses; and the permissible methods of taking and requirements pertaining to the monitoring and reporting of such taking are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Except with respect to certain activities not relevant here, the MMPA, as amended, now defines "harassment" as "...any act of pursuit, torment, or annoyance which (a) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (b) has 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, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

The MBNMS determined that authorizing fireworks displays above the MBNMS might potentially disturb marine mammals and, accordingly, submitted an application in 2002 for a 5-year rule, authorizing take, by harassment, of a small number of California sea lions and Pacific harbor seals incidental to fireworks displays. If the action proposed in the small take application will have no more than a negligible impact on the species or stock, will not have an unmitigable adverse impact on the availability of the species or stock for subsistence uses, and the permissible methods of taking and required monitoring are set forth, then the NMFS shall issue the regulations. NMFS would then issue an LOA to the MBNMS each year that the rule is in effect, provided MBNMS complied with the previous LOA's mitigation, monitoring, and reporting requirements and no unauthorized take occurred during the previous year. The purpose of the 5-year rule and LOAs is to investigate the status of the marine mammals that may be impacted by the action, set forth the types and amount of take that may occur, and list the mitigation and monitoring required to ensure the least practicable impact to marine mammal species.

## **B. Issuance of Marine Sanctuary Authorizations for Fireworks under the NMSA**

Section 308 of the NMSA authorizes the Secretary of Commerce to issue such regulations as may be necessary to protect National Marine Sanctuary resources and qualities, among other purposes. Accordingly, the Secretary promulgated regulations in Title 15 of the Code of Federal Regulations (15 CFR), section 922.132(a) prohibiting several activities within the MBNMS as environmental protection measures, including unauthorized discharges into Sanctuary waters and harassment of marine mammals, seabirds, and sea turtles. The Secretary may grant specific exceptions to otherwise prohibited activities under special circumstances. Sections 922.49 and 922.132(e) of Title 15 CFR allow the Secretary to authorize any valid Federal, State, or local lease, permit, license, approval, or other authorization for activities within the MBNMS that would otherwise be prohibited under Sanctuary regulations, provided the applicant complies with any terms and conditions to protect Sanctuary resources and qualities.

Coastal fireworks displays within the MBNMS result in discharges of debris into Sanctuary waters, incidental harassment of wildlife, and potential negative impacts to habitat; such incidental impacts are prohibited by MBNMS regulations. The MBNMS has developed an extensive list of terms and conditions designed to minimize the impacts of fireworks displays within the Sanctuary. Coastal fireworks displays over the MBNMS generally require Federal, state, and or local permits that address public safety and coastal access. The Secretary of Commerce has delegated authority to the MBNMS Superintendent to authorize such permits (i.e. approve the activity if the Superintendent determines that terms and conditions may be applied to the activity that adequately protect Sanctuary resources and qualities.

This EA, in addition to assessing impacts of coastal fireworks displays upon marine mammals pursuant to the MMPA, analyzes impacts of fireworks displays upon the broader resources and qualities of the MBNMS. If it is determined that coastal fireworks displays can be conducted in a manner that safeguards Sanctuary resources and qualities, then the MBNMS may issue authorizations of other valid Federal, State, and local fireworks approvals for up to 5-year periods, with terms and conditions that mitigate negative impacts.

## **III. DESCRIPTION OF ACTIVITY TO BE COVERED BY PROPOSED MMPA LOAs AND MBNMS AUTHORIZATIONS**

### **A. Description of Fireworks Displays Authorized by MBNMS**

The activity to be conducted is the display of commercial-grade fireworks in the atmosphere and at ground or sea level. Since 1993, the MBNMS, a component of NOAA, has processed requests for the professional display of fireworks that affect the Sanctuary and its resources. The MBNMS has determined that debris fallout (spent pyrotechnic materials) from fireworks events constitute a discharge into the Sanctuary and thus a violation of Sanctuary regulations, unless written authorization is secured from the Sanctuary. Therefore, sponsors of fireworks displays conducted in the MBNMS are required to obtain Sanctuary authorization prior to conducting such displays.

Since 1993, the MBNMS has received a total of 79 requests for professional fireworks displays and has issued 67 Authorizations, the majority of which have been associated with large community events such as Independence Day and municipal festivals. The Sanctuary redirected at least 4 displays away from the Sanctuary and 2 applications are currently (as of March 2006) being processed. However, the Sanctuary projects that as many as 20 coastal displays per year may be conducted in, or adjacent to, the MBNMS boundaries in the future. The number of “public” fireworks displays within the Sanctuary has remained relatively constant over time. “Private” fireworks displays averaged one per year from 1993 to 2000. But within a six-month period from October 2000 to March 2001, the MBNMS received four requests for private displays in the Sanctuary, and information suggests that such requests could increase in the future. Table 1 presents a relative comparison of the types of fireworks events authorized by the MBNMS between 1993 and 2005.

Fireworks Event Category	Percentage of Total Fireworks Permits Issued
Independence Day Festivals	45%
City Festivals	28%
Private Events	27%

**Table 1.** Percentage of total fireworks Authorizations issued by event.

In considering requests to conduct fireworks displays, the MBNMS has consulted biologists from state and federal agencies and universities, local property managers and residents, environmental sensitivity index (ESI) maps prepared for the California Department of Fish and Game (CDFG) and NOAA, other environmental maps, and both published and unpublished resources. As a result, the MBNMS has added special conditions to fireworks Authorizations that are designed to minimize fireworks impacts upon resources and qualities. Jointly developed by the MBNMS, NMFS Southwest Region, and the U.S. Fish and Wildlife Service (USFWS), the special Authorization conditions help assure that protected species and habitats are not jeopardized by this activity.

However, the application of individual Authorization conditions alone are not sufficient to assure that protected species will be adequately safeguarded from potential cumulative impacts of fireworks activity within the Sanctuary. NMFS and the USFWS thus support additional conservation measures described in sections (VI)(A)(4) and (VII)(A).

## **B. Description of Pyrotechnic Devices**

Professional pyrotechnic devices used in firework displays can be grouped into three general categories: aerial shells (paper and cardboard spheres or cylinders ranging from 2 inches to 12 inches in diameter and filled with incendiary materials), low-level comet and multi-shot devices similar to over-the-counter fireworks such as roman candles, and set piece displays that are mostly static in nature and are mounted on the ground.

*Aerial shells* are launched from tubes (called mortars), using black powder charges, to altitudes of 200 to 1000 feet where they explode and ignite internal burst charges and incendiary chemicals. Most of the incendiary elements and shell casings burn up in the atmosphere; however, portions of the casings and some internal structural components and chemical residue fall back to the ground or water, depending on prevailing winds. An aerial shell casing is constructed of paper/cardboard or plastic and may include some plastic or paper internal components used to compartmentalize chemicals within the shell. Within the shell casing is a burst charge (usually black powder) and a recipe of various chemical pellets (stars) that emit prescribed colors when ignited. Table 2 describes a list of chemicals that are commonly used in the manufacturing of pyrotechnic devices. Manufacturers consider the amount and composition of chemicals within a given shell to be proprietary information and only release aggregate descriptions of internal shell components. The arrangement and packing of stars and burst charges within the shell determine the type of effect produced upon detonation.

Common Contents of Pyrotechnic Devices		
Potassium Chlorate	Strontium Nitrate	Iron
Potassium Perchlorate	Strontium Carbonate	Titanium
Potassium Nitrate	Sulfur	Shellac
Sodium Benzoate	Charcoal	Dextrine
Sodium Oxalate	Copper Oxide	Phenolic Resin
Ammonium Perchlorate	Polyvinyl Chloride	Aluminum

**Table 2.** List of chemicals commonly used in manufacture of polytechnic devices.

Attached to the bottom of an aerial shell is a lift charge of black powder. The lift charge and shell are placed at the bottom of a mortar that has been buried in earth/sand or affixed to a wooden rack. A fuse attached to the lift charge is ignited with an electric charge or heat source, the lift charge explodes, and propels the shell through the mortar tube and into the air to a height determined by the amount of powder in the lift charge and the weight of the shell. As the shell travels skyward, a time-delay secondary fuse is burning that eventually ignites the burst charge within the shell at peak altitude. The burst charge detonates, igniting and scattering the stars, which may, in turn, possess small secondary explosions. Shells can be launched one at a time or in a barrage of simultaneous or quick succession launches. They are designed to detonate between 200 and 1000 feet above ground level (AGL).

In addition to color shells (also known as designer or starburst shells), a typical fireworks show will usually include a number of aerial “salute” shells. The primary purpose of salute shells is to announce the beginning and end of the show and produce a loud percussive audible effect. These shells are typically two to three inches in diameter and packed with black powder to produce a punctuated explosive burst at high altitude. From a distance, these shells sound similar to cannon fire when detonated.

*Low-level* devices consist of stars packed linearly within a tube, and when ignited, the stars exit the tube in succession producing a fountain effect of single or multi-colored light as the stars incinerate through the course of their flight. Typically, the stars burn rather than explode, thus producing a ball or trail of sparkling light to a prescribed altitude where they simply extinguish. Sometimes they may terminate with a small explosion similar to a firecracker. Other low-level devices emit a projected hail of colored sparks or perform erratic low-level flight while emitting a high-pitched whistle. Some emit a pulsing light pattern or crackling or popping sound effects. In general, low-level launch devices and encasements remain on the ground or attached to a fixed structure and can be removed upon completion of the display. Common low-level devices are multi-shot devices, mines, comets, meteors, candles, strobe pots and gerbs. They are designed to produce effects between 0 and 200 feet AGL.

*Set piece* or *ground level* fireworks are primarily static in nature and remain close to the ground. They are usually attached to a framework that may be crafted in the design of a logo or familiar shape, illuminated by pyrotechnic devices such as flares, sparklers and strobes. These fireworks typically employ bright flares and sparkling effects that may also emit limited sound effects such as cracking, popping, or whistling. Set pieces are usually used in concert with low-level effects or an aerial show and sometimes act as a centerpiece for the display. It may have some moving parts, but typically does not launch devices into the air. Set piece displays are designed to produce effects between 0 and 50 feet AGL.

Each display is unique according to the type and number of shells, the pace of the show, the length of the show, the acoustic qualities of the display site, and even the weather and time of day. The vast majority (97 percent) of fireworks displays authorized in the Sanctuary between 1993 and 2005 were aerial displays that usually include simultaneous low-level displays. An average large display will last 20 minutes and include 700 aerial shells and 750 low-level effects. An average smaller display lasts approximately 7 minutes and includes 300 aerial shells and 550 low-level effects. There seems to be a declining trend in the total number of shells used in aerial displays, due to increasing shell costs and/or fixed entertainment budgets. Low-level displays sometimes compensate for the absence of an aerial show by squeezing a larger number of effects into a shorter timeframe. This results in a dramatic and rapid burst of light and sound effects at low level. A large low-level display may expend 4,900 effects within a seven-minute period, and a small display will use an average of 1,800 effects within the same timeframe. Some fireworks displays are synchronized with musical broadcasts over loudspeakers and may incorporate other non-pyrotechnic sound and visual effects. Table 3 provides a comparison of fireworks displays performed within the Sanctuary in the past.

Display Types	Duration of Display	Number of Aerial Effects	Number of Low-level Effects	Number of Set-Piece Devices
Aerial, Small	5 Minutes	300	550	0
Aerial, Large	20 Minutes	700	750	1
Aerial, Largest to Date	25 Minutes	1700	1800	0
Low-level, Small	7 Minutes	0	1800	0
Low-level, Large	7 Minutes	0	4900	1

**Table 3.** Comparison of fireworks displays performed within MBNMS in the past (as of 2005).

#### IV. ALTERNATIVES INCLUDING THE PROPOSED ACTION

##### **A. Issuance of LOAs and Sanctuary Authorizations for 20 Fireworks Displays Annually (Preferred Alternative)**

The preferred alternative is for NMFS to issue annual LOAs to MBNMS for up to five years, authorizing the incidental take, by Level B harassment, of a small number of California sea lions and Pacific harbor seals for up to 20 fireworks displays per year within the MBNMS boundaries. The MBNMS would then exercise its regulatory authority to issue Authorizations to applicants seeking permission to conduct fireworks displays within the MBNMS. The potential impacts to marine mammals from a LOA would be as described in section (VI)(A) of this document. Potential impacts to other Sanctuary resources from issuance of Sanctuary Authorizations are also described in section (VI)(A). Under this alternative, the mitigation measures and reporting requirements described in section (VII) will be incorporated into the LOAs and Sanctuary Authorizations. NMFS has determined that the fireworks displays MBNMS proposes to authorize would result in the taking by Level B harassment of only small numbers of marine mammals and have no more than a negligible impact on affected stocks. The MBNMS has determined that issuance of Sanctuary Authorizations for a limited number of fireworks displays under certain conditions and terms will not exceed negligible short-term impacts upon Sanctuary resources and qualities.

