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**Summary of Substantial Evidence of Potentially Significant Wildlife Impacts from Fireworks Displays in the City of San Diego**

**Exhibit 1** **Email thread from Robert Patton to Richard Gilb regarding California Least Tern fireworks monitoring at airport, July 2009.**

- Notable response by habituated listed species colony to disturbances from fireworks noise and light. Opines significant long-term impacts questionable & unlikely, but that "colonies elsewhere with less habituation to noises would be expected to react more than those at the airport, & the observed flushing of adults, fledglings, & running of chicks in response to the fireworks confirms fears of possible threat of fledglings relocating to roost in active roadways, taxiways, or runway following dispersal due to fireworks.

  *- Confirms City fireworks shows in close proximity to bird nesting areas can result in potentially significant impacts, including anywhere endangered species might exist.*

**Exhibit 2** **Email from Robert Patton to Livia Borak following up on airport CLT report.**

- Confirms no expectation of lasting effects, but noted that during last two seasons the majority of nesting was completed by the 4th of July and the colony was habituated to loud noises from aircraft. Confirms stress from fireworks, including panic, running, flushing, and potential for impacts with aircraft or vehicles, exposure to weather & predators. But notes site fully enclosed with chick barrier, and "such disturbance elsewhere could result in chicks being separated from parents or entering/falling into hazardous areas such as roadways, riprap, etc." Comment also notes Mission Bay fireworks have had negative impacts on CLT, including nest predation by gulls.

  *- Confirms City fireworks shows in close proximity to bird nesting areas can result in potentially significant impacts, including anywhere endangered species might exist. Specifically recounts significant impacts in Mission Bay.*

**Exhibit 3** **New York Times article regarding Black Bird deaths New Year's Eve 2010/11**

- Cites fireworks as the likely culprit causing thousands of red-winged blackbirds to flush, become disoriented, and ultimately die.

  *- Confirms fireworks can cause bird disorientation, which can lead to large numbers of individual deaths in certain circumstances.*

**Exhibit 4** **Incidental Harassment Authorization Application for Navy training at Silver Strand.**

- Navy sought incidental harassment authorization for marine mammals due to training within the Silver Strand Training Complex south of Coronado. Study provides extensive information regarding marine mammal types in the region, life histories, and auditory sensitivities.

  *- Information in this Application will inform the potential significance of impacts to marine mammals from fireworks noise.*

**Exhibit 5** **Application for 5 year Programmatic Permit for Small Takes of Marine Mammals Incidental to Launching of Space Launch Vehicles, Long Range Ballistic Target Missiles, and Smaller Missile Systems at Kodiak Launch Complex, Kodiak Island, Alaska.**

- Sound pressure levels of vehicle and missile launches were measured between 3.5-4.5 miles from the seal haulout site. "Marine mammals produce sounds in various contexts and use sound for various biological functions including, but not limited to (1) Social interactions; (2) foraging; (3) orientation; and (4) predator detection. Interference with producing or receiving these sounds may result in adverse impacts. Audible distance, or received levels (RLs) will depend on the nature of the sound source, ambient noise conditions, and the sensitivity of the receptor to the sound (Richardson et al., 1995). Type and significance of marine mammal reactions to noise are likely to be dependent on a variety of factors including, but not limited to, the behavioral state (e.g., resting, socializing, etc.) of the animal at the time it receives the stimulus, frequency of the sound, distance from the source, and the level of the sound relative to ambient conditions (Southall et al., 2007). In general, marine mammal impacts from loud noise can be characterized as auditory and nonauditory." Temporary threshold shift in seals may occur, affecting auditory biological functions. Potential behavioral impacts may occur as well. Researchers found that young seals react more severely to loud noises, and the louder the launch noise, the longer it took for seals to begin returning to the haul-out site and for the numbers to return to pre-launch levels

  *- Fireworks noise and vibrational characteristics are similar to those of vehicle and missile launches. The fireworks shows in close proximity to marine mammals, such as those at the Children's Pool in La Jolla, may have significant impacts as*

*suggested in this application.*

**Exhibit 6** **Federal Register Vol. 75, No. 98, May 21, 2010 Notices re Application for take of Marine Mammals due to Missile Launches at Channel Islands (San Nicolas Island).**

- Request for letter of authorization for one year, for taking marine mammals incidental to missile launch at San Nicolas Island. In 2009 the Navy conducted test launches of vehicles and took acoustic measurements near Pacific harbor seals (and other animals). Approximately 60 seal were estimated to have been harassed during the tests. The noise generated by Navy activities may result in the incidental harassment of pinnipeds, both behaviorally and in terms of physiological (auditory) impacts. The noise and visual disturbances from missile launches may cause the animals to move towards or enter the water. Navy required to avoid launching during pupping season, must not launch near the seal haul-out sites, and must avoid multiple vehicle launches in quick succession over haul out sites-especially when young pups are present. They also must limit night-time launches. Monitoring must also be conducted.

  *- Documents suggests multiple loud bursts of fireworks at night, without monitoring would be similarly if not more harmful to seals. There is no way the City can say with certainty that loud noises in the vicinity of seals (during various times of the year) could not have potentially significant effects.*

**Exhibit 7** **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.**

- Fireworks cause "harassment" of seals as defined by the Marine Mammal Protection Act. Document contains descriptions of pyrotechnic devices and impacts from different types. Discusses alternatives, including limiting number of shows. Discusses in depth potential direct effects on Marine Mammals and other sensitive species from fireworks noise and light, including immediate physical and physiological impacts such as abrupt changes in behavior, flight response, diving, evading, flushing, cessation of feeding, and physical impairment or mortality. Notes impact area can extend from 1 to 2 statute miles from the center of detonation depending on size of shell, height of explosions, type of explosions, wind direction, atmospheric conditions and local topography. "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 fo the launch site)." Study

further indicates:

- "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 4th 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."

*- Marine mammals at Children's Pool and elsewhere along City's coastline will be harassed by fireworks shows. This document raises numerous questions regarding potential impacts to marine mammals and seabird. At the very least, it both shows that incidental take permits should be required, and that there is no plausible way the City can opine with certainty that there is no possibility significant environmental impacts may occur.*

**Exhibit 8 Guidelines for Managing Fireworks in the Vicinity of Piping Plovers and Seabeach Amaranth on the U.S. Atlantic Coast.**

- U.S. Fish and Wildlife Service guidance to advise landowners and federal agencies how to avoid adverse effects on endangered plovers and terns. Identifies direct impacts including territory abandonment, direct injuries from explosions or debris, nest and brood abandonment (exposing eggs and chicks to weather and predation), mortality. Recounts past evidence of negative direct impacts to shorebirds from fireworks displays. Identifies significant potential indirect fireworks show impacts as well, including from spectators, thrown illegal fire crackers, and trash. Provides measure for avoiding impacts, including establishment of sufficient distance requirement for fireworks from sensitive habitats.

*- Plovers and terns on in San Diego are similar to those on the East Coast, and therefore would potentially suffer the same fate as described in the study. San Diego does not have regulations such as these to protect sensitive shorebird populations and habitats. Provides substantial evidence in the form of reasonable assumption predicated upon presumed facts recounted in the regulations.*

**Exhibit 9 Seabird and Marine Mammal Monitoring and Response to a Fireworks Display at Gualala Point Island, Sonoma County, California, May to August 2007.**

- Comprehensive study of fireworks impacts on birds offshore of launch site. Study noted: "Observations documented a visible response by nesting seabirds on Gualala Point Island. Digiscoped and infra-red photography during the 6 July fireworks display showed that Brandt's Cormorants quickly changed from resting to erect postures at the first fireworks, followed by birds moving about or departing from the island. Western Gulls also flushed, circled and called during the fireworks display. During the study period, 90 Brandt's Cormorant nests were documented on Gualala Point Island. Of these, seven nests (35% of nest failures) were abandoned in the two days between 5 and 7 July, and another seven nests were abandoned between 7 and 12 July. These losses contrast with the abandonment of only six nests (30% of nest failures) for the 30-day period from 5 June to 5 July. Two of nine nests monitored from the adjacent mainland were abandoned between 6 and 8 July. The high rate of Brandt's Cormorant nest abandonment between 5 and 7 July, and possibly nest abandonment from 7 to 12 July, likely resulted from fireworks disturbance."

  "Pelagic Cormorants abandoned both of the two monitored nests on Gualala Point Island between 10 and 16 July for unknown reasons. For one day after the fireworks display, counts of adult Western Gulls on the island declined significantly, but no Western Gull nesting failures were known to have occurred during the count period. California Brown Pelicans *(Pelecanus occidentalis californicus*) did not use Gualala Point Island as an overnight roost until after the date of the fireworks display. "

  *- Study discussion of impacts from fireworks on seabirds, including the same species that nest in areas within the City of San Diego, renders it impossible to say with certainty that such shows have no possibility of causing significant effects.*

**Exhibit 10 Letter from NOAA to City re Harassment at Children's Pool, Nov. 30, 2007**

- Letter puts the City on notice that under the Marine Mammal Protection Act, it is unlawful for any person to "take," defined to also mean "harass," any marine mammal. Letter further indicates harassment includes any act of pursuit, torment, or annoyance with the potential to disturb a marine mammal by causing disruption of behavioral patterns. This includes activities that would not have the potential to

injure such animals in the wild. Letter specially addresses activities at the Children's Pool in La Jolla.

*- Fireworks at La Jolla Cove and anywhere else in the City near resting marine mammals (including throughout Mission Bay and San Diego Bay) constitute harassment under the Marine Mammal Protection Act. The other documents in the record discuss more thoroughly the acoustic impacts to marine mammals and behavioral responses, both directly related to fireworks and other similar explosive noises. There is no evidence to suggest with certainty that the harassment of marine mammals in the City through fireworks displays does not have the possibility of rendering significant environmental effects.*

**Exhibit 11 Letter from NOAA to City re Harassment at Children's Pool, March 21, 2006.**

- Provides information similar to that in Exhibit 10, except that it also identifies indirect impacts from human visitors to the Children's Pool.

*- Human visits to the Children's Pool area are exacerbated by the 4th of July fireworks shows at the Cove. The document indicates pupping season is from January through April. Because the City's actions would exempt fireworks shows year-round, it must study potential impacts from such shows during even the species' most sensitive times and show with certainty that significant effects are not likely. This has not, and cannot, be done.*

**Exhibit 12 Letter from William Everett, Everett and Associates, Environmental Consultants, dated April 23, 2011.**

- Indicates there is a large body of scientific literature on noise effects on wildlife, including both to bird and marine mammals. Specifically applies findings of Gualala Study to La Jolla Cove. States, "Simply put, to conclude categorically that fireworks displays have no possibility of having a significant on the environment is fallacious."

*- This document alone renders it impossible for the City to find "with certainty" that fireworks shows do not have the possibility to cause significant environmental harm to seabirds and other wildlife.*

**Exhibit 13 Letter from Travis Longcore, Ph.D, Land Protection Partners, dated April 25, 2011.**

- Letter from expert in light and noise impacts to wildlife, including endangered species, indicating "Based on this broad ecological knowledge and the published scientific literature on these topics, along with a specific review of the environmental effects of fireworks displays, I can report with certainty that fireworks displays can have an impact on the environment and that impact can be

significant as defined by CEQA.”

*- End of story. With this letter, there is no possible way the City’s approval of the proposed Code changes could be made under the common sense exemption.*

## Eileen Maher - SDIA-Lindbergh Field CLT night roost monitoring 7-2-09

**From:** "Robert Patton" <rpatton@san.rr.com>
**To:** "Richard Gilb" <RGILB@SAN.ORG>
**Date:** 7/3/2009 6:02 PM
**Subject:** SDIA-Lindbergh Field CLT night roost monitoring 7-2-09
**CC:** "Eileen Maher" <emaher@portofsandiego.org>, "Sandy Vissman" <sandy_vissman@fws.gov>, "Brian Collins" <Brian_Collins@fws.gov>, "Elizabeth Copper" <ecopper@san.rr.com>, "Elizabeth Copper" <ecopper@hotmail.com>, "Brian Foster" <bfostern@hotmail.com>, "Mayra Garcia" <migarcia@san.org>, "Rocco Moschetti" <rocco.a.moschetti@aphis.usda.gov>, "Dean Robbins" <drobbins@san.org>, "Matt Sadowski" <matt.sadowski@cox.net>, "John Turman" <John.W.Turman@aphis.usda.gov>, <David_Zoutendyk@fws.gov>

I phoned Air Ops this morning to request repairs at the west end of west oval 03-S where I noticed in driving by last night that two support stakes had broken off at the ground & the chick barrier fabric had pulled away from a third stake. (sorry but forgot to mention it to Dean when I called in upon completion last night)

At least 145 CLTs were visible on-site last night with 133-139 visible in a concentrated night roost flock in the southeastern portion of the oval from around 9:20 to 10 pm. Monitoring will be repeated during July 4th fireworks displays.

Oval 03-S was monitored for night attendance by CLTs from 20:00 to 22:00 on 2 July 09.
Initial observations were made using Zeiss 10x42 binoculars, then through Zeiss 20x85 spotting scope after dark. All observations were made from within vehicle as blind on shoulder of perimeter road, with focus on previously documented night roost location within the southeastern portion of the oval viewed from near the beacon.

My arrival was delayed by traffic, & due to heavy incoming marine layer, light was already less than what had been anticipated. As a result of the limited visibility, a good count of chicks was not possible.
In passing, multiple CLTs could be heard calling from the west end of oval 04-S.
In west oval 03-S (west of the Ryan taxiway), two nests were visibly incubated (nests 134 & 139) & 1 fledgling was visible in the SE corner of the oval.
One fledgling was visible on the Ryan taxiway & 3 adults & 3 fledglings were roosting along the road shoulder just east of the Ryan taxiway.
On arrival, most CLT activity in east oval 03-S appeared to be focused just inside the chick barrier along the perimeter road, with concentrations of roosting birds in grids 1A-B & 4-6 A-B (the site grid of 30m squares is designated 1 through 7 west to east from the Ryan taxiway to the Coast Guard taxiway, & A through D south to north from the perimeter road to taxiway Delta). Grid row 1 included at least 24 adults & 4 fledglings, 2 adults in grid 2A, 3 adults & 3 fledglings in grid row 3; 37 adults, 1 fledgling, 2 medium-large chicks, & 2 nests incubated (nests 131 & 137) in grid 4A; 32 adults & 5 fledglings in grid 5A-B, 14 adults in grid 6A-B, & at least 4 large chick/fledglings in 5-6 C-D, for a total of over 145 CLTs visible on-site.

Initial count of night roost flock in grids 4-6 A-B with binoculars beginning at 20:27 was 116 adult CLTs & 9 fledglings. Repeat count at 20:40 was 117 adults & 7 fledgling but calling & flight activity was continuing with movement of individuals briefly visible in the failing light at times beyond the concentrated flock.
Scope count from 20:45 to 20:55 was 120 adults & 3 fledglings, but still with regular calling & flight activity, & calls indicated that most fledglings were out of view to the west of the main flock.
21:00 to 21:08 - 121 CLTs including an apparently courting pair, others calling as if arriving with fish to the west (comparative count with binoculars in such low light was 109 CLTs).
21:25 to 21:35 - 139 CLTs, although there were calls of multiples still flying in & landing out of view, & some shifting of flock.
21:45 to 21:55 - 133 CLTs in grids 4-6 A-B.

On departure, multiple CLTs were visible still present in grid 1A & both nests still visibly incubated west of the Ryan taxiway. Fireworks from Seaworld were visible as I left but were relatively low on the horizon to the northwest & only audible between aircraft.

## Eileen Maher - SDIA-Lindbergh Field CLT night roost monitoring 7-4-09

**From:** "Robert Patton" <rpatton@san.rr.com>
**To:** "Richard Gilb" <RGILB@SAN.ORG>
**Date:** 7/6/2009 11:56 AM
**Subject:** SDIA-Lindbergh Field CLT night roost monitoring 7-4-09
**CC:** "Nancy Frost" <nfrost@dfg.ca.gov>, "Eileen Maher" <emaher@portofsandiego.org>, "Sandy Vissman" <sandy_vissman@fws.gov>, "Brian Collins" <Brian_Collins@fws.gov>, "Elizabeth Copper" <ecopper@san.rr.com>, "Elizabeth Copper" <ecopper@hotmail.com>, "Brian Foster" <bfostern@hotmail.com>, "Mayra Garcia" <migarcia@san.org>, "Rocco Moschetti" <rocco.a.moschetti@aphis.usda.gov>, "Dean Robbins" <drobbins@san.org>, "Matt Sadowski" <matt.sadowski@cox.net>, "John Turman" <John.W.Turman@aphis.usda.gov>, <David_Zoutendyk@fws.gov>

Summary
At least 206 CLTs were visible on-site with 145-162 visible in a concentrated night roost flock in the southeastern portion of the oval from around 8:20 to 10 pm on 4 July 2009. The flock reached its maximum observed number of 162 just prior to the commencement of fireworks with a total of 202 CLTs visible on-site. As fireworks ceased, flock size had dropped to 147. Visible reaction by roosting birds to fireworks appeared to be related to the loud explosions of shells being fired from the nearest barge off the embarcadero rather than from other locations, from the sound of aerial explosions, or from the light of aerial explosions. Upon the first firing from the nearest barge around 9 pm, the majority of the flock stayed in place but appeared to press lower to the ground & were visibly looking around, many began calling, several stood (most had been sitting, many asleep with bills tucked in wing), and several flew. Fledglings could be heard in flight calling & at least two chicks were observed to run across the site. Killdeer & gulls were also heard calling in flight over the site. As fireworks continued, the majority of the flock stood with several walking & some shifting with short low flights. Within 10 minutes of cessation of fireworks over the north bay (but with continued distant fireworks audible), the flock appeared settled again. Within 20 minutes, flock size increased to 153 & most had resumed sitting with several with bill tucked in wing as if asleep. On my departure around 10 pm, flock size was up to 155 & a total of 181 CLTs were visible on-site. Although fireworks were observed to affect & disrupt CLT behavior at the nesting site, it is questionable & unlikely whether any significant or long-term impacts will result from this event this season. However, colonies elsewhere with less habituation to noises would be expected to react more than those at the airport, & the observed flushing of adults, fledglings, & running of chicks in response to the fireworks confirm fears of possible threat of fledglings relocating to roost in active roadways, taxiways, or runway following dispersal due to fireworks.

Oval 03-S was monitored for night attendance by CLTs from 19:00 to 22:15 on 4 July 09.
Initial observations were made using Zeiss 10x42 binoculars, then through Zeiss 20x85 spotting scope after dark. All observations were made from within vehicle as blind on shoulder of perimeter road, with focus on previously documented night roost location within the southeastern portion of the oval viewed from near the beacon.

(Realized afterward that watch was set approx 8 minutes fast - left times as recorded for comparison with previous night's visit when data were recorded with same timepiece).

19:15 to 19:45 - checked site from perimeter - at least 23 adult CLTs present with feeding flights, courting pair, & 7 nests being incubated;
12-14 chicks, 8 large chick/fledglings, 30 fledglings observed,
including 2 fledglings on road shoulder well west of oval 03-S & on opposite side of taxiway bravo from nest location in west oval 04-S.
In west oval 03-S (west of the Ryan taxiway), three nests were visibly incubated (nests 47, 134 & 139), 2 fledglings were in the east & central portion of the oval, & 1 chick & 2 fledglings were visible in the SE corner of the oval.
6 fledglings were roosting along the road shoulder just east of the Ryan taxiway.
Most CLT activity in east oval 03-S appeared to be focused just inside the chick barrier along the perimeter road, with concentrations of roosting birds in grids 1A-B & 4-6 A-B (the site grid of 30m squares is designated 1 through 7 west to

east from the Ryan taxiway to the Coast Guard taxiway, & A through D south to north from the perimeter road to taxiway Delta). Grid row 1 included at least 4 adults, including incubating 2 nests (nests 126 & 132), 1 chick, 2 large chick/fledglings, & 6 fledglings; 2 adults in grid 2A, 2 large chick/fledglings, & 1 fledgling; 1 adult, 4 chicks, 4 large chick/fledglings, & 2 fledglings in grid row 3; 2 adults incubating 2 nests (nests 131 & 135), & 3 fledglings in grid row 4; 3 adults incubating 3 nests (nests 130, 136, 140) in grid row 5; 2 adults in grid row 6-7, & at least 6-7 chicks & 4 fledglings. 1 adult & 1 fledgling were on taxiway delta with another fledgling in oval 02-S.

20:01 - flock of at least 22 CLTs flying in & circling, most landed dispersed throughout site as if feeding chicks & fledglings
20:08 - flock of 30 circling & again landing dispersed through site
20:12 - most up & flocking, with at least 44 in air & 10 still on ground in grid 4A-6A/B
20:14 - at least 22 CLTs visible grid 1A-C; 46 adults, 6 chicks, 4 fledglings in grid 4-6 A-B
20:19 - several shifting around with flock of 50 circling, at least 60 grid 4-6 A-B, 20 in grid 1-2 A-C
20:22 - flock of 40 settled in, losing light & difficult to see distance, 82 adults & 8 fledglings in grid 4A, 53 adults, 4 chicks, 2 fledglings 5-6 A-B, at least 34 visible in 1-2 A-C
20:30 - too dark to count birds to west now, but took photos of clusters of roosting birds - 86 in grid 4A, 56 in grid 5-6 A-B

drove length of south perimeter oval 03-S before returning to park in observation location at 20:53 - at least 206 CLT visible on-site, including 4 adults west oval 03-S, including nest 134 incubating; 48 CLT in grid 1 A-C, including several fledglings; 2 fledglings on road shoulder; 13 CLT in grids 2-3 A-B, 67 CLT in grid 4A, 72 CLT in grids 5-6 A-B
sound of illegal fireworks to N - some calling by CLTs but difficult to tell if related
getting too dark to accurately count birds with binoculars

20:55-21:03 - count of night roost flock in grid 4-5 A-B using spotting scope - 162 CLT
increase in CLT over previous night visit due to migrants moving in
no longer able to distinguish birds incubating nests since so many CLTs in area (nests 130, 131, & 136 had been visibly incubated)
21:09 - percussion from fireworks shells to WSW (Shelter & Harbor Islands?) - no visible reaction by CLTs
21:10 - loud explosion from nearest barge off embarcadero (from observation location, appears located to SSE of SE corner of USCG station) - several CLTs flew, killdeer calling & circling, gulls calling over Teledyne, increasing CLT calls, some flying but most staying put - hunkered down & looking around
21:13 - fledglings calling & at least 2 chicks ran by
firing of shells from nearest barge causing odd echoes & reverberations off buildings and/or fence - high pitched whines alarmingly similar to sound of passing small projectiles
21:16 - several CLT walking, most standing now (had been sitting) but calling seems to have diminished
percussion from firing of shells off nearest barge loudest & most jarring (my ears hurt), aerial explosion sounds seem minimal in comparison, little visible light effects on oval relative to existing street, building, & airfield lights
21:19 - noise increasing, CLTs calling again, & some walking & shifting with short low flights
21:20 - loudest firing yet - several CLT flushed, multiple fledglings calling in flight, but majority CLTs appear to be staying put
21:22 - increased staccato frequency but not as loud
21:25 - jet taking off - booms of firing from barge significantly louder
loud firing again, CLTs & killdeer calling, increasing with loud staccato (apparent finale) & light of aerial explosions now visibly flashing across & lighting site, several CLTs walking & running back & forth, a few flew including the nearest group of CLTs that I had scope on
21:27 - fireworks quiet, some CLTs still calling
21:28-21:35 - count of night roost flock in grid 4-5 A-B using spotting scope - 147 CLTs, appear settled, no more calling other than 1 flying in, some distant fireworks audible but barely
21:44-21:52 - 153 CLTs, including begging fledgling, at least 2 CLTs flew in & landed, most back sitting & apparently asleep with bill tucked in wing
continuing distant sound of fireworks (OB? Mission Bay?) but barely audible
21:58-22:06 - 155 CLTs, at least 1 flew in calling as if with fish, fledgling answered
on way out, at least 24 CLTs in grid 1A, 2 in west oval 03-S, including incubating nest 134 (total 181 CLT)

checked site from perimeter on the following morning, 8:30 to 9:45 on 5 July 09, weather already hot
at least 24 adults, 9 chicks, 2 large chick/fledglings, 24 fledglings seen:
at least 3 fledglings on taxiway shoulder of west oval 04-S
4 adults including 3 incubating nests (nests 47, 134, 139), 3 chicks, 3 fledglings west oval O3-S

1 adult & 4 fledglings on road shoulder
6 adults including 3 incubating nests (nests 90, 126, 134), 1 chick, 2 fledglings grid row 1
1 adult, 2 large chick/fledglings, 2 fledglings grid row 2
1 adult incubating nest 138, 2 chicks, 5 fledglings grid row 3
5 adults including 3 incubating nests (nests 96, 131, 135), 2 fledglings grid row 4
3 adults incubating nests (nests 118, 130, 140), 1 fledgling grid row 5
2 adults, 4 chicks, 1 fledgling grid row 6-7
1 fledgling oval 02-S

for comparison:
5 July 09 8:30-9:45 - at least 24 adults, 9 chicks, 2 large chick/fledglings, 24 fledglings seen
4 July 09 19:15-19:45 - at least 23 adults, 12-14 chicks, 8 large chick/fledglings, 30 fledglings observed
2 July 09 8:15-11:15 - at least 20 adults, 7 chicks, 6 fledglings seen
30 June 09 13:30-16:00 - at least 20 adults, 19-25 chicks, 23 fledglings seen

variations in counts due to fledgling & adult movement back & forth to bay, & visibility of chicks related to heat & time of day

**From:** Robert Patton [mailto:rpatton@san.rr.com]
**Sent:** Friday, April 22, 2011 2:18 PM
**To:** Jill_Terp@fws.gov; Brian_Collins@fws.gov; Livia Borak
**Cc:** Elizabeth Copper; dmarschal@dfg.ca.gov; Kurt_Roblek@fws.gov; Sandy_Vissman@fws.gov
**Subject:** Re: Fireworks Impacts in City of San Diego

Thank you Livia,
Unfortunately I'm travelling & don't have access to all my files, but FWS staff may want to share my emailed summary reports from observations of the least tern colony at Lindbergh Field over the past two 4th of Julys. No lasting impacts such as nest abandonment were observed, but each of those seasons the significant majority of nesting had already been completed & that colony is habituated to loud noises from aircraft & vehicles. Impacts were observed in terms of fireworks inducing stress, causing non-flying chicks to panic and run, and fledglings and adults to flush from sleeping and roosting flocks, and creating the potential for impacts with aircraft or vehicles, and exposure of chicks and nests to weather & predators. This site is also fully enclosed with a chick barrier & such disturbance at other locations could result in chicks being separated from parents or entering/falling into hazardous areas such as roadways, riprap, etc.
In the past, it has been reported that fireworks on Mission Bay resulted in least terns being flushed from their nests, gulls being flushed from their regular roost sites & relocating to the tern colony & destroying nests.
Good luck,
Robert

# For Arkansas Blackbirds, the New Year Never Came

By CAMPBELL ROBERTSON
Published: January 3, 2011

Times Square had the ball drop, and Brasstown, N.C., had its descending possum. But no place had a New Year's Eve as unusual, or freakishly disturbing, as Beebe, Ark.

Enlarge This Image

Stephen B. Thornton/The Arkansas Democrat-Gazette, via Associated Press

On Monday, more dead birds were found near New Roads, La.

**Related**

Mass Animal Deaths: An Environmental Whodunit (January 9, 2011)

Enlarge This Image

Stephen B. Thornton/The Arkansas Democrat-Gazette, via Associated Press

Thousands of red-winged blackbirds fell dead from the sky in Beebe, Ark., on New Year's Eve. They may have been startled by fireworks, officials say.

Enlarge This Image

Around 11 that night, thousands of red-winged blackbirds began falling out of the sky over this small city about 35 miles northeast of Little Rock. They landed on roofs, roads, front lawns and backyards, turning the ground nearly black and terrifying anyone who happened to be outside.



"One of them almost hit my best friend in the head," said Christy Stephens, who was standing outside among the smoking crowd at a party. "We went inside after that."

The cause is still being determined, but preliminary lab results from the Arkansas Livestock and Poultry Commission revealed "acute physical trauma" in samples of the dead birds. There were no indications of disease, though tests were still being done for the presence of toxic chemicals.

Karen Rowe, the bird conservation program coordinator for the Arkansas Game and Fish Commission, said the prevailing theory was that the birds had been startled by New Year's Eve fireworks and suddenly dispersed, flying low enough to run into chimneys, houses and trees. Pyrotechnics are used to scatter blackbirds for bird control, though only during the day, given the birds' poor vision.

Beebe (pronounced BE-be) is a congregating spot for blackbirds, and one witness told Ms. Rowe that he saw the birds roosting earlier in the day and heard them again at night just after the fireworks started.

"It was the right mix of things happening in a perfect time sequence," Ms. Rowe said.

At most recent count, up to 5,000 birds fell on the city. Sixty five samples were sent to labs, one of which is at the Livestock and Poultry Commission and the other in Madison, Wis.

Keith Stephens, a spokesman for the commission, said he was not aware of a case this



Exhibit 3 NYT re Arkansas BB


The New York Times

Enlarge This Image

Warren Watkins/The Daily Citizen, via Associated Press

A worker with U.S. Environmental Services, a private contractor, picked up a dead bird on Saturday.

large. “About nine years ago we had some ducks,” he said, “but that was only a couple of dozen.”

The town contacted an environmental cleanup firm, which by Monday afternoon had picked up nearly all the birds, some of which were bagged and left at the end of driveways by residents.

“It just looked as if it had rained birds,” said Tracy Lightfoot, a member of the City Council, declining to speculate on the reason. “There’s lots of theories running around. I have no idea. I just don’t have a clue.”

State scientists believe one thing to be almost certain: that the bird deaths were not related to the roughly 85,000 fish that died a few days before near Ozark, in the western part of the state, the biggest fish kill in Arkansas that anyone can remember. They were spotted by anglers along the Arkansas River last week and reported to the Game and Fish Commission, which spent New Year’s Eve measuring and counting dead fish that had spread out for nearly 20 miles.

In that case, the victims were almost all drum, and almost all younger ones. That suggests the culprit was disease, said Mark Oliver, the chief of fisheries for the commission. He said fish kills were not uncommon, especially in winter when the fish are packed more closely, but he did not recall one of this size.

Meanwhile roughly 500 dead birds were found on Monday outside New Roads, La. Those birds were much more varied, with starlings and grackle in addition to blackbirds, and a few samples picked up by James LaCour, a wildlife veterinarian with the Louisiana Department of Wildlife and Fisheries, did not show any signs of trauma, he said.

A version of this article appeared in print on January 4, 2011, on page A11 of the New York edition.

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Exhibit 3 NYT re Arkansas BB

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## Boss Falls. Then What?

Either the United States and its allies help Yemen rebuild, or militants will.

Bleak Visions From Early-20th-Century Rebels





Exhibit 3 NYT re Arkansas BB

**Exhibit 4**
**Gualala Study**
**Submitted Under Separate Cover**

**Application for a Five-Year Programmatic Permit**
**for**
**Small Takes of Marine Mammals Incidental to Launching of Space Launch Vehicles, Long Range Ballistic Target Missiles, and Smaller Missile Systems at Kodiak Launch Complex, Kodiak Island, Alaska**

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

**Submitted by:**
**Alaska Aerospace Corporation**
**101 B Street, Suite 101**
**Anchorage, AK 99503**

## Contents

**Table 2. Continued**



## Figures



## Tables

**Table 2. Continued**

**1. Detailed Description of Specific Activity or Class of Activities Expected to Result in Incidental Taking of Marine Mammals.**

Alaska Aerospace Corporation (AAC), an entity of the State of Alaska, is applying for a five-year programmatic permit for the take of pinnipeds by harassment incidental to rocket launch operations from its Kodiak Launch Complex (KLC). KLC occupies 3,717 acres of state-owned lands on the Narrow Cape Peninsula on the eastern side of Kodiak Island, Alaska (Figure 1). Launch operations are authorized under license from the Federal Aviation Administration (FAA), Office of the Associate Administrator for Space Transportation, in accordance with the facility's Environmental Assessment (EA), stipulations in the EA's Finding of No Significant Impact (FAA 1996), and in subsequent licenses (FAA 1998, 2003, and 2005). The area considered to be affected by the facility and its operations was set in a September 1996 meeting involving AAC and its environmental consultant (University of Alaska Anchorage's Environment and Natural Resources Institute), and government agencies represented by FAA, the U.S. National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (FWS), and the Alaska Department of Environmental Conservation (ADEC). Attendees of that meeting reviewed information on the known effects of rocket operations on the environment and set the expected impact area to be within a six mile radius of the launch pad area (Figure 1). There are no federally listed terrestrial Threatened or Endangered species within this six mile radius area, however there are several federally listed marine mammals present in the waters offshore and on haulouts on Ugak Island, which lies about 3.5 miles distance from the launch pad area. Species of interest using Ugak Island haulouts include the Steller Sea Lion (*Eumatopias jubatus*) and Harbor Seal (*Phoca vitulina*).

KLC is a modern, state-of-the-industry commercial spaceport that supports civil and federal launch customers. Launch operations began in 1998, and KLC was the first commercial spaceport not to be collocated on a Federal range. It is designed specifically to provide optimal support for space launches to polar and high inclination orbits and for suborbital missions. KLC is the nation's sole high latitude space launch complex, and it is ideally situated to launch payloads into polar orbits, especially highly elliptical orbits, including Molniya and Tundra orbits, which are of increasing interest to Federal launch customers.

