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Alameda Point
Predator Management Plan
for Lands West of Main Street

Project # 3333-03

Prepared for:

City of Alameda

Prepared by:

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Section 1.0 Introduction and Background

1.1 Introduction

This predator management plan (PMP) describes the activities to be undertaken by the City of Alameda (City) to protect the state and federally endangered California least tern (*Sterna antillarum browni*) from predators supported by or originating from City-controlled lands west of Main Street on Alameda Point. This PMP is required as a condition of the Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (USFWS) for the U.S. Navy's conveyance of lands on the former Naval Air Station Alameda to the City and the Department of Veterans Affairs (VA). The BO requires the City to fund predator management activities totaling an average of at least 20 hours per week between 25 March and 7 August each year. The BO also contains a number of avoidance and minimization measures directly or indirectly related to predation, such as restrictions on vegetation that may be used as cover or nesting sites by predators, restrictions on height of structures that may serve as nesting sites or hunting perches by predators, and restrictions on increases in lighting, which could facilitate predation by nocturnal predators. However, this PMP focuses solely on predator management activities to be performed between 25 March and 7 August.

1.2 California Least Terns at Alameda Point

At the time of listing under the federal Endangered Species Act in 1970, there were an estimated 300 pairs of California least terns distributed among 14 nesting sites in San Diego and Orange Counties. Bair Island in San Mateo County was the only known breeding site within the San Francisco Bay (Bay) and it was the only known colony north of Orange County (Craig 1971). In 1976, a colony of 20 pairs was discovered at the Naval Air Station (NAS) Alameda, a U.S. Navy base in the City of Alameda. Although there was potential for collision with aircraft and vehicles, access was limited to few people and military activities limited mammalian predator access to the colony; as a result, the number of pairs more than doubled to 45 pairs producing an estimated 20 fledglings in 1977 (Atwood et al. 1977). Early management of the NAS site included installation of a barrier between the nests and the aircraft runways, elimination of vehicle traffic within the colony site, and placement of cement blocks that provided shelter for chicks. In 1978, the colony again nearly doubled to an estimated 80 pairs (Atwood et al. 1979). During the 1980s, a management program was implemented at NAS and predation on terns was reduced. Trapping and relocation of American kestrels (*Falco sparvarius*) substantially reduced avian predation (Collins 1984). Trapping of feral cats (*Felis domesticus)* and the installation of electric fencing around the colony essentially eliminated mammalian predation (Massey 1989). The management efforts resulted in an increase in colony size at Alameda Point, with 208 pairs in 1996 (Caffrey 1998), 301 pairs in 2003 (Patton 2003), and 424-495 in 2005 (Marschalek 2006). The number of pairs breeding have declined more recently, but have stabilized to around 300 breeding pairs each year for the past five years, with 355-358 pairs in 2007, 323 in 2008, 314-318 in 2009, 287-302 in 2010, and 304-329 in 2011 (Marschalek 2008-2012).

The NAS Alameda least tern colony is currently managed by the USFWS and the colony continues to be productive and is considered an important "source" colony in the Bay (Elliott et al. 2007). Management activities that occur on the colony site include the maintenance of a chain-link fence around the colony and the placement of substrate and materials that provide cover for tern chicks. The substrate includes pea gravel, sand, and oyster shells, and cover materials include randomly placed driftwood, clay tiles, and A-frame structures (Elliot et al. 2007). To facilitate mapping of nest locations, cinder blocks were placed in a 20-meter grid in the colony. California least terns typically occur at Alameda Point in mid-April through mid-August. For example, in 2012, the earliest least tern arrived on 17 April and the last tern was observed on 11 August (S. Euing pers. comm.). The mean nest initiation date is tends to be in late May or early June, with the peak number of nests occurring in early June (Elliot et al. 2007).

1.3 Alameda Point Land Conveyance

As part of the process to close and realign military bases, NAS Alameda (now referred to as "Alameda Point") was closed in 1997. The Navy has initiated the disposal process for surplus lands at Alameda Point, including the transfer of lands to the VA and conveyance to the City of Alameda. The Navy will transfer approximately 623.2 acres (ac) of property at Alameda Point to the VA in a federal property transfer, with approximately 112.4 ac of that property planned for development. The VA plans to construct an outpatient clinic, a cemetery, and an office for conservation-related educational and interpretive opportunities. The VA will also use an existing bunker for storage and emergency training exercises. The 9.7-ac California least tern colony occurs on the VA transfer property and the VA will be responsible for the long-term management and monitoring of the colony. The Navy will convey the remaining surplus property at Alameda Point to the City for mixed-use development.