A description of the activity to be covered by the proposed LOAs and Sanctuary Authorizations was provided above. A further-detailed description of the fireworks displays authorized at MBNMS may be found in the application and the 2001 Assessment of Pyrotechnic Displays and Impacts within the MBNMS.

##### **B. Issuance of LOAs and Sanctuary Authorizations for 7 Fireworks Displays Annually**

Another alternative is for NMFS to issue annual LOAs to MBNMS for up to five years authorizing the incidental take, by Level B harassment of a small number of California sea lions and Pacific harbor seals over the course of 7 fireworks displays per year authorized by MBNMS that occur within the MBNMS boundaries. The potential impacts to marine mammals would be

as described in section (VI)(B). Under this alternative, the mitigation measures and reporting requirements described in Section (VII) would be incorporated into the LOAs and Sanctuary Authorizations. NMFS has determined that the fireworks displays MBNMS proposes to authorize would result in the harassment taking of only small numbers of marine mammals. The MBNMS has determined that issuance of Sanctuary Authorizations for a limited number of fireworks displays under certain conditions and terms will not exceed negligible short-term impacts upon Sanctuary resources and qualities.

### **C. Issuance of LOAs to Individual Fireworks Sponsors**

A third alternative is for NMFS to issue annual LOAs to individual sponsors (e.g. municipalities, civic organizations, commercial companies) of fireworks displays within the coastal area of the MBNMS. The potential impacts to marine mammals would be as described in section (VI)(B). Under this alternative, many of the mitigation measures and reporting requirements described in Section (VII) would be incorporated into LOAs, except that MBNMS Authorization provisions would not apply. This alternative would require submission of multiple application requests and a case-by-case assessment of proposed fireworks displays by NMFS, since the MBNMS will not be serving in a coordinating role regarding MMPA requirements. This alternative would also necessitate monitoring and individual reporting by fireworks sponsors instead of consolidated reporting by the MBNMS on their behalf. Individual fireworks sponsors will be fully responsible for compliance with the terms and conditions of LOAs issued for displays conducted under their supervision.

### **D. No Action Alternative**

The No Action Alternative would not involve the issuance of LOAs and Sanctuary Authorizations for fireworks displays within the MBNMS. The MMPA prohibits all takings of marine mammals unless authorized by a permit or exempted under the MMPA. If an authorization to incidentally take California sea lions and Pacific harbor seals were denied, the applicant could choose to amend the project to avoid harassing marine mammals or choose not to pursue the project at that location. Execution of the project without a take authorization could result in the incidental take of marine mammals in violation of the MMPA. Impacts to marine mammals would vary between no takes if fireworks are not conducted to impacts similar to those assessed for 20 displays.

If no Sanctuary Authorizations were issued for coastal fireworks displays, such displays would have to be cancelled or moved to inland sites. Execution of such displays without the issuance of Sanctuary Authorizations would likely result in the discharge of debris into Sanctuary waters and the disturbance of wildlife in violation of Sanctuary regulations.

## V. DESCRIPTION OF THE AFFECTED ENVIRONMENT

### A. Display Areas

The Monterey Bay area is located in the Oregonian province subdivision of the Eastern Pacific Boreal Region. The six types of habitats found in the bay area are: (1) submarine canyon habitat, (2) nearshore sublittoral habitat, (3) rocky intertidal habitat, (4) sandy beach intertidal habitat, (5) kelp forest habitat, and (6) estuarine/slough habitat. Pyrotechnic displays within the Sanctuary are conducted from a variety of coastal launch sites - beaches, bluff tops, piers, offshore barges, and golf course sand traps and tee boxes. In the past, authorized displays have been confined to eight general locations in the Sanctuary. However, these regulations authorize displays in only four prescribed areas within the Sanctuary. These sites are approved for fireworks events based on their proximity to urban areas and pre-existent high human use patterns, seasonal considerations such as the abundance and distribution of marine wildlife, and the acclimation of wildlife to human activities and elevated ambient noise levels in the area.

The four “conditional” display areas (areas authorized for displays under the NMFS regulation subject to terms and conditions imposed by MBNMS) are located at Half Moon Bay, the Santa Cruz/Soquel area, the northeastern Monterey Peninsula, and Cambria (Santa Rosa Creek). Under the preferred alternative, no more than 20 events per year may be authorized within these four specific areas of the Sanctuary’s 276 mi (444 km) of coastline are authorized by this regulation.

The conditional display areas for fireworks displays must first be described in order to understand which marine mammals in the area may be affected by the activity. Monterey Bay supports a wide array of temperate cold-water species with occasional influxes of warm-water species, and this species diversity is directly related to the diversity of habitats.

#### 1. Half Moon Bay

Site Description – The site has been used annually for a medium-sized Independence Day fireworks display on July 4, which lasts about 20 minutes. The launch site is on a sandy beach inside and adjacent to the east outer breakwater, upon which the aerial shells are launched and aimed to the southwest. The site is often fogged in during summer months. The marine venue adjacent to Pillar Point Harbor is preferred for optimal public access and to avoid the fire hazard associated with terrestrial display sites. The fireworks display occurs at the height of the dry season in central California, when area vegetation is particularly prone to ignition from sparks or embers.

Human Use Patterns – The harbor immediately adjacent to the impact area is home to a major commercial fishing fleet that operates at all times of the day and night throughout the year. The harbor also supports a considerable volume of recreational boat traffic. Half Moon Bay Airport (HAF) is located adjacent to the harbor, and approach and departure routes pass directly over the impact area. The airport is commonly used by general aviation pilots for training, with an annual average attendance of approximately 15 flights per day. On clear sunny weekends, the

airport may accommodate as many as 50 flights in a single day. Beachgoers and water sport enthusiasts use the beaches to the south of the launch site. The impact area is also used by recreational fishermen, surfers, swimmers, boaters, and personal watercraft operators. To the north, around Pillar Point is an area known as “Mavericks” considered a world-class surfing destination. Periodically, surfing contests are held at Mavericks. The impact area is also subjected to daily traffic noise from California Highway 1, which runs along the coast and is the primary travel route through the area.

**Marine Mammals** – A considerable concentration of harbor seals are present to the north around Pillar Point and on the coast to the south of the launch site. Within the Half Moon Bay area, depending on time of year and local environmental factors, MBNMS has estimated that an average of 20 sea lions (100 maximum) and an average of 15 harbor seals (65 maximum) may be present during a fireworks display. Sea otters are not concentrated in the impact area, though some individuals may be present. It is possible that individual elephant seals may enter the area from breeding sites at Año Nuevo Island and the Farallon Islands, but breeding occurs in the winter and displays in Half Moon Bay are limited to summer. Gray whales typically migrate west of the reefs extending south from Pillar Point.

**Other Marine Wildlife** – Resource information and discussions with area biologists indicate that snowy plover are present within 2 statute miles to the south of the launch site. Brown pelicans, gulls, cormorants, and other marine birds are present in the harbor where they roost on piers and other structures or rest on the calm waters within the breakwater.

## 2. Santa Cruz/Soquel

**Site Description** – Three separate fireworks display sites (Santa Cruz, Capitola, and Aptos) are located within the Santa Cruz/Soquel area. The Santa Cruz launch site has been used annually for City anniversary fireworks displays in early October. The launch site is on a sandy beach, adjacent to the Santa Cruz Boardwalk and the San Lorenzo River and along the west bank. The aerial shells are aimed to the south. The site is sometimes fogged in during summer months.

The Capitola launch site has been used only once since 1993 for a 50-year City anniversary fireworks display on May 23, 1999. This display was the largest volume fireworks display conducted in the MBNMS to date, incorporating 1700 aerial shells and 1800 low-level effects and lasting 25 minutes. The launch site was on the Capitola Municipal Pier, adjacent to the City of Capitola. The aerial shells were aimed above the pier. The site is sometimes fogged in during summer months.

The Aptos site has been used annually for a large fundraiser for Aptos area schools in October. The launch site is on the Aptos Pier and part of a grounded cement barge at Seaclyff State Beach. The aerial shells are aimed above and to the south of the pier. The site is sometimes fogged in during summer months. The large aerial show lasts for approximately 20 minutes.

Human Use Patterns – The harbor immediately adjacent to the Santa Cruz impact area is home to a commercial fishing fleet that operates at all times of the day throughout the year. The harbor primarily supports a large volume of recreational boater traffic. The launch site is in the center of the shoreline of a major urban coastal city. The beaches to the west of the launch site are adjacent to a large coastal amusement park complex and are used extensively by beachgoers and water sport enthusiasts from the local area as well as San Jose and San Francisco. The impact area is used by boaters, recreational fishermen, swimmers, surfers, and other recreational users. Immediately southwest of the launch site is a mooring field and the Santa Cruz Municipal Pier which is lined with retail shops, restaurants, and offices. To the west of the pier is a popular local surfing destination known as “Steamer Lane.” Surfing contests are routinely held at the site. During the period from sunset through the duration of the fireworks display, 40-70 vessels anchor within the impact area to view the fireworks. Vessels criss-cross through the waters south of the launch site to take up position. In addition, U. S. Coast Guard and harbor patrol vessels motor through the impact area to maintain a safety zone around the launch site.

The Capitola impact area is immediately adjacent to a small urban community. The beaches to the east and west of the launch site are used daily by beachgoers and water sport enthusiasts from the regional area. The impact area is used by boaters, recreational fishermen, swimmers, surfers, and other recreational users. To the east of the Pier is a mooring field and popular public beach.

The Aptos impact area is immediately adjacent to a recreational beach. The beaches to the east and west of the launch site are used daily by beachgoers and water sport enthusiasts from the regional area. The impact area is used by boaters, recreational fishermen, swimmers, surfers, and other recreational users, but typically at moderate to light levels of activity. To the east and west of the Pier are public use beach areas and private homes at the top of steep coastal bluffs. During the period from sunset through the duration of the fireworks display, 30-40 vessels anchor within the impact area to view the fireworks. Vessels criss-cross through the waters seaward of the cement barge to take up position. In addition, U. S. Coast Guard and State Park Lifeguard vessels motor through the impact area to maintain a safety zone around the launch site.

Marine Mammals – California sea lions routinely use the Santa Cruz Municipal Pier as a haulout and resting site. Sea otters are moderately concentrated in the impact area, primarily around the nearshore kelp forests. Within the Santa Cruz/Soquel area, depending on time of year, specific launch site, and local environmental factors, MBNMS has estimated that an average of 0-100 sea lions (5-190 maximum) and an average of 0-15 harbor seals (5-50 maximum) may be present during a fireworks display. Gray whales typically migrate along a southerly course, west of Point Santa Cruz and away from the pier. Sea otters are moderately concentrated in the impact areas near the Capitola Municipal Pier and Aptos Pier, primarily in and around the nearshore kelp forests. At the seaward end of the Aptos Pier is a 400-foot grounded cement barge. The barge was set in position as an extension of the pier, but has since been secured against public access. The exposed interior decks of the barge have created convenient haulout surfaces for harbor seals. In a 2000 survey, the MBNMS recorded as many as 45 harbor seals hauled out on the barge in the month of October.

Other Marine Wildlife – The Santa Cruz Municipal Pier is a roost for a large number of gulls, Brown pelicans, and other marine birds. Brown pelicans, cormorants, gulls, and other marine birds routinely use the Capitola Municipal Pier as a roosting site. Seabirds also often gather on the sand beach at the mouth of Soquel Creek where a lagoon forms in the summer. The creek empties into the ocean immediately east of the Municipal Pier. Brown pelicans, cormorants, gulls, and other marine birds routinely use the Aptos cement barge (described above) as a roosting site. The barge has broken into two parts isolating the bow section from the rest of the vessel. The isolated bow section is particularly favored by pelicans and cormorants, and contains the bulk of roosting seabirds. Black turnstones seem to favor the interior spaces of the vessel along the aft section, and gulls attend the upper portions of the aft superstructure. Approximately 1/2 statute miles to the east of the pier is the mouth of Aptos Creek where shorebirds congregate.