Launch operations are a major source of noise on Kodiak Island, as the operation of launch vehicle engines produce substantial sound pressures. Generally, four types of noise occur during a launch: 1) combustion noise, 2) jet noise from interaction of combustion exhaust gases with the atmosphere, 3) combustion noise proper, and 4) sonic booms. The latter noise, sonic booms, are not an issue with wildlife at KLC as modeling predicts that sonic booms created by ascending rockets launched from KLC reach the Earth's surface over deep ocean, well past the edge of the Outer Continental Shelf (FAA 1996). Launch azimuths to orbit from KLC pass over the extreme northeastern most tip of Ugak Island, located 4.75 miles away from the launch pad area, at which location a rocket lifting to orbit will be nearing hypersonic velocities and be at an altitude of approximately eight miles above the Earth's surface. Spent first stage motors from space lift missions (i.e. those going to orbit) fall to Earth over the deep ocean beyond the edge of the Outer Continental Shelf (FAA 1996).

**Table 2. Continued**

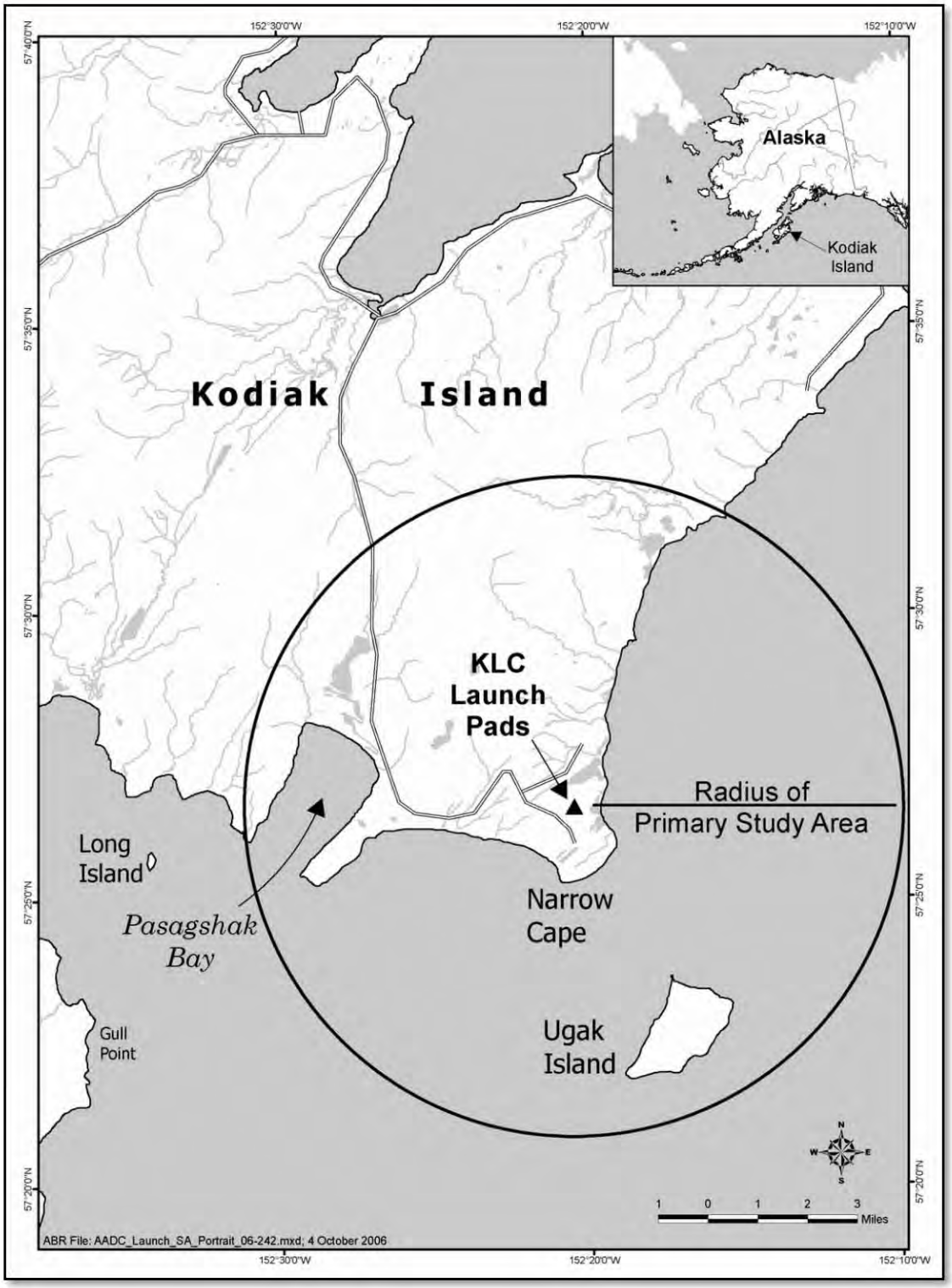



**Figure 1. KLC Vicinity Map.**

**Table 2. Continued**

KLC consists of several facilities that are intelligently sited to accommodate explosive safety quantity distance circles for the various vehicles that can be flown from the complex (Figure 2).

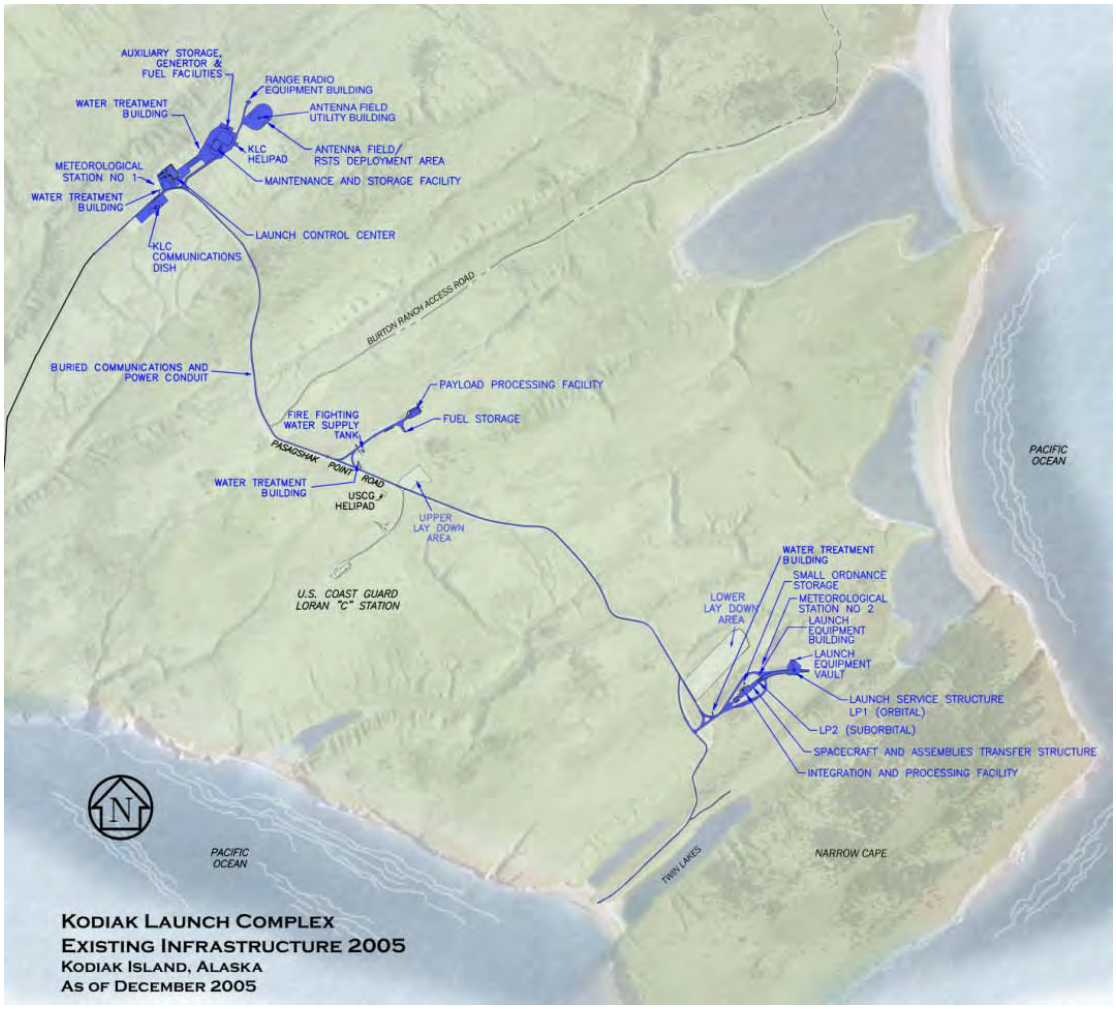



**Figure 2. Kodiak Launch Complex.**

The main facilities include the collocated Launch Control Center (LCC), the Maintenance Support Facility (MSF), and Antenna Field, all of which are about two miles from the pad complex; the Payload Processing Facility (PPF), which is about one mile from the pad complex; and the collocated Integration and Processing Facility (IPF), Spacecraft Assemblies Transfer (SCAT) Facility, and Launch Service Structure (LSS), which together consist of the launch pad complex (Figure 3).

**Table 2. Continued**

**Figure 3. Launch Pad Complex with from front to rear the IPF, SCAT, and LSS.**

In addition, a five bay Rocket Motor Storage Facility (RMSF) is under construction (the first two bays will be operational in 2010-2011), and there are plans laid for later construction of an additional launch pad complex.

The following subsections provide details on representative types of space launch vehicles and suborbital vehicles that might be launched over the five-year period covered by the requested rulemaking.

### 1.1 Representative Space Launch Vehicles, Target Vehicles, and Smaller Missile Systems That Might Be Launched From KLC

Space launch vehicles – which by definition are those used to boost satellites to orbit – are launched from the LSS, which sits over Launch Pad 1 (LP1). The LSS is an environmentally conditioned structure that rolls open for launch. This facility primarily supports launch of small to medium space launch vehicles ranging in size from the small space launch Castor 120 motor (used in the Athena, Minotaur IV, Minotaur V, and Taurus I systems) to the under-development medium-lift Taurus II. The Spaceport is also configured to support launch of the Minuteman I derived Minotaur I Space Launch System, and to support launch of long range ballistic systems such as the Polaris derived A-3 STARS, the Minuteman derived Minotaur II and III, and the C-4.

**Table 2. Continued**

Target vehicles are flown either out of the LSS at LP1 or from Launch Pad 2 (LP2), which is located midway between the IPF and the LSS. All weather indoor processing of erected boosters at LP2 is accomplished by parking the rail mobile SCAT Facility over the pad area. Representative target vehicles that might be flown from KLC range in size from modified C-4 Trident I vehicles, which have a range measured in thousands of miles, down to small vehicles built up from modified second or third stage components of larger missile systems, which have much shorter ranges. The Quick Reaction Launch Vehicle (QRLV) family serves as an example, being built around second stage motors used in the Minuteman I. Tactical missiles, such as the Patriot and Theater High Altitude Area Defense (THAAD) might also be flown from KLC, as might very small sounding rockets.

Table 1 provides motor diameters and representative sound pressures for various launch vehicles, some of which have been launched previously from KLC (where indicated below). The listed vehicles include various ballistic launch vehicles and the small lift Castor 120 space launch vehicle, as well as smaller target/interceptor systems and tactical rocket systems. All KLC sound measurements reported in Table 1 were taken at a distance of 3.5 miles from the launch pad on Ugak Island, the location of pinniped haulouts, where sound pressure monitors were installed prior to launch by skilled professionals. It is important to note that the Castor 120 (previously launched from KLC) is the loudest launch vehicle motor expected to be launched from KLC over the five year period covered by the requested permit.

**Table 1. Recorded and Estimated Sound Pressures at the Ugak Island Spit Haulout**

| **Previously Launched & Recorded at KLC (also Potentially Launched in Future)** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Launch Designator** | **Launch Vehicle** | **Date** | **Distance to Haulout** | **Motor Diameter (feet)[1]** | **SEL (dBA)** | **Lmax (dBA)** | **LPeak (dCBA)** |
| *ait*-1 | QRLV | 11/5/98 | 3.5 miles[2] | 4.3 | 88.4 | 78.2 | 97.0 |
| *ait*-2 | QRLV | 9/15/99 | 3.5 miles[2] | 4.3 | 92.2 | 81.5 | 101.5 |
| QRLV | QRLV | 3/22/01 | 3.5 miles[2] | 4.3 | 80.3 | 73.3 | 87.2 |
| Athena | Castor 120 | 9/29/01 | 3.5 miles[2] | 7.75 | 101.4 | 90.8 | 115.9 |
| FT-04-1 | Polaris A-3 STARS | 2/23/06 | 4.1 miles[3] | 4.5 | 92.3 | 86.0 | 109.0 |
| FTG-02 | Polaris A-3 STARS | 9/01/06 | 4.1 miles[3] | 4.5 | 90.1 | 83.1 | 105.6 |
| FTG-03a | Polaris A-3 STARS | 9/28/07 | 4.5 miles[4] | 4.5 | 91.4 | 84.2 | 107.3 |
| FTX-03 | Polaris A-3 STARS | 7/18/08 | 4.5 miles[4] | 4.5 | 89.6 | 83.0 | 108.3 |

**Table 2. Continued**

| Table 1. Continued-Potentially Launched in Future | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Launch Designator** | **Launch Vehicle** | **Date** | **Distance to Haulout** | **Motor Diameter (feet)[1]** | **SEL (dBA)** | **Lmax (dBA)** | **LPeak (dCBA)** |
| - | Taurus II | - | - | - | <101.4[5] | - | - |
| - | Minotaur I | - | - | 4.5 | 90+[5] | - | - |
| - | C-4 Trident I | - | - | 6.1 | - | - | - |
| - | Castor I | - | - | 2.6 | - | - | - |
| - | SR19/SR773 | - | - | 4.3 | - | - | - |
| - | SR19/SR19 | - | - | 4.3 | - | - | - |
| - | Castor IVB | - | - | 3.3 | - | - | - |
| - | Patriot | - | - | 1.3 | - | - | - |
| - | THAAD | - | - | 1.25 | - | - | - |

**NOTES:**
1. Motor sound pressures from solid fueled motors are directly correlated to motor diameter.
2. Traditionally used Steller Sea Lion seasonal haulout; use has declined significantly in recent times
3. Alternate Steller Sea lion haulout, a tidally exposed small rock located midway between the traditional haulout and the northeastern most cape of Ugak Island
4. Second alternate Steller Sea Lion haulout located on the northeastern most cape of Ugak Island
5. Estimated – see text Section 1.1.2

### 1.1.1 Castor 120 (Athena, Peacekeeper Derived Minotaur IV and V, and Taurus I)

The Castor 120 is the civil version of the Peacekeeper SR 118 first stage motor. The SR 118 provides the first stage of both the Minotaur IV and V. For the purposes of this application, there are no substantive differences between the SR 118 and the Castor 120. The Castor 120 provides the first stage of two different civil launch systems. These include the Athena and the Taurus I.

The Castor 120 was the base vehicle analyzed in the EA done by the FAA (US FAA 1996) in support of the decision to issue a launch license to AAC. The Castor 120 uses solid fuel and produces about 371,000 pounds of thrust. The motor mass is about 116,000 pounds and the motor is 347 inches long and 93 inches wide. Modeling shows the rocket is about eight miles above the earth's surface when it overflies Ugak Island, and that the sonic boom reaches earth between 21 to 35 miles down range, which is past the Outer Continental Shelf break and over the North Pacific abyss (US FAA 1996). Sound pressure from the Castor 120 at the traditional haulout on Ugak Island was measured to be 101.4 dBA (SEL) (Table 1). This location is 3.5 miles away from the launch pad. None of the vehicles expected to be flown from KLC over the five year period covered by this rule making and associated permit is known to be louder than the Castor 120.

**Table 2. Continued**

### 1.1.2 Taurus II

The Taurus II is an under development, medium class launch vehicle similar in capability to the Delta II, which is being withdrawn from service. The vehicle is liquid fueled and burns kerosene with liquid oxygen as the oxidizer. Orbital Sciences Inc. anticipates the first launch to be in 2011 or 2012, and AAC anticipates that KLC will be the west coast launch site for the vehicle. No sound pressure data is available, but because the Taurus II is very similar to the Delta II in design and capability, sound pressures produced by the Taurus II should be reasonably close to those of the Delta II. The U.S. Air Force reports that sound pressures of the Delta II were slightly less than those from the Taurus I (Castor 120) as measured from the same point (USAF 2008), thus the anticipated sound pressure from the Taurus II at the traditional Steller Sea Lion haulout on Ugak Island is likely to be at or somewhat less than the 101.4 dBA (SEL) recorded for the Castor 120 (see above).

### 1.1.3 Minotaur I

The Minotaur I is a small lift solid propellant space launch vehicle, the first stage of which is a modified Minuteman II first stage. The first stage motor has a diameter of 4.5 feet. This launch vehicle has not yet been flown from KLC. Sound pressure monitoring of two Minotaur I launches was accomplished at Vandenberg Air Force Base, California (VAFB). The data were collected 1.4 miles away from the launch point and show sound pressure levels of 104.9 to 107.0 dBA (SEL) at that distance. Sound energy at sea level decreases with the square of the distance, and given that the traditional Steller Sea Lion haulout on Ugak Island is two miles farther away (i.e. the haulout is 3.5 miles from the launch point), the anticipated sound pressure levels from a Minotaur I at the Ugak Island traditional haulout would range in the 90s dBA (SEL).

### 1.1.4 C-4 Trident I

The C-4 is a solid fueled vehicle and its first stage has a diameter of 6.1 feet, which is about 1.5 feet less than the Castor 120. The system's range is around 4,000 miles. It has never been flown from KLC, but given it is significantly smaller in diameter than the Castor 120 and uses a similar fuel, it is anticipated that sound pressure levels at the traditional Steller Sea Lion haulout would be less than those of the Castor120.

### 1.1.5 Polaris A-3 STARS

The Strategic Target System (STARS) utilizes the first stage of the Polaris A-3, which is solid fueled and measures 4.5 feet in diameter. Several STARS systems have been flown from KLC. Recorded sound pressure levels at Ugak Island have ranged from 90.2 to 91.4 dBA (SEL).

### 1.1.6 Smaller Target and Tactical Rocket Systems

A number of smaller missile systems have the possibility of being flown from KLC. Representative missile systems are the Castor 120 through the THAAD, shown at the bottom of Table 1. These are not the only such systems that might be flown, but they are representative of the sizes of such vehicles. As shown, representative smaller systems range from about a foot in

**Table 2. Continued**
diameter up to about four feet in diameter. As stated earlier, smaller systems ranging down in size to several inches in diameter and used as sounding rockets could conceivably be flown as well. Sound pressures from these smaller systems are not available, but will be substantially less than those from the space launch and ballistic vehicles described above and pose no potential for disturbance to marine mammals.

## 2. Dates and Duration of Activities and Specific Geographical Region Where They Will Occur.

Launch activities could occur at any time of day or night and in any weather during the period to be covered under this rulemaking (27 February 2011 through 28 February 2015). KLC launch azimuths range from 110° to 220°. The eastern most launch azimuth of 110° is within a few degrees of most orbital launches, and crosses the extreme eastern edge of Ugak Island where several pinniped haulouts are found. Modeling done of Castor 120 space launches indicates the vehicle is passing through 45,000 feet altitude by the time it reaches the island about seventy seconds post launch (US FAA 1996). Spent first stage rocket motors impact the ocean from 11 to more than 300 miles down range, depending on launch vehicle. Sonic booms reach the earth's surface beyond the Outer Continental Shelf (US FAA 1996).

KLC is about 22 air miles from the City of Kodiak, which is the largest settlement on the Kodiak Island. The land area occupied by KLC is owned by the State of Alaska and is administered by AAC under terms of an Interagency Land Management Assignment (ILMA) issued by AAC's sister agency, the Alaska Department of Natural Resources. Land elevations at KLC range from about 140 feet near the pad complex to about 300 feet at the Launch Control Center. The vegetation includes a mix of grass-sedge, shrub, wetland, and Sitka spruce (*Picea sitchensis*) associations. There are no federally listed or proposed Threatened or Endangered species on the land.

The ILMA also grants AAC authority to restrict public access for safety purposes to an additional 7,000 acres of land abutting KLC's northern and western boundaries, as well as to all of Ugak Island, which lies immediately south of Narrow Cape. Ugak Island's axis trends northeast to southwest. The island is about two miles long by about one mile wide. The land slopes steeply upward from a spit on the island's northern most point, which is a traditionally used Steller Sea Lion haulout (Figures 4 and 5), to the southwest, culminating in cliffs that are approximately 1,000 feet in elevation. These cliffs run the entire length of the island's long axis. Eastward, the narrow Outer Continental Shelf ends about twenty miles offshore, where it plunges precipitously to the North Pacific abyss. Near shore water depths to the immediate south and west of the island range to several hundred feet. Harbor Seal haulouts are present mainly on Ugak Island's eastern shores.

**Table 2. Continued**

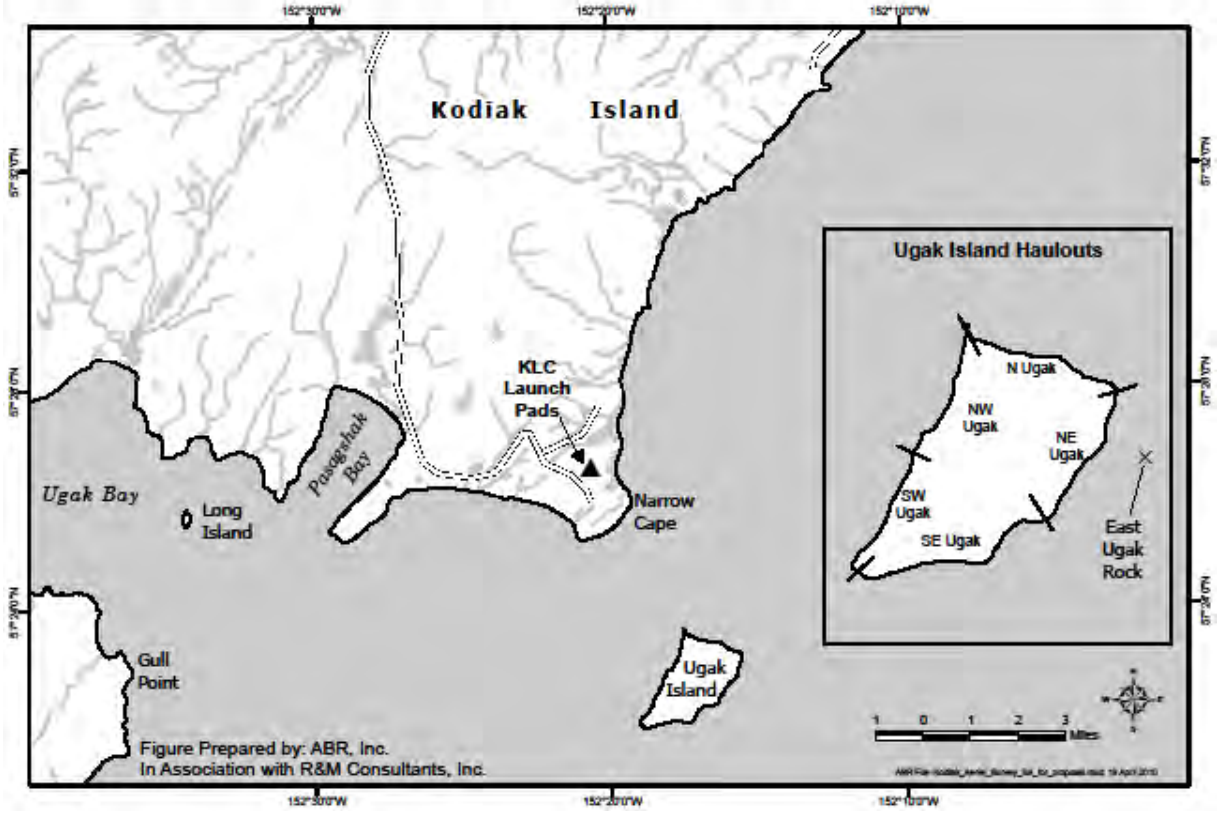



**Figure 4. Ugak Island Haulouts.**

**Figure 5. Ugak Island seen from the Southeast. The historic Steller Sea Lion haulout spit is visible, as is KLC across the strait. Most Harbor Seals use beaches beneath the 1,000 foot tall cliffs in the foreground.**

**Table 2. Continued**

**3. Species and Numbers of Marine Mammals Likely to be Found Within the Activity Area.**

Marine mammals that regularly occur in the vicinity of KLC include the Steller Sea Lion, Harbor Seal, Gray Whale (*Eschrichtius robustus*), Humpback Whale (*Megaptera novaeangliae*), and Sea Otter (*Enhydra lutris*) (Table 2). All are protected under the Marine Mammal Protection Act (MMPA), and in addition the Steller Sea Lion, Humpback Whale, and Sea Otter are listed as Threatened or Endangered under the Endangered Species Act (ESA). The U.S. Fish and Wildlife Service manages the Sea Otter, and NMFS does not have jurisdiction to issue takes of this species; therefore it is not discussed further in this application.

Table 2 presents daily counts, by species, of the MMPA-protected marine mammals that have been observed during launch-related environmental monitoring activities conducted since the current LOA became active in early 2006. The counts are specific to Ugak Island.

**Table 2. Marine Mammal Observations during Launch-Related Environmental Monitoring within Six-mile Radius Study Area**

| Date | Steller Sea Lion[1] | Harbor Seal[2] | Gray Whale | Humpback Whale | Pre-Launch Survey (# days pre-launch) | Post-Launch Survey (# days post-launch) |
|---|---|---|---|---|---|---|
| 2/18/2006 | | 684 | | | Yes (5) | |
| 2/19/2006 | | 519 | 2 | | Yes (4) | |
| 2/20/2006 | | 201 | | | Yes (3) | |
| 2/21/2006 | | 405 | 8 | | Yes (2) | |
| 2/22/2006 | | 350 | | | Yes (1) | |
| 2/23/2006 | | 211 | 1 | | | Yes (Same Day) |
| 2/24/2006 | | 270 | 1 | | | Yes (1) |
| 2/25/2006 | | 58 | | | | Yes (2) |
| 8/28/2006 | 3 | 495 | | | Yes (3) | |
| 8/29/2006 | 4 | 652 | | | Yes (2) | |
| 8/31/2006 | 8[3] | 901 | | | Yes (1) | |
| 9/1/2006 | 2 | 961 | | | | Yes (Same Day) |
| 9/2/2006 | 1 | 954 | 2 | 1 | | Yes (1) |
| 9/3/2006 | 1 | 789 | | 1 | | Yes (2) |
| 5/23/2007 | | 136 | 2 | | Yes (2) | |
| 5/27/2007 | | 402 | 3 | | | Yes (2) |
| 5/28/2007 | | 224 | 1 | | | Yes (3) |
| 9/25/2007 | | 381 | 4 | | Yes (3) | |
| 9/26/2007 | 2 | 265 | | | Yes (2) | |

**Table 2. Continued**

| Date | Steller Sea Lion[1] | Harbor Seal[2] | Gray Whale | Humpback Whale | Pre-Launch Survey (# days pre-launch) | Post-Launch Survey (# days post-launch) |
|---|---|---|---|---|---|---|
| 9/27/2007 | | 461 | 8 | | Yes (1) | |
| 9/30/2007 | | 686 | 6 | | | Yes (2) |
| 10/1/2007 | | 748 | | | | Yes (3) |
| 7/15/2008 | 4 | 700 | 9 | | Yes (3) | |
| 7/16/2008 | 5 | 611 | 32 | | Yes (2) | |
| 7/17/2008 | 1 | 853 | 9 | | Yes (1) | |
| 7/18/2008 | 4 | 840 | 12 | | | Yes (Same Day) |
| 7/19/2008 | 4 | 744 | 1 | | | Yes (1) |
| 7/20/2008 | 5 | 610 | 5 | | | Yes (2) |
| 7/21/2008 | 3 | 1534 | | | | Yes (3) |
| 12/7/2008 | 1 | 971 | 5 | | | Yes (2) |

**NOTES:**

1. Steller Sea Lions pup mid- May to mid-July and breed late-May to late-July at rookeries. Molt is late-July to early December (Hoover 1988). Haulouts are used for resting. Ugak Island is a haulout not a rookery. The Ugak Haulout has been used in the past between July and October.
2. Harbor Seals pup from ~15 May to end of June (Jemison and Kelly 2001) and molt from June to October. Both periods contain peaks in haulout attendance.
3. Five individuals observed by aerial survey, eight captured on unmanned video.

The primary monitoring method has involved conducting aerial surveys along set transect lines to observe and count Steller Sea Lions and Harbor Seals. Marine mammals other than sea lions and Harbor Seals, although observed and recorded, were not specifically targeted by the launch-related aerial surveys. Marine mammal abundance and distribution were recorded during aerial surveys flown in a single-engine fixed-wing airplane with floats. The aerial survey route was designed for Steller Sea Lions and Harbor Seals and was flown using a Global Positioning System (GPS) for navigation. All surveys were intended to be flown within two hours of the daytime low tide and during mid-day, when haul out attendance peaks for Harbor Seals. The aerial survey schedule during the formal monitoring period consisted of daily surveys one day prior to the launch, immediately following the launch (on the launch day), and each day of the three days following the launch date, weather conditions permitting (NMFS 2008). Two additional surveys were often conducted prior to the formal monitoring period at AAC's discretion. The two additional surveys were conducted to balance the pre-launch sample size with the three post-launch surveys to allow calculation of the variance in pre-launch counts for subsequent statistical analysis. The aerial surveys were flown 500 ft above sea level at 80–90 nautical mph and the flight line was kept ≥0.25 mi from known haulouts. Digital photographs of groups of seals (generally >10 seals) were taken with a Nikon D70 camera (equipped with a 70 to 300 millimeter zoom lens) or a Canon Powershot S5 camera with image stabilized zoom. Images were reviewed on a personal computer and counts of seals were summarized from sets of overlapping images. All counts of >15 seals were made from digital images taken from the

**Table 2. Continued**
aircraft, unless the images were blurred or underexposed, in which cases the visual estimates were used.

Foul weather, daylight considerations, launch timing, and timing of tidal flux have all contributed to the difficulty in collecting the data in Table 2. Foul weather precludes aerial surveys primarily due to visibility and/or excessive turbulence. In addition, rockets can often be launched during periods of weather that are not conducive to operation of small aircraft. Daylight, launch timing, and tidal flux create difficulty in timing of surveys, as low tide (when haulouts are more likely to be attended) may not coincide with daylight hours and/or aircraft availability. Table 2 does not reflect the several aerial surveys that were attempted and aborted, or that were scrubbed altogether due to the considerations just mentioned. Only successfully completed aerial surveys are listed above.

Descriptions of the various species that occur in the vicinity of KLC are set forth below, but the following general trends can be easily seen in Table 2. Previous rocket launches did not generally appear to depress the daily attendance of Harbor Seals at haulouts on Ugak Island. Harbor Seals appear to be increasing on Ugak Island. The number of Harbor Seals tallied at Ugak Island during the July 2008 FTX-03 surveys reached a new record for monitoring surveys, at 1,534 seals (R&M, 2008). Numbers in Table 2 are high during August and September surveys because they were conducted during the annual molt, when maximal numbers of seals tend to haulout (Calambokidis et al., 1987).

Marine mammals other than Steller Sea Lions and Harbor Seals, although observed and recorded, were not specifically targeted by the aerial survey and other monitoring efforts for this launch. A small number of Gray Whales (5) and sea otters (3) were the only other marine mammals observed.

### 3.1 Steller Sea Lion

The Steller Sea Lion population is described by two stocks. Those west of 144° west longitude, which includes the KLC area, are classified as Endangered. Mature and sub adult male Steller Sea Lions have historically used a post-breeding haulout found on a spit on Ugak Island. The spit is on the northwestern most shore of the island within 3.5 miles of the launch pad complex (Figures 4 and 5). This haulout is the closest haulout to the launch complex and experiences the highest sound pressures. Use has declined in recent times in keeping with general declines seen in the species as a whole. The historic occupancy period ranged from June to September (post breeding), with peak reported numbers in the few hundred (Sease 1997; ENRI 1995-1998). Numbers of individuals using the haulout have declined over time. The spit is designated a long term trend count site by NMFS and has been surveyed once yearly, with June as the target, since the 1990s. Counts since 2000 have generally been zero (e.g. US NMFS 2009; Fritz and Stinchcomb 2005), which is in line with the counts from all other long term trend count sites in the Kodiak Archipelago (known as Tonki Cape, Cape Barnabas, Cape Ugat, and Steep Cape) over the same time period. The low count data is supported by anecdotal reports from KLC

**Table 2. Continued**

staff. A decade ago it was normal to hear the bellows of sea lions on the spit from the vicinity of the Launch Control Center, which is about 5.5 miles away. This is no longer the case, and in fact, newer staff have never heard them. The spit haulout has not been used by Steller Sea Lions during launch-monitoring surveys since 1999 (ENRI, 2000, R&M, 2007a,b, 2008); however, since then only three launches from the KLC (FTG-02, FTG-03a, and FTX-03) have occurred during the June to September time frame. Seventeen aerial surveys have been conducted during those launches (Table 2). More often, when sea lions were present during recent monitoring surveys, they have occupied a haulout on a supratidal rock on eastern Ugak Island (termed East Ugak Rock). During one aerial survey that was completed outside the June-September timeframe (during the FTG-05 campaign in December 2008), a single sea lion was observed on East Ugak Rock. The same location was used daily by sea lions during previous monitoring surveys in the June-September timeframe. Two to eight (per day) sea lions were observed there during the FTG-02 launch (R&M, 2006b) and one to five (per day) were observed during the FTX-03 launch (R&M, 2008).