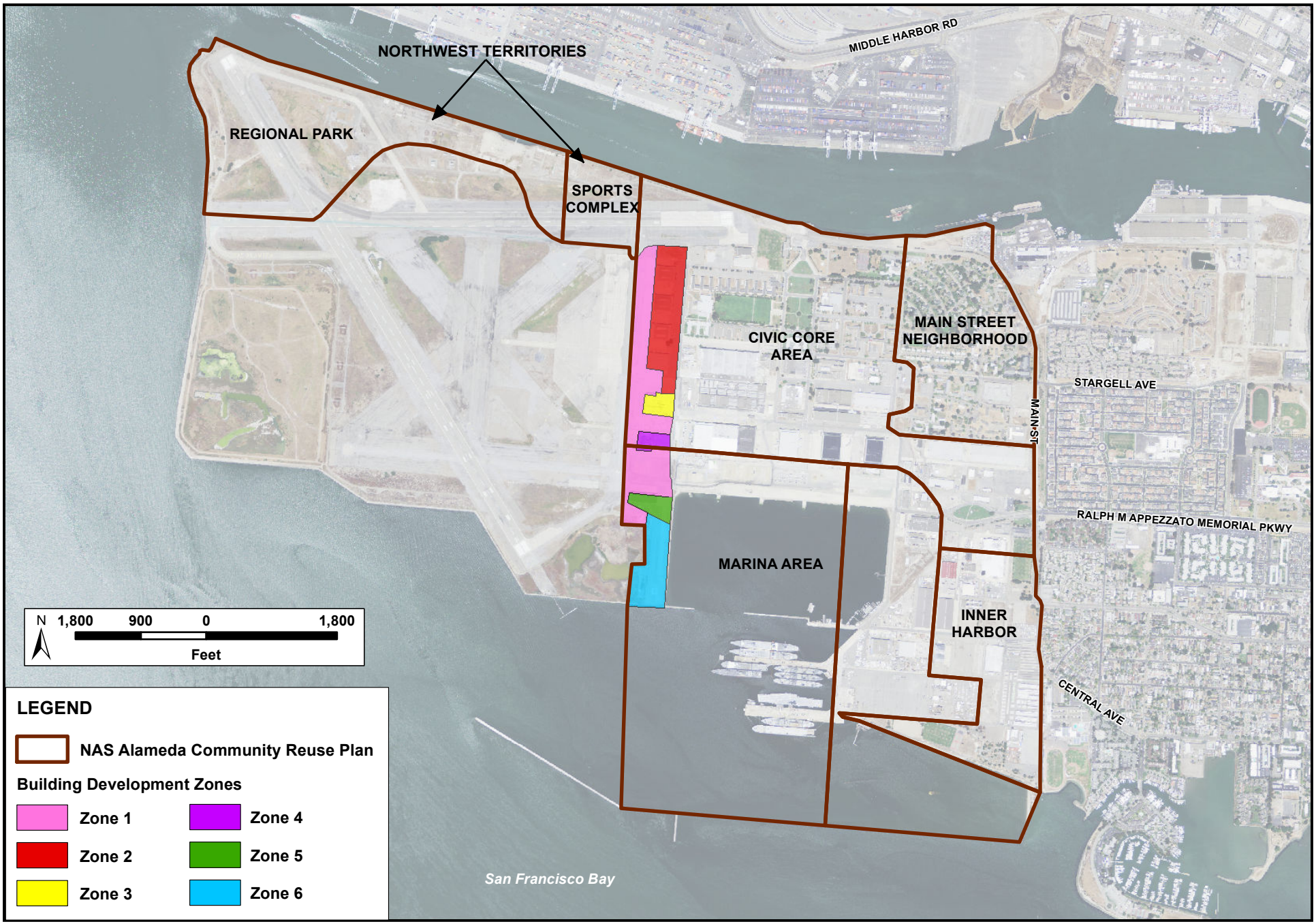

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Figure 1: NAS Alameda Community Reuse Plan Area

Alameda Point Predator Management Plan (3333-03)
December 2012

1.4 Purpose and Scope of this Predator Management Plan

1.4.1 Biological Opinion Conditions for the Alameda Point Land Transfer/Conveyance

Through consultation with the Navy pursuant to Section 7 of the Federal Endangered Species Act, the USFWS has issued a BO for the Alameda Point land transfer/conveyance with several conditions related to long-term management of the California least tern colony. Although the tern colony is located on land that will be transferred to the VA, and the VA will be responsible for management of the tern colony itself, the USFWS BO requires the City to develop and implement a PMP for lands to be conveyed from the Navy to the City. This includes lands in the Civic Core Area, portions of the Main Street Neighborhoods west of Main Street, Inner Harbor, Marina Area, and NWT (Figure 1). The PMP will be funded by the City in perpetuity, and is required to be integrated with current predator management activities that occur on Alameda Point. Additionally, the USFWS BO requires the City to implement certain restrictions within the conveyed lands, such as a prohibition of cat feeding stations and restrictions on lighting and structure design. Although those measures are related to predator management, this PMP focuses only on active predator management activities. The geographic scope of this PMP includes the five planning areas on Alameda Point west of Main Street to be conveyed to the City as described above and depicted in Figure 1. Predator management activities will occur between 25 March and 7 August each year, for an average of 20 hours per week, per conditions of the BO.