### 3. Monterey Peninsula

Site Description – Two separate fireworks display sites (City of Monterey and Pacific Grove) are located within the Monterey Peninsula Area. Each Independence Day, the City of Monterey launches approximately 750 shells and an equal number of low-level effects from a barge anchored approximately 1000 feet east of Municipal Wharf II and 1000 feet north of Del Monte Beach. The aerial shells are aimed above and to the northeast. The site is often fogged in during summer months. The City’s display lasts approximately 20 minutes and is accompanied by music broadcasted from speakers on Wharf II. The marine venue adjacent to Monterey Harbor is preferred for optimal public access and to avoid the fire hazard associated with terrestrial display sites. The fireworks display occurs at the height of the dry season in central California, when area vegetation is particularly prone to ignition from sparks or embers. Since 1999, a Monterey New Year’s festival has used the City’s launch barge for an annual fireworks display. The medium-size aerial display lasts approximately 8 minutes. In addition, three private displays (1993, 1998, and 2000) have been authorized from a launch site on Del Monte Beach. The 1993 display was an aerial display. Subsequent displays have been low-level displays, lasting approximately 7 minutes.

The Pacific Grove site has been used annually for a “Feast of Lanterns” fireworks display in late July. The Feast of Lanterns is a community event that has been celebrated in the City of Pacific Grove for over 95 years. The fireworks launch site is at the top of a rocky coastal bluff adjacent to an urban recreation trail and public road. The aerial shells are aimed to the northeast. The site is often fogged in during summer months. The small aerial display lasts approximately twenty minutes and is accompanied by music broadcasted from speakers at Lover’s Cove. The fireworks are part of a traditional outdoor play that concludes the festival. The marine venue is preferred for optimal public access and to avoid the fire hazard associated with terrestrial display sites. The fireworks display occurs at the height of the dry season in central California, when area vegetation is particularly prone to ignition from sparks or embers.

Human Use Patterns – The Monterey fireworks impact area lies directly under the approach/departure flight path for Monterey Peninsula Airport (MRY) and is commonly exposed to noise and exhaust from general aviation, commercial, and military aircraft at approximately

500 feet altitude. The airport supports approximately 280 landings/takeoffs per day in addition to touch-and-goes (landing and takeoff training). Commercial and recreational vessels operate in the area during day and night hours from the adjacent harbor. A 30-station mooring field lies within the impact area between the launch barge and Municipal Wharf II. The moorings are completely occupied during the annual fireworks event. Auto traffic and emergency vehicles are audible from Lighthouse and Del Monte Avenues, main transportation arteries along the adjacent shoreline. The impact area is utilized by thousands of people each week for boating, kayaking, scuba diving, fishing, swimming, and harbor operations. During the period from sunset through the duration of the fireworks display, 20-30 vessels anchor within the impact area to view the fireworks. Vessels criss-cross through the waters south of the launch site to take up position. In addition, U. S. Coast Guard and harbor patrol vessels motor through the impact area to maintain a safety zone around the launch site.

The Pacific Grove launch site is in the center of an urban shoreline, adjacent to a primary public beach in Pacific Grove. The shoreline to the east and west of the launch site is lined with residences and a public road and pedestrian trail. The impact area is used by boaters, recreational fishermen, swimmers, surfers, divers, beachgoers, tidepoolers, and others. The center of the impact area is in a cove with 30-40 foot coastal bluffs. Immediately north of the launch site is a popular day use beach area. On a clear summer day, the beach may support up to 500 visitors at any given time. Surfing activity is common immediately north of the site. During the period from sunset through the duration of the fireworks display, 10-20 vessels anchor within the impact area to view the fireworks. A U. S. Coast Guard vessel motors through the impact area to maintain a safety zone seaward of the launch site.

Marine Mammals – The largest concentration of wildlife near the Monterey impact area are California sea lions and marine birds resting at the Monterey breakwater approximately 700 yards northwest of the center of the impact area. Within the Monterey Bay area, depending on time of year, specific launch site, and local environmental factors, MBNMS has estimated that an average of 0-700 sea lions (150-1500 maximum) and an average of 7-50 harbor seals (60-100 maximum) may be present during a fireworks display. Several sea otters are present within Monterey Harbor and the impact area during the time of the fireworks display. Otters outside the harbor are most concentrated to the northwest of the Monterey breakwater, however, otters routinely forage and loiter within the impact area and along the shoreline to the north.

Sea otters and pups routinely forage and loiter within the Pacific Grove impact area in moderate numbers. Harbor seals routinely use offshore rocks and wash rocks for haulout and also forage in the area.

Other Marine Wildlife - Non-breeding California brown pelicans appear in greatest number in central California during the late summer and fall. Within the Monterey harbor area, pelicans roost on the Monterey breakwater; on wharfs, piers, and structures; on exposed rocks in the harbor; and on the barge used to launch pyrotechnics during the fireworks display. The southernmost documented plover nest site (no longer active) near east Monterey was located approximately 1000 yards north of the launch site. The public beaches where spectators gather for City fireworks displays are routinely groomed by municipal public works department staff

and frequented daily by beachgoers and their domestic pets. These beaches are high human use areas, and therefore, do not present optimal nesting habitat. The likelihood of successful nesting and nest survival in these high-use beach areas is low. The greatest nesting density for snowy plover in the local region is centered 6-10 statute miles to the north.

Individual cormorants and gulls often roost on offshore rocks adjacent to the Pacific Grove launch site, but there are no large concentrations of marine birds due to the high volume of human activity and lack of significant roosting habitat. A small roost site exists at Point Cabrillo, approximately 3/4 miles southeast of the launch site, and hosts aggregations of gulls, cormorants, pelicans, and other marine birds. Extensive kelp beds cover much of the impact area. The Hopkins Marine Reserve boundary is approximately 1/2 statute mile southeast of the launch site.

#### 4. Cambria

**Site Description** – The site has been used annually for a small Independence Day fireworks display on July 4, which lasts approximately 20 minutes. The launch site is on a sandy beach at Shamel County Park, and the aerial shells are aimed to the west. Immediately north of the launch site is the mouth of Santa Rosa Creek and Lagoon. The marine venue is preferred for optimal public access and to avoid the fire hazard associated with terrestrial display sites. The fireworks display occurs at the height of the dry season in central California, when area vegetation is particularly prone to ignition from sparks or embers.

**Human Use Patterns** – The impact area is immediately adjacent to a county park and recreational beach. The impact area is used by boaters, recreational fishermen, swimmers, surfers, and beachgoers. The shoreline south of the launch site is lined with hotels, abuts a residential neighborhood, and is part of San Simeon State Beach.

**Marine Mammals** – The impact area includes low concentrations of harbor seals. Sea otters and sea lions are present in the impact area in moderate numbers. Within the Cambria area, depending on time of year, specific launch site, and local environmental factors, MBNMS has estimated that an average of 0 sea lions (25-50 maximum) and an average of 20 harbor seals (60 maximum) may be present during a fireworks display. It is possible that individual elephant seals may enter the area from breeding sites to the north at Point Piedras Blancas, but breeding occurs in the winter and displays at Cambria are limited to the summer. Gray whales migrate along the coast in this area and may pass through the impact area, but July is not peak gray whale migration period.

**Other Marine Wildlife** - Immediately north of the launch site is the mouth of Santa Rosa Creek and Lagoon. Gulls, shorebirds, and waterfowl are commonly found in the lagoon. Snowy plover habitat is located 1 1/2 miles to the north of the launch site.

## B. Marine Mammals Potentially Found in the Area

Twenty-six species of marine mammals have been observed in the Monterey Bay area, including five species of the sub-order pinnipeds (seals and sea lions), one species from the sub-order fissipeds (sea otter), and twenty species of the order cetaceans (whales and dolphins). Of these, the species of marine mammals that are likely to be present in any of the four fireworks display impact zones at the time of fireworks displays include the California sea lion (*Zalophus californianus*), Pacific harbor seal (*Phoca vitulina richardsi*), bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocena phocena*), California gray whale (*Eschrichtius robustus*), and Southern sea otters (*Enhydra lutris neries*). One additional species that would be found only rarely within fireworks impact zones at the time of display is the northern elephant seal (*Mirounga angustirostris*). General information on these species can be found in Folkens' *Guide to the Marine Mammals of the World* (2002). Information relevant to the distribution, abundance and behavior of the species that are most likely to be impacted by fireworks displays within the MBNMS is provided below. Additional information regarding these species may be found the FR Notice for the IHA (68 FR 28810, May 27, 2003) and in the NMFS stock assessments on the NMFS website: [http://www.nmfs.noaa.gov/pr/PR2/Stock\\_Assessment\\_Program/individual\\_sars.html](http://www.nmfs.noaa.gov/pr/PR2/Stock_Assessment_Program/individual_sars.html). Relevant information from these sources on these species is incorporated by reference.

### 1. California Sea Lions (*Zalophus californianus*)

The population of California sea lions ranges from southern Mexico to southwestern Canada (Caretta et al., 2004). In the U.S., they breed during July after pupping in late May to June, primarily in the Channel Islands of California. Most individuals of this species breed on the Channel Islands off southern California (100 miles south of the MBNMS) and off Baja and mainland Mexico (Odell 1981), although a few pups have been born on Año Nuevo Island (Keith et al., 1984). Following the breeding season on the Channel Islands, most adult and sub-adult males migrate northward to central and northern California and to the Pacific Northwest, while most females and young animals either remain on or near the breeding grounds throughout the year or move southward or northward, as far as Monterey Bay.

Since nearing extinction in the early 1900's, the California sea lion population has increased and is now robust and growing at a current rate of 5.4 to 6.1 percent per year (based on pup counts) with an estimated "minimum" population (U.S. West Coast) of 138,881 animals. Actual population level may be as high as 237,000 to 244,000 animals. The population is not listed as "endangered" or "threatened" under the Endangered Species Act (ESA); nor is this species designated as "depleted" or classified as a "strategic stock" under the MMPA.

In any season, California sea lions are the most abundant pinniped in the area (Bonnell et al., 1983), primarily using the central California area to feed during the non-breeding season. After breeding farther south along the coast and migrating northward, populations peak in the Monterey Bay area in fall and winter and are at their lowest numbers in spring and early summer. A minimum of 12,000 California sea lions is probably present at any given time in the MBNMS

region. Año Nuevo Island is the largest single haul-out site in the Sanctuary, hosting as many as 9,000 California sea lions at times (Weise, 2000 and Lowry, 2001).

## 2. Harbor Seal (*Phoca vitulina richardsi*)

Harbor seals are distributed throughout the west coast of the U.S., inhabiting near-shore coastal and estuarine areas from Baja California, Mexico, to the Pribilof Islands in Alaska. They generally do not migrate, but have been known to travel extensive distances to find food or suitable breeding areas (Caretta et al., 2004). In California, approximately 400-500 harbor seal haulout sites are widely distributed along the mainland and on offshore islands (Caretta et al., 2004).

The harbor seal population in California is healthy and growing at a current rate of 3.5 percent per year with an estimated “minimum” population (California) of 25,720 animals (Caretta et al., 2004). The California population is estimated at 27,863 animals. The population is not listed as “endangered” or “threatened” under the ESA; nor is this species designated as “depleted” or classified as a “strategic stock” under the MMPA.

Harbor seals are residents in the MBNMS throughout the year, occurring mainly near the coast. They haul out at dozens of sites along the coast from Point Sur to Año Nuevo. Within MBNMS, tagged harbor seals have been documented to move substantial distances (10-20 km) to foraging areas each night (Oxman 1995, Trumble 1995). The species does breed in the Sanctuary, and pupping within the Sanctuary occurs primarily during March and April followed by a molt during May and June. Peak abundance on land within the Sanctuary is reached in late spring and early summer when they haul out to breed, give birth to pups, and molt (MBNMS Final Environmental Impact Statement (FEIS), 1992).

## 3. Southern Sea Otters (*Enhydra lutris neries*)

The southern sea otter population presently contains about 2,150 animals, and can be found along the coast of central and southern California from Half Moon Bay to Point Conception (USFWS, 2003). They can be found throughout the shallow waters of Monterey Bay from Pismo Beach to Año Nuevo Island. Approximately 31 percent of this population is currently found in the area from Point Sur north to Año Nuevo/Pigeon Point. Southern sea otters breed and give birth year round, however the seasonality is not highly synchronous and the birth peak may extend over several months.

Range-wide population counts declined at a rate of approximately 5 percent per year between 1995 and 1999, although the population’s range expanded both to the north and the south. The current population status is less certain, with recent counts being relatively stable (USFWS, 2003). The southern sea otter is listed as “threatened” under the ESA, and is therefore also designated as “depleted” under the MMPA. Take of southern sea otters is regulated by the USFWS.

Within the MBNMS, sea otters inhabit a narrow zone of coastal waters, normally staying within one mile from shore (MBNMS FEIS, 1992). They forage in both rocky and soft-sediment communities as well as in the kelp understory and canopy. They seldom are found in open waters deeper than 30 m, preferring instead the kelp beds, which serve as vital resting, foraging, and nursery sites. An official state-designated Sea Otter Game Refuge extends from Carmel south to Santa Rosa Creek near Cambria, encompassing about half the otter's established range.