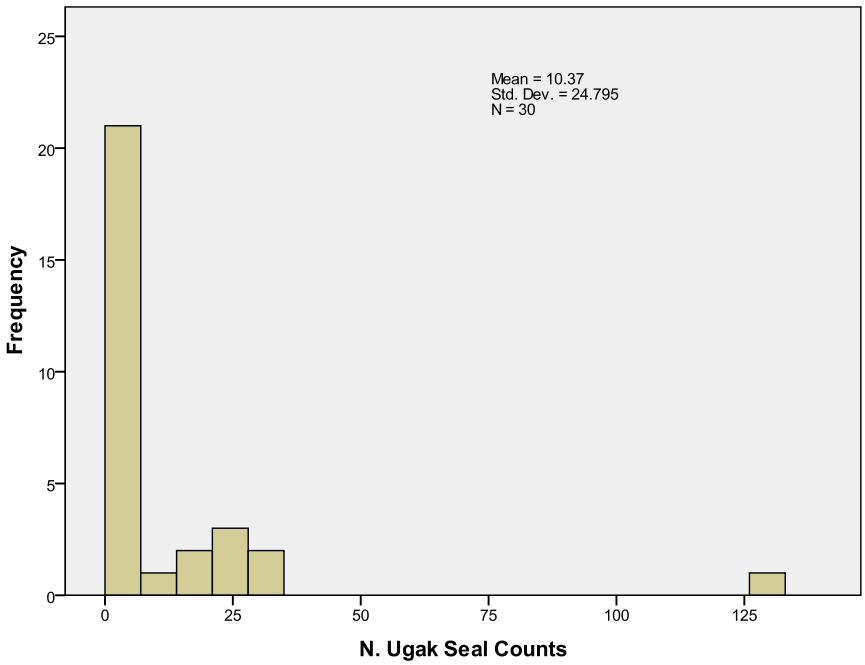
### 3.2 Harbor Seal

Harbor Seals are present on Ugak Island year round. Approximately 97% of all individuals are found on the eastern shore, based on aerial survey counts from launch monitoring reports conducted since January 2006 (Figure 6). The eastern shore is backed by high steep cliffs that reach up to 1,000 feet above sea level. These cliffs form a visual and acoustic barrier to rocket operations, and limit effects on the species. This conclusion is based on review of sound pressure recordings that showed surf and wind-generated sound pressures at sea level were generally in the >70 dBA (SEL) range on the best days (cf. Cuccarese et al. 1999, 2000). During inclement periods sound pressures at sea level can exceed 100dBA (SEL). Haulout on the eastern shore are all about five miles distance from the pad complex.

Because access to Ugak Island Harbor Seal haulouts is difficult and dangerous, nothing is known of how seals use these habitats. Harbor Seals generally breed and molt where they haulout, so it is assumed that both of these activities take place on Ugak Island. This assumption is supported by the fact that young seals have routinely been seen there during launch-related aerial surveys. These haulouts are the only haulouts used by Harbor Seals within the six mile radius area (Figure 1) designated as being affected by launch operations, and so they have a local importance. Pupping in Alaska takes place generally in the May-June time frame; molting occurs generally from June to October. Total counts on Ugak Island have increased steadily since the 1990s from several hundred (ENRI 1995-1998) up to a peak of about 1,500 today (R&M 2007a, 2007b, 2008, 2009) (Table 2). In the prior absence of reliable count data by area of Ugak Island, NMFS originally estimated that up to 25% of all Harbor Seals were using haulouts on the island's northern shores (NMFS 2005) to support its rule making on the previous request from AAC for a permit. Subsequent analysis of count data shows that the NMFS estimate of use of the northern shore of Ugak Island by seals was too high (Figure 6). As stated above, approximately 97% of all observed Harbor Seals since 2006 have used haulouts on the eastern shore of Ugak Island.

**Table 2. Continued**

**Figure 6. Percentage of Harbor Seals counted on Ugak Island's Northern Shore[1].**




1. Frequency of Harbor Seals counts using Northern Ugak Island haulouts during 30 aerial surveys conducted during six rocket launches, Kodiak Island, 2006–2008. Unpublished data collected by ABR, Inc. in association with R&M Consultants, Inc. Note: no seals were seen on North Ugak Island during 19 of 30 surveys.

## 3.3 Gray Whale

The migration path of the Gray Whale runs past Narrow Cape twice yearly as members of the population move between southern breeding grounds and northern feeding areas in the Chukchi and Beaufort Seas. The area from Cape Chiniak (which is about 15 miles north of Narrow Cape) to Narrow Cape/Ugak Island has been identified by NMFS as a major spring Gray Whale concentration area and probable feeding area (Consiglieri et al. 1989). The total stock size for this species is estimated to be around 18,000 (Allen and Angliss 2010). Nearly all of the population passes by KLC each spring and fall during migrations to feeding areas in the Chukchi and Beaufort Seas and winter grounds in Mexico. KLC operations do not affect Gray Whales because airborne noise is generally reflected at the sea surface outside of a 26° cone extending downward from the ascending rocket (Richardson et al. 1995). Little sound energy passes into the sea across the air-water boundary. Submerged animals would have to be directly underneath the rocket to hear it, and given the hypersonic velocity of launch vehicles in the atmosphere, the duration of sounds reaching Gray Whales will be negligible. Given the limited surface area involved, the very short time a cetacean would be exposed to the noise, and the attenuation that occurs at the sea-air interface, Gray Whales are not anticipated to be affected by launch operations, and they are not discussed further within this application.

**Table 2. Continued**
**3.4 Humpback Whale**

The Humpback Whale is seasonally present in small numbers in the near shore waters around Narrow Cape. A peak count of thirteen was recorded in 1997 about fifteen miles north of KLC at Cape Chiniak (ENRI 1995-1998). Sightings around Narrow Cape in the vicinity of the launch complex are sporadic (Table 2) and range from one to four. The total population of the stock(s) using the Gulf of Alaska is estimated to be around 2,200 (Allen and Angliss 2010). Humpback Whales will not be affected by launch operations from KLC for the identical reasons discussed for Gray Whales in section 3.4, and they will not be discussed further in this application.

## 4. Description of the Status, Distribution, and Seasonal Distribution of Species or Stocks of Marine Mammals Likely to be Impacted

### 4.1 Steller Sea Lion

The western stock of the Steller Sea Lions, which includes those found in the Narrow Cape area, is estimated to total around 41,000 (Allen and Angliss 2010). This stock is listed as Endangered under the ESA and depleted under the MMPA. The western stock occupies a huge geographic range that stretches around 1,800 from Kodiak Island to the end of the Aleutian Island chain. As stated in Section 3.1 above, numbers in the Narrow Cape area have diminished over time in concert with declines seen in the stock as a whole. The species is normally seen on Ugak Island between June and September (Table 2); current numbers are imprecisely known but are much lower than in the past. The prime area used historically as a haulout is a gravel substrate spit on Ugak Island's north side (see Section 3.1). The spit haulout has not been used by Steller Sea Lions during launch-monitoring surveys since 1999 (ENRI, 2000, R&M, 2007a,b, 2008). Since that time, observed animals have occurred on Ugak Island's east side. Historic data do indicate that when hauled out at the spit, the population has consisted of adult males only. The spit is under the influence of long shore currents and its geomorphology shifts over time. Currently the spit appears smaller in size than in the past.

### 4.2 Harbor Seal

The Harbor Seal is widely distributed in the Gulf of Alaska, an area that includes Narrow Cape. Harbor Seals have not been listed under the ESA, nor have they been listed as depleted under the MMPA. The Gulf of Alaska stock, which is found from Cape Suckling to Unimak Pass, is estimated to number around 44,000. The stock is rebounding from a crash that occurred in the 1990s. Current numbers on Ugak Island total around 1,500 (R&M 2009), which is an increase of about 1,100 since the 1990s (ENRI 1995-1998). As indicated in Section 3.2 above, pupping in this stock generally occurs from May to June and molting occurs from June to October.

## 5. Type of Incidental Taking Authorization Being Requested and the Method of Incidental Taking.

Pinnipeds might be taken by incidental harassment (e.g. head lifting, move toward or into the water) as a consequence of rocket motor noise or the sudden visual appearance of a rocket during

**Table 2. Continued**
its ascent from KLC. Pinniped responses to launches from VABF, with notes on related observations from Ugak Island are presented in Section 7.

## 6. By Age, Sex, and Reproductive Condition, the Number of Marine Mammals That Might be Taken by Harassment, and the Number of Times Such Takings are Likely to Occur.

### 6.1 Number of Space Launch Vehicles, Targets, and Smaller Missile System Launches.

The number of launches of space launch vehicles and ballistic target vehicles from KLC is variable. Launch planning is a dynamic process, and launch delays, which can last from hours to more than a year, can and do occur. Launch delays occur due to variables ranging from technical issues to adverse weather. These factors have controlling influence over the numbers of vehicles by class that are actually launched in any given year from KLC. Launches take place year round when all variables affecting launch decisions are in correct alignment.

Historically, launch operations have required months of preparation that included 1) shipment of individual motor stages and pay loads, 2) checkout and interim storage of motors and payloads, 3) Launch Operations Control Center and range safety system mission data integration, 4) integration of motors either horizontally for later erection of the complete motor assembly on the pad, or by building the complete motor assembly by stacking with use of a crane directly on the pad, 5) integration of the payload on the completed stack, 6) methodical checking of all completed launch vehicle and payload components, 7) multiple launch dress rehearsals, and 8) launch.

Following launch it is normal under present procedures to require months to reconfigure a launch complex for a new mission. This paradigm poses increasing problems for support of today's space asset infrastructure, which is vital to commerce and the military. If a critical space asset is lost, or if additional assets are required, it currently takes months to years to ready another launch. This is untenable and planning is underway to allow on demand launch when and as needed. The U.S. Department of Defense is leading this planning effort with an initiative called Operationally Responsive Space (ORS). This concept will allow the rapid launch after call up of assets to orbit. In brief, what is envisioned is revolutionary. Multiple fully integrated rocket systems (complete stacks of all boost motors) will be stored in bunkers on trailers that have the capability to function as strong back erectors. The motor stacks will be monitored by computer 24/7 with reports on vehicle health reported in real time as problems arise. This will assure a completed stack is ready on demand. Multiple satellites will also be stored on site, or available off site for delivery to a launch complex within 24 hours of issuance of a mission order. At the launch complex, multiple launch solutions and infrastructure configurations will be stored in electronic media in a launch library. On receipt of a launch order, a completed motor stack will be rolled out of its bunker and driven to the launch pad where it will be erected intact (fully complete) on the launch stool with the transporter's integral strong back erector. The satellite will then be brought from storage and integrated onto the stack. Satellite, vehicle and launch

**Table 2. Continued**
operations integration checks will then be performed. This concept holds promise of achieving launch in as little as 24 hours after call up.

AAC is actively configuring KLC to support ORS missions, and KLC will have the nation's first rapid on demand launch capability when complete. A five bay Rocket Motor Storage Facility is currently under construction and the first two bays are expected to be operational in the 2010-2011 time frame. Once available, KLC will be the first launch complex capable of supporting on-demand access to space. What this means is that instead of taking months to recycle the complex to support a new mission, the spaceport will be able to support multiple launches to space in days. For example, with initial capacity limited to the two bunkers, and assuming a third stack was held in reserve erect on the pad and that satellites were available along with launch and safety solutions, up to three launches from a single pad could be performed in a week's time.

AAC's estimate of the total number of vehicles that might be launched from KLC over the course of the five-year period covered by the requested rulemaking is 45, with an average of nine per year. Most of these vehicles are expected to be of the Minotaur I through V class, including civil versions of the Castor 120 known as the Athena and Taurus I (See Section 1) or smaller target vehicles (See Section 1). AAC estimates that up to three of the 45 launches will be of the now under development Taurus II (See Section 1), and that up to 10 of the 45 launches will be of smaller vehicles such as the THAAD, or even smaller sounding rockets. Thus, AAC estimates that of the 45 estimated launches from KLC over the five-year period in consideration, 32 will be of small space launch and target vehicles of the Castor 120 or smaller size, 10 will be of THAAD or smaller size, and three will be of the medium lift Taurus II. While it is difficult to estimate, the highest number of launches in any given year might be 12 if smaller tactical systems were flown for test and evaluation purposes. This is a high end number that represents the worst case for analysis.

Launch timing is out of the control of AAC and is driven by customer needs that include variables ranging from 1) availability of down range assets necessary to support launch, 2) orbital parameters, and 3) exigencies requiring rapid response to requests for replacement of lost assets, or to augment existing ones to support vital defense, humanitarian, or commercial needs. Launches can, and do occur year round and in all weather. Under the ORS paradigm, some of these launches will occur in clusters. AAC does not think ORS missions will happen that often, and the normal existing model of drawn out step wise launch campaigns will dominate its business through the foreseeable future. Thus, over time, most launches likely will be done as at present. What this means is that after a series of ORS launches is performed for a customer, it is likely that the next launch might be a month or more away.

### 6.2 Numbers of Pinnipeds That Might be Taken By Harassment

Total numbers of Steller Sea Lions seasonally present on Ugak Island today are imprecisely known, but numbers have declined to the point they are relatively uncommon. Numbers tallied during recent launch campaigns have been very low (See Sections 3 and 4). Based on available

**Table 2. Continued**
data, AAC assumes about ten currently use Ugak Island for haulout purposes. All might potentially be taken by harassment during launch operations.

The total number of Harbor Seals present on Ugak Island ranges up to about 1,500, most of which are found on the island's eastern shore where they are sheltered from launch effects by the 1,000 foot tall cliffs that stand between their haulouts and KLC. Relatively few Harbor Seals use haulouts on the northern side of the island across from KLC because of the lack of suitable beaches (See Section 3.2). No seals were seen on northern haulouts, which consist primarily of isolated rocks, during 19 of 30 surveys. When present, the majority of counts on northern haulouts were of less than 25 individuals (Figure 6). A one-time high count of about 125 animals has been made. Using the conservative and rare high number of 125 as being a representative figure, AAC estimates that up to 125 individuals might be taken per launch operation. Actual numbers will likely be smaller given the low and variable use of the area by Harbor Seals.

### 6.3 Numbers of Whales That Might be Taken By Harassment

No whales will be taken by harassment given that sound pressures in the range produced by rocket motors generally decouple at the air-water interface. AAC does not anticipate impacts to whales.

## 7. Anticipated Impact of the Activity by Species or Stock

Launch activities are generally considered to be subject to the terms of the National Environmental Policy Act (NEPA), as was the issuance of KLC's Launch Site Operator's License. Consequently, several NEPA processes have been done for launches from KLC. Pertinent ones are listed in Table 3 below. All have concluded in Findings of No Significant Impact (FONSI) or related determinations such as Records of Environmental Consideration.

Rocket operations at KLC analyzed under NEPA include those for the Castor 120 (US FAA 1996), small launch vehicles used in the *ait* and QRLV programs (USAF 1997, 2001), the Polaris A-3 STARS (US Army 2001), the Minotaur family including the Minuteman based Minotaur I through III and the Peacekeeper based Minotaur IV and V (USAF 2006), and the C-4 Trident I (US Army 2003). In addition NMFS completed an EA for rulemaking concerning issuance of Letters of Authorization for taking pinnipeds by harassment (NMFS 2005); FAA completed Environmental Impact Statements for licensing launches (US FAA 2001) and experimental flights of small reusable rockets (US FAA 2009); and the U.S. Army completed an EA for deployment and use of a variety of mobile sensors (US Army 2005), along with a companion Record of Environmental Consideration.

**Table 2. Continued**

**Table 3. Pertinent NEPA Processes Completed for KLC Operations.**

| Purpose | Environmental Assessment FONSI | Environmental Impact Statement FONSI | Record of Environmental Consideration | Analyzed Topic |
|---|---|---|---|---|
| FAA Site Operator's License | X | | | Launch of Up to 9 Castor 120s per year |
| USAF *ait* Program | X | | | SR19/M57 and Castor IVB/M57 |
| USAF QRLV Program | X | | | M56 and SR19 |
| USA STARS | X | | | Polaris A-3 |
| NMFS LOA Rulemaking | X | | | Launch Operations Effects on Marine Mammals |
| USAF OSP | X | | | Minotaur, All Classes (I through V) |
| FAA Programmatic Licenses | | X | | License Rulemaking |
| GMD ETR EIS | | X | | C-4 Trident I |
| FAA Experimental Flight Permits | | X | | Small Reusable Launch Vehicles |
| USA Mobile Sensors | X | | X | Use of Mobile Sensors |

Predicted effects in these NEPA analyses include unequivocal findings of no impact due to sound pressures being below 100 dBA (SEL), which is the general point at which pinnipeds will leave shore for the water (USAF 1997) to possible short term behavioral effects of no long lasting consequence due to expected sound pressures of about 100 dBA (SEL) (US Army 2003). The above documentation shows 100 dBA (SEL) is the threshold at which one can expect to dependably see short term behavioral responses.

Wildlife generally exhibit a startle response to sudden loud, uncommon, short term noises such as occur during a rocket launch. This statement is supported by observations from the Kennedy Space Center in Florida and VAFB (US Army 2003), as well as from KLC. As stated, response in pinnipeds is variable up to around 100 dBA (SEL), at which point affected animals tend to leave haulouts and move into the water (USAF 1997, 2001; US Army 2003). Once in the water

**Table 2. Continued**

affected pinnipeds tend to mill around just off the beach in an alert posture, and to return to shore within minutes to a few hours post disturbance (Portor 1997; Kouvaccs et al.1990; Thorson et al. 1999a, b; Perry et al. 2002). Pinnipeds can and do habituate to loud sounds, with older adults showing less concern than younger, less experienced ones (Thorson et al. 1999a, b).

Potential launch effects on pinnipeds are limited to disturbance from rocket motor noise (FAA 1996; USAF 1997, 2001, 2006; US Army 2001, 2003). Potential noise effects can be characterized as auditory and non-auditory. Auditory impacts to pinnipeds by definition consist of injury effects such as ruptured ear drums or behavioral impairments such as temporary threshold shift in hearing level. Auditory impacts are associated with exposure to close by explosive events, such as might happen were a rocket to suffer a highly unusual catastrophic failure on ignition. Given the distance from the pad area to Ugak Island, auditory impacts are not considered further in this request for permit. Non-auditory effects could include stress, behavioral changes, and interference with mating or care of young. Behavioral responses in animals can be highly variable depending on the situation and vary from startle behaviors to flight. Animals can be sensitive to sound pressures of a given level one day and not the next.

The effects of sound pressure on marine mammals are highly variable and were categorized by Richardson et al. 1995 to include: 1) sound pressures that are below the hearing threshold of the species or less than the prevailing ambient noise, 2) sound pressures that are within the audible range of the species but not strong enough to elicit an overt behavioral response, 3) sound pressures that elicit reactions of variable conspicuousness and variable relevance to the well being of an individual, 4) sound pressures for which repeated exposure elicits either diminishing responses (habituation) or persistence of effects, 5) sound pressures strong enough to reduce (mask) the ability of pinnipeds to hear natural sounds at similar frequencies, including calls from conspecifics, and environmental sounds such as surf noise, 6) sound pressures of such magnitude and frequency that they induce physiological stress and affect the well being or reproductive success of individuals, and 7) sound pressures that lead to permanent hearing impairment. With regard to number 7, received sound levels must far exceed an animal's hearing threshold for there to be even temporary threshold shift, and as indicated, any explosive events that might occur would be distant from Ugak Island; thus, they are not considered further in this application. The first six effects listed by Richardson et al. (1995) have varying potentials ranging from likely to unlikely in the vicinity of Ugak Island. For example, numbers 2 through 5 above are likely depending on the vehicle, while numbers 1 and 6 are unlikely.

Spent rocket motors will fall into the open ocean over deep water, far from Ugak Island and do not pose a threat to seals or sea lions. Similarly, sonic booms will occur well past the edge of the Outer Continental Shelf break over the deep ocean, and do not pose any threat to pinnipeds. Airborne launch sounds outside of a cone of 26° beneath an ascending rocket will not penetrate the water column to an appreciable extent, and of that portion which does, the transitory nature of the event (because of the very swift and rapidly increasing velocity of the rocket) will serve to mitigate effects; sounds that do penetrate the water column will not persist more than a few seconds at a time.

**Table 2. Continued**

As indicated previously, the primary historical Steller Sea Lion haulout on Ugak Island is on a spit facing the launch complex. Sound pressures recorded at this location from the launch of a Castor 120, which is expected to be the loudest vehicle to be flown from KLC over the course of the five year rule and related permit under request, are negligibly above the threshold known to generally induce flight response in pinnipeds. Sound pressure from the Castor 120 at the Ugak Island spit used historically by Steller Sea Lions, which is the closest pinniped haulout to the pad complex, is just above the 100 dBA (SEL) threshold that causes general disturbance to pinnipeds. This is the loudest sound pressure expected at the Ugak Island Steller Sea Lion haulout over the five year period to be covered by the requested permit. Consequently, any sea lions present on this haulout will likely exhibit stereotypical disturbance responses. As sound pressures rise, the initial response of sea lions could be expected to range from alert behaviors, described generally as having the head held erect while bellowing, to outright flight (stampede) off of the beach in the presence of stronger stimuli, where they will tend to mill around just offshore on alert with heads held up (Portor 1997). Time spent milling offshore by disturbed animals is generally of short duration and ranges from minutes to a few hours (Portor 1997).

Observations of rocket launch effects on sea lions on Ugak Island are limited, but show that any negative effects are of short duration. This is in keeping with observations of pinnipeds at other west coast launch ranges. During the launch of a small ballistic target vehicle from KLC in 1999, sound pressures exceeded 91dBA (SEL) at the haulout spit (Cuccarese et al 2000). Steller Sea Lions were found immediately post launch offshore of the haulout, milling about with heads held erect in alert posture, however a firm cause and effect could not be definitely ascribed. A video recorder set up to document stimulus-response behaviors failed in the hours before launch. The video record showed a mass stampede into the water had occurred several hours before launch, and the animals were still in the water when the system failed. Subsequent aerial survey data taken post launch found all of the animals to be in the water, but it is unknown whether they remained in the water since the time of the video record, or were later disturbed anew by the rocket launch. No stimulus for the stampede was apparent in either the video record or the sound pressure record, but given the animals were previously disturbed by something, it seems likely the launch contributed to the animals sense of unease despite the relatively low sond pressures involved.

As stated in Section 3.1, Steller Sea Lion numbers on Ugak Island have declined from highs recorded in the 1990s in keeping with trends seen in the entire stock. Pre and post launch counts of Steller Sea Lions show good concordance indicating that any disturbance effects from launch operations are of limited duration (Table 4—cf.*ait*-1 results with FTX-03 results per foot notes).

**Table 2. Continued**

**Table 4. Steller Sea Lions Present on the Ugak Island Haulout during expected occupancy period (15 June through 30 September) by launch.**

| *Launch Name/Date* | *Numbers Pre Launch* | *Numbers Post Launch* |
|---|---|---|
| *ait*-2 (09/15/99)[1] | 60-70 | 60-70 |
| Kodiak Star (09/29/01)[2] | 0 | 0 |
| FTG-02 (09/01/06)[3] | 0 | 0 |
| FTG-03a (09/28/07)[4] | 0 | 0 |
| FTX-03 (07/18/08)[5] | 0[6] | 0[7] |

1. Cuccarese et al. 2000. Kodiak Launch Complex, Alaska Environmental Monitoring Studies September 1999 *ait*-2 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 30pp + Appendices.
2. Cuccarese et al.2002. Kodiak Launch Complex, Alaska Environmental Monitoring Studies September, 2001 Athena (Kodiak Star) Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 26pp + Appendices.
3. R&M et al. 2006. Environmental Monitoring Report FTG-02 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 32pp + Appendices.
4. R&M et al. 2007. Environmental Monitoring Report FTG-03a. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 28pp + Appendices.
5. R&M et al. 2008. Environmental Monitoring Report FTX-03 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska, 29pp + Appendices.
6. Note: 1 Steller Sea Lion was seen pre launch on a supra littoral rock on the northeastern most cape of Ugak Island.
7. Up to 5 Steller Sea Lions were seen post launch on the supra littoral rock referenced in Note 6 above.

The numbers of Steller Sea Lions that might be taken by disturbance from rocket operations includes all that might be present on the north shore of Ugak Island during the launch event. Current numbers of Steller Sea Lions using Ugak Island are not precisely known, but appear to be $\leq 10$. This represents the worst case potential take by harassment per launch. Assuming that an average of 9 launches per year occur, that all 9 launches involve the Castor 120, the loudest vehicle expected to be flown from KLC over the period to be covered by the requested permit, and that there is no habituation to rocket motor effects with experience, then up to ninety takes by disturbance/harassment per year could occur.

Haulout behaviors of Harbor Seals are generally better understood than those of Steller Sea Lions. For example, haulout behavior of Harbor Seals has been investigated by radio tagging individuals in North America (Kovacs et al. 1990). Tagged seals ranged in age from pup through adult. Time of day rather than tidal stage or sea state was found to be the main influence on haulout use. However, combinations of high tide and high swell also influenced haulout behavior, with higher tides and swells limiting haulout behavior. Site fidelity as measured over six months was found to be high, i.e. seals generally returned to the same beach after leaving for the water over time (Kovacs et al. 1990, Suryan and Harvey 1998).

**Table 2. Continued**

Harbor Seal counts from Ugak Island during and immediately after launch operations show that seal numbers pre and post launch are generally congruent, indicating no lasting effects are accruing from launch operations (shown in Table 2 and summarized below in Table 5 with reference to the foot notes). Further, the seal population has been growing steadily since the 1990s, increasing from several hundred to more than 1,500 today. This indicates that rocket launch operations are not having a negative effect on reproductive behavior.

**Table 5. Harbor Seal counts pre and post launch since LOA was executed in 2006.**

| *Launch Name/Date* | *Numbers Pre Launch* | *Numbers Post Launch* |
|---|---|---|
| FT-04-1 (02/23/06)[1] | 350[7] | 211[7] |
| FTG-02 (09/01/06)[2] | 901[8] | 961[8] |
| FTG-03 (05/27/07)[3] | 136[8,9] | 402[8,9] |
| FTG-03a (09/28/07)[4] | 461[8] | 0[10] |
| FTX-03 (07/18/08)[5] | 853[8] | 840[8] |
| FTG-05 (12/05/08)[6] | No Data[11] | No Data[11] |

1. R&M et al. 2006. Environmental Monitoring Report FT-04-1 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 28pp +Appendices.
2. R&M et al. 2006. Environmental Report FTG-02 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 32pp + Appendices.
3. R&M et al. 2007. Environmental Monitoring Report FTG-03 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 24pp + Appendices.
4. R&M et al. 2007. Environmental Monitoring Report FTG-03a Launch. Report for the Alaska Aerospace Development Corporation. Anchorage, Alaska. 28pp + Appendices.
5. R&M et al. 2008. Environmental Monitoring Report FTX-03 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 29pp + Appendices.
6. R&M et al. 2009. Environmental Monitoring Report FTG-05 Launch. Report for Alaska Aerospace Development Corporation. Anchorage, Alaska. 25pp + Appendices.
7. Note: Visual count; launch coincided with execution of LOA that requires photographic documentation of seal numbers.
8. Note: Counts from photographs.
9. Note: Data are not representative of launch period. Sole pre launch survey was done two days pre launch (weather precluded surveys on launch day), and first post launch survey was done two days after launch due to adverse weather conditions.
10. Note: Survey occurred at high tide when haulouts were flooded.
11. Note: Survey cancelled due to adverse weather.

The primary haulouts for Harbor Seals are located on the eastern shore of Ugak Island, all of which are five miles or more from the pad complex. These haulouts, as described earlier, are shielded from rocket launch effects by 1,000 foot tall cliffs and by noise from the high energy shore line that characterizes that shore of the island. Distance from the pad complex also mitigates launch related sounds. Cumulatively over the term of the current Letter of Agreement (LOA), approximately 97% of all Harbor Seals present used this shoreline. Most of the

**Table 2. Continued**
remaining Harbor Seals are found in low numbers around the island. Anticipated sound pressures reaching these distributed Harbor Seal haulouts will be materially less than those reaching the Stellar Sea Lion haulout, as all are farther from the launch complex.

As stated in Section 3.2, Harbor Seal numbers in the waters around Narrow Cape have increased over time from several hundred to about 1,500 today. This is a strong indication that rocket launch operations are not having long term adverse effects on the species. Pre and post launch photographic count data indicate that any disturbance from launch operations is of limited duration (Table 5—cf. especially FTG-02 with FTX-03 results per foot notes).

Harbor Seals most affected by launch operations will be those using the rocks found between the Steller Sea Lion haulout spit and the northeastern most cape of Ugak Island. Numbers using this shore commonly range on any given day from several to approximately twenty, however on one occasion as many as 125 were tallied in a single aerial survey. This number represents approximately 1% of the total seals currently present on Ugak Island. This was a rare occurrence, but it serves to describe the worst case disturbance situation. Thus, up to 125 seals might be taken by disturbance per launch event assuming none habituate to rocket motor noise. Assuming that up to nine launches per year occur, that all launches are of the Castor 120, and that no habituation occurs, then up to 1,125 takes by disturbance/harassment could occur each year. This is an upper end worse case estimate that addresses foreseeable unknowns.

**8. Anticipated Impact of Activities on Availability of Marine Mammals for Subsistence Uses.**

There are no documented subsistence uses of marine mammal resources in the area, and thus, there will not be any impact on subsistence.

**9. Anticipated Impact of Activities Upon the Habitat of Marine Mammal Populations**

There will be no adverse effects on marine mammal habitat as a result of launch operations at KLC. Spent rocket motors fall to the sea well beyond the edge of the Outer Continental Shelf over the North Pacific abyss (See Section 2).

**10. Anticipated Impact of Loss of the Habitat on the Marine Mammal Populations Involved.**

Not Applicable.

**11. Availability and Feasibility of Equipment, Methods, and Manner of Conducting Activity or Other Means of Effecting the Least Practical Adverse Impact Upon Species or Stocks, Their Habitat, or Availability for Subsistence.**

As stated in Section 6, launch operations are controlled by a range of variables that are beyond the control of AAC. Launch operations are conducted at the control of the launch provider/sponsor, whose schedule is driven by variables beyond their influence including need to

**Table 2. Continued**
launch within certain windows to meet mission orbits, availability of critical down range assets including ships, planes, and ground stations worldwide, and international crises.

**12. Plan of Cooperation to Minimize Impacts on Subsistence Uses.**

Not applicable.

**13. Suggested Means of Accomplishing Necessary Monitoring and Reporting That Will Result in Increased Knowledge of Species, Levels of Taking, or Impacts on Populations of Marine Mammals expected to be Present During Launch Activities.**

AAC proposes to purchase and emplace one (1) remote live streaming video system overlooking a haulout selected in cooperation with NMFS and consultation with the video system's manufacturer. The system of choice was developed, tested, and first put into service in Alaska, and has proven itself over many years of operation both in Alaska and around the world. The video system is all weather proven and autonomous, drawing energy from a combination of wind and solar generators. It features a camera that includes a lens that can be focused (zoom and pan) on command and provides live streaming video that can be made available through internet access to interested researchers in real time. This system would be maintained year round.

The camera system would replace other study means used up to this point that have met with variable success due to the influences of the adverse weather that typifies the local environment. AAC proposes to purchase, install, and maintain one of the remotely operated video systems from the manufacturer. AAC would establish the system in a locale overlooking a known pinniped haulout in working cooperation with NMFS staff, AAC's research consultants, and the video manufacturer who has the expertise necessary to ensure optimal placement of the equipment. Launch monitoring would be done as follows. The selected haulout would be viewed either in real time or via "tape" delay for six days using the following schedule where day length permits. The six day schedule will be roughly centered on the day of launch, with launch day being day three of the monitoring schedule. The video stream will be viewed by professional biologists for four hours each day with monitoring centered on the time of launch on launch day, and on low tide on the other days.

Data will be taken from the animals present in the view; these will serve as a representative sample of the whole for the purposes of monitoring launch effects. Data will minimally include behavioral observations by time period including percent resting, percent on alert, and percent showing full disturbance as indicated by flight from the beach. This will provide a snapshot of normal pre and post launch behavior patterns.

Prelaunch data will be collected on days 1, 2, 4, 5, and 6 as follows. A CD will be made of the video record for later study. The period of record will begin two hours pre low tide and continue for two hours post low tide unless directed otherwise by NMFS. This will provide data on normal haulout behaviors.

**Table 2. Continued**

On launch day, if daylight allows, the period of record will include two hours pre launch and two hours post launch. The data will be collected to a CD. If the launch occurs in the hours of darkness the data record will begin as soon as there is sufficient daylight to collect data, and data will be recorded from that point post launch for two hours. All data will be subsequently reduced and analyzed with results extrapolated to all pinnipeds on Ugak Island. Copies of the report will be provided to NMFS within sixty working days of a launch.

The data record will be summarized after the first five monitoring efforts, and results reported to NMFS staff. Subsequently, AAC and NMFS will cooperatively determine if the system is optimally sited for permit purposes, or if an alternative location should be sought. The criteria for this determination shall be whether or not the system is capturing data of sufficient quality to determine if disturbance effects are occurring at time of launch, and if so, how long it takes for normal behavioral patterns (i.e. non disturbance) to resume. If an alternative location is desired for the system, AAC will search for one in cooperation with NMFS and the maker of the video system, and if a suitable/viable alternative is found, AAC will move the system to the new location within ninety days, weather permitting. Should it be determined that a viable alternative location for the video system was not available for any reason, AAC would resume in person monitoring done under the current permit, specific details of which are found in Section 3.