#### 4. California Gray Whale (*Eschrichtius robustus*)

The latest abundance estimate is 26,635, based on counts made during the 1997/1998 southbound migration; however, the population size of this species has increased slightly over the past few decades (Caretta *et al.*, 2002). Because of these increases, in 1994 the gray whale was de-listed from its “endangered” under the ESA, and was also undesignated as “depleted” under the MMPA.

Gray whales are seasonal migrants, traveling close to shore, and are the object of most of the whale watching in the area. They pass through the area of the Sanctuary twice during their yearly migrations. The peak northward migration of male gray whales occurs in mid-March, followed two months later by the second migration wave, which is composed of cows and calves. These whales migrate from wintering grounds in Baja California, Mexico, northward to Alaska. The southbound migration occurs in late December and January, from their breeding grounds in the north back down to the south. The species does not breed in the Sanctuary.

No California gray whales have ever been sighted in fireworks impact areas during displays. Display locations within Monterey Bay are not immediately adjacent to the prime coastal migration route, since most gray whales bypass the inner shorelines of the bay, instead transiting between Point Piños and Point Santa Cruz. Likewise, the Half Moon Bay display occurs east of the natural reef barrier between the migration route and the shoreline. The only remaining display site that might impact gray whales is at Cambria, but the current display authorized for the area occurs in July, outside of the prime migration seasons.

#### 5. Bottlenose dolphin (*Tursiops truncatus*)

Bottlenose dolphins are distributed world-wide in tropical and warm-temperate waters, including California where separate coastal and offshore populations are known to exist (Caretta *et al.*, 2004). Relative to the location of the MBNMS, California coastal bottlenose dolphins are found within about 1 kilometer of shore primarily from Point Conception south into Mexican waters. Bottlenose dolphins are found in small numbers (12-18) within the bay seemingly on a year-round basis (MBNMS FEIS, 1992). The best current estimate of the average number of coastal bottlenose dolphins from this stock in this area is 206 animals (Caretta *et al.*, 2004). This species is not listed under the ESA or listed as depleted under the MMPA.

## 6. Harbor porpoise (*Phocena phocena*)

In the Pacific Ocean, harbor porpoises are found in coastal and inland waters from Point Conception, CA to Alaska and across the Pacific to Kamchatka and Japan (Barlow *et al.*, 1995, Gaskin 1984). This species appears to have more restricted movements along the west coast of the continental U.S. than along the eastern coast. Harbor porpoises prefer shallow waters, and can usually be found over sandy bottoms just off the surf in the north central part of the bay.

Based on aerial surveys from 1997-1999 under good survey conditions, the estimate of abundance for the Monterey Bay stock of this species is 1,603 animals with a minimum abundance estimate of 1,143 animals (Caretta *et al.*, 2002). Population growth has not been measured for any harbor porpoise population (Caretta *et al.*, 2002). This species is not listed under the ESA or listed as depleted under the MMPA.

## 7. Northern elephant seal (*Mirounga angustirostris*)

Northern elephant seals breed and give birth in California (U.S.) and Baja California (Mexico), primarily on offshore islands (Stewart *et al.*, 1994), in the winter months from December to March (Stewart and Huber, 1993). They then disperse to feed in pelagic waters throughout the eastern North Pacific. Adults return to land between March and August to molt, with males returning later than females (Caretta *et al.*, 2002).

Elephant seals nearly became extinct in the past century, but have undergone a remarkable sustained population growth, and colonies continue to grow. Based on an estimated 28,845 pups born in California in 2001, the California stock was estimated to be 101,000 in 2001, while the minimum population size was estimated conservatively to be 60,547 (Caretta *et al.*, 2004). They are not listed under the ESA or listed as depleted under the MMPA.

Peak abundances on land within the MBNMS occur in the spring when juvenile males and females haulout to molt. The breeding population at these locations presently numbers about 3,500 animals, and the spring population on land exceeds 4,000 animals (MBNMS FEIS, 1992). The largest populations are on Año Nuevo Island and the adjacent mainland point. Estimates based on population structure indicate that elephant seals of the Año Nuevo colony account for about 4% of the entire world population of this species (MBNMS FEIS, 1992). The elephant seal would only rarely be found within the fireworks areas of the MBNMS.

## C. Other Protected Marine Wildlife Potentially Found in the Area

### 1. Brown Pelican (*Pelecanus occidentalis*)

The brown pelican was federally listed as endangered in 1970 (35 *Federal Register* 16047). The recovery plan for the brown pelican describes the biology, reasons for decline, and actions needed for recovery of the species (USFWS, 1983). Critical habitat for the brown pelican has not been designated.

The California brown pelican is one of six recognized subspecies of the brown pelican. The brown pelican is a large bird recognized by the long, pouched bill that is used to catch surface-schooling fishes. The California brown pelican weighs up to ten pounds and has a wingspan of up to eight feet.

The brown pelican is a conspicuous resident along the coasts of California and Baja California. Brown pelicans nest in colonies on small coastal islands that are free of mammalian predators and human disturbance. They are associated with an adequate and consistent food supply and areas with appropriate roosting sites for both resident and migrant pelicans (USFWS 1983). During the non-breeding season, brown pelicans roost communally in areas that are near adequate food supplies, have some type of physical barrier to predation and disturbance, and that provide some protection from environmental stresses such as wind and high surf. Offshore rocks, breakwaters, and jetties are often used for roosting.

The breeding distribution of the California brown pelican ranges from the Channel Islands of southern California southward to the islands off Nayarit, Mexico. When not breeding, pelicans may range as far north as Vancouver Island, British Columbia, Canada, and south to Colima, Mexico. The maximum breeding population of the California brown pelican throughout its range may number about 55,000 to 60,000 pairs. The largest breeding group is located on the Gulf of California, comprising approximately 68 percent of the total breeding population. Only two breeding colonies exist in the United States. These are located on Anacapa and Santa Barbara Islands. In the past, breeding occurred as far north as Point Lobos near Monterey.

Brown pelicans are seasonally present at all general fireworks display locations within the MBNMS and react to fireworks in the same general manner as other marine birds. Pelicans do not nest or breed in the Sanctuary.

## 2. Western Snowy Plover (*Charadrius alexandrinus nivosus*)

The Pacific coast population of the western snowy plover was federally listed as threatened on March 5, 1993 (58 *Federal Register* 12864). A draft recovery plan for the western snowy plover has been completed (USFWS, 2001).

Critical habitat for this taxa was designated for 28 units along the coasts of Washington, Oregon, and California on December 7, 1999 (64 *Federal Register* 68508). The primary constituent elements for western snowy plover critical habitat include space for individual and population growth, and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species. The primary constituent elements are found in areas that support or have the potential to support intertidal beaches (between mean low water and mean high tide), associated dune systems, and river estuaries. Important components of the beach/dune/estuarine ecosystem include surf-cast kelp, sparsely vegetated foredunes (beach area immediately in front of a sand dune), interdunal flats (flat land between dunes), spits, washover areas, blowouts (a hole or cut in a dune caused by storm action), intertidal flats (flat

land between low and high tides), salt flats, flat rocky outcrops, and gravel bars. Several of these components (sparse vegetation, salt flats) are mimicked in artificial habitat types used less commonly by snowy plovers (*i.e.*, dredge spoil sites and salt ponds and adjoining levees).

The western snowy plover is one of 12 subspecies of the snowy plover (*Charadrius alexandrinus*). The species occurs within the family Charadriidae. The western snowy plover is a small, pale-colored shorebird with dark patches on either side of the upper breast.

Western snowy plovers prefer coastal beaches that are relatively free from human disturbance and predation. Sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries are the preferred habitats for nesting plovers. Several of these components (*e.g.*, sparse vegetation, salt flats) are mimicked in artificial habitat types used less commonly by western snowy plovers.

Western snowy plovers tend to be gregarious during the winter months. Western snowy plovers are primarily visual foragers, feeding on invertebrates in the wet sand and surf-cast kelp within the intertidal zone, in dry, sandy areas above the high tide, on salt pans, on spoil sites, and along the edges of salt marshes, salt ponds, and lagoons.

The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico. Historically, western snowy plovers bred or wintered at 157 locations on the Pacific coast, including 133 sites in California. Larger numbers of birds are found in southern and central California, in Monterey Bay (estimated 200 to 250 breeding adults), Morro Bay (estimated 85 to 93 breeding adults), Pismo Beach to Point Sal (estimated 130 to 246 breeding adults), Vandenberg Air Force Base (estimated 130 to 240 breeding adults), and the Oxnard Lowland (estimated 69 to 105 breeding adults).

During the non-breeding season, western snowy plovers may remain at breeding sites or may migrate to other locations. Most winter south of Bodega Bay, California. Many birds from the interior population winter on the central and southern coast of California.

Western snowy plovers bred at 53 coastal locations in California prior to 1970. Between 1970 and 1981, western snowy plovers stopped breeding in parts of San Diego, Ventura, and Santa Barbara counties, most of Orange County, and all of Los Angeles County (Page and Stenzel 1981). By 1991, 78 percent of the remaining breeding population in coastal California nested at only eight sites: San Francisco Bay, Monterey Bay, Morro Bay, Callendar-Mussel Rock dunes area, the Point Sal to Point Conception area (Vandenberg Air Force Base), Oxnard lowlands, Santa Rosa Island, and San Nicolas Island (Page *et al.*, 1991).

Five critical habitat units for the Pacific coast population of the western snowy plover have been designated within the area where fireworks events may be authorized. Some of these units are subdivided into one or more subunits. These areas include the Half Moon Bay Beaches (one subunit), the Santa Cruz Coast Beaches (four subunits), Monterey Beaches (five subunits), Point Sur Beach (one subunit), and Arroyo Hondo Creek Beach (one subunit).

### 3. Other Marine Birds

Cormorants and gulls commonly forage, roost, and nest near most fireworks launch sites. These species are common throughout the MBNMS and nest in the spring and early summer months on piles, dolphins, piers, buildings, and coastal rocks and structures. Their population numbers are healthy and growing, and birds inhabiting urban areas have adapted to increased noise levels caused by various human activities.

Other marine birds occasionally found near fireworks sites on a seasonal basis are sooty shearwaters, western grebes, common loons and surf scoters. None of these birds nest within the MBNMS nor roost onshore. All enter the Sanctuary to forage during non-breeding seasons. Loons, grebes, and scoters appear in the Sanctuary in modest numbers during late fall and winter months. Shearwaters are true pelagic seabirds that appear throughout the Sanctuary in large aggregations totaling tens of thousands from spring until early fall.

The USFWS has determined that the protected marine bird species marbled murrelet, California condor, California clapper rail, California least tern do not occur in assigned fireworks display areas and are thus not likely to be impacted by authorized fireworks activity.

## VI. ENVIRONMENTAL CONSEQUENCES

### **A. Issuance of LOAs and Sanctuary Authorizations For 20 Fireworks Displays (Preferred Alternative)**

#### **1. Potential Direct Effects on Marine Mammals and Other Sanctuary Resources – Sound and Light**

Marine mammals can be impacted by fireworks displays in three ways: light, sound, and debris. The primary causes of disturbance are light flashes and sound effects from exploding fireworks. Pyrotechnic devices that operate at higher altitudes are more likely to have a larger impact area (such as aerial shells), while ground and low-level devices have more confined effects. The impact area is defined as the area where sound, light, and debris effects have direct impacts on marine organisms and habitats. Direct impacts include, but are not limited to, immediate physical and physiological impacts such as abrupt changes in behavior, flight response, diving, evading, flushing, cessation of feeding, and physical impairment or mortality.

The largest commercial aerial shells used within the Sanctuary are 10-12 inches in diameter and reach a maximum altitude of 1000 feet AGL. The bursting radius of the largest shells is approximately 850 feet. The impact area can extend from 1 to 2 statute miles from the center of the detonation point depending on the size of the shell, height of the explosions, type of explosions, wind direction, atmospheric conditions, and local topography.

Aerial shells produce flashes of light that can be brilliant (exceeding 30,000 candela<sup>8</sup>) and can occur in rapid succession. Loud explosive and crackling sound effects stem primarily from salutes (described earlier) and bursting charges at altitude. People and wildlife on the ground

and on the surface of the water can feel the sound waves and the accompanying rapid shift of ambient atmospheric pressure. This pressure wave has been known to activate car alarms that detect vibration. Sounds attenuate farther from high altitude shells than low altitude shells since they are not as easily masked by buildings and landforms, allowing the sound envelope to ensonify more surface area on the ground and water. The sound from the lifting charge detonation is vectored upward through the mortar tube opening and reports as a dull thump to bystanders on the ground, far less conspicuous than the high-level aerial bursts. The intensity of an aerial show can be amplified by increasing the number of shells used, the pace of the barrage, and the length of the display.

Low-level devices reach a maximum altitude of 200 feet AGL. The impact area can extend to 1 statute mile from the center of the ignition point depending on the size and flight patterns of projectiles, maximum altitude of projectiles, the type of special effects, wind direction, atmospheric conditions, and local structures and topography. Low-level devices also produce brilliant flashes and fountains of light and sparks accompanied by small explosions, popping, and crackling sounds. Since they are lower in altitude than aerial shells, sound and light effects impact a smaller area. Low-level devices do not typically employ large black powder charges like aerial shells, but are often used in large numbers in concert with one another and in rapid succession, producing very intense localized effects.

Set Pieces are stationary, do not launch any encased effects into the air, and produce effects between 0 and 50 ft AGL. Small pellets of a pyrotechnic composition, such as those from sparklers or roman candles may be expelled a short distance into the air. Loud, but not explosive, noises, such as crackling, popping, or whistling may emanate from a set piece, though they are usually used in concert with low-level effects and aerial displays. Depending on the size and height of the structure, the number and type of effects, wind direction, and local topography, the impact area can extend up to 0.5 mile from the center of the ignition point, though fallout is generally confined within a 100 yard radius. Residue may include smoke, airborne particulates, fine solids, and slag.

The primary impact to wildlife noted in past observation reports by Sanctuary staff is the disturbance of marine mammals and seabirds from the light and sound effects of the exploding aerial shells. The loud sound bursts and pressure waves created by the exploding shells appear to cause more wildlife disturbance than the illumination effects. In particular, the percussive aerial salute shells have been observed to elicit a strong flight response in California sea lions and marine birds in the vicinity of the impact area (within 800 yards of the launch site).

#### *a. Physical Impairment*

In 2001, the MBNMS and USFWS monitored the July 4 City of Monterey fireworks display with the most thorough effort to date. Monitors recorded species abundance before, during, and after the event and measured the decibel level of exploding fireworks. A hand-held decibel meter was located aboard a vessel adjacent to the Monterey Breakwater, approximately one half mile from the fireworks launch site. The highest sound pressure level (SPL) reading observed on the decibel meter during the fireworks display (which did not include aerial salutes)

was 82 decibels. In the Vandenberg Air Force Base (VAFB) studies (described in sub-section b. below), some harbor seals remained at their haul-out during a space rocket launch until the sound exposure level (SEL) was 100 decibels or above (which, in the case of the VAFB launch locations and durations, is equivalent to an SPL of 89 to 95 decibels), and only short-term effects were detected. The typical decibel levels for the display ranged from 70 to 78 decibels, and no salute effects were used in the display. An ambient noise level of 58 decibels was recorded at the survey site 30 minutes following the conclusion of the fireworks. The final regulations for incidental take of marine mammals during fireworks displays include an acoustic monitoring requirement to measure sound levels at the Monterey Breakwater (where sea lions typically haul out) during the 2006 City of Monterey Fourth of July fireworks display (which will include aerial salutes).

Permanent (auditory) threshold shift (PTS) occurs when there is physical damage to the sound receptors in the ear. In some cases there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges. Although there is no specific evidence that exposure to fireworks can cause PTS in any marine mammals, physical damage to a mammal's ears can potentially occur if it is exposed to sound impulses that have very high peak pressures, especially if they have very short rise times (time required for sound pulse to reach peak pressure from the baseline pressure). Such damage can result in a permanent decrease in functional sensitivity of the hearing system at some or all frequencies.

Temporary (auditory) threshold shift (TTS) is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). When an animal experiences TTS, its hearing threshold rises and a sound must be stronger in order to be heard. TTS can last from minutes or hours to (in cases of strong TTS) days. Richardson *et al.* (1995) note that the magnitude of TTS depends on the level and duration of noise exposure, among other considerations. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity recovers rapidly after exposure to the noise ends.

Temporary or permanent hearing impairment is a possibility when marine mammals are exposed to very strong sounds, but there has been no specific documentation of this for marine mammals exposed to fireworks. Based on current information, NMFS precautionarily sets impulsive sounds equal to or greater than 190 dB re 1 microPa (rms) as the exposure thresholds for onset of Level A harassment (injury or mortality) for pinnipeds, *in water* (NMFS, 2000). If measured by an inanimate receiver 190 dB re 1 microPa (rms) would equal an A-weighted sound intensity level of 128 dB re 20 microPa, which are the units used for airborne sound. However, environmental conditions and the ear of the receiving animal may alter how the sound is received in air versus water, and precise exposure thresholds for airborne sounds have not been agreed upon.

Some factors that contribute to onset of PTS are as follows: (1) exposure to single very intense noises, (2) repetitive exposure to intense sounds that individually cause TTS but not PTS, and (3) recurrent ear infections or (in captive animals) exposure to certain drugs.

Given the frequency, duration, and intensity of sounds (maximum measured 82 dB for larger aerial shells) that marine mammals may be exposed to, it is unlikely that they would sustain temporary, much less permanent, hearing impairment during fireworks displays.

In order to determine if harbor seals experience any change in their hearing sensitivity as a result of launch noise, researchers at VAFB conducted Auditory Brainstem Response (ABR) testing on 10 harbor seals prior to, and after, the launches of 3 Titan IV rockets (one of the loudest launch vehicles at the south VAFB haul-out site). Detailed analysis of the changes in waveform latency and waveform replication of the ABR measurements showed that there were no detectable changes in the seals' hearing sensitivity as a result of the launch noise, which ranged from an A-weighted SPL L<sub>max</sub> of 111.4 to 111.2 dB and an A-weighted SEL from 96.6 to 103.6 (SEL is an energy metric that takes duration of the sound into account, and since the rocket sounds last more than one second, SEL is higher than SPL) (SRS Technologies, 2001).

#### *b. Behavioral Response*

In some display locations, marine mammals and other wildlife may avoid or temporarily depart the impact area during the hours immediately prior to the beginning of the fireworks display due to increased human recreational activities associated with the overall celebration event (noise, boating, kayaking, fishing, diving, swimming, surfing, picnicking, beach combing, tidepooling, etc.), and as a fireworks presentation progresses, most marine mammals and birds generally evacuate the impact area. In particular, a flotilla of recreational and commercial boats usually gathers in a semi circle within the impact area to view the fireworks display from the water. From sunset until the start of the display, security vessels of the U.S. Coast Guard and/or other government agencies often patrol throughout the waters of the impact area to keep vessels a safe distance from the launch site.

Non-nesting marine birds (especially pelicans, cormorants, and gulls) are among the first wildlife to evacuate the area at the start of fireworks displays. Past observations by the MBNMS indicate that virtually all birds within the impact area depart in a burst of flight within one minute of the start of a fireworks display, including low-level displays. However, staff have also repeatedly observed that Brandt's cormorants nesting at the Monterey Breakwater remain on their nests (over 200 nests) throughout the large July 4<sup>th</sup> aerial display that is launched each year from a barge approximately 900 yards away. Most non-nesting marine birds on the breakwater evacuate the area until the conclusion of the display. Their numbers return to normal levels by the following morning. During a 1998 display in Monterey, MBNMS staff observed a marine bird swim within 70 yards of the launch site during the fireworks display. The bird remained on the water as the pyrotechnic effects were ignited aboard the barge and made no effort to swim away from the launch site. No injuries, fatalities, or negative impacts to marine birds have been detected during several years of monitoring and observations by the MBNMS.

Sea lions have been observed evacuating haul-out areas upon initial detonation of fireworks, and then returning to the haul-out sites within 4 to 15 hours following the end of the fireworks display. Harbor seals have been seen to remain in the water after initial fireworks detonation around the haul-out site. Sea lions in general are more tolerant of noise and visual

disturbances than harbor seals - adult sea lions have likely habituated to many sources of disturbance and are therefore much more tolerant to nearby human activities. For both pinniped species, pups and juveniles are more likely to be harassed when exposed to disturbance than older animals. In general, marine wildlife depart or avoid surface waters and haul-out sites within a 1000-yard radius of the center of the impact area during fireworks displays. Even short, low-level displays can cause a flight response in wildlife within the impact area (fireworks report).

NMFS and MBNMS found no peer-reviewed literature that specifically investigates the response of California sea lions and harbor seals to commercial fireworks displays. Similarly, general harassment or injury thresholds for exposure to airborne sounds have not been set. However, extensive studies have been conducted at VAFB to determine responses by California pinnipeds to the effects of periodic rocket launches, the light and sound effects of which would be roughly similar to the effects of pyrotechnic displays, but of greater intensity. This ongoing scientific research program has been conducted since 1997 to determine the long-term cumulative impacts of space vehicle launches on the haul-out behavior, population dynamics and hearing acuity of harbor seals at VAFB. In addition, when prediction models projected that a sonic boom from the rocket launches would hit one of the northern Channel Islands, pinniped populations were studied at identified haul-out sites in order to determine the impact of the sound wave on pinniped behavior.

The response of harbor seals to rocket launch noise at VAFB depended on the intensity of the noise (dependent on the size of the vehicle and its proximity) and the age of the seal (SRS Technologies 2001). Not surprisingly, the highest noise levels are typically from launch vehicles with launch pads closest to the haul-out sites. The percentage of seals leaving the haul-out increases with noise level up to approximately 100 decibels (dB) A-weighted SEL, after which almost all seals leave, although recent data has shown that an increasing percentage of seals have remained on shore, and those that remain are adults. Given the high degree of site fidelity among harbor seals, it is likely that those seals that remained on the haul-out site during rocket launches had previously been exposed to launches; that is, it is possible that adult seals have become acclimated to the launch noise and react differently than the younger inexperienced seals. Of the 20 seals tagged at VAFB, 8 (40 percent) were exposed to at least 1 launch disturbance but continued to return to the same haul-out site. Three of those seals were exposed to 2 or more launch disturbances. Most of the seals exposed to launch noise (n=6, 75 percent) appeared to remain in the water adjacent to the haul-out site and then returned to shore within 2 to 22 minutes after the launch disturbance. Of the 2 remaining seals that left the haul-out after the launch disturbance, both had been on shore for at least 6 hours and returned to the haul-out site on the following day (SRS Technologies 2001).

The launches at VAFB do not appear to have had long-term effects on the harbor seal population in this area. The total population of harbor seals at VAFB is estimated to be 1,040 animals and has been increasing at an annual rate of 12.6 percent. Since 1997, there have been 5 to 7 space vehicle launches per year and there appears to be only short-term disturbance effects to harbor seals as a result of launch noise (SRS Technologies, 2001). Harbor seals will

temporarily leave their haul-out when exposed to launch noise; however they generally return to the haul-out within one hour.

On San Miguel Island, when California sea lions and elephant seals were exposed to sonic booms from vehicles launched on VAFB, sea lion pups were observed to enter the water, but usually remained playing in the water for a considerable period of time. Some adults approached the water, while elephant seals showed little to no reaction. This short-term disturbance to sea lion pups does not appear to have caused any long-term effects to the population.

The conclusions of the five-year VAFB study are almost identical to the MBNMS observations of pinniped response to commercial fireworks displays. Observed impacts have been limited to short-term disturbance only and NMFS believes that the fireworks activities would have a negligible impact on the affected pinniped species and stocks.

#### *c. Sea Otters*

Past Sanctuary observations have not detected any disturbance to California sea otters as a result of the fireworks displays; however, past observations have not included specific surveys for this species. Sea otters do frequent all general display areas. Sea otters and other species may temporarily depart the area prior to the beginning of the fireworks display due to increased human activities.

Some sea otters in Monterey harbor have become quite acclimated to very intense human activity, often continuing to feed undisturbed as boats pass simultaneously on either side and within 20 feet of the otters. It is therefore possible that select individual otters may have a higher tolerance level than others to fireworks displays. Otters in residence within the Monterey harbor display a greater tolerance for intensive human activity than their counterparts in more remote locations.

The USFWS is responsible for regulating the take of southern sea otters. The USFWS issued a biological opinion on June 22, 2005, which concluded that the authorization of fireworks displays, as proposed in the preferred alternative, is not likely to jeopardize the continued existence of endangered and threatened species within the Sanctuary or to destroy or adversely modify any listed critical habitat. The USFWS further found that MBNMS would be unlikely to take any southern sea otters, and therefore issued neither an incidental take statement under the ESA nor an IHA. Further information may be found in the USFWS' Biological Opinion for the Authorization of Fireworks Displays Within the Monterey Bay National Marine Sanctuary, San Mateo, Santa Cruz, Monterey, and San Luis Obispo Counties, California (1-8-02-F-33).