Additionally, regardless of which survey technique was used (live streaming video as proposed above, or video recorder plus aerial surveys as done under the present LOA), whenever a new class of rocket was flown from KLC, a real time sound pressure record will be obtained for documentation purposes and correlation with the behavioral response record. Two sound pressure monitors shall be used: one shall be placed at the established sound pressure recording location known as Narrow Cape and the other at the haulout at the Ugak Island spit used historically by Steller Sea Lions.

## 14. Suggested means of Learning of, Encouraging, and Coordinating Research Opportunities, Plans, and Activities Related to Reducing Such Incidental Taking and Evaluating its Impacts.

AAC will continue to publicly announce launch dates through open news media whenever possible. Additional benefits to researchers and the public would be realized from the proposed new video system discussed in Section 13. Finally, as in the past, reports of environmental monitoring activities would continue to be made available to the public via the Kodiak Library, local government offices, and NMFS.

**Table 2. Continued**

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within the Shatsky Rise area in the northwest Pacific Ocean may result, at worst, in a temporary modification in behavior (Level B harassment) of small numbers of marine mammals. Further, this activity is expected to result in a negligible impact on the affected species or stocks of marine mammals. The provision requiring that the activity not have an unmitigable impact on the availability of the affected species or stock of marine mammals for subsistence uses is not implicated for this proposed action.

For reasons stated previously in this document, the specified activities associated with the proposed survey are not likely to cause TTS, PTS or other non-auditory injury, serious injury, or death to affected marine mammals because:

(1) The likelihood that, given sufficient notice through relatively slow ship speed, marine mammals are expected to move away from a noise source that is annoying prior to its becoming potentially injurious;

(2) The fact that cetaceans would have to be closer than 940 m (0.6 mi) in deep water when the full array is in use at a 9 m (29.5 ft) tow depth from the vessel to be exposed to levels of sound believed to have even a minimal chance of causing PTS;

(3) The fact that marine mammals would have to be closer than 3,850 m (2.4 mi) in deep water when the full array is in use at a 9 m (29.5 ft) tow depth from the vessel to be exposed to levels of sound (160 dB) believed to have even a minimal chance at causing TTS; and

(4) The likelihood that marine mammal detection ability by trained observers is high at that short distance from the vessel.

As a result, no take by injury, serious injury, or death is anticipated or authorized, and the potential for temporary or permanent hearing impairment is very low and will be avoided through the incorporation of the proposed monitoring and mitigation measures.

While the number of marine mammals potentially incidentally harassed will depend on the distribution and abundance of marine mammals in the vicinity of the survey activity, the number of potential Level B incidental harassment takings (*see* Table 3 above this section) is estimated to be small, less than two percent of any of the estimated population sizes based on the data disclosed in Table 2 of this notice, and has been mitigated to the lowest level practicable through incorporation of the monitoring and mitigation measures mentioned previously in this document.

**Proposed Authorization**

As a result of these preliminary determinations, NMFS proposes to issue an IHA to L–DEO for conducting a marine geophysical survey at the Shatsky Rise area in the northwest Pacific Ocean, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The duration of the IHA would not exceed one year from the date of its issuance.

**Information Solicited**

NMFS requests interested persons to submit comments and information concerning this proposed project and NMFS' preliminary determination of issuing an IHA (*see* **ADDRESSES**). Concurrent with the publication of this notice in the **Federal Register,** NMFS is forwarding copies of this application to the Marine Mammal Commission and its Committee of Scientific Advisors.

Dated: May 17, 2010.

**James H. Lecky,**

*Director, Office of Protected Resources, National Marine Fisheries Service.*

[FR Doc. 2010–12296 Filed 5–20–10; 8:45 am]

**BILLING CODE 3510–22–P**

## DEPARTMENT OF COMMERCE

### National Oceanic and Atmospheric Administration

**RIN 0648–XW03**

### Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Missile Launch Operations from San Nicolas Island, CA

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Notice of issuance of a Letter of Authorization.

**SUMMARY:** In accordance with the Marine Mammal Protection Act (MMPA), as amended, and implementing regulations, notification is hereby given that a letter of authorization (LOA) has been issued to the Naval Air Warfare Center Weapons Division, U.S. Navy (Navy), to take three species of seals and sea lions incidental to missile launch operations from San Nicolas Island (SNI), California, a military readiness activity.

**DATES:** Effective June 4, 2010, through June 3, 2011.

**ADDRESSES:** The LOA and supporting documentation are available for review by writing to P. Michael Payne, Chief, Permits, Conservation, and Education Division, Office of Protected Resources, National Marine Fisheries Service (NMFS), 1315 East West Highway, Silver Spring, MD 20910–3225 or by telephoning one of the contacts listed below (**FOR FURTHER INFORMATION CONTACT**). Documents cited in this notice may be viewed, by appointment, during regular business hours, at the aforementioned address and at the Southwest Regional Office, NMFS, 501 West Ocean Boulevard, Suite 4200, Long Beach, CA 90802.

**FOR FURTHER INFORMATION CONTACT:** Michelle Magliocca, Office of Protected Resources, NMFS, 301–713–2289, or Monica DeAngelis, NMFS, 562–980–3232.

**SUPPLEMENTARY INFORMATION:**

**Background**

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1361 *et seq.*) directs the National Marine Fisheries Service (NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers 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. However, for military readiness activities, the National Defense Authorization Act (Public Law 108–136) removed the "small numbers" and "specified geographical region" limitations. Under the MMPA, the term "take" means to harass, hunt, capture, or kill, or to attempt to harass, hunt, capture, or kill marine mammals.

Authorization may be granted for periods up to 5 years if NMFS finds, after notification and opportunity for public comment, that the taking will have a negligible impact on the species or stock(s) of marine mammals and will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses. In addition, NMFS must prescribe regulations that include permissible methods of taking and other means of effecting the least practicable adverse impact on the species and its habitat and on the availability of the species for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance. The regulations must include requirements for monitoring and reporting of such taking.

Regulations governing the taking of northern elephant seals (*Mirounga angustirostris*), Pacific harbor seals

(*Phoca vitulina richardsi*), and California sea lions (*Zalophus californianus*), by harassment, incidental to missile launch operations at SNI, were issued on June 2, 2009, and remain in effect until June 2, 2014 (74 FR 26580, June 3, 2009). For detailed information on this action, please refer to that document. The regulations include mitigation, monitoring, and reporting requirements for the incidental take of marine mammals during missile launches at SNI.

**Summary of Request**

On April 19, 2010, NMFS received a request for an LOA renewal pursuant to the aforementioned regulations that would authorize, for a period not to exceed 1 year, take of pinnipeds, by harassment, incidental to missile launch operations from San Nicolas Island, CA.

**Summary of Activity and Monitoring Conducted During 2009 and 2010**

The Navy's monitoring report for June 2009 through December 2009 describes three single launches from SNI on three different days. These launches occurred at night during the Airborne Laser (ABL) testing program. A single Terrier-Lynx was launched on each of two days, June 6 and 13, 2009, and a single Terrier-Black Brant was launched on August 10, 2009. Vehicles were launched from the 807 Launch Complex located close to shore on the western end of SNI, 11 m above sea level. The launch azimuths caused the vehicles to pass over or near various pinniped monitoring and acoustic measurement sites where Autonomous Terrestrial Acoustic Recorders (ATARs) and video systems had been deployed. The video data were supplemented by direct visual scans of the haul-out groups several hours prior to the launches and following one of the launches. For each launch, the number, proportion, and (where determinable) ages of the individual pinnipeds that responded in various ways were extracted from the video, along with comparable data for those that did not respond overtly. Approximately 750 California sea lions, 60 Pacific harbor seals, and no northern elephant seals are estimated to have been harassed by launches during the June-December 2009 monitoring report. The authorized level of take was not exceeded and no evidence of injury or mortality was observed during or immediately succeeding the launches for the monitored pinniped species.

**Description of 2010 Activities**

This LOA is effective from June 4, 2010, through June 3, 2011, and authorizes the incidental take of the three pinniped species listed above that may result from the launching of up to 40 missiles from SNI per year. Up to 10 launches per year may occur at night. Nighttime launches will only occur when required by the test objectives, e.g., when testing the Airborne Laser system (ABL). Northern elephant seals, Pacific harbor seals, and California sea lions are found on various haul-out sites and rookeries on SNI.

Potential impacts of the planned missile launch operations from SNI on marine mammals involve both acoustic and non-acoustic effects. Acoustic effects relate to sound produced by the engines of all launch vehicles, and, in some cases, their booster rockets. Potential non-acoustic effects could result from the physical presence of personnel during placement of video and acoustical monitoring equipment. However, careful deployment of monitoring equipment is not expected to result in any disturbance to pinnipeds hauled out nearby. Any visual disturbance caused by passage of a vehicle overhead is likely to be minor and brief as the launch vehicles are relatively small and move at great speed. The noise generated by Navy activities may result in the incidental harassment of pinnipeds, both behaviorally and in terms of physiological (auditory) impacts. The noise and visual disturbances from missile launches may cause the animals to move towards or enter the water. This LOA authorizes the following numbers of pinnipeds to be incidentally taken by Level B harassment: 474 northern elephant seals; 467 Pacific harbor seals; and 1606 California sea lions.

Take of pinnipeds will be minimized through implementation of the following mitigation measures: (1) The Navy must avoid launch activities during harbor seal pupping season (February through April), unless constrained by factors including, but not limited to, human safety, national security, or for launch trajectory necessary to meet mission objectives; (2) the Navy must limit launch activities during other pinniped pupping seasons, unless constrained by factors including, but not limited to, human safety, national security, or for launch trajectory necessary to meet mission objectives; (3) the Navy must not launch missiles from the Alpha Complex at low elevation (less than 305 m [1,000 ft]) on launch azimuths that pass close to pinniped haul-out site(s) when occupied; (4) the Navy must avoid multiple vehicle launches in quick succession over haul-out sites when occupied, especially when young pups are present, except when required by mission objectives; and (5) the Navy must limit launch activities during nighttime hours, except when required by mission objectives (e.g., up to 10 nighttime launches for ABL testing per year). Additionally, for 2 hours prior to, during, and approximately 30 minutes following each launch, personnel are not allowed near any of the pinniped haul-out beaches that are close to the flight track on the western end of SNI. Associated fixed-wing and rotary aircraft will maintain an altitude of at least 305 m (1,000 ft) when traveling near beaches on which pinnipeds are hauled out, except in emergencies or for real-time security incidents (e.g., search-and-rescue, fire-fighting, adverse weather conditions), which may require approaching pinniped haul-outs and rookeries closer than 305 m (1,000 ft). Additionally, plain monitoring methods will be reviewed by NMFS if post-launch surveys determine that an injurious or lethal take of a marine mammal occurred. The Navy will also use monitoring surveys and time-lapse video to monitor the animals before, during, and after missile launches. Reports will be submitted to NMFS after each LOA expires, and a final comprehensive report, which will summarize all previous reports and assess cumulative impacts, will be submitted before the rule expires. This LOA will be renewed annually based on review of the annual monitoring report.

**Authorization**

The Navy complied with the requirements of the 2009 LOA and NMFS has determined that there was no evidence of pinniped injuries or fatalities related to vehicle launches from SNI. The Navy's activities fell within the scope of the activities analyzed in the 2009 rule and the observed take did not exceed that authorized in the 2009 LOA. NMFS has determined that this action continues to have a negligible impact on the affected species or stocks of marine mammals on SNI. Accordingly, NMFS has issued a LOA to the Navy authorizing the take of marine mammals, by harassment, incidental to missile launch activities from SNI. The provision requiring that the activities not have an unmitigable adverse impact on the availability of the affected species or stock for subsistence uses does not apply for this action.

Dated: May 17, 2010.

**James H. Lecky,**

*Director, Office of Protected Resources, National Marine Fisheries Service.*

[FR Doc. 2010–12294 Filed 5–20–10; 8:45 am]

**BILLING CODE 3510–22–S**

# 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 and Atmospheric Administration (NOAA), the MBNMS adjoins 276 miles (444 km) of central California's outer coastline (overlaying 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.

**Deleted:** guidelines were developed to

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 Seacliff 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 *(Zalophuus 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. Relevant information from these sources on these species is incorporated by reference.

1. California Sea Lions *(Zalophuus 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 to105 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[8]) 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 Lmax 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$^{th}$ 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 Fouth 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 (*Zalophuus 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 Fouth 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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# GUIDELINES FOR MANAGING FIREWORKS IN THE VICINITY OF PIPING PLOVERS AND SEABEACH AMARANTH ON THE U.S. ATLANTIC COAST

February 4, 1997

The following is provided as guidance to Federal agencies, landowners, commercial fireworks companies, and fireworks event sponsors seeking to avoid adverse effects on piping plovers and seabeach amaranth. They are intended to advise Federal agencies that conduct, fund, or authorize fireworks activities regarding the measures needed to avoid adverse effects on listed species, thereby averting the need for formal consultation under Section 7 of the Endangered Species Act (ESA). These practices also constitute the U.S. Fish and Wildlife Service's (Services's) best professional advice to non-Federal entities on avoiding take of piping plovers under Section 9 of the ESA.

These guidelines supplement information about protection of piping plovers from a variety of recreational activities, provided in the Service's April 15, 1994 *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act*.

Seabeach amaranth, a threatened plant species protected under the Endangered Species Act (ESA), occurred historically along coastal beaches from southern Massachusetts to South Carolina. At the present time it is found only on Long Island, New York; North Carolina; and South Carolina. Section 7 of the ESA requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that directly or indirectly affect listed plants; this requirement is applicable to permits related to fireworks events that are issued by the U.S. Coast Guard.

## Potential Impacts Related to Fireworks Displays

### Direct Impacts

Fireworks are highly disturbing to piping plovers. Fireworks early in the breeding season may cause plovers conducting courtship activities to abandon their territories. Direct injury can be caused by the explosions or debris, and piping plovers and terns (which often nest adjacent to or near plovers) will often abandon their nests and broods during fireworks displays, exposing eggs and chicks to weather and predators. If a flightless chick were to become permanently separated from its parents during the confusion, mortality would be almost certain.

Several situations where fireworks caused severe adverse effects on least terns, colonial nesting birds often found in the vicinity of piping plovers, serve as indicators of the effects that pyrotechnics can exert on beach-nesting birds. An August 1993 fireworks display in New Jersey caused permanent abandonment of a least tern colony located more than 250 m away, and a 1994 New Jersey fireworks display caused temporary abandonment and displays of distress by terns within a colony located more than 3/4 mile away. Incidents in New York where piping plovers were disturbed by fireworks also caused prolonged disturbance to least terns and black skimmers nesting nearby.

Seabeach amaranth can be directly affected by launch activities if they occur in areas where the plants may be crushed or damaged by launch personnel or equipment.

### Indirect Impacts

In addition to adverse effects from the noise and lights of the pyrotechnics, commercial fireworks displays often draw large crowds that may pose threats to nearby plovers. These crowds may be situated at some distance from the actual launch site, for example, across an inlet. Potential indirect impacts that may adversely affect piping plovers include: spectators walking through and/or throwing objects (including illegal pyrotechnics) into plover nesting and brood-rearing areas; additional off-road vehicle patrols by public safety personnel; increased boat landings by spectators on relatively remote stretches of beach; low-flying aircraft, including helicopter patrols and personal spectator aircraft; additional trash (which attracts predators). Signs and symbolic fences that are adequate for the purpose of alerting daytime beach users to locations of plover breeding areas are often insufficient to prevent accidental entry by fireworks spectators wandering in the dark.

Potential indirect adverse effects on seabeach amaranth include trampling or crushing of unprotected plants by pedestrian or vehicular traffic on the beach.

## Measures for Avoiding and Monitoring Direct and Indirect Impacts of Fireworks Events

### Direct Impacts

Fireworks displays including launch areas and debris fallout areas should be located to avoid disturbance of breeding piping plovers. In general, the Service recommends that the launch site be located a minimum of 3/4 mile from the nearest plover nesting and/or foraging area. Access routes for personnel deploying the fireworks and other public safety personnel (including fire prevention/suppression and law enforcement officers) should conform with the vehicle management recommendations contained in the *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act.* Launch sites should also be located to prevent trampling any seabeach amaranth plants.

## Indirect Impacts

Event sponsors should plan and implement measures to assure that spectators will not walk through and/or throw objects into plover nesting and brood-rearing areas. Sufficient law enforcement and other personnel must also be on-site during these events to enforce plover protection measures and prevent use of illegal fireworks in the vicinity of the birds.

1. Plover habitats in the vicinity of where spectators may congregate should be intensively surveyed by qualified biologists[1] for at least four days prior to the event to locate nests, adult plovers, chicks, and/or post-fledged juveniles. For events prior to July 1, surveyors should also search for territorial and/or courting adults that have not yet established nests or may be preparing to re-nest. In New York, potential habitat for seabeach amaranth should be surveyed to locate any seabeach amaranth plants.

2. Plover habitats should be symbolically fenced in accordance with the Service's *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act* (see Section on Management of Nonmotorized Recreational Uses). Seabeach amaranth plants should be symbolically fenced to provide a minimum 3 meter buffer zone around individual plants or groups of plants.

3. Additional protection measures recommended to avoid impacts that may occur when the large crowds are drawn to the beach at night include[2]:

    a. Close parking lots and beach access points in the vicinity of breeding plovers.

    b. Increase the size of symbolically fenced areas around plover nesting areas to provide extra buffers between birds and pedestrians that may be on the beach. The size of buffers should be appropriate for the size of the anticipated crowd; for large crowds, buffers should be expanded from the standard 50 meters to a total of 100 meters from established nests.

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[1] State wildlife agencies and private environmental groups often conduct plover monitoring activities and can be consulted for available information about plover breeding locations. However, intensity of surveys needed to avoid adverse effects from fireworks events will often exceed those routinely conducted by these wildlife agencies/organizations. Arrangements and commitments for added surveys for these events are the responsibility of the permitting agencies and/or event sponsors. It is recommended that these arrangements be made well in advance of the potential event, due to limited availability of qualified personnel.

[2] For extremely large fireworks events, additional protection measures may be needed, including: issuing air traffic advisory for all aircraft to remain >1000' above sensitive areas; issuing mariners advisory telling boaters not to land in sensitive areas; boat patrols; extensive advanced publicity advising spectators where they *should* go to watch the fireworks and about closed areas; training about protection needs of rare plants and/or animals for law enforcement personnel.

c. Increase the visibility of fencing using reflectorized tape or by substituting snowfences, plastic orange highway construction fences, or wire mesh fences for string fencing, as string fences are very difficult to see at night. Snowfences and highway construction fences should be removed the next day if there is any chance that they will impede chick movements.

d. Fence and post foraging territories of unfledged chicks, as delineated by a qualified biologist, especially in areas where large crowds are anticipated and/or if the day of the event is especially hot (since heat often deters chick foraging during the daytime, increasing the birds' reliance on evening feeding).

e. Provide adequate numbers (consistent with anticipated numbers of spectators) of monitors and law enforcement personnel in the vicinity of plover breeding areas or seabeach amaranth locations to patrol fenced areas from the time when spectators begin congregating on the beach until the crowd disperses after the event. Assure that monitors and enforcement personnel receive accurate current information about the locations of threatened birds and plants so that they can minimize any disruptions from their own activities.

f. Prohibit all pets on the beach during the event and ensure compliance with this prohibition.

4. Remove any trash or litter from the beach immediately following the event. However, any trash located within fenced areas should be left until daylight and then removed by or under the supervision of plover monitors. Further, vehicles should not be used at night to remove trash within 100 meters of unfledged plover chicks.

5. In order to gauge the effectiveness of the measures 3 and 4, the following data should be collected:

a. Locations and status of all adult plovers, nests, and chicks within 1/4 mile of spectator viewing areas should be determined by a qualified biologist on the day of the event and again on the following day.

b. Counts of human and dog tracks that intersect the perimeter of symbolically fenced areas before and after the event.

c. Counts of any persons actually observed inside symbolically fenced areas during the event.

d. Counts of any instances of illegal pyrotechnics used on the beach during the event.

e. Counts of trash/litter items inside symbolically fenced areas before and after the event. For very large areas or areas that have substantial amounts of trash before the event, trash counts may be conducted in sample plots.

f. Count of breaks in symbolic fences.

6. Except when responding to an actual emergency situation, all law enforcement, fire department, public works, fireworks deployment, and other vehicles in the vicinity of breeding plovers should only be operated in conformance with the Service's *Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act* (see discussion of Essential Vehicles).

# SEABIRD AND MARINE MAMMAL MONITORING AND RESPONSE TO A FIREWORKS DISPLAY AT GUALALA POINT ISLAND, SONOMA COUNTY, CALIFORNIA, MAY TO AUGUST 2007

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Bureau of Land Management
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and

United States Department of the Interior
Fish and Wildlife Service
San Francisco Bay National Wildlife Refuge Complex, Newark, CA

12 February 2008

Exhibit 9: Gualala Study

# SEABIRD AND MARINE MAMMAL MONITORING AND RESPONSE TO A FIREWORKS DISPLAY AT GUALALA POINT ISLAND, SONOMA COUNTY, CALIFORNIA, MAY TO AUGUST 2007

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Title Page Photo: Marge Anthony

## EXECUTIVE SUMMARY

During part of the 2007 breeding season, seabirds and pinnipeds were monitored on Gualala Point Island, Sonoma County, California. Monitoring was conducted in response to reports of disturbance from a fireworks display in July 2006 to nesting seabirds on the island, a part of the California Coastal National Monument (CCNM) administered by the United States Department of Interior (USDI) Bureau of Land Management (BLM). In 2007, monitoring examined potential impacts to seabirds and marine mammals during a fireworks display on 6 July and gained additional basic knowledge of this little studied colony. The fireworks display took place on the north side of the Gualala River mouth in the unincorporated community of Gualala, located at the southern end of Mendocino County, California, and 1.8 km northeast of Gualala Point Island.

The study period extended from 30 May to 30 August, with a core monitoring period from 1 to 12 July. The BLM developed monitoring protocols in collaboration with four of its formal partners: the California Department of Fish and Game, a CCNM Core-Managing Partner; US Fish and Wildlife Service (USFWS) and PRBO Conservation Science, both CCNM Collaborative Partners; and its local CCNM Steward, The Sea Ranch Association. BLM and USFWS staff biologists and trained volunteers from The Sea Ranch CCNM Stewardship Task Force staff carried out protocol monitoring. Monitoring focused on populations of breeding seabirds on Gualala Point Island, particularly the Brandt's Cormorant (*Phalacrocorax penicillatus*), to examine potential responses and effects on reproductive success from the fireworks display. Monitoring also included Harbor Seals (*Phoca vitulina*), which haul out on Gualala Point Island. Seabird monitoring consisted of modified versions of existing protocols from the USFWS for monitoring seabird colonies from mainland vantage points in central California and for aerial photography. Protocols for disturbance monitoring were developed from protocols by PRBO Conservation Science, USFWS, and other sources. Surveys included four daily bird counts of all species and monitoring of visible nests of Brandt's Cormorants, Pelagic Cormorants (*P. pelagicus*), Western Gulls (*Larus occidentalis*), and Black Oystercatchers (*Haematopus bachmanni*) between 1 and 12 July, with follow-up surveys conducted through 18 July. Aerial photographic surveys of the Gualala Point Island Brandt's Cormorant colony were conducted on six dates between 30 May and 30 August to document numbers of nests and relative nest success for the entire colony. Harbor Seals were monitored following the protocol established by the Point Reyes National Seashore. At the same time and location each day, photographs of the visible surface of Gualala Point Island were taken to document seabird distribution, densities and behavior. Nighttime photography (with digiscoped and infra-red photographs) was conducted on two nights, 4 July and 6 July, to examine differences in Brandt's Cormorant behavior prior to and during the fireworks display. Video cameras recorded fireworks explosions and the response vocalizations of seabirds.

Observations documented a visible response by nesting seabirds on Gualala Point Island. Digiscoped and infra-red photography during the 6 July fireworks display showed that Brandt's Cormorants quickly changed from resting to erect postures at the first fireworks, followed by birds moving about or departing from the island. Western Gulls also flushed, circled and called during the fireworks display. During the study period, 90 Brandt's Cormorant nests were documented on Gualala Point Island. Of these, seven nests (35% of

nest failures) were abandoned in the two days between 5 and 7 July, and another seven nests were abandoned between 7 and 12 July. These losses contrast with the abandonment of only six nests (30% of nest failures) for the 30-day period from 5 June to 5 July. Two of nine nests monitored from the adjacent mainland were abandoned between 6 and 8 July. The high rate of Brandt's Cormorant nest abandonment between 5 and 7 July, and possibly nest abandonment from 7 to 12 July, likely resulted from fireworks disturbance.

Pelagic Cormorants abandoned both of the two monitored nests on Gualala Point Island between 10 and 16 July for unknown reasons. For one day after the fireworks display, counts of adult Western Gulls on the island declined significantly, but no Western Gull nesting failures were known to have occurred during the count period. California Brown Pelicans (*Pelecanus occidentalis californicus*) did not use Gualala Point Island as an overnight roost until after the date of the fireworks display. Other seabird species were too few in number or too difficult to monitor to detect potential responses from the fireworks display. No significant response was detected for Harbor Seals, which were not present on the island during the fireworks display.

Other human and "natural" disturbances to the island's wildlife were rare and minor, with no detectable impacts to nesting birds or pinnipeds.

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## INTRODUCTION

Understanding impacts from human disturbances to seabird colonies may be key to restoring certain nesting seabird populations along the California coast. Disturbances to seabirds during their reproductive cycles are a critical element for analysis in the process of adapting management to preserve and augment California seabird populations. Sources of human disturbance that are well recognized include habitat destruction, close-approaching boats, humans on foot and low-flying aircraft (*e.g.*, McChesney 1997, Carney and Sydeman 2003, Rojek *et al.* 2007). Another source of human disturbance to seabirds that is not well documented is the display of celebratory fireworks. In California, only one study (Wengert and Gabriel 2002) of the heron colonies of Humboldt Bay has previously looked at the impact of fireworks on colonial waterbirds in California.

This monitoring study was conducted to determine how a recently initiated Independence Day fireworks display affected nesting and resting seabirds and marine mammals on Gualala Point Island within the California Coastal National Monument (CCNM), administered by the US Department of the Interior (USDI), Bureau of Land Management (BLM). Concern about potential impacts to nesting seabirds originated from observer reports of large numbers of birds on Gualala Point Island that flushed and flew into the darkness above the island on 2 July 2006 during the First Annual Gualala Festivals Committee Independence Day fireworks display.

The BLM and its partner regulatory wildlife agencies, the California Department of Fish and Game, the US Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, wanted to assess whether the Gualala fireworks display impacted breeding success or attendance patterns of seabirds and marine mammals at Gualala Point Island and to learn the current status of the island's natural resources. To obtain information, BLM and USFWS biologists worked with The Sea Ranch CCNM Stewardship Task Force (hereafter "the Task Force") to monitor seabirds and marine mammals on Gualala Point Island before, during, and after the fireworks display using a combination of aerial and land-based techniques. This report summarizes the study results from 2007.

## METHODS

### *Study Area*

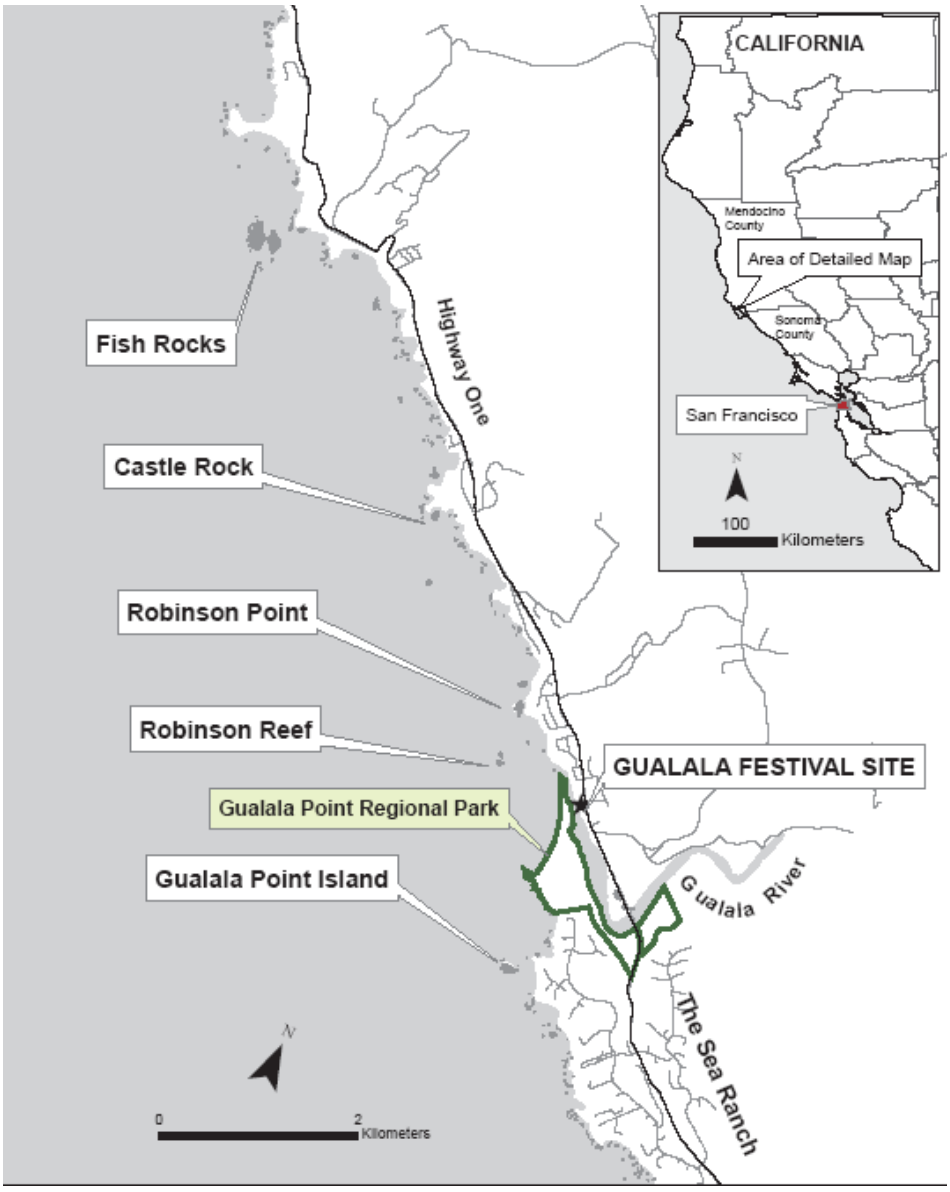
Gualala Point Island (California Seabird Colony Number SO-384-01; 38º45'04" N, 123º31'42" W) is located just offshore at the northern border of Sonoma County, California. The island is situated 1.8 km southwest from the Gualala Festivals Committee fireworks launch site located on a bluff top above the mouth of the Gualala River in the unincorporated community of Gualala, Mendocino County (Figure 1).

Geological factors combine to make Gualala Point Island a unique and favorable habitat for colonial seabirds. Gualala Point Island is part of the Gualala Block, a narrow crustal sliver that extends roughly from Point Arena in Mendocino County south to Fort Ross in Sonoma

County. The Gualala Block consists predominantly of sedimentary formations deposited originally hundreds of miles south of their current location and subsequently transported northward along the San Andreas Fault System. The Gualala Block is the most northerly large assemblage of rocks on the west side of the San Andreas Fault (M. Lane, pers. comm.).

Additionally, the large-scale movement has brought to the Gualala area some rocks, such as limestones, that are uncommon along the northern California Coast. This small area of well-bedded sedimentary rocks contrasts sharply with the heterogeneous lithologies of the Franciscan Group prevalent north of San Francisco.

Figure 1 – Map of Gualala Point Island and vicinity, Mendocino and Sonoma counties, California.




Gualala Point Island bedrock consists of interbedded shales and massive sandstones of the Paleocene-Eocene Germán Rancho Formation. However, at this locality, crustal deformation associated with northward transport of the Gualala Block has caused the bedding planes to

twist and become vertical. The result is a corrugated effect to the rocks, with the softer shales eroding more rapidly than the massive resistant sandstones. Crevices that form between the interbedded rock layers form nesting sites for Pigeon Guillemots (*Cepphus columba*) and rock ledges create nesting habitat for Pelagic Cormorants (*Phalacrocorax penicillatus*). Brandt's Cormorants (*P. penicillatus*) nest primarily on the limestone flats of the island.

### *Monitoring*

The study period ranged from 30 May and 30 August 2007, with a more intensive monitoring period (hereafter referred to as the "count period") between 1 and 12 July 2007 (six days before and six days after the fireworks display). Multiple methods were used to record bird and mammal numbers, reproductive success, and potential impacts of fireworks displays and other disturbances. These methods included aerial photography, land-based surveys, land-based photography both during the day and at night (including during the fireworks display), and audio recordings made during the fireworks display. Data collection (except as indicated below) was conducted by BLM staff and Task Force volunteers. Data analysis and interpretation was conducted by the authors with assistance from Paul Roush (BLM). Documentation of the monitoring protocol used for this study (USDI Bureau of Land Management and The Sea Ranch CCNM Stewardship Task Force 2008) is available from the BLM California State Office.

Aerial Photography: The USFWS, in cooperation with Humboldt State University and the California Department of Fish and Game, photographed Gualala Point Island on 30 May 2007 during an annual aerial photographic survey of Common Murre, Brandt's Cormorant, and Double-crested Cormorant colonies in northern and central California. Subsequently, a volunteer pilot and a volunteer professional photographer flew additional surveys of Gualala Point Island on 5 June, 5, 7, and 12 July, and 30 August, using a protocol comparable to that used by the USFWS. A planned flight for 6 July was cancelled because of heavy fog and low visibility. Surveys on 30 May were conducted at 210-230 m (700-750 ft) altitude in a fixed-wing, high-wing Partenavia aircraft. Photographs were taken through a belly port by two photographers with Canon 30D digital cameras and 70-200 mm or 300 mm telephoto lenses. All other flights were conducted above 300 m (1000 ft) altitude in a fixed-wing Cessna 172-M aircraft and digital photographs were taken through a side window. Survey altitudes were flown high enough to alleviate disturbance to seabirds from these types of fixed-wing aircraft. Photographs were taken of the entire island, with a focus on the Brandt's Cormorant colony.