#### *d. Cetaceans*

Though the aforementioned species are known to frequent nearshore areas within the Sanctuary, they have never been reported in the vicinity of a fireworks display, nor have there

been any reports to the MBNMS of strandings or injured/dead animals discovered after any display. Since sound does not transmit well between air and water, these animals would likely not encounter the effects of fireworks except when surfacing for air. NMFS does not anticipate any impacts to cetaceans and they are not addressed further in this document.

*e. Pinnipeds*

The northern elephant seal is seen infrequently in the areas with fireworks displays and NMFS believes that they are not likely to be impacted by fireworks displays. Therefore, the only pinniped species likely to be harassed by the fireworks displays, and further addressed in this document, are the California sea lion and the Pacific harbor seal.

Past monitoring by the MBNMS has identified only a short-term harassment of animals by fireworks displays, with the primary causes of disturbance being sound effects and light flashes from exploding fireworks. Additionally, the VAFB study of the effects of rocket-launch noise, which is more intense than fireworks noise, on California sea lions and Pacific harbor seals indicated only short-term behavioral impacts. With the mitigation measures proposed below, takes will be limited to the temporary incidental harassment of California sea lions and Pacific harbor seals due to evacuation of usual and accustomed haul-out sites for as little as 15 minutes and as much as 15 hours following any fireworks event. Most animals depart affected haul-out areas at the beginning of the display and return to previous levels of abundance within 4 to 15 hours following the event. This information is based on observations made by Sanctuary staff over an eight-year period (1993-2001) and a quantitative survey made in 2001. Empirical observations have focused on impacts to water quality and selected marine mammals and birds in the vicinity of the displays. No observations were made in upland areas (beyond the jurisdiction of the Sanctuary) due to limited staff resources.

#### California Sea Lions

Sea lions in general are more tolerant to noise and visual disturbances than harbor seals. In addition, pups and juveniles are more likely to be harassed when exposed to disturbance than the older animals. Adult sea lions have likely habituated to many sources of disturbance and are therefore much more tolerant of human activities nearby. Of all the display sites in the Sanctuary, California sea lions are only present in significant concentrations at Monterey. The following is an excerpt from a 1998 MBNMS staff report on the reaction of sea lions to a large aerial fireworks display in Monterey:

In the first seconds of the display, the sea lion colony becomes very quiet, vocalizations cease, and younger sea lions and all marine birds evacuate the breakwater. The departing sea lions swim quickly toward the open sea. Most of the colony remains intact until the older bulls evacuate, usually after a salvo of overhead bursts in short succession. Once the bulls depart, the entire colony follows suit, swimming rapidly in large groups toward the open sea. A select few of the largest bulls may sometimes remain on the breakwater. Sea lions have

been observed attempting to haul out onto the breakwater during the fireworks display, but most are frightened away by the continuing aerial bursts.

Sea lions begin returning to the breakwater within 30 minutes following the conclusion of the display but have been observed to remain quiet for some time. The colony usually reestablishes itself on the breakwater within 2-3 hours following the conclusion of the display, during which vocalization activity returns. Typically, the older bulls are the first to renew vocalization behavior (within the first hour), followed by the younger animals. By the next morning, the entire colony seems to be intact and functioning with no visible sign of abnormal behavior.

In the 2001 Monterey survey (discussed earlier), most animals were observed to evacuate haul-out areas upon the initial report from detonated fireworks. Surveys continued for 4.5 hours after the initial disturbance and numbers of returning California sea lions remained at less than 1% of pre-fireworks numbers. When surveys resumed the next morning (13 hours after the initial disturbance), sea lion numbers on the breakwater equaled or exceeded pre-fireworks levels. MBNMS staff have been opportunistically monitoring sea lions at the City of Monterey's Fourth of July celebration for more than 10 years. The following is a summary of their general observations: sea lions begin leaving the breakwater as soon as the fireworks begin, evacuate completely after an aerial salute or quick succession of loud effects, usually begin returning within a few hours of the end of the display, and are present on the breakwater at pre-firework numbers by the following morning.

#### Pacific Harbor Seals

Up to 15 harbor seals may typically be present on rocks in the outer Monterey harbor in early July. The seal haulout area is approximately 2,100 ft (640 m horizontal distance) from the impact zone for the aerial pyrotechnic display. Only two harbor seals were observed on and near the rocks adjacent to Fisherman's Wharf prior to the 2001 display. Neither were observed to haul out after the initial fireworks detonation, but remained in the water around the haul-out. The haul-out site was only surveyed until the conclusion of the fireworks display, therefore, no animal return data is available. However, the behavior of the seals after the initial disturbance and during the fireworks display is similar to the response behavior of seals during the VAFB rocket launches, where they loitered in the water adjacent to their haul-out site during the launch and returned to shore within 2 to 22 minutes after the launch disturbance.

MBNMS staff monitored harbor seal reactions to a coastal fireworks display at Aptos in October 2000. The staff report made the following finding:

Harbor seals could not be seen during and immediately after the event. It's likely, based on the reaction of the birds and the noise of the display, that the seals evacuated the area on and around the cement ship. Harbor seals were sighted hauled out on the ship and in the water the following morning.

A private environmental consultant has monitored the Aptos fireworks display each October from 2001 through 2005 (per California Coastal Commission permit conditions) and concluded that harbor seal activity returns to normal at the site by the day following the display. Surveys have detected no evidence of injury or mortality in harbor seals as a result of the annual 30-minute fireworks display at the site.

Since harbor seals have a smaller profile than sea lions and are less vocal, their movements and behavior are often more difficult to observe at night. In general, harbor seals are more timid and easily disturbed than California sea lions. Thus, based on past observations of sea lion disturbance thresholds and behavior, it is very likely that harbor seals evacuate exposed haul outs in the impact area during fireworks displays, though they may loiter in adjacent surface waters until the fireworks have concluded.

*f. Estimated levels of incidental take of marine mammals*

As discussed above, the two marine mammals NMFS believes likely to be taken by Level B harassment incidental to fireworks displays authorized within the Sanctuary are the California sea lion (*Zalophus californianus*) and the harbor seal (*Phoca vitulina richardsi*), due to the temporary evacuation of usual and accustomed haul-out sites. Both of these species are protected under the MMPA, and neither is listed under the ESA. Numbers of animals taken by Level B harassment are expected to vary due to factors such as tidal state, seasonality, shifting prey stocks, climatic phenomenon (such as El Nino events), and the number, timing, and location of future displays. The take of sea lions and harbor seals was estimated using a synthesis of information, including data gathered by MBNMS biologists at the specific display sites, results of independent surveys conducted in the MBNMS, and population estimates from government wildlife surveys covering larger geographic areas. More detailed information regarding the estimates of take of sea lions and harbor seals may be found in the application at: <http://www.nmfs.noaa.gov/pr/permits/incidental.htm>.

With the incorporation of mitigation measures proposed below, NMFS expects that only Level B incidental harassment of a small number of pinnipeds may occur as a result of the proposed authorized coastal fireworks displays. NMFS further believes that the fireworks displays will have a negligible impact on the affected species and stocks and will not have an unmitigable adverse impact on the availability of such species or stocks for subsistence uses.

#### California Sea Lions

Stage structure of California sea lions within the Sanctuary varies by location, but generally, the majority are adult and sub-adult males. Weise (2000) reported on the stage structure of California sea lions at two historic fireworks display areas within the MBNMS, and speculated that juveniles may haul out at the Monterey jetty in large numbers due to a need for a more protected haul-out location. He also reported that most animals on Año Nuevo Island appeared to be adult males and suggested that the stage structure may vary between mainland haul-out sites and offshore islands and rocks. At all four designated display areas combined, twenty fireworks events per year could disturb an average total of 2,630 California sea lions,

with the maximum being 6,170 animals, out of a total estimated population of 237,000-244,000. These numbers are small relative to the population size (1.1-2.6 percent).

### Harbor Seals

At all four designated display areas combined, twenty fireworks events per year could disturb an average of 302 harbor seals and a maximum of 1,065 harbor seals within the Sanctuary out of a total estimated population of 27,836. These numbers are small relative to the population size (1.1-3.8 percent). Nicholson (2000) studied the stage structure of harbor seals on the northeast Monterey Peninsula (an area with the largest single concentration of animals within the Sanctuary) for two years. For the final spring season of the study, survey numbers equate to a stage structure comprising 38% adult females, 15% adult males, 34% sub-adults, and 13% yearlings or juveniles.

## 2. Potential Indirect Effects on Marine Mammals and Other Sanctuary Resources

### *a. Chemical Residue*

Possible indirect impacts to marine mammals and other marine organisms include those resulting from chemical residue or physical debris emitted into the water. When an aerial shell detonates, its chemical components burn at high temperatures, which usually promotes efficient incineration. Pyrotechnic vendors have stated that the chemical components are incinerated upon successful detonation of the shell. However, by design, the chemical components within a shell are scattered by the burst charge, separating them from the casing and internal shell compartments.

Chemical residue is produced in the form of smoke, airborne particulates, fine solids, and slag (spent chemical waste material that drips from the deployment canister/launcher and cools to a solid form). The fallout area for chemical residue is unknown, but is probably similar to that for solid debris. Similar to aerial shells, the chemical components of low-level devices produce chemical residue that can migrate to ocean waters as a result of fallout. The point of entry would likely be within a small radius (about 100 yards) of the launch site.

The MBNMS has found only one scientific study directed specifically at the potential impacts of chemical residue from fireworks upon the environment. A 1992 Florida study (DeBusk et al, 1992) indicates that chemical residues (fireworks decomposition products) do result from fireworks displays and can be measured under certain circumstances. The report, prepared for the Walt Disney Corporation in 1992, presented the results of a 10-year study of the impacts of fireworks decomposition products (chemical residue) upon an aquatic environment. Researchers studied a small lake in Florida subjected to two thousand fireworks shows over a ten-year period to measure key chemical levels in the lake. The report concluded that detectable amounts of barium, strontium, and antimony had increased in the lake but not to levels considered harmful to aquatic biota. The report further suggested that “environmental impacts from fireworks decomposition products typically will be negligible in locations that conduct fireworks displays infrequently“. Based on the findings of this report, the lack of any evidence

that fireworks displays within the Sanctuary have degraded water quality, and the fact that the chemical byproducts of less frequent fireworks displays in an open marine system are even less likely to accumulate to a harmful level than those described in the report, NMFS and the MBNMS believe that chemical residue from fireworks does not pose a significant risk to the marine environment. No negative impacts to water quality have been detected.

*b. Debris*

The fallout area for the aerial debris is determined by local wind conditions. In coastal regions with prevailing winds, the fallout area can often be projected in advance. This information is calculated by pyrotechnicians and fire department personnel in selection of the launch site to abate fire and public safety hazards. Mortar tubes are often angled to direct shells over a prescribed fallout area, away from spectators and property. Generally, the bulk of the debris will fall to the surface within a 1/2 statute mile radius of the launch site. In addition, the tops of the mortars and other devices are usually covered with household aluminum foil to prevent premature ignition from sparks during the display and to protect them from moisture. The shells and stars easily punch through the thin aluminum foil when ignited, scattering pieces of aluminum in the vicinity of the launch site. Through various means, the aluminum debris and garbage generated during preparation of the display may be swept into ocean waters.

Some low-level devices may project small casings into the air (such as small cardboard tubes used to house flaming whistle and firecracker type devices). These casings will generally fall to earth within a two hundred yard radius of the launch site, since they do not attain altitudes sufficient for significant lateral transport by winds. Though typically within 300 ft (91 m), the impact area for set piece devices can extend to 1/2 statute mile from the center of the ignition point depending on the size and height of the fixed structure, the number and type of special effects, wind direction, atmospheric conditions, and local structures and topography. Like aerial shells, low-level pyrotechnics and mortars are often covered with aluminum foil to protect them from weather and errant sparks, pieces of which are shredded during the course of the show and initially deposited near the launch site.

The explosion in a firework separates the cardboard and paper casing and compartments, scattering some of the shell's structural pieces clear of the blast and burning others. Some pieces are immediately incinerated, while others burn up or partially burn on their way to the ground. Many shell casings simply part into two halves or into quarters when the burst charge detonates and are projected clear of the explosion. However, during the course of a display, some devices will fail to detonate after launch (duds) and fall back to earth/sea as an intact sphere or cylinder. Aside from post display surveys and recovery, there is no way to account for these misfires. The freefalling projectile could pose a physical risk to any wildlife within the fallout area, but the general avoidance of the area by wildlife during the display and the low odds for such a strike probably present a negligible potential for harm. Whether such duds pose a threat to wildlife (such as curious sea otters) once adrift is unknown. After soaking in the sea for a period of time, the likelihood of detonation rapidly declines. Even curious otters are unlikely to attempt to consume such a device. At times, some shells explode in the mortar tube (referred to as a flower pot) or far below their designed detonation altitude. It is highly unlikely that mobile organisms

would remain close enough to the launch site during a fireworks display to be within the effective danger zone for such an explosion.