From each aerial survey, the photograph with the highest quality and most complete coverage of the cormorant colony primarily was used, augmented by additional photos as needed for complete views of all nests. From the photographs, all active nest sites were identified and assigned unique site numbers. For each survey, the status of each nest was identified using the following codes:

E = empty nest
P = poorly built nest
F = fairly well-built nest
W= well-built nest
C = chick(s) visible
S = adult sitting on nest
D = adult standing at nest site
T = territorial site, *i.e.*, adult bird(s) on territory but no nest
V = vacant site, *i.e.*, no birds present

"Active nests" were well-built or fairly well-built nests with either an adult sitting on the nest or standing at a nest containing visible eggs or visible chicks, except for nests known to have failed recently (i.e., too soon to have laid a new clutch of eggs). "Territorial sites" had one of three characteristics: adults standing or sitting at a potential nest site with little or no nesting material; adults on a poorly-built nest; or adults sitting or standing at a well-built or fairly well-built nest that was visibly empty or known to have failed recently. From these data, a history of each nest site was established, including seasonal site status (breeding or territorial), approximate breeding phenology, and whether or not the nest failed during the survey period. Breeding sites were those with confirmed eggs or chicks or where breeding was inferred by nest status. Territorial sites were those where breeding could not be confirmed or inferred by nest status.

Seabird Counts from Mainland Vantage Points: These counts were conducted by BLM wildlife biologists and volunteers from the Task Force. Adults and ambulatory chicks of all seabirds on Gualala Point Island were counted through 20x to 60x spotting scopes from two mainland vantage points four times daily (05:30, 08:30, 10:00 and 13:30 h), visibility permitting, during the 1-12 July count period. One vantage point viewed the north side, and the other viewed the south side of the island. Observers also recorded any bird and marine mammal observations at 21:00 h just before sunset on the evening of 6 July.

UTM locations in Zone 10N (NAD 1983) of the vantage points are as follows:

| | | | |
|---|---|---|---|
| North Vantage Point: | 454244 E | 4289459 N | about 245 m from the island |
| South Vantage Point: | 454411 E | 4289224 N | about 305 m from the island |

Seabird Nest Monitoring from Mainland Vantage Points: A modified version of the USFWS Common Murre Restoration Project protocol for Brandt's Cormorant nest monitoring (McChesney *et al.* 2007) was used. Along with Brandt's Cormorants, the protocol included nest monitoring of two other species on Gualala Point Island: Pelagic Cormorant and Western Gull (*Larus occidentalis*). Observations were recorded during the same times that seabird counts took place. For each species, visible nests were assigned unique numbers and identified on photographs. During the count period, the status of each nest was identified by recording the number of adults present, adult posture (sitting or standing), and the number of eggs and chicks visible.

Daytime Marine Mammal Monitoring: The count form for monitoring Harbor Seals (*Phoca vitulina*) at Point Reyes National Seashore and along the Sonoma County coast including The Sea Ranch (Manna *et al.* 2006) was adopted for this project. Censuses of Harbor Seals took place at the daytime low tide closest to seabird count times. In addition, as time permitted, seals were counted during seabird counts.

Daytime Disturbance Monitoring: Disturbances to seabirds were recorded systematically. The protocol to monitor and characterize disturbances combined pre-established protocols from PRBO Conservation Science (unpubl. data), USFWS (McChesney et al. 2007), and Jaques and Strong (2002). All aircraft flying below 300 m (1000 ft) and boats approaching to within 300 m (1000 ft) of Gualala Point Island were recorded, as well as any visible disturbance behaviors to seabirds or seals (*e.g.*, flushing or displacement).

Daytime Land Photography from Mainland Vantage Points: An initial photographic survey of Gualala Point Island was conducted at the onset of the count period. Photographs taken with a Canon 20D digital single lens reflex (DSLR) camera with a 300 mm lens and a 2x teleconverter (magnification = 12x) documented the initial nest site locations for both Western Gulls and Brandt's Cormorants as well as other species of interest. These photographs served as the basis for subsequent monitoring. On most days during the count period, one or more observers took photographs of Gualala Point Island from each of the mainland vantage points between 10:30 and 11:30 h.

Nighttime Photo Monitoring: On both 4 and 6 July, two volunteer professional photographers took nighttime photographic images of the Brandt's Cormorant colony on Gualala Point Island from the south vantage point. Two digital photographic methods were used: visible light digiscoping and infrared photography. On each night, photography documented bird activity for 90 minutes after sunset. Images provided for comparison of cormorant activity during the same time on the two evenings, one before and one during the fireworks display.

Nighttime Video and Sound Recording: Continuous video and audio recordings of Gualala Point Island were conducted from both mainland vantage points during the fireworks display. One observer used a Sony Handycam DCR-DVD308 mounted on a tripod to capture video and sound from 21:00 until 22:00 h, and another observer used a Sony 20x optical Handycam (DCR-HC26). The time marks on the video corresponded within one minute of the time recorded on the nighttime DSLR images.

Acoustic Monitoring: Sound monitoring took place during the Gualala Festivals Committee's fireworks display. Monitoring consisted of a sound recording of the entire fireworks display from the north vantage point for Gualala Point Island and of sound meter readings filmed in real time alongside a GPS unit with satellite clock time. One sound level meter, a Tenma™ model 72-860, measured sound during the fireworks display.

## RESULTS

### *Aerial Photography of the Brandt's Cormorant Colony*

In 2007, the Brandt's Cormorant colony was limited to a relatively small area on the southwest side of Gualala Point Island (Figure 2). Figure 3 (a-e) shows aerial photographs of the entire Gualala Point Island Brandt's Cormorant colony from six surveys between 30 May and 30 August 2007. During the survey period, a total of 93 sites were identified and assigned unique site numbers that are indicated in the photos. Histories of each site are shown in Appendix 1. A small number of apparent territorial sites that were present on single surveys only were not assigned site numbers.

Of all sites followed, 90 were identified as breeding sites and three as territorial sites (*i.e.*, where egg-laying was not likely to have occurred). Most nests (72%) recorded during the study period were active when the colony was first photographed on 30 May (Table 1); most of these likely had eggs at that time based on well-formed nest structures and adults sitting in incubation postures. Nest establishment continued for some time afterward, and by 5 July an additional 25 nests were added. By 5 July, part of the colony had entered the chick period, as

twelve nests had relatively large chicks (*ca.* two to four weeks old) visible in nests. Six nests, or 8.2% of the 5 June total and 6.7% of the seasonal total, failed between 5 June and 5 July.

On 7 July, no new nests were recorded and six additional nests had visible chicks. Seven nests, or 8.3% of the 5 July nest total and 7.8% of the seasonal total, were newly failed. Of these, none had visible chicks (*i.e.*, adults were either incubating eggs or brooding small chicks) on 5 July, two were newly established between 5 June and 5 July and one was established between 30 May and 5 June. Of fourteen total nests with visible chicks, all were attended by adults, and no chicks appeared to be wandering from natal nests.

On 12 July, another seven nests were newly failed and an additional 28 nests had visible chicks. Of failed nests, none had visible chicks in 5 July photographs. Three were established by 30 May, two were established between 30 May and 5 June, one was established between 5 June and 5 July, and one was established between 30 May and 5 July (nest-building on 30 May but no data on 5 June). Some chicks were clearly larger than on previous surveys, and some chicks were large enough (*ca.* minimum three to four weeks old) to wander from natal nests. Five sites that failed between 5 and 7 July were attended on 12 July: three had large chicks present that had wandered from other nearby nests; and two were attended by territorial adults only. These sites were considered to be territorial sites and not active nests because of their recent failures. Two nests had visible eggs, indicating that some pairs were still incubating.

By 30 August, the entire nesting area was abandoned following the end of breeding. This last survey showed that no pairs that failed nesting in July re-nested successfully. Based on averages of eight days to lay a new egg, a 30-day incubation period, and about 30 days until chicks can become independent from natal nests (Ainley and Boekelheide 1990, Carter and Hobson 1988), active nests still would have been present on 30 August if re-nesting after 6 July had been successful.

In summary, 20 nests, or 22.2%, of documented nests failed between 5 June and 12 July. Of failed nests, 30% failed between 5 June and 5 July and 35% failed during each of the periods 5-7 July and 7-12 July. Cumulatively, 70% of nest failures occurred during the brief period between 5 and 12 July. By 12 July, 46 nests (51%) had visible chicks, with the oldest chicks close to 30 days old and wandering from natal nests. Based on those chicks, the earliest eggs were laid in mid-May. However, at least some nests clearly still had eggs on 12 July, indicating that egg-laying had continued at least through mid-June. No failed nests had chicks visible to observers prior to failure, indicating that failed nests had either eggs or very small (or young) chicks prior to failing.

Figure 2 – Aerial photograph of Gualala Point Island from the southeast, 30 May 2007. The arrow points to the Brandt's Cormorant colony, indicated by the dark mass of nests and birds surrounded by white guano.

Photo courtesy of US Fish and Wildlife Service

Table 1 - Summary of the status of Brandt's Cormorant nest and territorial sites as determined from aerial photographs, Gualala Point Island, 30 May to 12 July 2007.

| **Reproductive Stage** | **30 May** | **5 June** | **5 July** | **7 July** | **12 July** |
|---|---|---|---|---|---|
| Active nests[a] | 65 | 83[h] | 84 | 77 | 69 |
| Active territorial sites[b] | 15 | 7 | 4 | 5 | 11 |
| **Total active sites** | **80** | **90** | **88** | **82** | **80** |
| Unknown[c] | 0 | 1 | 0 | 0 | 0 |
| Newly categorized nest sites (former territorial sites)[d] | 0 | 10 | 5 | 0 | 0 |
| New nest sites[e] | 65 | 8 | 2 | 0 | 0 |
| Total new nests[f] | 65 | 18 | 7 | 0 | 0 |
| New territorial sites[e] | 15 | 3 | 0 | 0 | 0 |
| **Total new sites[g]** | **80** | **11** | **2** | **0** | **0** |
| Nests w/newly visible chicks | 0 | 0 | 12 | 6 | 28 |
| Newly failed nests | 0 | 0 | 6 | 7 | 7 |

[a] Includes: 1) nests with birds sitting in fairly well-built to well-built nests (probably incubating eggs or brooding chicks); and 2) nests with visible chicks that were not recorded as failed on a previous survey.
[b] Includes nests that failed previously but were attended by adult birds on the survey date.
[c] No photo coverage available for site that was active on later surveys only.
[d] Sites categorized as nests that were present and categorized as territorial on previous survey(s).
[e] Sites not recorded as either nest or territorial sites on previous surveys.
[f] Sum of "newly categorized nest sites" and "new nest sites."
[g] Sum of "new nest sites" and "new territorial sites."
[h] Includes one site (Site 91) with no photo coverage that was known to be active before and after 5 June.

Figure 3 (a through e) – Time series of aerial photographs of the Brandt's Cormorant colony on Gualala Point Island, 30 May to 30 August 2007. Site numbers used for monitoring are indicated in each photograph.[1]

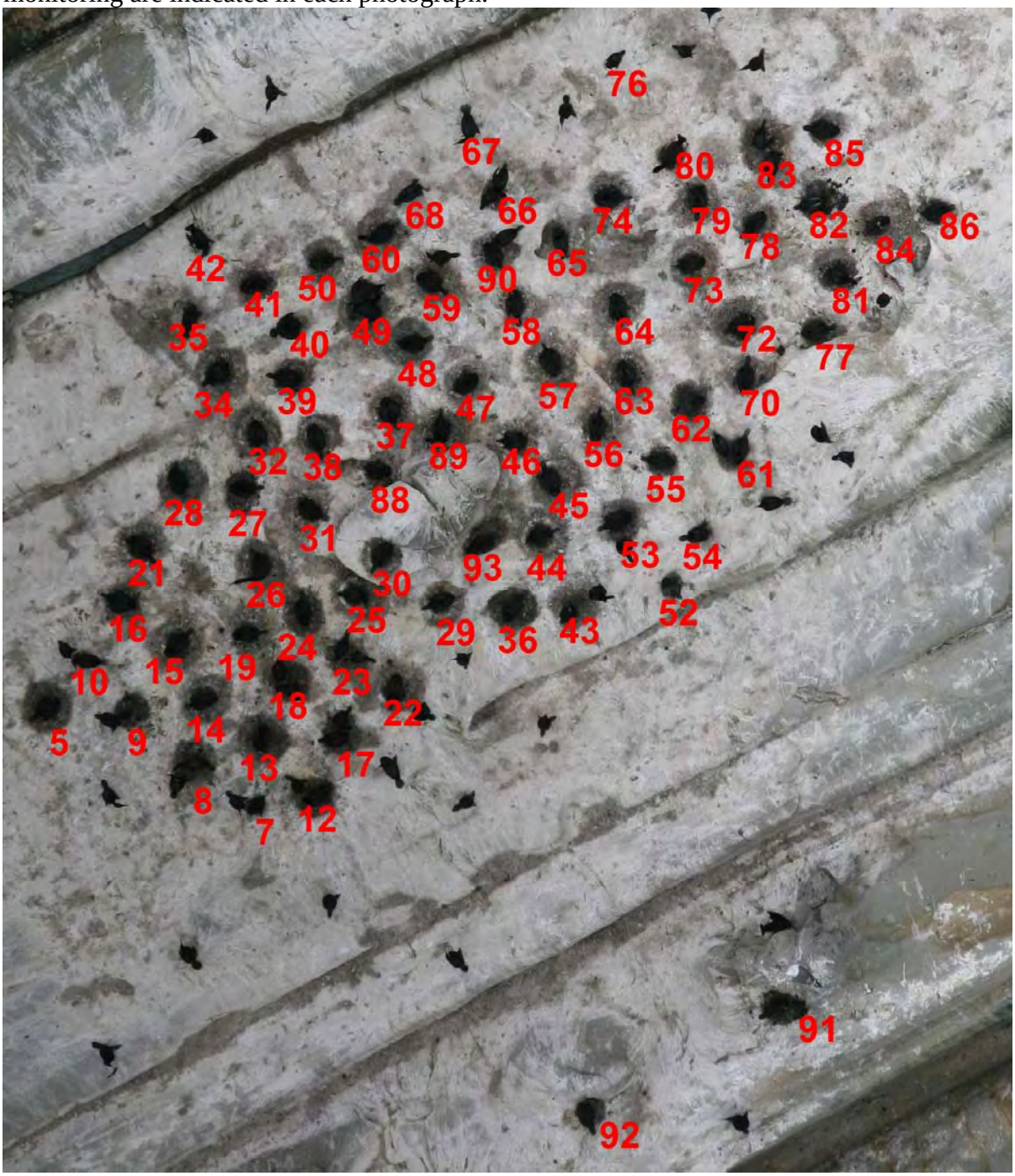



Photo by Gerard McChesney, US Fish and Wildlife Service

**a) 30 May 2007**

Photo © Craig Tooley, The Sea Ranch School of Photography

**b) 5 June 2007**


Photo © Craig Tooley, The Sea Ranch School of Photography

**c) 5 July 2007**

Photo © Craig Tooley, The Sea Ranch School of Photography

**d) 7 July 2007**


Photo © Craig Tooley, The Sea Ranch School of Photography

**e) 12 July 2007**

Photo © Craig Tooley, The Sea Ranch School of Photography

**f) 30 August 2007**

[1]For the photographs on 5, 7 and 12 July 2007, nest numbers are color coded as follows:

blue: active nests or territorial sites;
red: 6 nests categorized as newly failed on 5 July 2007;
green: 7 nests categorized as newly failed on 7 July 2007; and
pink: 7 nests categorized as newly failed on 12 July 2007.

*Seabird Counts from Mainland Vantage Points*

Appendix 2 displays graphs of seabird count data by count time and vantage point for the key species monitored on Gualala Point Island. All but the Brown Pelican nested on the island. Where data bars are absent in graphs, either no birds were present or no data were collected because of adverse weather conditions. Foggy conditions on 6-7 July precluded some counts and comparisons between the day of the fireworks and the day immediately after the fireworks.

Brown Pelican: Gualala Point Island is frequently a nocturnal roost for Brown Pelicans during their post-breeding dispersal. During the count period, many more pelicans were observed flying by Gualala Point Island than actually landing on the island, and pelicans were absent on the island on most days before the fireworks display. Large numbers of pelicans have roosted on Gualala Point Island in past summers, often reaching 100 birds before 1 July (R. Kuehn and G. Marshall, pers. comm.). The island did not appear to be a significant nocturnal roost site during the count period in 2007. When present during the day, most birds roosted on the lower rocks at the west end of Gualala Point Island or occasionally on the lower rocks on the east end of the island.

Brandt's Cormorant: Only a small portion (10%) of the Brandt's Cormorant colony was visible from the mainland and only from the south vantage point. Brandt's Cormorants were typically most numerous during the two earlier daily count times (see Appendix 2). Between 1 and 10 July, no consistent trend in counts was discernible, although a decline may have occurred between 5 and 9 July. Fog prevented counts at 05:30 and 08:00 h on 6 July, making this assessment less clear. On 11 and 12 July, an influx of non-breeding or post-breeding Brandt's Cormorants arrived and began roosting on Gualala Point Island. Their different origin was apparent by the presence of immature birds, not previously recorded on the island during the count period, and a clear spatial segregation between the roosting birds and the nesting colony.

Figure 4 shows the Brandt's Cormorant colony on Gualala Point Island from the south vantage point on four different days between 6 and 12 July. Nest #1 at the far left edge of the colony was found to be abandoned on 8 July and then reoccupied on 12 July. A Common Murre appears in flight in the 12 July photograph.

Figure 4 – The Brandt's Cormorant colony on Gualala Point Island, photographed from the south vantage point at mid-morning on 6, 7, 10 and 12 July 2007.

Brandt's Cormorants GPI-S 20070706

Brandt's Cormorants GPI-S 20070707

Brandt's Cormorants GPI-S 200707010

Brandt's Cormorants GPI-S 20070712

Photos © Rozanne Rapozo, Nature As I See It

Pelagic Cormorant: Counts of Pelagic Cormorants on Gualala Point Island consisted mostly of non-breeding birds. Most birds congregated on ledges along the north side of the island. Bird counts varied considerably between count times and days. No trend in counts was evident during the count period.

Black Oystercatcher: One breeding pair of oystercatchers was located from the north vantage point (Figure 5). Parents fed the young throughout the count period after first being discovered on 2 July 2007. All three young birds were first seen together on 6 July 2007. The chicks were still present at the end of the count period and beyond.

On most days, the total numbers of adult oystercatchers using Gualala Point Island for feeding and resting included more than the breeding pair. Most activity occurred in the intertidal foraging zone. They were also regularly seen in transit between the island and the mainland. Daily maximum counts ranged from two to seven birds.

Figure 5 – Location of the Black Oystercatcher nest site, marked in red, from the north vantage point, Gualala Point Island, July 2007.

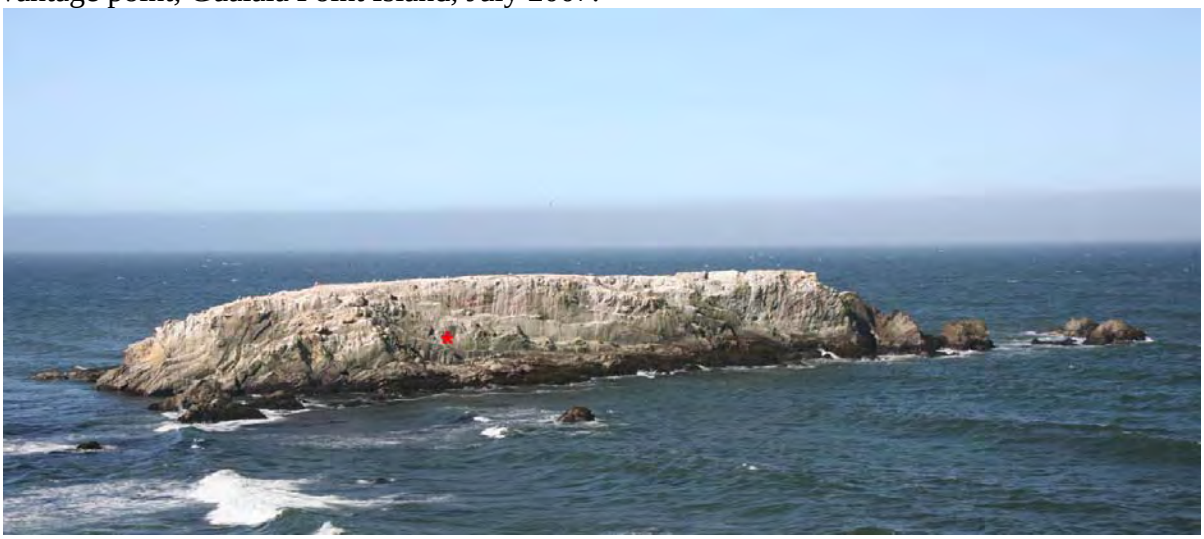
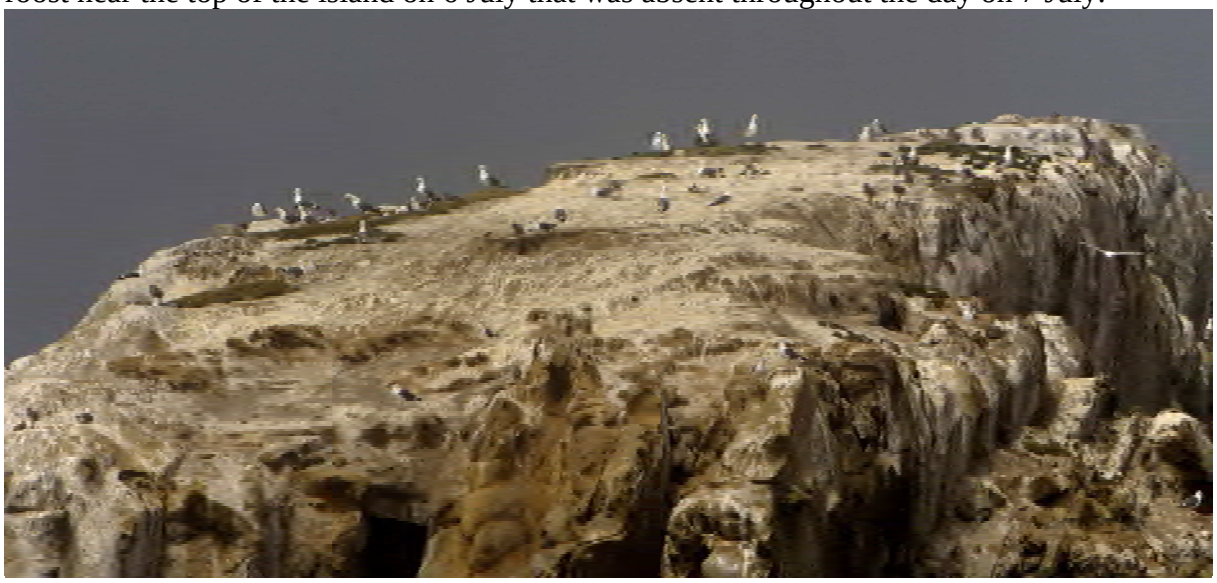


Photo by Paul Roush, USDI Bureau of Land Management

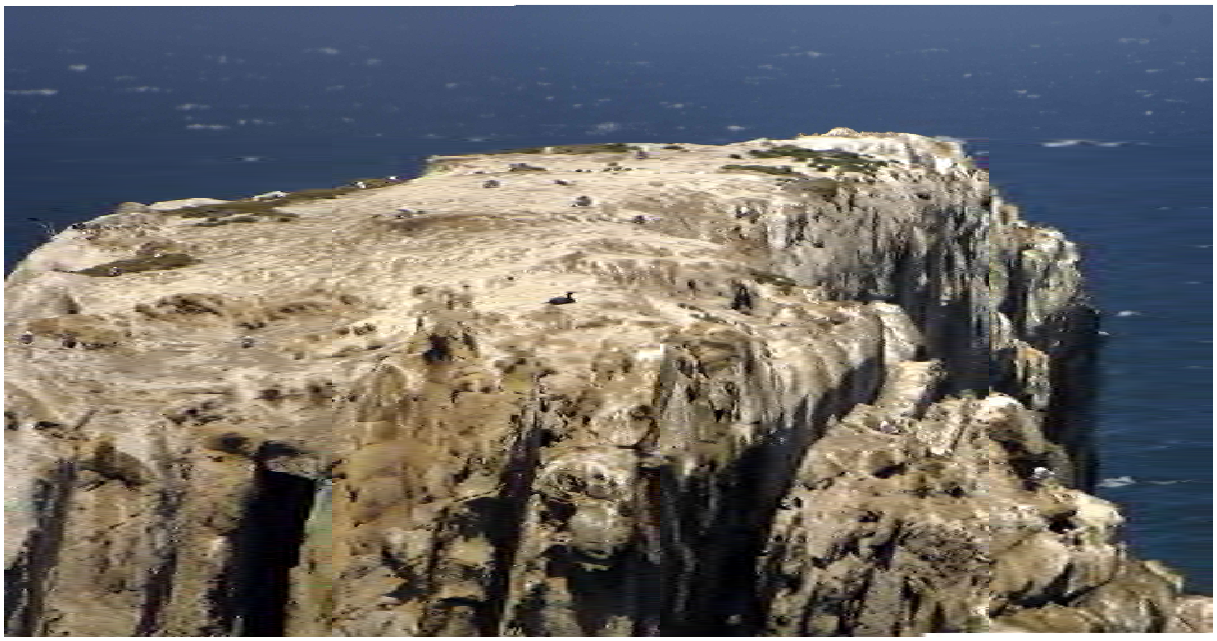
Western Gull: Although more Western Gull nests were visible from the north vantage point of the island, counts of adult Western Gulls were consistently higher from the south vantage point (Appendix 2). Immature Western Gulls were virtually absent from the island during the count period, as noted in previous years (R. Kuehn, pers. comm.). Most adult gulls not attending nests roosted on the sparsely vegetated flat top of the east end of the island. Maximum daily counts usually occurred during the second or third shift (08:00 or 10:30 h). Counts of adult Western Gulls generally increased through the count period, except for a clear decline that lasted through the day on 7 July (Appendix 2, Figure 6). These counts were among the lowest of the count period and indicated that many gulls departed the island and remained away during the course of that day. Otherwise, the general increase observed suggested an influx of non-breeders or failed breeders from other colonies.

Figure 6 shows the Western Gull colony as viewed from the south vantage point on 6 and 7 July at about 10:30 h each day. The higher density gull roost on top of the island on 6 July was absent on 7 July.

Figure 6 – View of the Western Gull colony on Gualala Point Island from the south vantage point at 10:30 h on 6 (upper photo) and 7 (lower photo) July 2007. Note the higher density roost near the top of the island on 6 July that was absent throughout the day on 7 July.



Western Gulls GPI-S
20070706



Western Gull GPI-S
20070707

Pigeon Guillemot: Observers at both the north and south vantage points regularly noted Pigeon Guillemots resting on ledges and cliffs as well as entering crevices where birds were believed to be nesting (Figure 7).

Figure 7 - Pigeon Guillemot nest crevices on Gualala Point Island, marked in red, detected as of 5 July 2007 from the south (upper photo) and north (lower photo) vantage points.

Photos by Paul Roush, USDI Bureau of Land Management

Counts of Pigeon Guillemots may have contained birds simultaneously visible to observers at both the north and south vantage points. Highest guillemot counts occurred during the first two shifts each day. This pattern was expected because guillemots tend to congregate near

nest sites in the early morning hours (Carter *et al.* 1992, Ewins 1993). Numbers of guillemots counted generally increased through the count period.

Other Bird Species Observed: In addition to bird species discussed above, observers recorded the following species on Gualala Point Island during the count period:

| | |
|---|---|
| Double-crested Cormorant | *Phalacrocorax auritus* |
| Unknown Sandpiper | *Calidris* spp. |
| Whimbrel | *Numenius phaeopus* |
| Ring-billed Gull | *Larus delawarensis* |
| Heermann's Gull | *Larus heermanni* |
| Common Murre | *Uria aalge* |
| Cliff Swallow | *Petrochelidon pyrrhonota* |
| Barn Swallow | *Hirundo rustica* |
| European Starling | *Sturnus vulgaris* |
| Brewer's Blackbird | *Euphagus cyanocephalus* |

Common Murres were observed on nine days during the main count period and on 16 to 18 July, usually among the nesting Brandt's Cormorants. Counts ranged from one to seven birds. Although this abundant California breeder has the closest colonies located just north of Point Arena, nesting has not been documented on Gualala Point Island or anywhere else in Sonoma County (Carter *et al.* 2001).

*Seabird Nest Counts*

All species noted as nesting on Gualala Point Island during the last complete colony survey in 1989 (Carter *et al.* 1992) were nesting in 2007 (Table 2). Historically and in 2007, Brandt's Cormorants have been the most numerous nesting seabird species. Although census methodologies were different each year except for Brandt's Cormorants, numbers of breeding birds for most species appeared similar between the 1989 and 2007 counts.

Table 2 – Comparison of nest counts for breeding seabirds on Gualala Point Island in 1989 and 2007.

| Species | 1989 | | | 2007 | | |
|---|---|---|---|---|---|---|
| | Nest Count | Census Method | Census Date | Nest Count | Census Method | Census Date |
| Brandt's Cormorant | 237 | aerial survey | 23 May | 84[1] | aerial survey | 5 July |
| Pelagic Cormorant | 2 | boat survey | 6 June | 2 | mainland survey | 1 July |
| Black Oystercatcher | 0 | boat survey | 6 June | 1 | mainland survey | 2 July |
| Western Gull | 13 | boat survey | 6 June | 17 | mainland survey | 5 July |

[1]High single survey count. The seasonal total for all nests constructed in 2007 was 90 nests (see text).

Brandt's Cormorant nest counts were conducted using aerial photographic surveys. A total of 90 Brandt's Cormorant nests were identified over the five surveys conducted between 30

May and 12 July 2007, with a high count of 84 nests on 5 July 2007. Only 65 nests were active during the standardized annual USFWS survey on 30 May (Table 1). Other past nest counts have been: 620 in 1980 (Sowls *et al.* 1980); 78, 139, and 125 nests in 1993, 1994, and 1995, respectively (Carter *et al.* 2000); and 132 in 2003 (Capitolo *et al.* 2004).

Thus, nest counts of Brandt's Cormorants on Gualala Point Island in 2007 were 85% lower than the high count in 1980 and 32% lower than the most recent count in 2003. Comparing the standardized USFWS survey periods, the 2007 nest count was 51% lower than the 2003 count.

*Seabird Nest Monitoring*

Brandt's Cormorant: In 2007, only about 10% of the Brandt's Cormorant colony was visible from the mainland and only from the south vantage point. Although views were not ideal, the data obtained were sufficient to establish nesting status during the count period for nine sites (Table 3). Of these, six nest sites had breeding confirmed by the presence of chicks. Two other sites were not confirmed to have eggs or chicks, but breeding was inferred by the conditions of the nests and adult behavior (*i.e.*, sitting in nests). One site (#15) was identified as "territorial" only. At this site, an adult was sitting on the nest during nearly every nest check between 11 and 18 July, suggesting that egg-laying might have occurred during that period although the nest was clearly empty (*i.e.*, no eggs or chicks) by 21 July (data not shown in Table 3).

Table 3 - Summary of daily status for the nine Brandt's Cormorants nests monitored from the mainland on Gualala Point Island, 1-18 July 2007.[1,2]

| Nest # | Status | Day in July 2007 | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 16 | 17 | 18 |
| **1** | B | N | N | N | N | N | N | N | F | T | T | T | T | T | T | T |
| **2** | B | N | C | N | C | N | N | C | N | C | C | C | N | N | C | ? |
| **3** | B | N | N | N | N | N | N | F | T | T | T | T | T | T | T | T |
| **4** | B | N | N | N | N | N | N | N | N | N | N | C | N | N | C | N |
| **13** | B | ? | C | N | C | C | C | N | N | C | C | C | C | ? | C | ? |
| **14** | B | N | N | N | N | N | C | N | N | C | C | C | N | C | N | ? |
| **15** | T | T | T | T | T | T | T | N? | N? | T? | T? | N | N | N | N | N |
| **16** | B | ? | C | N | C | C | N | N | N | C | C | C | C | N | C | ? |
| **18** | B | ? | ? | ? | ? | ? | ? | ? | ? | C | C | C | ? | N | C | ? |

[1]The numbered nests below are different from the schema used in Figure 2 and in Appendix 1.
[2]Key to abbreviations:
B = breeding site
C = cormorant chick(s) seen
F = failed nest
N = adult sitting on nest
N? = uncertain whether the site is a functioning nest
T = territorial site ("status") or adult at nest territory only (daily nest condition)
T? = uncertain whether the site is functioning as a territory
? = or no data (nest view obstructed or not checked)

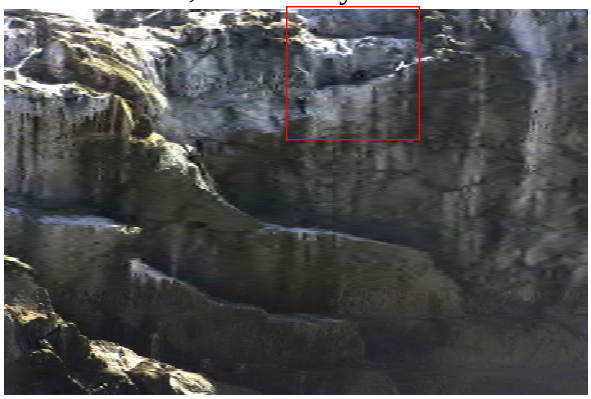
Chicks were not visible until they were large enough to be seen above the nest bowl, usually after seven to ten days of age. Of nests with chicks, the maximum numbers of chicks

recorded were: one chick at one nest; two chicks at four nests; and > 3 chicks at one nest. Four nests had chicks confirmed before the fireworks, and three more nests had chicks confirmed after the fireworks. Beginning on 9 July, some chicks were large enough to begin wandering from nests, when failed Nest #3 was sporadically visited by a wandering chick from another nearby nest.