The MBNMS has conducted surveys of solid debris on surface waters, beaches, and subtidal habitat and has discovered no visual evidence of or chronic impacts to the environment or wildlife. Aerial displays generally produce a larger volume of solid debris than low-level displays. Past MBNMS fireworks Authorizations (discussed later) require the fireworks sponsor to clean area beaches of fireworks debris for up to two days following the display. In some cases, debris has been found in considerable quantity on beaches the morning following the display. The MBNMS staff have recovered many substantial uncharred casing remnants on ocean waters immediately after marine displays. Other items found in the impact area are cardboard cylinders, disks, and shell case fragments; paper strips and wading; plastic wading, disks, and tubes; aluminum foil; cotton string; and even whole unexploded shells (duds or misfires). In other cases, virtually no fireworks debris was detected. This variance is likely due to several factors, such as type of display, tide state, sea state, and currents. In either case, due to the requirement for the fireworks sponsor to clean up following the displays, NMFS and the MBNMS do not believe the small amount of remaining debris is likely to significantly impact the environment, including marine mammals or their habitat.

### *c. Increased Boat Traffic*

Increased boat traffic is often an indirect effect of fireworks displays as boaters move in to observe the event. The more boats there are in the area, the larger the chance that a boat could potentially collide with a marine mammal or other marine wildlife. The number of boats present at any one event is largely dependent upon weather, sea state, distance of the display from safe harbors, and season. At the MBNMS, some events have virtually no boat traffic, while others may have as many as 40 boats ranging in size from 10 to 65 feet in length.

Prior to and during fireworks displays at the MBNMS, boats typically enter the observation area at slow speed (less than 8 kts) due to the other vessels present and limited visibility (i.e., most fireworks displays occur at night). The U.S. Coast Guard and/or other federal agency vessels are on site to enforce safe boating laws and keep vessels out of the debris fallout area during the display. Most boaters anchor prior to the display, while others drift with engines in neutral for convenient repositioning.

MBNMS staff have observed boat traffic during several fireworks displays and generally found that boaters are using good boating and safety practices. They have also never witnessed the harassment, injury, or death of marine mammals or other wildlife as a result of vessels making way at these events. In general, as human activity increases and concentrates in the viewing areas leading up to the display, wildlife avoid or gradually evacuate the area. As noted before, the fireworks venues are marine areas with some of the highest ambient levels of human activity in the MBNMS. Many resident animals are accustomed to stimuli such as emergency sirens, vehicle noise, boating, kayaking, swimming, tidepooling, crowd noise, etc. Due to the gradual nature of the increase in boat traffic, it's infrequent occurrence and short duration, and

the slow speed of the boats, NMFS does not believe the increased boat traffic is likely to significantly impact the human environment, including marine mammals.

*d. Fire*

The marine venue is the preferred site for fireworks displays in coastal areas, in part, due to the considerable reduction of fire hazard by siting the aerial debris fallout zone over ocean waters. While there is no guarantee that all airborne embers will fall into the water, siting is managed for that intent. The coastal areas of California generally receive more moisture than the interior areas and are inherently less prone to wildfire than the drier upland regions. Authorized fireworks launch sites within the MBNMS are primarily located on sand beaches or steel/concrete offshore barges, minimizing fire hazard at a launch site, even if devices explode prematurely on the surface.

All coastal fireworks displays within the MBNMS must be authorized by a fire marshal permit in accordance with California state law and local ordinances. In issuing such permits, a local or state fire marshal establishes terms and conditions to protect spectators and property from potential fire hazards associated with fireworks displays. The terms and conditions govern the siting of the launch site away from flammable materials and environments and establish viewing areas a prescribed safe distance from the launch site in the event of misfires or premature detonations. These permits typically require that fire fighting equipment (e.g. fire engines and trucks) be on-scene during the display to respond to any fire emergency. The permits also govern the unloading, handling, and preparation of pyrotechnics for the display.

Display preparation requires the placement of racks of mortar tubes on a flat surface (usually a sand beach or barge) distant from vegetation, structures, and overhangs. The racks may be partially buried on a sand beach or in long, narrow boxes filled with sand. Ground displays are usually affixed to wooden frameworks staked into the ground or fixed to a sturdy base. Fireworks devices are detonated electrically from a central control box connected to the launch tubes and other devices by wire. Preparation of the launch site involves no more than short-term negligible impacts to the surrounding environment. Sanctuary Authorizations require fireworks sponsors to collect all debris at and near a fireworks launch site following each display, including mortars, racks, frameworks, stands, undetonated devices, wrappers, paper debris, etc.

Where boat traffic is expected to attend a coastal fireworks display, the U.S. Coast Guard issues a marine event permit and establishes a safety zone over the waters below the impact zone. Coast Guard and/or other public safety vessels patrol the zone during the fireworks display to assure that spectator vessels remain out of the area where airborne fireworks debris and embers are likely to fall. In Monterey, the fire department deploys its fire boat to augment the Coast Guard patrol. At Aptos, State Parks deploys an enforcement vessel to assist the Coast Guard. At Half Moon Bay, the harbor authorities provide a safety patrol during the event.

The culmination of the above measures considerably minimize the risk of fire resulting from coastal fireworks displays within the MBNMS. Since the MBNMS began authorizing

coastal fireworks displays in 1993, no uncontrolled fires have occurred, and no property or marine resources have been damaged due to fire.

### 3. Impact on Marine Wildlife Habitat (Habitat Exclusion)

Impacts on marine mammal habitat are part of the consideration in making a finding of negligible impact on the species and stocks of marine mammals. Impacts upon Sanctuary habitat are also considered for any activity reviewed for a Sanctuary Authorization. Habitat includes, but is not necessarily limited to, rookeries, mating grounds, feeding areas, roosting areas, nest sites, and areas of similar significance. The amount of debris and chemical residue resulting from fireworks displays authorized in the MBNMS is determined by wind conditions, weather, and other local variations. LOAs and Sanctuary Authorizations will require fireworks sponsors to clean up affected areas following approved fireworks displays. No evidence of water quality deterioration has been found in relation to prior MBNMS fireworks displays and Section (VI)(A)(2) of this document discusses the 1992 Walt Disney report, which found that environmental impacts from fireworks decomposition products typically will be negligible in locations that conduct fireworks displays infrequently. Because of the aforementioned mitigation measure and report, NMFS does not expect the debris and residue resulting from authorized fireworks displays to significantly impact marine mammals or marine mammal habitat in the MBNMS. Likewise, the MBNMS has determined that fireworks debris has only negligible short-term effects upon Sanctuary resources and qualities.

### 4. Potential Cumulative Effects

Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7).

With the exception of regular ongoing boat and aircraft traffic and urban background noise levels at some sites, NMFS and MBNMS are aware of no other human activities occurring in the action area that may affect marine mammals. NMFS notes here that stress from long-term and continuous cumulative sound exposures can result in physiological effects on reproduction, metabolism, and general health, or on marine mammals’ resistance to disease. However, because of the infrequent nature and short duration of the noise generated from the fireworks, and adaptation of urban marine mammal populations to elevated sound levels, NMFS does not believe that cumulative impacts are likely to occur at MBNMS as a result of the issuance of LOAs for the permitting of limited fireworks displays by the MBNMS. We anticipate impacts to be limited to temporary behavioral disturbance and displacement of marine mammals from their accustomed haulouts during the actual fireworks.

Since 1993, 67 fireworks displays have been conducted within the Sanctuary. MBNMS staff have been opportunistically monitoring sea lions at the City of Monterey's Fourth of July celebration for more than 10 years. Their general observations may be summarized as follows: sea lions begin leaving the breakwater as soon as the fireworks begin, clear completely off after

an aerial salute or quick succession of loud effects, usually begin returning within a few hours of the end of the display, and are present on the breakwater at pre-firework numbers by the following morning. No long term effects on the population of either species of pinniped have been noted, and, in fact, the California sea lion population has increased and is growing at a current rate of 5.4 to 6.1 percent per year and the harbor seal population in California is healthy and growing at a current rate of 3.5 percent per year.

In upcoming years (during the five-year duration of the regulations), the number of fireworks displays in the Sanctuary throughout a given year may increase by two and a half times (up to 20 authorized per year versus the average 7 per year previously). However, LOAs and the USFWS Biological Opinion will limit fireworks displays by number of displays, geographical area, display duration, temporal interval, and seasonal restrictions for the express purpose of minimizing cumulative impacts to wildlife and habitat. Due to these measures and additional terms and conditions applied by the Sanctuary, NMFS and the MBNMS do not believe that authorization of fireworks displays within the Sanctuary, including an increase in number up to the maximum authorized under the regulations, will produce measurable cumulative impacts.

#### 5. Impacts on Endangered Species

As mentioned earlier in this document, the Steller sea lion and several species of federally listed cetaceans may be present at MBNMS at different times of the year and could potentially swim through the fireworks impact area during a display. In a 2001 consultation with MBNMS, the Southwest Region, NMFS, concluded that the proposed fireworks displays is not likely to adversely affect federally listed species under NMFS' jurisdiction.

The MBNMS has not observed sea otter responses to fireworks events; however, sea otters do frequent all general display areas. As noted under Environmental Impacts above, otters and other species may temporarily depart the area prior to the beginning of the fireworks display due to increased human activities. Some otters in Monterey harbor have become quite acclimated to very intense human activity, often continuing to feed undisturbed, as boats pass simultaneously on either side and within 20 feet of the otters. It is therefore possible that select individual otters may have a higher tolerance level than others to fireworks displays. Sea otters in residence within the Monterey harbor display a greater tolerance for intensive human activity than their counterparts in more remote locations. Past Sanctuary observations have not detected any disturbance to California sea otters as a result of the fireworks displays; however, past observations have not included specific surveys for this species.

Within the scope of the potential effects of the MBNMS fireworks displays, the USFWS is responsible for regulating take of the southern sea otter and any terrestrial plants or animals. MBNMS consulted with the USFWS pursuant to Section 7 of the ESA regarding impacts to these species from fireworks displays. The USFWS issued a Biological Opinion (BiOp) on June 22, 2005, which concluded that the authorization of fireworks displays, as described in the preferred alternative, is not likely to jeopardize the continued existence of the southern sea otter, brown pelican, western snowy plover, San Francisco garter snake, California red-legged frog, Smith's blue butterfly, Monterey gilia, Menzie's wallflower, Monterey spineflower, or

Tidestrom's lupine and is not likely to destroy or adversely modify the critical habitat of the western snowy plover or Monterey spineflower.

More specifically, the USFWS further concluded that no southern sea otters would be taken as a result of the proposed fireworks events, and therefore issued neither an incidental take statement under the ESA nor an IHA. The USFWS found that an incidental take of brown pelicans in the form of harassment, injury, or mortality could occur as a result of pelicans flushing quickly in response to the visual or acoustic stimuli and subsequently colliding with boats, wires, or other objects in the area. The USFWS issued an incidental take statement for the brown pelican, but because they considered the chance of take resulting to be "remote and unpredictable", they did not exempt a specific number of birds, but instead included two terms and conditions that require MBNMS notify the USFWS if a dead pelican is found, and notify the USFWS if more than one dead pelican is found to discuss re-initiation of formal consultation. The Sanctuary authorization incorporates these terms and conditions by requiring that the entity authorized to conduct fireworks look for dead or injured wildlife during their debris cleanup the day after the fireworks display and that they report any dead or injured animals found immediately to the Sanctuary.

The BiOp did not include incidental take statements for any of the other species analyzed and did not include any other terms and conditions. The BiOp does, however, contain non-mandatory conservation recommendations for some of the other species, and the Sanctuary provides these conservation measures to authorized entities that will be conducting fireworks in areas to which the recommendations apply.

## **B. Issuance of LOAs and Sanctuary Authorizations for 7 Fireworks Displays**

If LOAs and Sanctuary Authorizations for 7 fireworks displays per year were issued to the MBNMS, the nature of the effects on the marine environment and marine mammals (Level B harassment in the form of temporary abandonment of haulout sites) would be the same as those described above for 20 fireworks displays per year, however, the estimated numbers of pinnipeds taken by the activity would be smaller, or, potentially the number of times a single pinniped were exposed to fireworks in one year could be smaller. The number of marine mammals taken by Level B harassment is expected to vary due to factors such as tidal state, seasonality, shifting prey stocks, climatic phenomenon (such as El Nino events), and the number, timing, and location of future displays. If the 7 fireworks events per year continued at their historic locations, NMFS estimates they could disturb an average total of 1,070 California sea lions (2,795 maximum) out of a total estimated population of 237,000-244,000 (0.4-1.2 %) and an average total of 122 harbor seals (400 maximum) out of a total estimated population of 27,836 (0.5-1.4 %) within the Sanctuary. These numbers are small relative to the population size.

Limiting Sanctuary Authorizations for fireworks to 7 events per year would reduce overall disturbance to wildlife at fireworks launch sites within the Sanctuary, but it would have little measurable effect on species abundance or distribution within the Sanctuary due to the negligible short-term nature of the disturbance. Under this alternative, the same mitigation and

monitoring measures would be required as are required under the preferred alternative, which would further reduce the adverse effects to wildlife.

### **C. Issuance of LOAs to Individual Fireworks Sponsors**

If LOAs were issued to individual fireworks sponsors, the activities would be the same, the same mitigation and monitoring would be required as in the two previous alternatives, the nature and extent of the effects on the marine environment would be the same as those described in (VI)(A) and (VI)(B) above, and the effects would similarly have a negligible impact on the affected species or stocks. This alternative primarily relates to administrative matters and has no direct bearing upon environmental consequences. By requiring multiple permits in lieu of one consolidated permit through the MBNMS, this alternative would increase administrative costs by NMFS and fireworks sponsors in order to comply with incidental take provisions of the MMPA.

### **D. No Action Alternative**

If LOAs and Sanctuary Authorizations were not issued, any takes resulting from fireworks displays would be unauthorized, and a violation of the MMPA and NMSA would occur. If the MBNMS were to stop authorizing fireworks displays, the previously described risks to marine mammals and other marine wildlife would be eliminated; however, applicants could potentially consider alternate terrestrial venues, which are dangerous, as many fireworks displays occur at the height of the dry season, when area vegetation is particularly prone to ignition from sparks or embers. The central California region is a semi-arid environment with elevated fire hazards throughout the year. The relocation of fireworks displays inland would shift, and could significantly increase, environmental hazards to upland habitats. Such action would also pose increased hazards to public health and safety and property.

## **VII. MITIGATION AND MONITORING**

In order to ensure that fireworks displays within the MBNMS will have the least practicable impact on marine mammals and their habitat under both the 20 displays per year (preferred) and the 7 displays per year alternatives, the MBNMS would adopt the following mitigation and monitoring requirements as part of an approved 5-year incidental take regulation (under the MMPA) and subsequent LOAs. Furthermore, the MBNMS would implement the mitigation measures as part of its fireworks Authorization process (under the NMSA) to protect overall Sanctuary resources and qualities.

### **A. Mitigation**

NMFS has collaborated with the MBNMS and USFWS since 2001 to develop conservation measures that minimize fireworks impacts on protected species and the marine environment within the MBNMS by defining the locations, frequency, and conditions under which the MBNMS can authorize marine fireworks displays.

The mitigation measures can be grouped into five broad approaches for managing fireworks displays and will be implemented under alternatives 1 and 2 by the MBNMS:

(1) *Limit displays to certain seasons to safeguard reproductive periods:* This regulation does not authorize fireworks events between March 1 and June 30 of any year, since this period is the primary reproductive season for many marine species.

(2) *Establish four conditional display areas:* Traditional fireworks display areas within the MBNMS are located adjacent to urban centers where wildlife has often acclimated to human disturbances, such as low-flying aircraft, emergency vehicles, unleashed pets, beach combing, recreational and commercial fishing, surfing, swimming, boating, and personal watercraft operations. This regulation only authorizes fireworks displays in four prescribed areas of the Sanctuary. The conditional display areas (described earlier in detail) are located at Half Moon Bay, the Santa Cruz/Soquel area, the northeastern Monterey Peninsula, and Cambria (Santa Rosa Creek).

(3) *Create a per-annum limit on the number of displays allowed in each display area:* If properly managed, a limited number of fireworks displays conducted in areas already heavily impacted by human activity can occur with sufficient safeguards to prevent any long-term or chronic impacts upon local natural resources. This regulation authorizes no more than 20 displays along the entire Sanctuary coastline in order to prevent cumulative negative environmental effects from fireworks proliferation. Additionally, displays will be authorized at an average frequency equal to or less than 1 every 2 months in each conditional display area. Fireworks displays shall not exceed 30 minutes with the exception of two longer displays per year that shall not exceed 1 hour.

(4) *Retain Authorization requirements and general and special restrictions for each event:* The Sanctuary will continue to assess displays on a case-by-case basis, using specially developed terms and conditions to address concerns unique to fireworks displays (e.g. restricting the number of aerial “salute” effects used; requiring the removal of plastic and aluminum labels and wrappings; and requiring post-show reporting and cleanup). Such terms and conditions have evolved over twelve years, as the Sanctuary has sought to improve its understanding of the potential impacts that fireworks displays have upon marine wildlife and the environment. The MBNMS will implement general and special restrictions unique to each fireworks event as necessary.

(5) *Institute a 5-year Authorization system for annual displays:* The Sanctuary intends to institute a 5-year Authorization system for fireworks displays that occur annually at fixed locations in a consistent manner, such as municipal Independence Day shows. Authorizations will include special conditions that mitigate negative impacts upon species and habitat from fireworks displays, such as the requirement for Authorization holders to clean up debris following each event. Authorizations for fireworks displays will not be valid unless current LOAs have been issued by NMFS for unintentional harassment incidental to the displays.

The above conservation measures are designed to prevent an incremental proliferation of fireworks displays and disturbance throughout the Sanctuary and minimize area of impact by

authorizing displays in primary traditional use areas. They also place multiple special conditions on the displays and allow fireworks displays only during seasons that avoid sensitive wildlife breeding cycles. These measures and MBNMS Authorization conditions assure that protected species and habitats are not jeopardized by fireworks activities. They have been well received by local fireworks sponsors who have pledged their cooperation in protecting Sanctuary resources.

## **B. Monitoring and Reporting**

The MBNMS has monitored commercial fireworks displays for potential impacts to marine life and habitats for 12 years. In July 1993, the MBNMS performed its initial field observations of professional fireworks at the annual Independence Day fireworks display conducted by the City of Monterey. Subsequent field observations were conducted in Monterey by the MBNMS staff in July 1994, July 1995, July 1998, March 1998 (private display), October 2000 (private display), July 2001, and July 2002. Documented field observations have also been made at Aptos each October from 2000 to 2005. The MBNMS staff have observed additional displays at Monterey, Pacific Grove, Capitola, and Santa Cruz, but those observations were primarily for permit compliance purposes, and written assessments of environmental impacts were not generated. Though monitoring techniques and intensity have varied over the years and visual monitoring of wildlife abundance and behavioral responses to nighttime displays is challenging, observed impacts have been consistent. Wildlife activity nearest to disturbance areas returns to normal (pre-display species distribution, abundance, and activity patterns) within 12 hours, and no signs of wildlife injury or mortality have ever been discovered as a result of managed fireworks displays.

Of all the past authorized fireworks display sites within the Sanctuary, the City of Monterey site has received the highest level of Sanctuary monitoring effort. The City of Monterey has hosted a marine fireworks display each July 4th since 1988 (five years prior to designation of the MBNMS). The display is the longest running and largest annual commercial fireworks display within the Sanctuary. The Monterey Breakwater (approximately one half statute mile from the pyrotechnic launch site) was constructed in the 1930s and, along with other natural rock formations, has been a regular haul-out site for California sea lions and harbor seals for many decades. For this reason, the Monterey site has been studied and surveyed by government and academic researchers for over 20 years. Consequently, the Monterey site has the best background data available for assessing status and trends of key marine mammal populations relative to annual fireworks displays. Therefore, the MBNMS proposes that Monterey be monitored as necessary to assess how local California sea lion and harbor seal distribution and abundance are affected by an annual fireworks display.

The Sanctuary proposes conducting a visual census of the Monterey Breakwater and Harbor Rocks on July 4-5, 2006 to update annual abundance, behavioral response patterns, and departure and return rates for California sea lions and harbor seals relative to the July 4 fireworks display. Data will be collected by an observer aboard a kayak or small boat and from ground stations (where appropriate). The observer will use binoculars, counters, and data sheets to census animals. The pre and post fireworks census data will be analyzed to identify any significant temporal changes in abundance and distribution that might be attributed to impacts

from the annual fireworks display. The data will also be added to past research statistics on the abundance and distribution of stocks at Monterey Harbor.

It should be noted however that annual population trends at any given pinniped haul-out site can be influenced by a myriad of environmental and biological factors, ranging from predation upon pups at distant breeding colonies to fluctuating prey stocks due to El Nino events. These many variables make it difficult to measure and differentiate the potential impact of a single stimulus on long-term population trends.

The Sanctuary also proposes to conduct one-time acoustic monitoring at a future City of Monterey Fourth of July fireworks display. The procedures and equipment for this monitoring will be outlined and described in the proposed rule, the regulations, and appropriate LOA.

In addition to the comprehensive behavioral monitoring to be conducted at the Monterey Bay Breakwater in 2006, under alternatives 1 and 2 MBNMS will require its applicants to conduct a pre-event census of local marine mammal populations within the fireworks impact area each year. Each applicant will also be required to conduct post-event monitoring in the fireworks impact area to record injured or dead marine mammals brown pelicans, and other wildlife.

Under a NMFS LOA (alternatives 1 and 2) a draft final report must be submitted to NMFS within 60 days after the conclusion of each calendar year. A final report must be submitted to the Regional Administrator within 30 days after receiving comments from NMFS on the draft final report. If no comments are received from NMFS, the draft final report will be considered to be the final report. In addition, the MBNMS will continue to incorporate updated census data from government and academic surveys into its analysis and will make its information available to other marine mammal researchers upon request.

Last, a comprehensive draft final report must be submitted to NMFS 120 days prior to the expiration of the regulations, and a final report submitted within 30 days after receiving comments from NMFS on the draft final comprehensive report.

As stated previously, NMFS and MBNMS have identified no other directed research or monitoring efforts (within California or elsewhere) that specifically address the impacts of fireworks on pinnipeds. The Sanctuary coordinates a Research Activities Panel comprised of 21 marine research institutions and organizations adjacent to the Sanctuary and receives constant updates of ongoing research within the Sanctuary that might be related to this issue. The MBNMS is coordinating with researchers at the NMFS, the USFWS, the California Department of Fish and Game, and various specific research institutions concerning the status and local trends of wildlife stocks in the Sanctuary.

## VIII. CONCLUSION

As a result of this environmental review, NMFS and the National Marine Sanctuary Program have determined that the implementation of any of the four alternatives (the issuance of

LOAs and Sanctuary Authorizations for 20 displays, the issuance of LOAs and Sanctuary Authorizations for 7 displays, the issuance of LOAs to individual fireworks sponsors, or the denial of the permit and MBNMS Authorizations) will not significantly affect the quality of the human environment. Additionally, the issuance of these Authorizations is not controversial (one general comment of opposition was received during the 30-day comment period) and will not set a precedent for future actions with significant effects. Accordingly, an environmental impact statement is not required.

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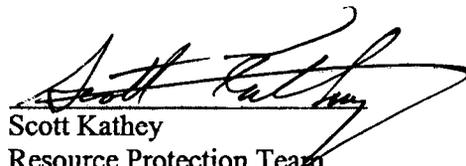
Prepared by:



Jolie Harrison  
Permits, Conservation, and Education Division  
Office of Protected Resources  
National Marine Fisheries Service

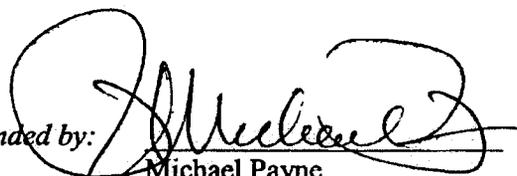
06/20/06  
Date

Prepared by:

  
Scott Kathey  
Resource Protection Team  
Monterey Bay National Marine Sanctuary  
National Marine Sanctuary Program

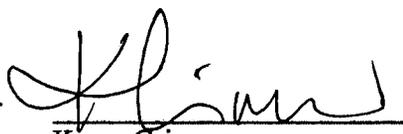
6/23/2006  
Date

Recommended by:

  
Michael Payne  
Permits, Conservation, and Education Division  
Office of Protected Resources  
National Marine Fisheries Service

6/23/06  
Date

Recommended by:

  
Karen Grimmer  
Monterey Bay National Marine Sanctuary  
National Marine Sanctuary Program

6/23/06  
Date