During the count period, two nests, or 22% of the sample, failed as indicated by a sudden change in adult behavior (*e.g.*, standing outside the nest, irregular attendance), lack of eggs or chicks in nests when exposed to view, and deterioration of the nests. Nest #3 was found to be failed on 7 July and Nest #1 on 8 July (Table 3). Although these nests were fairly regularly (but not constantly) attended thereafter until at least 18 July, subsequent checks through 28 July showed no evidence of re-nesting. Because no chicks had been observed prior to nest failure, these nests likely were in the egg or early chick stage when they failed (Nest #3 had a possible egg observed on 1 July).

Pelagic Cormorant: Two Pelagic Cormorant nests were located on the same ledge on the north side of Gualala Point Island (Figure 8). The number of nests was low in comparison to 2006, when seven nests were recorded on the south side cliffs of the island (R. Kuehn, pers. comm.).

Figure 8 – Images of the two Pelagic Cormorant nest sites on Gualala Point Island from three different dates, 1 to 12 July 2007.



Pelagic Cormorants GPI-N 20070706

Pelagic Cormorants GPI-N 20070706

Pelagic Cormorants GPI-N 20070707


Pelagic Cormorants GPI-N 20070711

Photos © Rozanne Rapozo, Nature As I See It

In 2007, both nests monitored on Gualala Point Island failed. Pelagic Cormorant Nest #1 first showed signs of failure on 10 July when an apparently incubating adult departed the nest for several hours. Later the same day, the same or a different bird was observed sitting on the nest. Sporadic occupancy continued after 10 July but eggs or chicks were not observed and the nest was completely abandoned by 12 July. At Nest #2, adults incubating two or more eggs were observed through 12 July; by 16 July (outside the count period), this nest also was abandoned.

Western Gull: Observers at both the north and south vantage points observed Western Gull nests and young in nests throughout the count period. Western Gull nests occupied either the relatively flat top surface at the east end of the island or wide ledges and nooks just below the top of the island. Thirteen nests on the north side and eight nests on the south side of the island were visible. Accounting for visual overlap between vantage points, a total of seventeen nests were observed daily for as long as the young gulls remained in or near the nest. Afterward it was not possible to distinguish nest origin of mobile chicks and loss of individual young could not be determined.

All but four nests contained visible chicks by 2 July and all nests had chicks by 12 July. Brood sizes averaged 2.29 chicks (range = 2–3, n = 17); 29% of broods contained three chicks. No nest failures or chick fatalities were recorded during the count period. However, surveys of all chicks were often difficult to obtain because of high wind conditions, when chicks crouched out of the wind. As chicks grew larger, they were easier to detect, which may explain the continued rising trend in counts of mobile chicks toward the end of the count period, even though very few young hatched after 2 July.

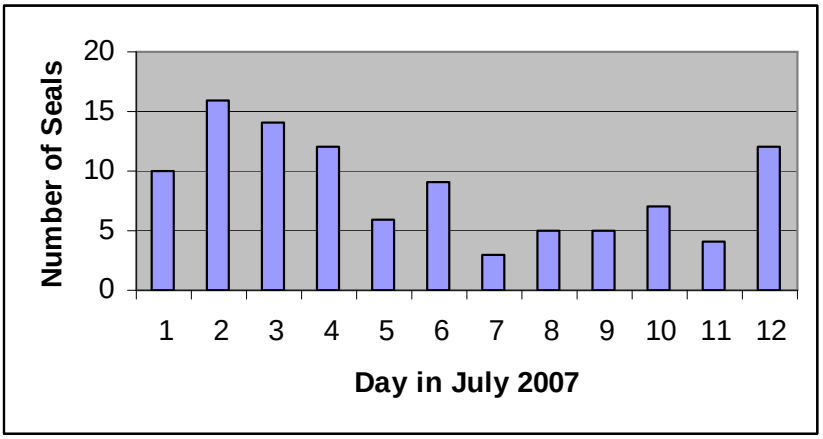
### *Harbor Seal Counts from Mainland Vantage Points*

Harbor Seals regularly hauled out along the intertidal perimeter of the island and less often above the mean high tide line. No Harbor Seal pups were recorded at Gualala Point Island during the count period.

Seals were not double-counted during simultaneous counts from each vantage point. Therefore, counts from north and south vantage points were pooled for the total daily maximum count at the diurnal low tide (Figure 9). Because the counts took place as close to low tides as possible, Harbor Seal count times changed from day to day.

In general, low-tide counts declined through the count period, with the lowest count on 7 July. This observation suggests that there may have been a response that coincided with the fireworks display. However, at 21:00 h on 6 July, just before the Gualala fireworks display began and the island was still visible, Task Force observers did not locate any Harbor Seals from either vantage point on Gualala Point Island. Thus, a link between a decline in numbers on 7 July and the fireworks display is not conclusive.

Figure 9 – Census of Harbor Seals at daytime low tide, Gualala Point Island, 1 to 12 July 2007.




*Daytime Disturbance Monitoring*

Aircraft and boat disturbances have been shown to impact certain seabird colonies in central California and elsewhere (Carney and Sydeman 1999, Rojek *et al.* 2007). To assess overall agents of disturbance and their effects at Gualala Point Island, all potential human disturbances and all non-human disturbances were recorded during daytime seabird counts (Table 4). Daytime disturbance agents and disturbances to seabirds, whether human- or animal-caused, were rare and minor during the count period. Two disturbances were from cannon blasts and one from a fishing boat. Of all aircraft recorded, only the jets and helicopter flew below 300 m but still did not cause any notable disturbance. The fishing boat that caused two Brandt's Cormorants to flush had approached to within 45 m of the island.

Table 4 – Summary of daytime disturbances to seabirds on Gualala Point Island recorded during seabird counts and nest surveys, 1-12 July 2007.

| Disturbance Agent | Total Number of Events | Total Duration in Minutes | Number of Disturbance Events | Effect on Seabirds |
|---|---|---|---|---|
| Aircraft | | | | |
| Airplane | 7 | 14 | 0 | none |
| Military Jets (4) | 1 | 1 | 0 | none |
| Helicopter | 1 | 1 | 0 | none |
| People on Beach | 1 | 22 | 0 | none |
| Cannon Blast | 3 | 3 | 2 | Brandt's Cormorants assumed an alert posture, did not flush |
| Fishing Boats | 6 | 25 | 1 | 2 Brandt's Cormorants flushed |
| Avian Sources | | | | |
| Brown Pelican | 1 | 1 | 1 | 20 Western Gulls flew up, called |
| Western Gull | 1 | 1 | 1 | other gulls became agitated |
| Unknown | 1 | 2 | 1 | 20 to 30 Western Gulls flushed |
| **Total** | **22** | **70** | **6** | -- |

*Data Collection during the Gualala Festivals Committee Fireworks Display, 6 July 2007*

The South Coast Fire Protection District issued a permit, dated 13 June 2007, to the Gualala Festivals Committee to detonate 732 three-inch shells containing fireworks during an interval of ten minutes. The fireworks display ran from 21:35 to 21:53 h on 6 July 2007. A bird count, taken at 21:00 h while light conditions still permitted complete coverage, included nineteen Brandt's Cormorants, eight Pigeon Guillemots, one Black Oystercatcher and about 100 Western Gulls on the island.

Observers did not tally the number of detonations during that time. However, the detonations were continuous for the entire eighteen-minute interval. In contrast with the permit issued for the 2006 display, the 2007 permit covered a narrower spectrum and less powerful selection of fireworks to display.

Weather conditions during the fireworks display were clear with a strong northwest wind onshore, but a fog bank was present offshore.

During the fireworks display, two observers viewed and verbalized observations to a third observer who recorded observations. The following are verbatim observations recorded at the south vantage point viewing Gualala Point Island:

> "At 9:35 pm the fireworks began with no loud 'salutes' but with light burst[s] and pops. There was lots of noise from the birds as soon as the fireworks started. We heard the bird cries from 1000 feet away. The gulls are up and flying immediately and constantly calling. Cormorants are moving around at the nest area; a few are up and flying also. Birds are flying higher and higher. Lots of bird noise. Birds are high enough to silhouette above the fog bank. None are seen landing at this time. Birds are up 1½ times higher than the island's height. Fireworks 'pop' every 1 to 1½ seconds. No break between fireworks; steadily shot off. About 9:45 pm it is quieter: we cannot hear the gulls nor see them in flight. Have they landed? About 9:50 pm we lost visibility to the dark and the fog bank background. The right corner of the upper face of Gualala Point Island is lit up 3 times by fireworks. The finale is very loud and frequent explosions. Right face of the rock is lit up. Birds are flying again and calling loudly through the finale. 18 minutes total disturbance time."

During these observations, "bird noise" referred to Western Gulls, a vocal species. Most other seabird calls, such as from cormorants, were not audible from the mainland vantage points. The cormorants observed referred to Brandt's Cormorants. In the darkness, observers were not able to obtain data on Pelagic Cormorants, Black Oystercatchers, or Pigeon Guillemots.

<u>Nighttime Photography and Audio Recording:</u> Photographers took pictures set for nighttime exposures on two evenings during the count period. On 4 July 2007, photographs taken at thirty-second exposures monitored Western Gull and Brandt's Cormorant behavior for 80 minutes after sunset. Minimal bird activity was noted during this time; both cormorants and gulls appeared to be in the same positions from image to image.

On 6 July 2007, photographic images of the Brandt's Cormorant colony were taken from 55 minutes prior to the start of the fireworks display until 22:00 h. Prior to the fireworks, activity of Brandt's Cormorants and Western Gulls was minimal; birds were in the same relative positions from image to image. In the images acquired at 21:35 h just after the start of the fireworks, cormorants had changed postures from resting to standing and alert. By 21:36 h, some birds had moved from their original locations to points on the tops of rocks. By 21:37 h at least six birds were gone from their positions, having either flushed or otherwise moved out of view. In the next four minutes, at least three other birds departed and one other bird moved to a position higher on the rock. In one example, a resting cormorant first became alert, looked to the left, then looked to the right, and then lifted off and departed the colony.

Audio was recorded with a hand-held video camera during the fireworks. An iMovie™ slide file with the synchronized Western Gull calls was made. High winds appeared to dampen the sounds of the gulls and fireworks at the observation site. Additional photographs and sound recordings are on file with The Sea Ranch Association.

Acoustical Readings: No data on acoustical readings are reported here. A windscreen used did not adequately shield the sound recording instrument, and the wind turbulence caused high background readings. Further sound analysis will require more complex filtering of background noise from this procedure. Task Force members and BLM biologists will work further to analyze the recordings with software for generating sound spectrograms.

Data from the fireworks operator were not available for comparing sound levels of the fireworks displays in 2006 and 2007.

## Discussion

### *Short-term Impacts*

This study was the first to examine colony attendance patterns and relative breeding parameters for seabirds and marine mammals at Gualala Point Island. The impetus for the study was to examine potential impacts of a fireworks display conducted from a low coastal bluff 1.8 km from the island on 6 July 2007. Data also provide baseline information that will be valuable for guiding future monitoring efforts, management, or other studies. Surveys demonstrated the same five species of seabirds nesting on Gualala Point Island in 2007 as in the previous complete survey of the island in 1989 (Carter et al. 1992). Breeding populations of most species also were similar to 1989 except for Brandt's Cormorant, which has declined substantially.

While data were collected on all species observed, efforts focused on the colony of Brandt's Cormorants because of their known sensitivity to human disturbance (Hunt *et al.* 1981, McChesney 1997, Wallace and Wallace 1998, Thayer *et al.* 1999) and the relatively large sample size that could be monitored. For this species, colony monitoring combined land-based nest monitoring and bird counts with data from a series of aerial photographs. The aerial photography established "snapshots" in time and provided coverage of the entire cormorant colony. Land-based nest monitoring, however, was limited because only about 10% of the colony was visible from the mainland vantage point. Still, land-based nest monitoring provided

relatively detailed information on the nests that could be viewed and helped interpret aerial photographic results.

From the aerial photographs, 90 breeding pairs of Brandt's Cormorants were identified on Gualala Point Island in 2007. Overall, 78% of nests were successful through 12 July (but may have been lower if additional nests failed after 12 July). Most (70%) nests that failed did so within a short, seven-day interval between 5 and 12 July, and 35% of nest failures occurred over just two days between 5 and 7 July. Nest success was lower than Brandt's Cormorant nest success in 2007 at three central California colonies: 86%, 90%, and 97% at Castle Rocks and Mainland (Monterey County), Devil's Slide Rock and Mainland (San Mateo County), and Point Reyes (Marin County), respectively (G. J. McChesney, USFWS, unpubl. data). At these colonies, nest failures occurred infrequently and asynchronously over the course of the season, and most nest failure occurred prior to 6 July.

Nighttime monitoring during the 6 July fireworks display demonstrated visible disturbance to both Brandt's Cormorants and Western Gulls on Gualala Point Island. The cormorants became visibly alert immediately after the start of the display, followed shortly by birds being displaced and flushed. Western Gulls also flushed and flew over the island. These responses coincided with high rates of Brandt's Cormorant nest abandonment in the days immediately after and shortly following 6 July. During severe disturbance events, cormorants may depart their nests, leaving eggs and chicks susceptible to predators such as gulls or they may accidentally kick eggs out of the nest (McChesney 1997, Wallace and Wallace 1998). Following the cessation of the disturbance, birds may either return to their nests or they may abandon nesting efforts entirely. Thus, it is highly likely that nests found to be failed on 7 July were associated with the fireworks disturbance the previous evening.

For Brandt's Cormorant nests found to be failed after 7 July, the causes for failure are less clear but also may have been associated with the fireworks disturbance. Brandt's Cormorants sometimes will attend nests for up to several days after nest failure, even refurbishing and sitting in the nest (G. McChesney, pers. obs.). Thus, it is possible that some nests recorded as "active" on 7 July actually had already failed but that adults were still attending nests, which visibly failed a few days later. Other factors associated with the fireworks display also may have contributed to a prolonged period of nest failure. For example, at certain colonies with high levels of human activity, high nest loss over longer periods has been demonstrated in other seabirds even in the absence of obvious behavioral cues (Giese 1996, Beale and Monaghan 2004). High stress caused by human disturbance was thought to be the cause. Based on behavioral observations in this study, cormorants and other birds almost certainly experienced elevated stress levels during the fireworks display and this may have had an effect lasting up to several days. Also, if a cormorant mate had been disturbed by the display and subsequently abandoned the island, the breeding pair's nest certainly would have failed because two parents are necessary for cormorants to nest and rear young successfully.

The fact that most cormorant nests abandoned were on the edge of the colony was not surprising. Studies of other seabirds have shown that birds nesting on the edge or in low-density portions of a colony can experience higher rates of nest predation and lower breeding success than nests in the interior or denser parts of colonies (Birkhead 1977, Siegel-Causey and Hunt 1981). Also, nests established later and still holding eggs or small chicks were more prone to predation by gulls (e.g., Birkhead 1977). Larger chicks, such as chicks in many nests on 6 July, are generally

too large for avian predators to handle and are capable of maintaining their body temperatures to survive brief periods of exposure when adults are absent (Ainley and Boekelheide 1990). None of the cormorant nests known to have failed on Gualala Point Island between 7 and 12 July had large chicks.

Data were not adequate to fully evaluate potential impacts of the fireworks display on other species. However, for the entire day on 7 July, Western Gulls showed a brief but marked decline in numbers of adults counted on Gualala Point Island. This decline may have been associated with disturbance to gulls recorded the previous night during the fireworks display.

### *Potential Long-term Impacts*

The Brandt's Cormorant is one of the most abundant breeding seabirds in California (Sowls *et al.* 1980, Carter *et al.* 1992). However, along the southern Mendocino County and Sonoma County coasts, few colonies exist mainly because suitable breeding habitat is scarce. Formerly, Gualala Point Island was the largest of only a handful of Brandt's Cormorant colonies between Point Arena and Bodega Bay. Available data indicate that the Brandt's Cormorant colony at Gualala Point Island has declined substantially since 1980. The count of 65 nests on 30 May 2007 was the lowest recorded to date during standardized USFWS annual surveys (Sowls *et al.* 1980; Carter *et al.* 1992 and 2000; Capitolo *et al.* 2004; and this study).

Fireworks displays are not the major cause for the long-term decline of Brandt's Cormorants on Gualala Point Island. A specific cause or set of causes remains unknown at this time. Given the sensitivity of Brandt's Cormorants to disturbance and the proximity of the colony to various human-related activities, human disturbance may be at least partially responsible for reductions in numbers. Thus, a major concern is that additional human disturbances, such as the recently instituted fireworks display, will add to the burden of impacts and will make future recovery of the colony less likely.

Common Murres, a species recovering in California from past human impacts that is undergoing a breeding population expansion in southern Mendocino County (Carter *et al.* 2001, Capitolo *et al.* 2006), were observed prospecting on several days in 2007 among the Brandt's Cormorant colony on Gualala Point Island. If properly protected, murres may begin nesting on the island in the near future and become the first documented colony in Sonoma County.

In addition to the importance of Gualala Point Island to nesting and roosting seabirds, the coast between Collins Landing and the Gualala River has been important for certain species, especially Pelagic Cormorants (Sowls *et al.* 1980, Carter *et al.* 1992). This species, which nests in more scattered and lower-density colonies, is also sensitive to both disturbance and shortages in prey supplies (Carter *et al.* 1984, Ainley and Boekelheide 1990). Given the similar proximity to developed areas, this local colony also may be jeopardized by increases in human disturbance. A remnant population of the federally threatened Marbled Murrelet (*Brachyramphus marmoratus*) uses the waters just off the mouth of the Gualala River (C. S. Strong, Crescent Coastal Research, pers. comm.). Intensifying human disturbance could jeopardize the well-being of this small group of birds.

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Appendix 1

**Histories of Brandt's Cormorant nest and territorial sites recorded in aerial photographs, Gualala Point Island, 30 May to 12 July 2007.**[1]

| Nest # | Status | 30 May | 5 June | 5 July | 7 July | 12 July | Fate as of 12 July |
|---|---|---|---|---|---|---|---|
| 1 | B | V | V | SF | SF | SW | S |
| 2 | B | V | T | SF | SF | failedT | F |
| 3 | B | V | SF | SW | SW | SW | S |
| 4 | B | V | SF | SW | SW | failedDE | F |
| 5 | B | SW | SW | SW | SW | SW | S |
| 6 | B | V | V | SW | failedDE | T | F |
| 7 | B | DPE | SF | failedV | V | V | F |
| 8 | B | SF | SW | SW | SW | SW | S |
| 9 | B | SF | SF | SW | SW | SW | S |
| 10 | B | T | SF | SW | SW | failedDE | F |
| 11 | B | V | SF | SF | SW | SW | S |
| 12 | B | SF | SW | SW | SW | SW | S |
| 13 | B | SW | SW | SW | SW | SW | S |
| 14 | B | SW | SW | SW | SW | DC | S |
| 15 | B | SW | SW | SW | SW | DC | S |
| 16 | B | SW | SF | SW | failedE | T | F |
| 17 | B | SW | SW | SW | SW | SW | S |
| 18 | B | SW | SF | SW | SW | SWG | S |
| 19 | B | SW | SW | DC | DC | DC | S |
| 20 | B | V | SW | SW | SW | SW | S |
| 21 | B | SW | SF | SW | SW | DC | S |
| 22 | B | SW | SW | DW | DC | DC | S |
| 23 | B | SW | SW | SW | SW | DC | S |
| 24 | B | SW | SW | SW | SW | C | S |
| 25 | B | SW | SW | DC | DC | DC | S |
| 26 | B | SW | SW | DC | DC | DC | S |
| 27 | B | SF | SW | SF | SF | SW | S |
| 28 | B | SW | SW | DC | DC | DC | S |
| 29 | B | SW | SW | failedT | V | DF(E in alt photo) | F |
| 30 | B | SW | SW | SW | SW | SW | S |
| 31 | B | SW | SW | DC | SW | DC | S |
| 32 | B | SW | SW | SW | SW | SW | S |
| 33 | B | V | SP | SF | SF | DC | S |
| 34 | B | SW | SW | DC | SW | DC | S |
| 35 | B | T | SF | SF | SW | SW | S |
| 36 | B | SW | SW | SW | failedE | SW(E in alt photo) | F |
| 37 | B | SW | SW | SW | SW | DC | S |
| 38 | B | SW | SW | SW | DC | DC | S |
| 39 | B | SF | SW | SW | SW | DC | S |
| 40 | B | T | SP | SF | failedV | DC | F |
| 41 | B | SF | SW | SW | SW | DC | S |
| 42 | B | T | SP | SW | SW | SW | S |

| Nest # | Status | 30 May | 5 June | 5 July | 7 July | 12 July | Fate as of 12 July |
|---|---|---|---|---|---|---|---|
| 43 | B | SW | SW | failedV | V | V | F |
| 44 | B | SW | SW | SW | DC | DC | S |
| 45 | B | SW | SW | DC | DC | DC | S |
| 46 | B | SW | SF | SF | SW | SW | S |
| 47 | B | SW | SW | SW | SW | DC | S |
| 48 | B | SW | SW | SW | SW | SW | S |
| 49 | B | SW | SW | SW | SW | DC | S |
| 50 | B | SW | SW | DW | SW | DC | S |
| 51 | B | V | SF | SF | failedV | T | F |
| 52 | B | SP | SW | failedDPE | V | V | F |
| 53 | B | SW | SW | SW | SW | DC | S |
| 54 | B | T | SF | SW | SF | SW | S |
| 55 | B | SF | SF | SW | failedE | DC | F |
| 56 | B | SW | SW | DC | DC | DC | S |
| 57 | B | SW | SW | SW | DC | DC+ | S |
| 58 | B | SW | SF | DW | SC | DC | S |
| 59 | B | SW | SW | DC | SW | DC | S |
| 60 | B | SW | SW | failedDE | V | T | F |
| 61 | B | SF | SF | DW | DC | DC | S |
| 62 | B | SW | SW | SW | SW | failedDE | F |
| 63 | B | SW | SW | DC | SW | DC | S |
| 64 | B | SW | SW | DC | DC | DC | S |
| 65 | B | DPE | SF | SW | SW | DC | S |
| 66 | T | T | SP | T | V | DC | na |
| 67 | B | T | SF | SW | SW | SW | S |
| 68 | B | T | SW | SW | SW | SW | S |
| 69 | B | V | SW | SW | SW | SW | S |
| 70 | B | SW | SW | SW | SW | failedV | F |
| 71 | B | V | SW | SW | SW | DC | S |
| 72 | B | SW | SW | SW | SW | DC | S |
| 73 | B | SW | SW | SW | SW | DC | S |
| 74 | B | SW | SF | SW | SW | SF | S |
| 75 | B | V | SF | SF | SF | SF | S |
| 76 | T | T | DF | V | V | V | na |
| 77 | B | SW | SW | SW | SW | failedDE | F |
| 78 | B | SW | SF | SW | failedE | DC | F |
| 79 | B | SW | SW | SW | SW | DC | S |
| 80 | B | SP | SF | SW | SW | DC | S |
| 81 | B | SW | SF | SW | SW | SW | S |
| 82 | B | SW | SW | SW | SW | DC | S |
| 83 | B | SW | SW | SW | SW | DC | S |
| 84 | B | SW | SW | SW | SW | DC | S |
| 85 | B | SF | SF | SF | SW | DC | S |
| 86 | B | SP | SF | failedV | V | V | F |
| 87 | T | V | T | V | V | V | na |
| 88 | B | SW | SW | DC | DC | DC | S |
| 89 | B | SW | SW | SW | SW | DC | S |
| 90 | B | SW | SF | SW | SW | DC | S |

| Nest # | Status | 30 May | 5 June | 5 July | 7 July | 12 July | Fate as of 12 July |
|---|---|---|---|---|---|---|---|
| 91 | B | SF | n/a | SF | SF | SFG | S |
| 92 | B | DF | n/a | SW | SW | failedV | F |
| 93 | B | SF | SF | SW | SW | SW | S |

[1] Codes are as follows:

**Status:** B = breeding site
T = territorial site

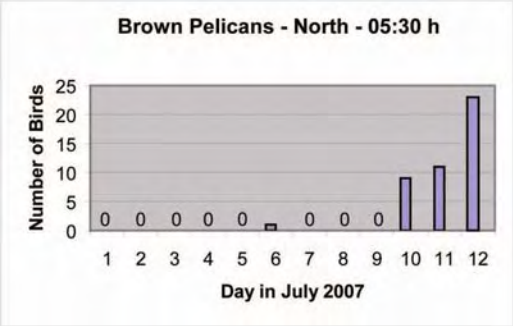
**Nest Site Condition by Date:** C = chick(s) visible in nest
D = adult standing at nest site
E = empty nest
F = fairly well built nest
G= egg(s) visible in nest
P = poorly built nest
S = adult sitting on nest
T = adult bird(s) on territory with little or no nest material
V = vacant site
W = well built nest
failed = first survey when nest discovered to be failed
n/a = no photo coverage

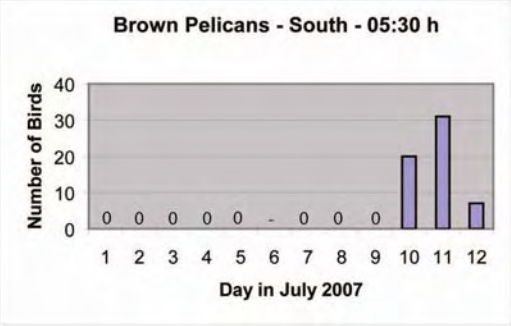
**Fate as of 12 July:** F = failed
S = successful
n/a = no nest established during the count period

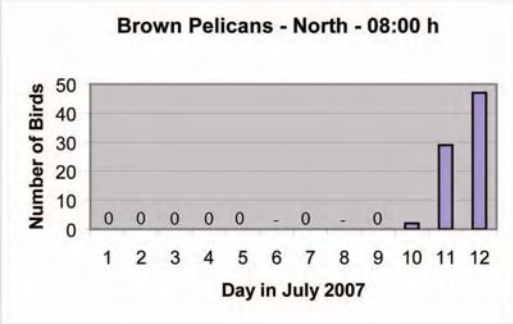
Appendix 2

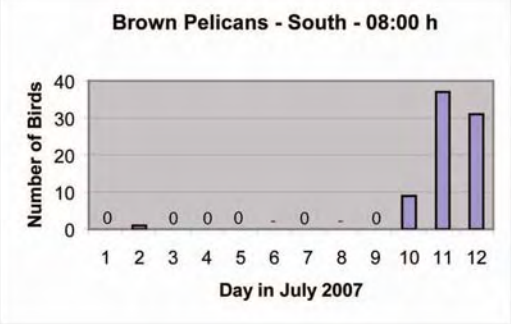
**Bird Census Totals by Species, Vantage Point and Time of Day, 1 to 12 July 2007**

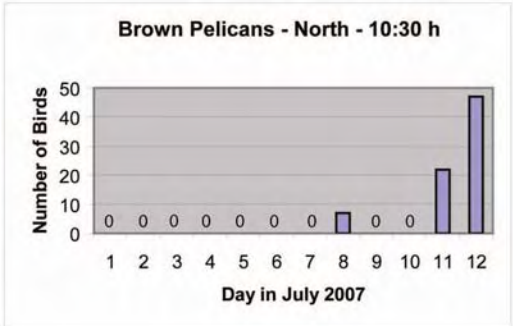
**0 = no birds observed – = no data available because of poor visibility**

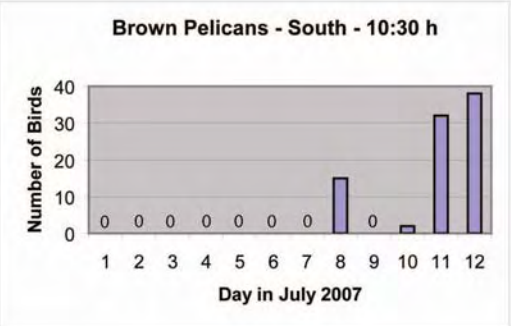


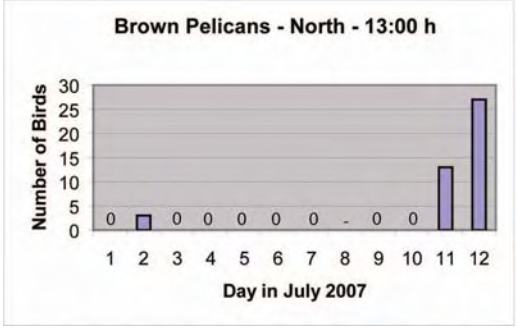



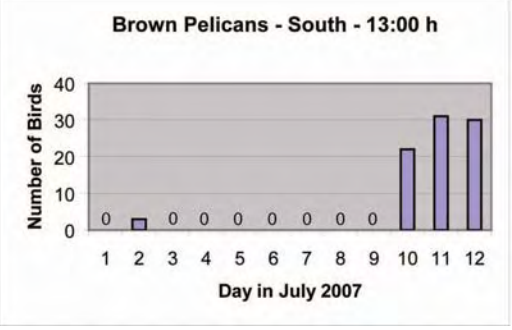



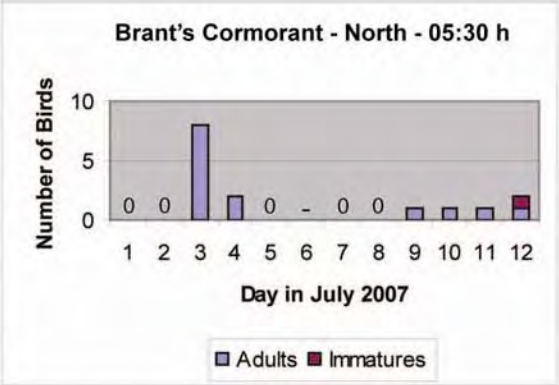



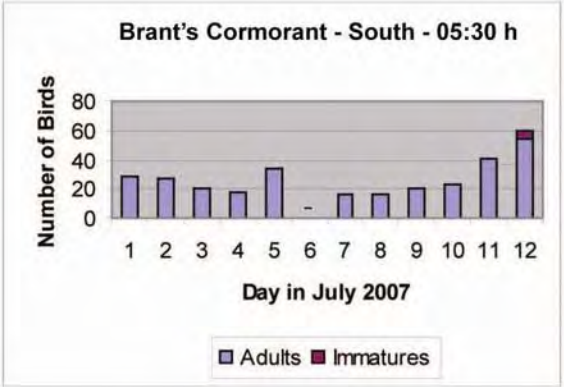



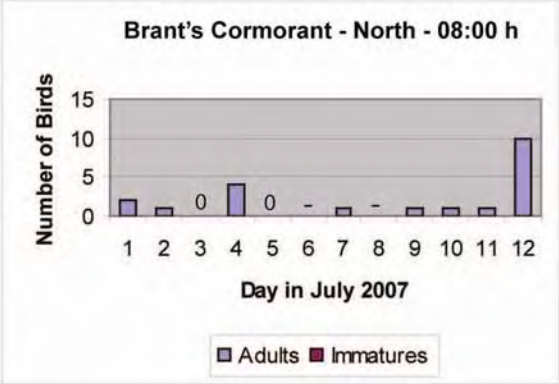



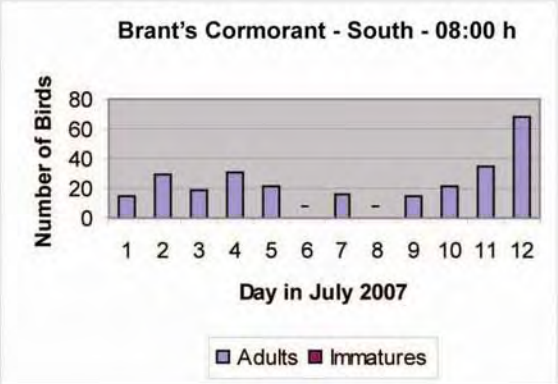



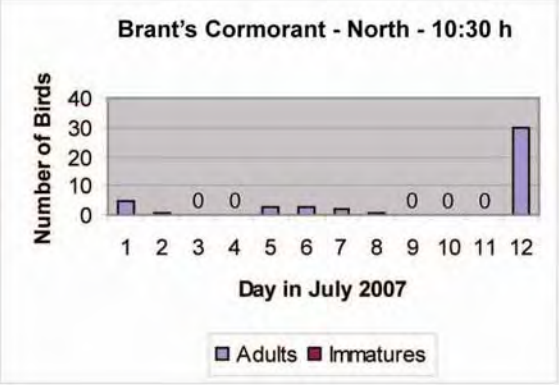



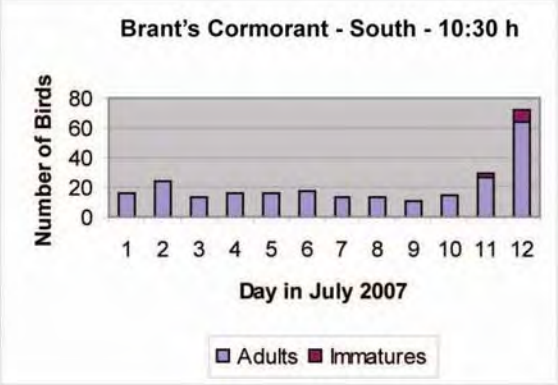


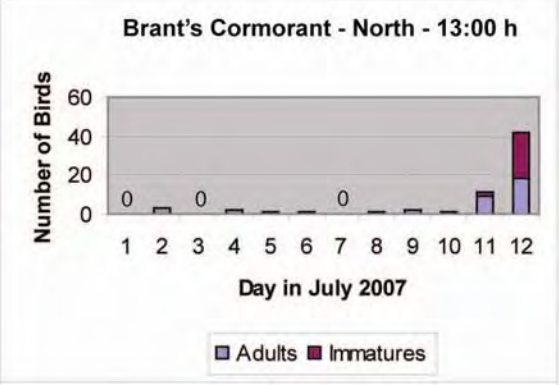



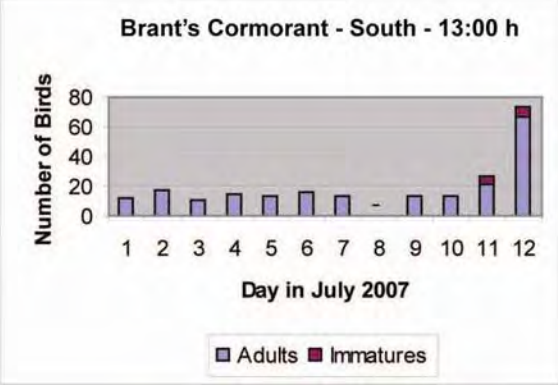
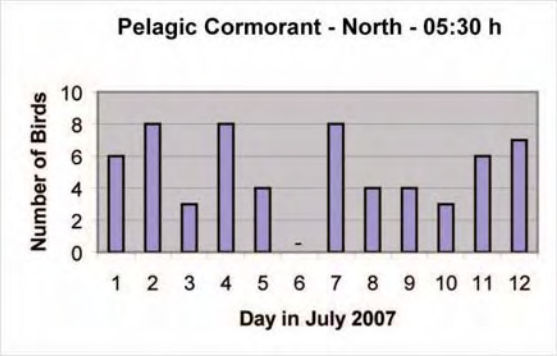
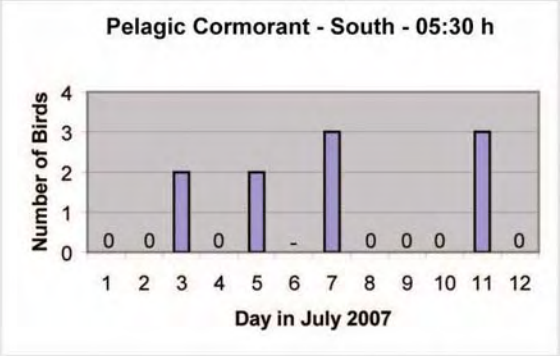
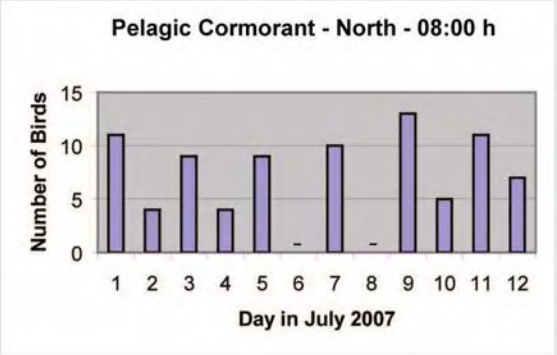



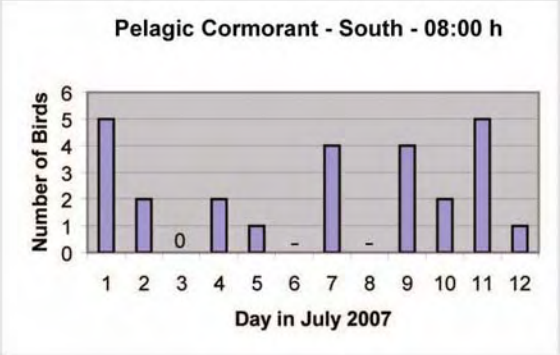


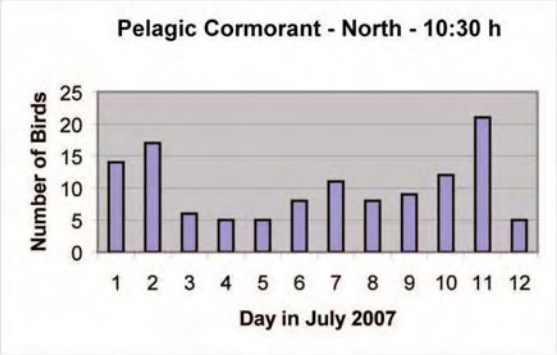

Exhibit 9: Gualala Study

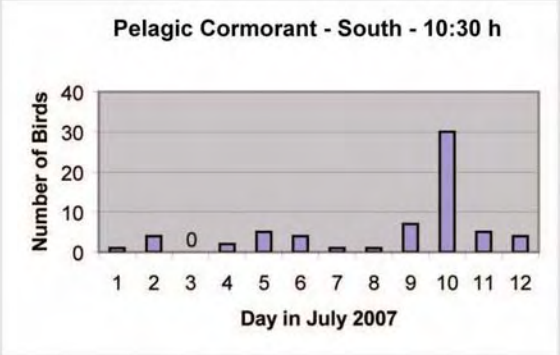


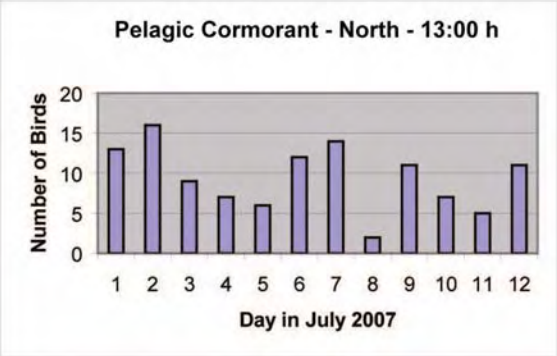



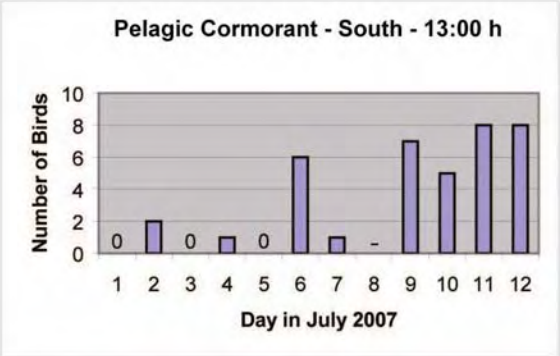
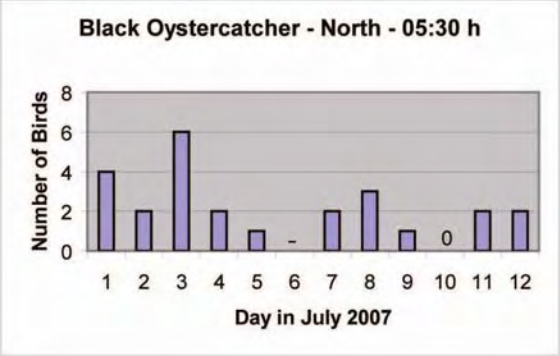
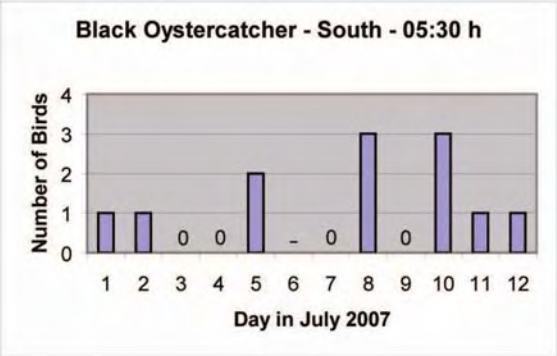
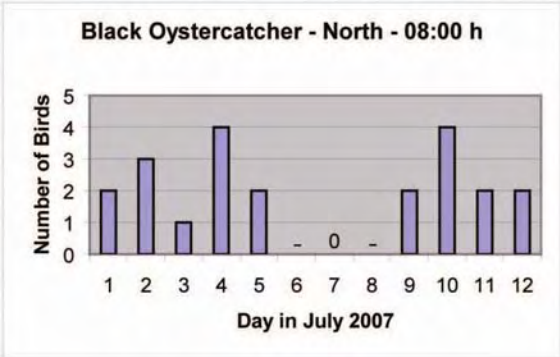



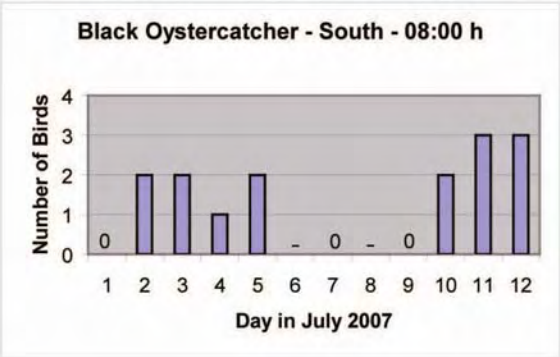


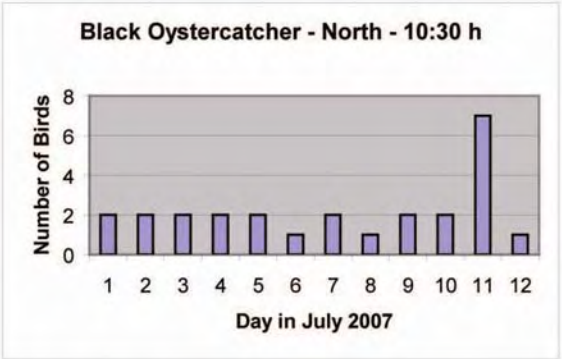

Exhibit 9: Gualala Study

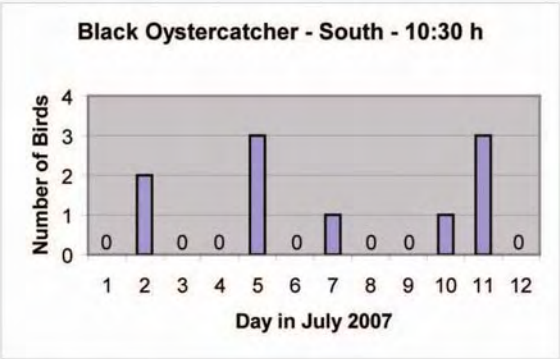


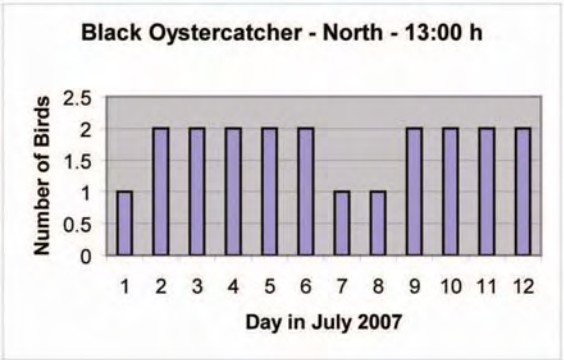



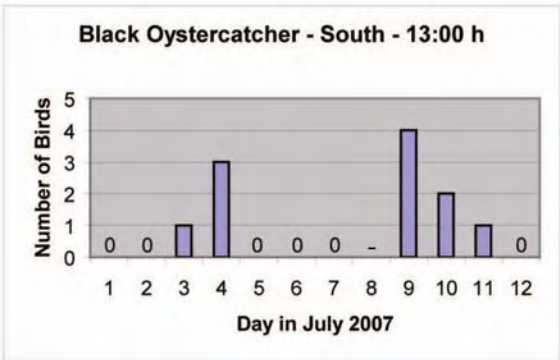
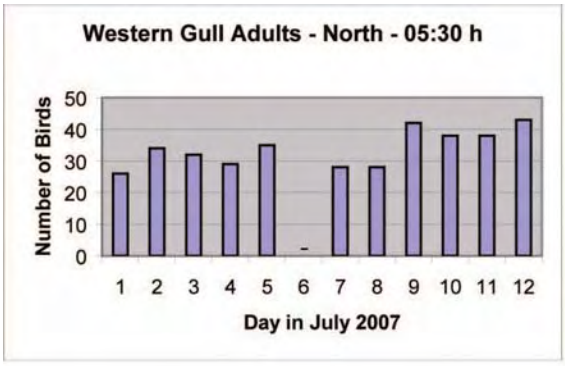
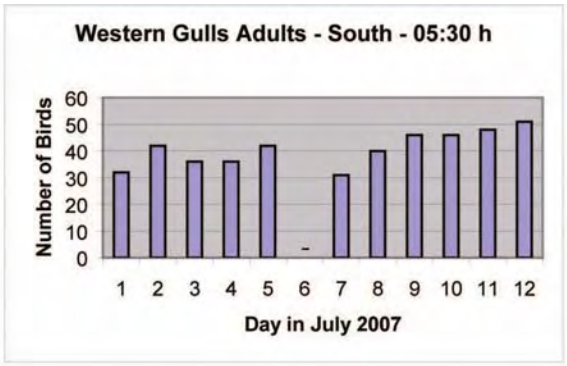
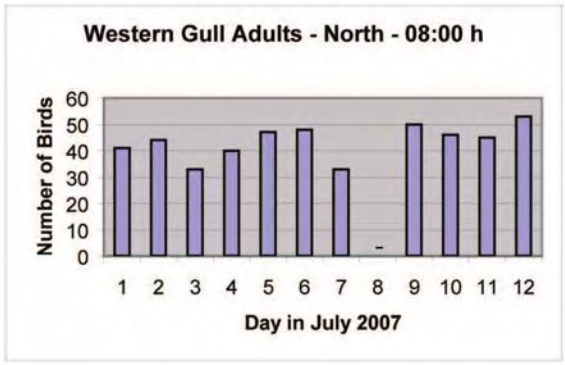



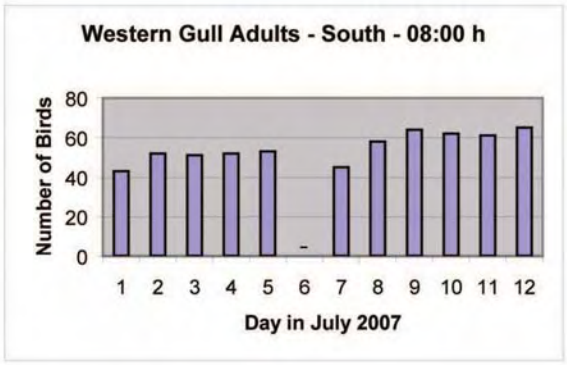


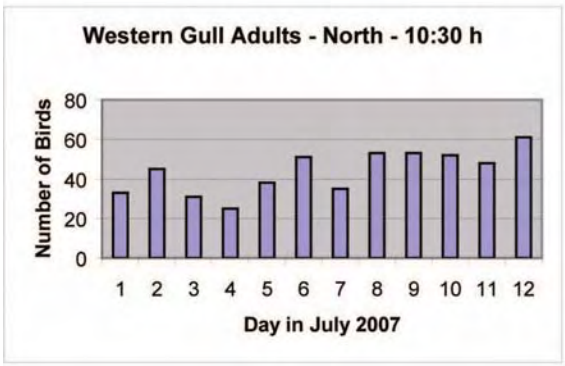

Exhibit 9: Gualala Study

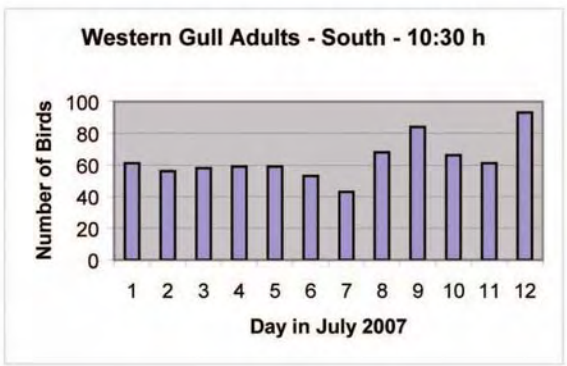

Western Gull Adults - North - 05:30 h
Number of Birds
0 10 20 30 40 50
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007


Western Gulls Adults - South - 05:30 h
Number of Birds
0 10 20 30 40 50 60
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007


Western Gull Adults - North - 08:00 h
Number of Birds
0 10 20 30 40 50 60
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007


Western Gull Adults - South - 08:00 h
Number of Birds
0 20 40 60 80
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007


Western Gull Adults - North - 10:30 h
Number of Birds
0 20 40 60 80
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007


Western Gull Adults - South - 10:30 h
Number of Birds
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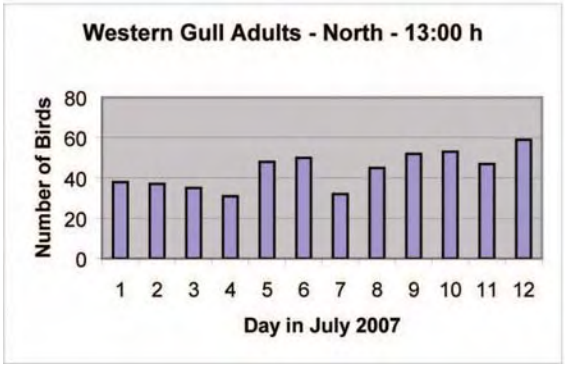
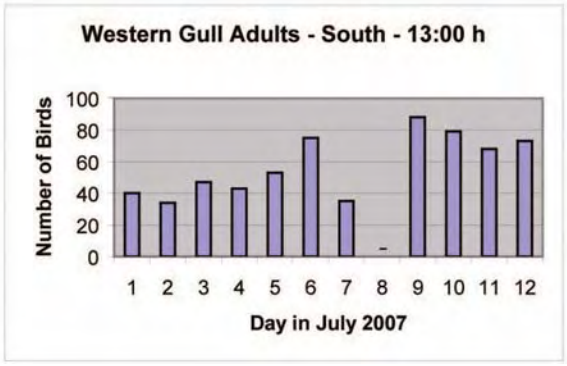
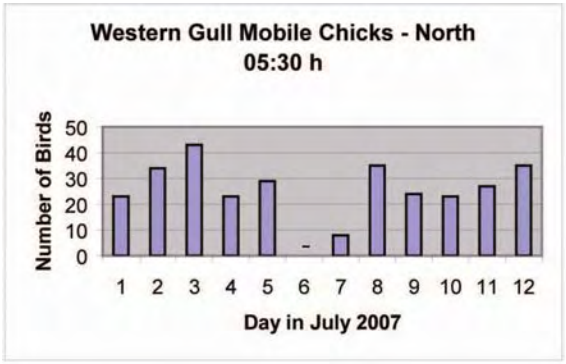
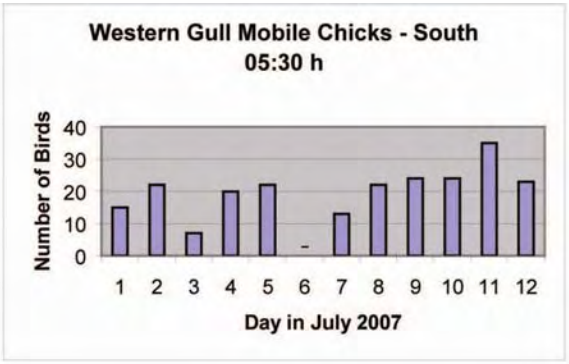
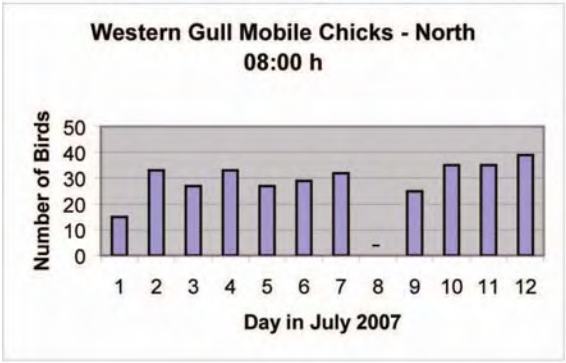
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

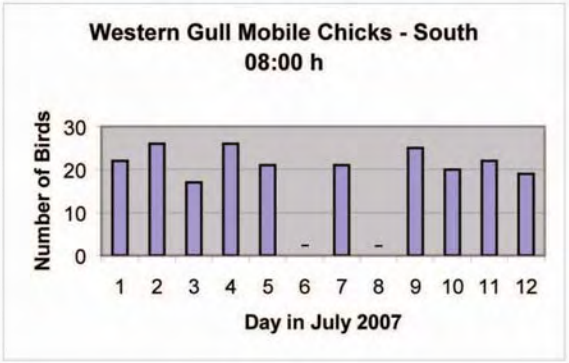

Western Gull Adults - North - 13:00 h
Number of Birds
0 20 40 60 80
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

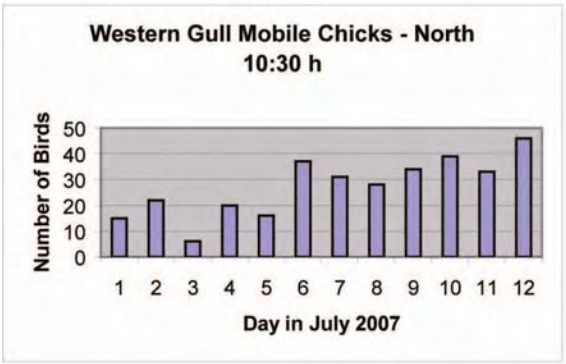

Western Gull Adults - South - 13:00 h
Number of Birds
0 20 40 60 80 100
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

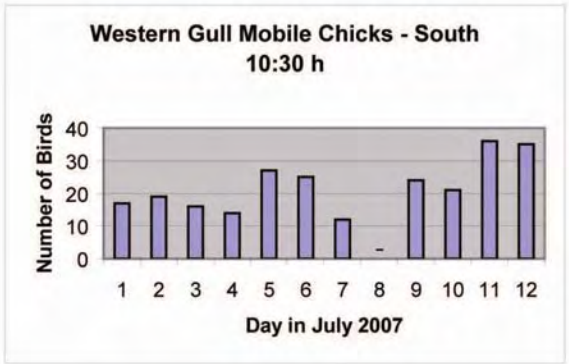

Western Gull Mobile Chicks - North
05:30 h
Number of Birds
0 10 20 30 40 50
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

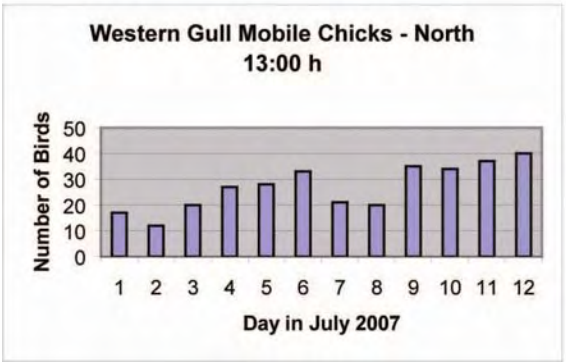

Western Gull Mobile Chicks - South
05:30 h
Number of Birds
0 10 20 30 40
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

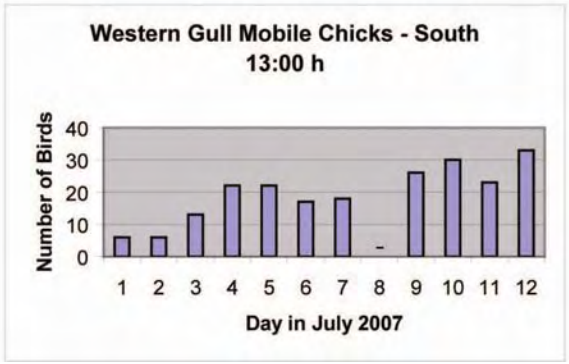

Western Gull Mobile Chicks - North
08:00 h
Number of Birds
0 10 20 30 40 50
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

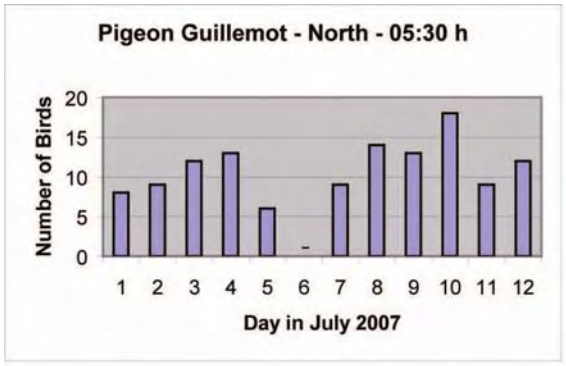

Western Gull Mobile Chicks - South
08:00 h
Number of Birds
0 10 20 30
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

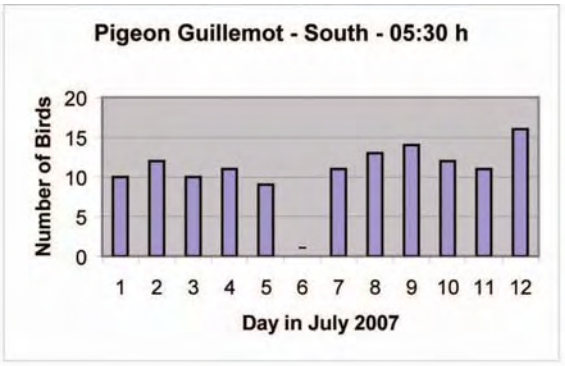

Western Gull Mobile Chicks - North
10:30 h
Number of Birds
0 10 20 30 40 50
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

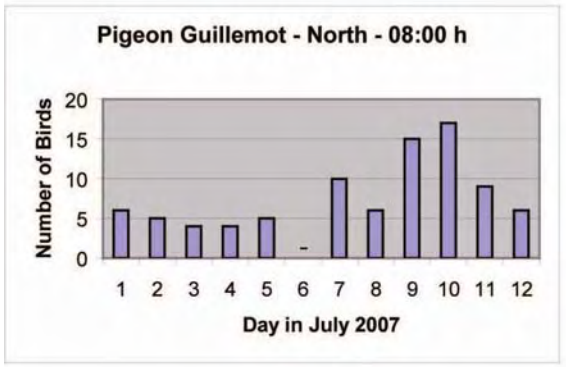

Western Gull Mobile Chicks - South
10:30 h
Number of Birds
0 10 20 30 40
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

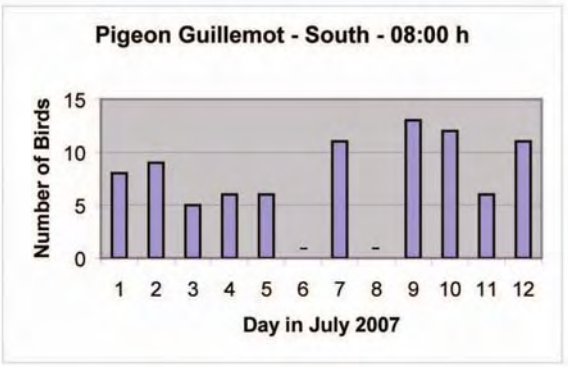

Western Gull Mobile Chicks - North
13:00 h
Number of Birds
0 10 20 30 40 50
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

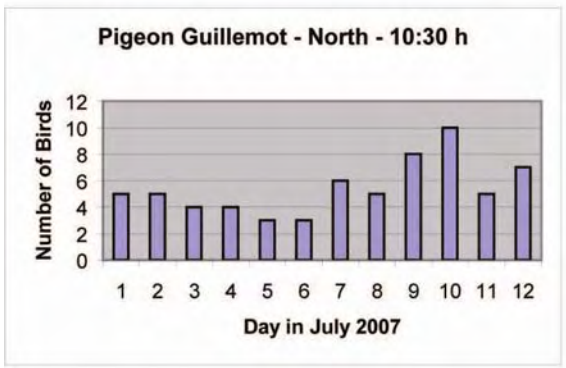

Western Gull Mobile Chicks - South
13:00 h
Number of Birds
0 10 20 30 40
1 2 3 4 5 6 7 8 9 10 11 12
Day in July 2007

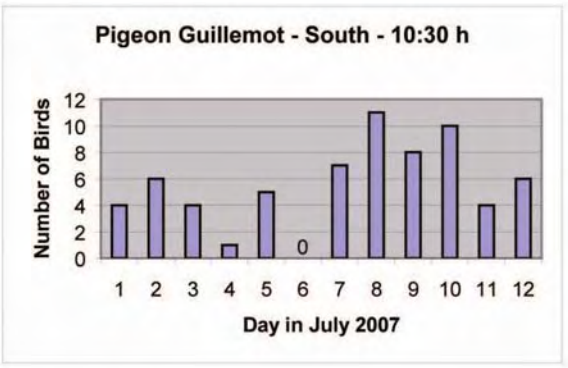


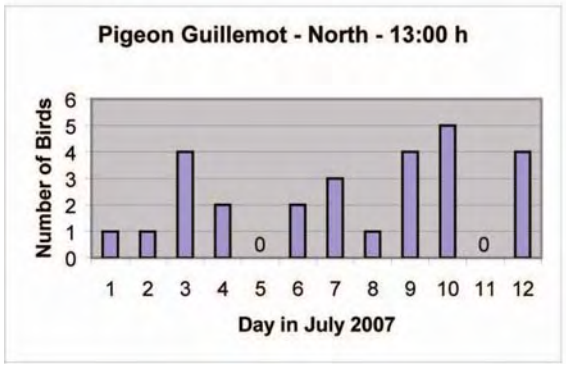



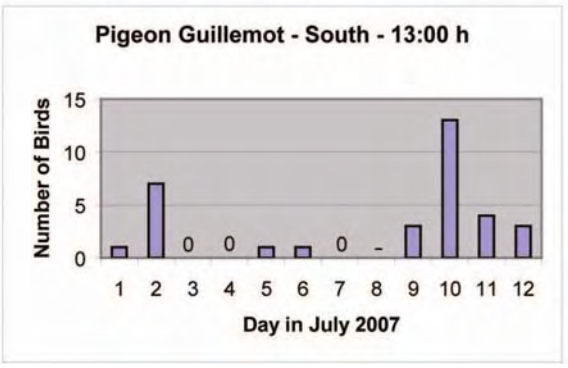






Exhibit 9: Gualala Study

NOAA FISHERIES SERVICE
Office of Law Enforcement
501 W. Ocean Blvd., Suite 4300
Long Beach, CA 90802

November 30, 2007

San Diego City Attorney's Office
Nina M. Fain, Deputy City Attorney
1200 Third Ave, Suite 1100
San Diego, CA 92101

Dear Ms. Fain,

I am writing in regard to the marine mammals at La Jolla's Children's Pool and steps we can take to protect them and the people in the community. In the past few months, there have been numerous calls and other communications to NOAA's Office of Law Enforcement (OLE) regarding incidents of marine mammal harassment by the public at the Children's Pool Beach (CPB) in La Jolla, CA. As you know, under the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1372 (a)(2)(A), *it is unlawful for any person or vessel or other conveyance to take any marine mammal in waters or on lands under the jurisdiction of the United States.* Harassment is listed under the definition of 'take.' Take means to harass, hunt, capture, collect, or kill, or to attempt to… any marine mammal.

Harassment (Level B) means any act of pursuit, torment, or annoyance which 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 but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

Joe Cordaro, NOAA Wildlife Biologist, advises that harbor seals haul out at CPB for breeding, nursing, molting, and resting. The first full-term pups are usually born in early-mid January. Pups wean from their mothers in approximately 4-7 weeks. The last pups of the season may not wean until the end of May.

The CPB receives numerous visitors each month which increases the potential for seal/human interaction. OLE has placed signs on the landings above the CPB, which warn the public to keep a safe distance from the hauled out harbor seals. While the guidelines are useful, they have not prevented actions that could be considered harassment from occurring at the beach, particularly during pupping season. OLE continues to receive HOTLINE calls reporting alleged marine mammal harassment at the CPB.

OLE is concerned that the public will continue to harass marine mammals and continue to be subject to citation under the MMPA at CPB. Therefore, we strongly recommend, that the City close the CPB starting December 15 through May 30 or, at a minimum, consider reinstating the CPB rope barrier that was once in place. Unfortunately, in the past the rope barrier did not deter the "determined" individual(s) from approaching the seals. The rope barrier will provide a clear message for those that have a sincere desire to respect the marine mammals present on the beach, and therefore will provide some level of heightened protection for the adults and newborn seals. The rope barrier will also aid in informing people when they are more likely to be found in violation of the MMPA and potentially cited.

Attachment 4

Exhibit 10 NOAA letter re seal harassment 2007

In previous years, OLE appreciates your practice of implementing the rope barrier. The rope barrier has been a needed step in the right direction, but closing the beach would make a safer environment for the nursing seals. OLE appreciates and looks forward to a continued opportunity to work with you in assisting you achieving your goals as well as protecting the animals and citizens of our community.

Sincerely,

Donald W. Masters
Special Agent in Charge
NOAA Fisheries/OLE

cc: April Penera, City Manager's Office
Dale Jones, Director, Office of Law Enforcement
Rod McInnis, Regional Administrator, SW Region
Russ Strach, Assistant Regional Administrator for Protected Resources, SW Region

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Office for Law Enforcement
Southwest Region
501 W. Ocean Blvd., Suite 4300
Long Beach, CA 90802

March 21, 2006

Mayor Jerry Sanders
City Administration Building
11th Floor
202 C Street
San Diego, CA 92101

Dear Mayor Sanders,

I am writing in regard to the marine mammals at La Jolla's Children's Pool and steps we can take to protect them and the people in the community. In the past few months, there have been numerous calls and other communications to NOAA's Office for Law Enforcement (OLE) regarding incidents of marine mammal harassment by the public at the Children's Pool Beach (CPB) in La Jolla, CA. As you know under the Marine Mammal Protection Act (MMPA), §16 U.S.C. 1372 (a)(2)(A), *it is unlawful for any person or vessel or other conveyance to take any marine mammal in waters or on lands under the jurisdiction of the United States.* Harassment is listed under the definition of 'take.'

> Take means to harass, hunt, capture, collect, or kill, or to attempt to... any marine mammal.
>
> Harassment (Level B) means any act or pursuit, torment, or annoyance which 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 but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

The CPB receives an estimated 80,000 visitors per month which increases the potential for seal/human interaction. OLE has placed two signs down on the beach which warn the public to keep a safe distance from the hauled out seals and sea lions. While the guidelines are useful, they have not prevented actions that could be considered harassment from occurring at the beach, particularly during pupping season. The OLE has received over 60 HOTLINE calls reporting alleged marine mammal harassment at the CPB since January 1, 2006. The agency responded to these complaints by increasing the number of patrols to the beach, especially on weekends but, resources do not afford us with the ability to maintain a constant presence.

Harbor seals haul out at CPB for breeding, nursing, molting, and resting. The pupping season at the CPB is from January through the end of April. Typically, the pup is born and weaned during the late spring. Nursing usually lasts about 3-6 weeks, averaging about 4 weeks until the pup is weaned. Unlike many other seal pups, harbor seals are able to swim at birth, but harbor seal mothers are very protective and the mother/pup bond is very important, particularly during the time immediately following birth.

California State Parks closed beaches in Arroyo Laguna and Piedras Blancas because of concerns of elephant seals being harassed at sites they are known to haul out to rest, give birth, care for their pups, and molt.

OLE is concerned that the public will continue to harass marine mammals and continue to be subject to citation under the MMPA at CPB. Therefore, we strongly recommend, as well, that the City close the CPB during the remainder of pupping season (through the end of April). The closure during this time will afford the City with time to decide, plan, and place into action a more permanent strategy for the CPB.

In the event you decide against a temporary closing of the beach, as conducted at Arroyo Laguna and Piedras Blancas, consider reinstating the CPB rope barrier that was once in place. Unfortunately, in the past the rope barrier did not deter the "determined" individual(s) from approaching the seals. The rope barrier will provide a clear message for those that have a sincere desire to respect the marine mammals present on the beach, and therefore will provide some level of heightened protection for the adult and newborn seals. The rope barrier will also aid in informing humans when they are more likely to be found in violation of the MMPA and potentially cited. This option has been supported by Susan Davis, Member of the U.S. Congress (House or Representatives).

OLE appreciates and looks forward to a continued opportunity to work with you in assisting you fulfill your goals as well as protect the animals and citizens of our community.

Sincerely,

Donald W. Masters
Special Agent in Charge

cc: Julie Teel, Office of the City Attorney
April Penera, City Manager's Office
Dale Jones, Director, Office for Law Enforcement
Rod McInnis, Regional Administrator, SW Region

**Exhibit 12  Everett Declaration**

# EVERETT AND ASSOCIATES
## ENVIRONMENTAL CONSULTANTS
**ESTABLISHED IN 1975**

POST OFFICE BOX 1085
LA JOLLA, CALIFORNIA 92038

(858) 456-2990 TELEPHONE
(760) 765-3113 FACSIMILE


23 April 2011

Chris C. Polychron, Esq.
Coast Law Group, LLP
1140 South Coast Highway 101
Encinitas, California 92024

**Re: Potential Impacts of Fireworks on Nesting Seabirds**

Dear Mr. Polychron,

It is my understanding that the City of San Diego is currently considering a Municipal Code Amendment that would allow fireworks displays to take place at the La Jolla Cove and other locations with no consideration of the potential impacts to wildlife. In the process of promulgating this amendment the City has apparently determined that it is exempt from the California Environmental Quality Act (CEQA) because this discretionary action "has no possibility of having a significant effect on the environment".

I am not entirely clear on how the City reached this conclusion. There is a large body of scientific literature on noise effects on wildlife. Some noise may not significantly impact birds, but in many cases the negative impacts are dramatic.

Here is an example of how fireworks could potentially impact nesting seabirds at the La Jolla Cove: A species of seabird known as Brandt's Cormorant *Phalacrocorax penicillatus* nests every year on the cliffs above the La Jolla Sea Caves (Unitt, P. 2004. San Diego County Bird Atlas, Proceedings of the San Diego Society of Natural History No. 39). They typically nest on narrow ledges on the cliff face, as this gives them protection from terrestrial predators. If they are suddenly startled they could, as they take flight, knock the eggs out of their nests. In my 36 years as a professional seabird biologist, I have seen this happen many times at other locations. If they are startled and leave their nest but do not dislodge the eggs or chicks, they provide a prime opportunity for avian predators (gulls) to prey on the exposed eggs or chicks. This phenomenon is also very well-known to seabird biologists.

Simply put, to conclude categorically that fireworks displays have no possibility of having a significant on the environment is fallacious.

In recent years there has been increasing interest and study on the actual and potential impacts of fireworks displays on wildlife, especially seabirds. The U.S. Fish and Wildlife Service (USFWS) and Bureau of Land Management have conducted annual monitoring of a fireworks display in coastal Sonoma County (Study attached) and have reported "a visible response by nesting seabirds" and resultant nest abandonment.

Concern regarding fireworks impacts to seabirds has increased significantly in recent years in both the scientific and conservation communities. The Pacific Seabird Group, the leading seabird research and conservation organization throughout the Pacific Basin, issued a letter to the California Coastal Commission in 2007 (Attached) detailing actual and potential negative impacts resulting from coastal fireworks displays. In addition, the USFWS will be initiating studies this summer at one or more coastal locations in Oregon to assess and document disturbance to seabirds by commercial fireworks displays (Roy Lowe, Project Leader, Oregon Coast National Wildlife Refuge Complex, *Pers. Comm.*).

In summary, there is no factual basis to conclude that fireworks displays have no possibility of having significant effects on the environment.

Thank you for the opportunity to provide this analysis, and please contact me if I can provide any additional information.

Sincerely,

William T. Everett, MS, FN, FRGS

# *CURRICULUM VITAE*

**William T. Everett**
**President**
**Everett and Associates Environmental Consultants**
Post Office Box 1085
La Jolla, California 92038 USA
Telephone (858) 456-2990
Facsimile (760) 765-3113
Email: everett@esrc.org

## PROFESSIONAL EMPLOYMENT AND PROJECTS

| | |
|---|---|
| 2009-2010 | Senior Natural Resources Oil Spill Damage Assessment Consultant: NRDA pathway evaluation, seabird resource injury assessment, and seabird restoration planning for 2004 Selendang Ayu Oil Spill, Unalaska Island, Aleutian Islands, Alaska. |
| 2007-2010 | Senior Natural Resources Oil Spill Damage Assessment Consultant: NRDA pathway evaluation, seabird resource injury assessment, and seabird restoration planning for 2007 Cosco Busan San Francisco Bay Oil Spill. |
| 2006 | Senior Scientist, National Science Foundation Research Project, Surveys for Marine Mammals and Seabirds aboard the Swedish Icebreaker *Oden*. Punta Arenas Chile to McMurdo Station, Antarctica; 3,700 nautical miles. |
| 2000-01 | Senior Consultant: Preparation of seabird impacts sections for Draft and Final Environmental Impacts Statements for Hawaii-based pelagic fisheries of the tropical Pacific Ocean. NMFS and URS Corporation, Honolulu, Hawaii. |
| 1999-00 | Co-Principal Investigator and Expedition Leader: National Science Foundation International Biocomplexity Survey and Expedition to Isla Guadalupe, Baja California, Mexico. |
| 2000-02 | Senior Consultant: Mitigation of seabird impacts for installation of HOPE-X space shuttle landing facility on Christmas Island, Pacific Ocean. URS Corporation, Mitsubishi Corporation, and National Space agency of Japan. |
| 2000-01 | Principal Investigator: Characterization of natural resource and habitat value of Hazardous Substance Sites (HSS) and Petroleum, Oils and Lubricant sites (POLs), Wake Atoll. URS Corporation (Honolulu) for U.S. Air Force. |
| 2000-01 | Principal Investigator, Conservation of Indigenous Birds at Wake Atoll. Department of Defense, U.S. Air Force Legacy Grants Program. |
| 2000 | Consultant to the County of San Diego, Department of Planning and Land Use: Review of sensitive species (Grasshopper Sparrow) account for use in Multiple Species Conservation Program (MSCP). |

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|---|---|
| 1999-01 | Principal Investigator: Impacts of free-ranging dogs on endangered Desert Tortoise at the Marine Air Ground Task Force Training Command (MAGTFTC), Twentynine Palms, California. |
| 1998-00 | Co-Principal Investigator: Satellite and VHF telemetry, banding and patagial marking of Great Blue Herons at the Naval Submarine Base, Point Loma, San Diego, California. Investigations into movements and habitat selection as possible basis for steatitis outbreak and mortality. |
| 1998-99 | Co-Principal Investigator: Raptor and passerine bird surveys in support of the SERDP wind farm project, San Clemente Island. Potential impacts on endangered species. U.S. Navy. |
| 1997-01 | Senior Natural Resources Oil Spill Damage Assessment Consultant: NRDA pathway evaluation, resource injury assessment, and restoration planning. Vertex Engineering, Inc., Weymouth Massachusetts. |
| 1996-01 | Senior Project Scientist, for U.S. Air Force. Survey and mapping of baseline terrestrial fauna and flora data of Wake Atoll, Pacific Ocean, as precursor to ecological restoration program. |
| 1996 | Senior Researcher: Observations of effects of K22 Titan IV Missile launch sonic boom on marine birds and pinnipeds, California Channel Islands. U.S. Air Force/Hubbs-Sea World Research Institute. |
| 1995-99 | Consultant to Naval Submarine Base San Diego: Preparation of long-term Management Plan for Great Blue and Black-crowned Night Heron nesting colonies. |
| 1995 | Expedition Leader: Voyage to the Line Islands, Tuamotu Islands, and Society Islands, aboard the M.S. World Discoverer. Society Expeditions. |
| 1993 | Senior Researcher, Zoological Society of San Diego: Field investigations of the Upe *Ducula galeata* on Nuku Hiva, Marquesas Islands, French Polynesia. |
| 1993 | Expedition Leader: Malaysia and Vietnam, aboard the M.V. Caledonia Star. Noble Caledonia, Ltd., London. |
| 1993 | Principal Investigator for U.S. Navy: Research, surveys, and report on the status of the California Gnatcatcher *Polioptila californica* on Point Loma, San Diego County. |
| 1992 | Naturalist, lecturer, and Zodiac driver: Exploration of Tierra del Fuego and the Antarctic Peninsula aboard the M.S. Frontier Spirit. Salen-Lindblad Expeditions. |
| 1992 | Project Leader and Senior Researcher: Collection of seabird eggs in the California Channel Islands for DDT and contaminant analysis. U.S. Department of Justice and National Oceanic and Atmospheric Administration. |

| | |
|---|---|
| 1991-92 | Expedition Leader: Exploration of Orinoco River and over 4000 miles on the Amazon River from Belem, Brazil to Iquitos, Peru, including research on distribution of Pink River Dolphins. Salen-Lindblad Expeditions. |
| 1991-97 | Principal Investigator for U.S. Navy: Monitoring and population studies of the Endangered San Clemente Island Loggerhead Shrike. Development of survey and telemetry techniques, release of captive-reared offspring. |
| 1989-92 | Consultant to California Department of Transportation (CALTRANS): Classroom and field training of staff biologists in techniques in field ornithology. |
| 1989 | Consultant to Oceans Unlimited\School for Field Studies: Feasibility study for establishment of Center for Marine Mammal Studies in Baja California, Mexico. |
| 1987 | Seabird Researcher, Foundation for Field Research: Expedition to Isla Natividad, Baja California, Mexico. Studies on Black-vented Shearwaters *Puffinus opisthomelas* and participation in pinniped census. |
| 1987-88 | Senior Naturalist, California Natural History Tours: Gray Whale cruises to San Ignacio Lagoon and the islands of Baja California's Pacific coast. |
| 1986 | Senior Researcher, Hubbs-Sea World Research Institute: Expedition to Clarion Island, Revillagigedo Islands, Mexico. |
| 1984-85 | Consultant to Joseph R. Jehl, Jr., Ph.D.: Systematic surveys for birds at Famosa Marsh, San Diego, California. |
| 1983 | Consultant to Sea World, Inc.: Studies of nest site habitat selection and seabird census at Savoonga, Saint Lawrence Island, Bering Sea, Alaska. |
| 1983 | Research Scientist: Two months at sea conducting shipboard and helicopter surveys for marine mammals and seabirds aboard United States Coast Guard Icebreaker Polar Sea, frozen central Bering Sea, Alaska. Envirosphere Company, Seattle, Washington. |
| 1983 | Senior Researcher, Hubbs-Sea World Research Institute: Shipboard studies of Gray Whale behavior at natural oil seeps in the Santa Barbara Channel. |
| 1981-83 | Senior Researcher/Alaska Operations Coordinator: Aerial surveys for Bowhead and other endangered whales in the southeastern Bering Sea and northern Gulf of Alaska. Hubbs Sea World Research Institute/U.S. Minerals Management Service. |
| 1981 | Marine mammal and seabird observer: Dall Porpoise\Japanese high-seas salmon fishery interaction program of the National Marine Mammal Laboratory, NMFS, Seattle, Washington. Northwest Pacific and Bering Sea, Alaska. |
| 1981 | Consultant to Polar Contractors, Inc.: Research and report: Current and historical status of Bowhead Whales and Eskimo whaling activities in the Beaufort Sea, Alaska. |

| | |
|---|---|
| 1981 | Senior Researcher, Hubbs-Sea World Research Institute: Aerial and platform surveys for Gray whales and other marine mammals in the Santa Barbara Channel. |
| 1981 | Consultant to U.S. Fish and Wildlife Service: Trapping and removal of Brown-headed Cowbirds from San Clemente Island. |
| 1980-81 | Consultant to Woodward-Clyde Consultants: Research, surveys, and report: An analysis of the avifauna of the Naval Ocean Systems Center property. Point Loma, San Diego, California. |
| 1980 | Senior Researcher, Hubbs-Sea World Research Institute: National Science Foundation Antarctic Research Program. Aerial and shipboard surveys for marine birds and mammals aboard U.S. Coast Guard Icebreaker Polar Star. |
| 1980 | Consultant to Pacific Southwest Biological Services: Mapping of sensitive bird species in San Diego County. |
| 1979-80 | Consultant to Hubbs-Sea World Research Institute and the U.S. Air Force: Surveys for Peregrine Falcons on San Miguel Island, California Channel Islands. |
| 1979 | Consultant to Joseph R. Jehl Jr., Ph.D.: Literature search and report; Historical status of the California Least Tern at Mission Bay, San Diego, California. |
| 1978 | Consultant to Lockheed Center for Marine Biology: Seasonal surveys for birds on San Diego Bay. |
| 1977 | Biotechnician, U.S. Fish and Wildlife Service: Field collection of data on nesting Peregrine Falcons and recovery of eggshell fragments for pesticide analysis. |

## ADDITIONAL EXPERIENCE

| | |
|---|---|
| 1995 | Survey of San Nicolas Island, California Channel Islands, for Endangered Snowy Plovers, for U.S. Navy, Point Magu Naval Weapons Station. |
| 1993-95 | Graduate Student Committee Member, School of Marine Science (CICESE), for studies of seabirds in the northern Gulf of California. |
| 1994 | Invited Facilitator, National Park Service, Channel Islands National Park\U.S. Fish & Wildlife Service public hearing to assess status of plants and animals proposed for listing under the Endangered Species Act. |
| 1993 | Participant, Sea Lion pup capture and tagging studies, San Clemente Island. |
| 1992 | Co-curator with Stephen Leatherwood of major traveling exhibit on whales and whale biology at the San Diego Natural History Museum. |
| 1990 | Field studies of birds, Society Islands, French Polynesia. |

| | |
|---|---|
| 1989-92 | Principal Investigator: Analysis of the history and status of the avifauna of Islas Los Coronados, Baja California. Cooperative study with the School of Marine Science (CICESE), Ensenada, Baja California, Mexico. |
| 1989 | Participant in studies of Saw-whet Owls on Santa Cruz and Santa Catalina Islands, California Channel Islands. |
| 1988 | Participant in University of California Davis Brown Pelican banding and blood sampling program. Anacapa Island, California Channel Islands. |
| 1981-96 | California Brown Pelican nesting survey and pinniped census. Islas Los Coronados, Baja California, Mexico. |
| 1982 | Guest Lecturer aboard the M.S. World Discoverer. Portugal, Straights of Gibraltar, Northwest Africa, Canary and Cape Verde islands to Belem, Brazil. |
| 1980-81 | Guest lecturer on the natural history of the California Gray Whale, aboard the M.V. Finalista 100. Scammon's and San Ignacio Lagoons, Baja California, Mexico. |
| 1980 | Participant in Harbor Seal census and Elephant Seal pup count. San Miguel Island, California Channel Islands. |
| 1980 | Field studies of birds. Ecuadorian Amazon, temperate and alpine Andes, and Ecuadorian cloud forest. |
| 1979-80 | Field studies of birds and pinnipeds. Galapagos Islands, Ecuador. |
| 1979 | Avian predator control for California Department of Fish and Game Least Tern Endangered Species Program, Mission Bay, San Diego. |
| 1978-81 | Annual survey for birds and pinniped count. Islas Todos Santos, San Martin, Guadalupe, Cedros, and the San Benito Islands, Baja California, Mexico. |
| 1973-10 | Over 16,000 hours of recorded field surveys for birds; United States and Mexico. |

## CURRENT RESEARCH POSITIONS

Research Fellow, Zoological Society of San Diego (Elected 1990)

Research Associate, Department of Birds and Mammals, San Diego Natural History Museum (Elected 1977)

## PROFESSIONAL AFFILIATIONS

American Ornithologists Union
Cooper Ornithological Society
Western Field Ornithologists
The Wildlife Society
Fundacion Natura (Ecuador)
Pacific Seabird Group
San Diego County Certified Biological Consultant
Society for Ecological Restoration

## HONORS AND EDUCATION

Fellow, Royal Geographical Society of London (Elected 1996)

Fellow, Explorers Club of New York. (Elected 1993)

Post-Graduate Certificate Program, Strategic Public Sector Negotiation. Harvard University, John F. Kennedy School of Government, 1997.

Master of Marine Science Degree, University of San Diego, 1991.

Who's Who in Science and Engineering, Fifth Edition, 2000-2001.

Bachelor of Arts Degree, Psychology (with honors), California State University at Sonoma, 1975.

Associate of Arts Degree (with honors) Grossmont College, San Diego, California, 1972.

Dean's Honor Roll for eight consecutive semesters.

## SCIENTIFIC PERMITS

State of California and U.S. Fish & Wildlife Service (Joint) Scientific bird collecting permit # 0423.

U.S. Fish & Wildlife Service Master Bird-banding permit # 22378. Endangered Species authorized.

U.S. Fish & Wildlife Service California Gnatcatcher Survey Authorization. Permit # PRT-788036.

## PUBLIC SERVICE

| | |
|---|---|
| 2000-02 | Member, Conservation and Research Advisory Committee, Zoological Society of San Diego. |
| 1996-02 | Policy Council Member, American Bird Conservancy, Washington, D.C. |
| 1996-00 | Member, Board of Directors, Explorers Club, San Diego Chapter. |
| 1995-96 | Chair, Pacific Seabird Group. |
| 1995 | Scientific Program Chair, Joint Annual Meeting of the Pacific Seabird Group and Colonial Waterbird Society, Victoria, British Columbia, Canada. |
| 1994-97 | Member, Pacific Seabird Group Standing Committee on *Exxon Valdez* Oil Spill Restoration Workshop and Proceedings, Anchorage, Alaska. |
| 1994-02 | Member, Board of Directors, Ocean Research Institute. |
| 1994-98 | Technical Coordinator, Mexico Committee of the Pacific Seabird Group. |
| 1994-02 | Advisory Council Member, Santa Rosa Island Chapter, Santa Cruz Island Foundation. |
| 1993-02 | Technical Coordinator, Xantus' Murrelet Committee of the Pacific Seabird Group. |
| 1992-02 | Member, Editorial Board, Western Field Ornithologists. |
| 1989-97 | Member, San Clemente Loggerhead Shrike Working Group. |
| 1984-86 | Director, San Diego Chapter, California Solar Energy Industries Association. |
| 1989-93 | Member, Advisory Committee, Cordell Expeditions. |
| 1988-93 | Member, Natural Resources Committee, Commission of the Californias. |
| 1981-83 | Member, Biological\Technical Committee, San Diego Least Tern Management Program. |
| 1980-81 | Conservation Chairman, San Diego Audubon Society. |
| 1979-80 | Director, San Diego League of Conservation Voters. |
| 1979-80 | President, San Diego Audubon Society. |

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1997 Conservation problems and opportunities in the Line Islands, Central Pacific Ocean. Pacific Seabird Group Meeting, Portland, Oregon.

1995 Endangered Species and the Business Environment. Invited Speaker, Harvard Business School Owner\President Management Program Reunion, Ritz Carlton Hotel, San Francisco, California.

1994 Xantus' and Craveri's Murrelets: A synopsis of their biology. Pacific Seabird Group Meeting, Sacramento, California.

1992 Conservation and Management of the San Clemente Loggerhead Shrike. Wildlife Society (Western Section) meeting, San Diego, California.

1992 Within and among-year nest sharing by five seabird species at Islas Los Coronados, Baja California, Mexico. Pacific Seabird Group meeting, Oregon Institute of Marine Biology.

1991 Breeding biology of the Black Storm-Petrel at Islas Los Coronados, Baja California, Mexico. Pacific Seabird Group meeting, Monterey, California.

1990 Status, ecology, and conservation of shearwaters in the temperate North Pacific. Invited paper for Pacific Seabird Group meeting, Victoria, British Columbia, Canada.

1987 Alcid research and research opportunities at Sea World in San Diego. Pacific Seabird Group meeting, Pacific Grove, California.

1987 History and status of the breeding seabirds of Baja California. Southern California Ocean Studies Consortium, Annual Meeting, La Paz, Baja California Sur, Mexico.

1986 Black-vented Shearwater: Current state of knowledge. Pacific Seabird Group meeting, Pacific Grove, California.


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December 11, 2007

Bob Merrill
California Coastal Commission
710 E Street, Suite 200
Eureka, CA 95501

Re: Disturbance of Seabirds By Fireworks Displays

Dear Mr. Merrill,

On behalf of the Pacific Seabird Group (PSG) we want to offer our views on the disturbance of seabirds on Gualala Point Island by fireworks displays. PSG is an international, non-profit organization that was founded in 1972 to promote the knowledge, study, and conservation of Pacific seabirds. It has a membership drawn from the entire Pacific basin, including Canada, Mexico, Peru, Chile, Russia, Japan, South Korea, China, Australia, New Zealand, and the USA. Among PSG's members are biologists who have research interests in Pacific seabirds, government officials who manage seabird refuges and populations, and individuals who are interested in marine conservation.

We understand that the Coastal Commission will be hearing a report on the effect of an 18-minute fireworks display on a population of seabirds and marine mammals. This display was held on July 6, 2007 in the vicinity of Gualala Point Island in northern Sonoma County. This event engendered a fair amount of local attention as a result of perceived disturbance to nesting Brandt's and Pelagic Cormorants during a similar event in 2006. As a result, a group of citizens, the Sea Ranch CCNM Stewardship Task Force of The Sea Ranch Association, contacted biologists with the US Bureau of Land Management and the US Fish and Wildlife Service. With the help of these biologists, the Stewardship Task Force established a protocol for monitoring the seabirds during the 2007 breeding season, with particular interest in gauging the effect of the fireworks display on these birds. A description of the protocol and the results from the 2007 monitoring can be read at http://www.blm.gov/ca/st/en/prog/blm_special_areas/ccnm.html and is titled "Seabird

and Marine Mammal Monitoring on Offshore Rock Islands in Sonoma County and Mendocino Counties, California 2007, Preliminary Report Findings And Protocol Documentation."

Little has been published regarding the impact of fireworks on seabird colonies, and consequently the data gathered by the task force are of great interest. To the credit of the task force, the documentation of its protocol and the publication of its findings are well presented. Of importance is the documented impact of the fireworks on the nesting Brandt's Cormorants, where 11% of the nests were abandoned at the time of the fireworks event. The documentation by photography, including night photography, indicates that the cormorants reacted quickly and many left the island during the event.

This cormorant colony has been declining since surveys in 1979 and 1980 counted 1,840 and 1,240 birds, respectively, but only 521 in 1989-1991 (Carter et al., 1992). While the reasons for this decline are not clear, seabird breeding failures in the California Current have occurred frequently during the past decades, including a well publicized widespread failure during the summer of 2005. An avoidable disturbance that causes as much as 10% of a population to fail in its breeding attempts is unwarranted.

The Gualala Point Rocks are part of the California Coastal National Monument, established by Presidential Proclamation in 2000 primarily to provide habitat for seabirds and marine mammals. We encourage the appropriate agencies, including the California Coastal Commission, the Bureau of Land Management, the Fish and Wildlife Service and the California Department of Fish and Game, to take necessary steps to insure that these kinds of disturbances are avoided. Please contact us if we can be of further assistance in this regard.

Sincerely,

/s/ *Craig S. Harrison*

Craig S. Harrison
Vice Chair for Conservation

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**Exhibit 13 Longcore Declaration**


# Land Protection Partners

P.O. Box 24020, Los Angeles, CA 90024-0020
Telephone: (310) 247-9719


April 25, 2011

Coast Law Group LLP
Att'n: Livia Borak
1140 South Coast Highway 101
Encinitas, California 92024

Dear Ms. Borak:

I am responding to your inquiry about the potential environmental impacts of fireworks displays in public parks in the City of San Diego. I understand from you that the City is proposing to exempt such displays from the discretionary permitting process, thereby exempting any future displays from environmental review under the California Environmental Quality Act (CEQA). This proposed ordinance change is itself subject to CEQA and the City is claiming an exemption on the basis that the proposed action can be seen with certainty to have no impact on the environment.

I have worked in the field of urban conservation for fifteen years and have concentrated my research on the protection of native, rare, and endangered species within and around cities and also on the stressors on wildlife that cities produce, including lights and noise (e.g., Longcore and Rich 2004). Based on this broad ecological knowledge and the published scientific literature on these topics, along with a specific review of the environmental effects of fireworks displays, I can report with certainty that fireworks displays can have an impact on the environment and that impact can be significant as defined by CEQA.

The avenues for environmental impacts from fireworks include direct impacts at the time of display (lights, noise, associated cumulative disturbances) and indirect impacts through pollution of air and water.

The lights and noise associated with fireworks are disruptive to wildlife. This is evidenced by use of pyrotechnics as a method to reduce the abundance of nuisance wildlife. Different species of wildlife respond differently to fireworks; the long-term impact depends on the species and other conditions, such as what behaviors (e.g., nesting, mating, care of young) are being disrupted. Many fireworks displays are conducted over bodies of water, so the impacts to aquatic, marine, wetland, and shore-associated wildlife are particularly relevant.

Birds that use sandy beaches as habitat are particularly vulnerable to impacts from fireworks displays. These include rare and endangered species such as Least Terns, Piping Plovers, and

Snowy Plovers. Evidence from both coasts of the United States indicates that these species are vulnerable to disturbance from fireworks and associated activities and that these disturbances may result in "take" as defined by the U.S. Endangered Species Act. From the Gulf and Atlantic coasts, losses of nests of Least Terns are reported each year from fireworks displays and their associated beach activity and beach maintenance (Thompson et al. 1997; U.S. Fish and Wildlife Service 2007). In California, significant impacts on Western Snowy Plover have been reported; the 2005 fireworks display near Coal Oil Point Reserve in Santa Barbara flushed all Western Snowy Plovers (during their nesting season) and the 1996 fireworks display at Del Monte Beach in Monterey County resulted in the abandonment of a newly-hatched Western Snowy Plover chick within an area that was protected from other public intrusion (U.S. Fish and Wildlife Service 2007). The impacts at Del Monte Beach represent the synergistic effects of the fireworks with the associated surge in beach visitors, which from a CEQA perspective must be considered as part of the project impacts. As a result of the documented direct impacts of fireworks displays on listed shorebirds, the U.S. Fish and Wildlife Service has, in places, developed guidelines for fireworks displays to reduce impacts to listed species (U.S. Fish and Wildlife Service 1997). These guidelines further document the adverse impacts of fireworks displays on nesting shorebirds, including abandonment of a Least Tern colony 250 m from a display and other disturbances to Least Terns, Piping Plovers, and Black Skimmers.

The impacts of fireworks on nesting shorebirds can take the form of direct injury from debris, abandonment of eggs and nests (exposing them to predation and the weather), and separation of chicks from adults (resulting in almost certain death for chicks). Indirect impacts include large crowds and disturbance associated with such shows, resulting in spectators in and around habitat for sensitive species, illegal personal fireworks associated with spectators, additional vehicles on the beach, increased boat landings, and additional trash. While efforts to segregate beachgoers from sensitive wildlife species can be effective during the day (e.g., symbolic fencing), such barriers are less effective in the dark (U.S. Fish and Wildlife Service 1997).

Other bird species are disturbed, to the point of nest abandonment, by fireworks displays. Monitoring of Brandt's Cormorant on Gualala Island, Sonoma County, California during 2007 documented a greatly elevated rate of nest abandonment at the time of a July 4 fireworks display (Wiegand and McChesney 2008). This is not surprising, since pyrotechnics are used as a method to control presence of cormorant species where they are not desired (Mott et al. 1998) and cormorants are known to be sensitive to human disturbance when nesting (Nisbet 2000), as are many other colonially nesting waterbirds (Carney and Sydeman 1999). The mass mortality of blackbirds killed in Beebe, Arkansas on January 1 of this year was, according to my colleagues in the region, almost certainly the result of flocks of roosting birds being spooked by fireworks and then colliding with obstructions or each other.

Loud noises exceeding 70 dB(A) are generally interpreted to result in a range of impacts to wildlife, including temporary shifts in hearing sensitivity, startles, failure to habituate, and flight, so adverse impacts to marine mammals out of the water can be predicted as well. Noise from fireworks can exceed 100 dB(A) (Bach et al. 1975) and thereby cause significant impacts on wildlife and humans alike.

Marine mammals can be affected by fireworks. For this reason, underwater fireworks (called "seal bombs") are used to "haze" animals that pose a threat to other species, such as California sea lions that hunt endangered salmon (Gearin et al. 1986).

Fireworks can also result in a range of air and water pollution impacts. Fireworks shows result in significant increases in particulate matter, especially in the form of extremely small (and dangerous) particles of heavy metals that are used to produce the colors in fireworks (Moreno et al. 2010). Such transient high particulate matter pollution episodes are known health hazards, made worse by the toxic nature of the compounds involved and their small size, which allow them to penetrate deep into the lungs (Moreno et al. 2010). These compounds can include lead, strontium, barium, bismuth, zinc, copper, antimony, and potassium (Moreno et al. 2010). Investigation of individual events have documented that particulates from fireworks exceed local air pollution standards by 170%, result in a 700% increase in microfine particles, and cause a 113% increase in treated respiratory illness (Bach et al. 1975). The literature on the air pollution impacts of fireworks is growing (Camilleri and Vella 2010; Croteau et al. 2010; Joly et al. 2010; Sarkar et al. 2010; Thakur et al. 2010; Zhang et al. 2010; Chang et al. 2011; Shi et al. 2011) and none of it supports the conclusion that fireworks do not have any environmental impacts. Furthermore, these studies usually only address effects on human health and do not consider the effects on wildlife, which can be much more sensitive receptors than humans.

Perchlorate salts are common in fireworks and they are also regulated as pollutants of water (Dean et al. 2004). Fireworks displays dramatically increase the concentration of perchlorate in surface water, as illustrated by studies of lakes before and after fireworks displays (Wilkin et al. 2007). Chronic use of sites for displays results in accumulation of perchlorate pollution (Massachusetts Department of Environmental Protection 2007).

This rapid review of some of the environmental impacts of fireworks displays should be adequate under the CEQA standards for evidence to demonstrate that the City of San Diego's claim that it can be determined with certainty that fireworks displays would have no environmental impacts is irrefutably false. Any environmental review of this issue under CEQA would need to consider this information and much more to properly document the environmental impacts of this practice to wildlife, people, and the environment.

Sincerely,

Travis Longcore, Ph.D.
Principal

**Statement of Qualifications**

Travis Longcore is Associate Adjunct Professor at the UCLA Institute of the Environment and Sustainability and Associate Research Professor at the University of Southern California Spatial Sciences Institute. He also serves as Science Director of The Urban Wildlands Group, a Los

Angeles-based conservation nonprofit. His research interest is urban ecology and conservation, with emphasis on: conservation planning and management, edge effects of development, especially artificial night lighting, and monitoring and management of endangered species. He is co-editor of the book *Ecological Consequences of Artificial Night Lighting* (Island Press, 2006) and author of 20 peer-reviewed articles in journals such as *Conservation Biology*, *Restoration Ecology*, *Environmental Management*, *Urban Geography*, and *Frontiers in Ecology and the Environment*. His research has been covered in *National Geographic*, *Audubon Magazine*, *New York Times*, *Wall Street Journal*, *Life*, and *Discover*.

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