1.4.2 Methodology

This PMP was prepared by reviewing relevant information on predator management, including the 2002 Draft Predator Management Plan for Alameda Point prepared by Zander Associates; the 1991 *San Francisco Bay National Wildlife Refuge Predator Management Plan*; the 2012 *Newby Island Landfill Nuisance Species Abatement Plan* prepared by H. T. Harvey & Associates; and the Don Edwards National Wildlife Refuge Draft Avian Predator Management Plan. Additionally, H. T. Harvey & Associates wildlife ecologist Scott Demers attended a meeting with Brian Popper of the U.S. Department of Agriculture (USDA) Wildlife Services to obtain information on current predator management activities at Alameda Point. The USDA Wildlife Services is currently contracted by the USFWS, through funds provided by the Navy, to conduct predator management on Alameda Point. Mr. Demers also met with USFWS biologist Susan Euing, who conducts management and monitoring activities at the Alameda Point least tern colony. The experience of Mr. Popper and Ms. Euing related to predator management and least tern ecology at Alameda Point was used to inform and prepare this PMP.

Section 2.0 Alameda Point Predator Management

2.1 Predators of California Least Terns

In 2011, predation on California least terns resulted in the loss of 1144 eggs, 764-784 chicks, and 69 adults throughout their range (Marschalek 2012). Forty-six species were reported as documented or possible predators; the most commonly reported predators were common ravens (*Corvus corax*), peregrine falcons (*Falco peregrinus*), American crows (*Corvus brachyrhynchos*), American kestrels (*Falco sparverius*), red-tailed hawks (*Buteo jamaicensis*), and coyotes (*Canis latrans*; Marschalek 2012). At Alameda Point, confirmed predators of least terns, including their eggs or chicks, include the red-tailed hawk, peregrine falcon, American kestrel, northern harrier (*Circus cyaneus*), burrowing owl (*Athene cunicularia*), barn owl (*Tyto alba*), common raven, American crow, loggerhead shrike (*Lanius ludovicianus*), and Argentine ant (*Linepithema humile*). Most recently, peregrine falcons and American kestrels have been the most common predators of least terns at Alameda Point (B. Popper, S. Euing, pers. comm.).

Great blue herons (*Ardea herodias*) have been observed hunting around the colony, and thus probably have attempted to prey upon terns, but there have been no direct observations of such predation. Great horned owls (*Bubo virginianus*) are also suspected predators of least terns at Alameda Point because their pellets have been observed along the fenceline that encircles the site, but there has been no direct evidence of this species depredating terns (S. Euing, pers. comm). Gulls, including western gulls (*Larus occidentalis*) and California gulls (*Larus californicus*), are potential avian predators of least terns at Alameda Point, as they have been observed in the vicinity of the colony and these species are known to depredate eggs and chicks of other waterbird species.

Potential mammalian predators of least terns observed on Alameda Point include the feral cat, Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), red fox (*Vulpes vulpes*), Norway rat (*Rattus norvegicus*), and domestic dog (*Canis lupus familiaris*; B. Popper, pers. comm.). However, since the least tern colony at Alameda Point has been encircled with a fence, mammalian predation on terns has not been documented.

2.1.1 Predator Management Personnel

USDA Wildlife Services personnel currently conduct predator management activities at the Alameda Point California least tern colony. Predator management activities focus on the colony itself and are closely coordinated with USFWS personnel that manage and monitor the colony, along with a team of volunteer monitors. The USDA has also worked closely with the Navy to obtain access to properties on Alameda Point in order to facilitate predator management. For instance, the USDA has been granted access to rooftops to monitor for avian predators and to implement management activities. The USDA currently

conducts predator management activities in a variety of locations throughout the Bay Area, including on Don Edwards San Francisco Bay National Wildlife Refuge and Eden Landing Ecological Reserve, to reduce predation pressure on sensitive species, including the California clapper rail (*Rallus longirostris obsoletus*) and western snowy plover (*Charadrius alexandrinus nivosus*). USDA personnel are trained in a variety predator management and removal techniques, and have appropriate permits to conduct such activities. These include non-lethal techniques such as trapping and relocation, hazing, and egg oiling, and lethal techniques, such as shooting and euthanizing trapped animals.

The City may choose to contract with USDA to conduct predator management activities described in this PMP or may contract with another organization. If another organization is contracted to conduct predator management by the City, the USFWS must approve personnel qualifications prior to conducting any predator management activities, per BO conditions for the land conveyance. In addition to qualifications, the ability to acquire the appropriate permits for control measures described below in Sections 2.2.2 (*Avian Predator Control*) and 2.3.2 (*Mammalian Predator Control*) needs to be considered. For the purposes of this PMP, members of the organization that is contracted to implement this PMP are referred to as "predator management personnel". The City's predator management personnel will coordinate with tern colony managers and predator management personnel employed by the VA on a weekly basis (or more often if necessary).

2.2 Avian Predator Management

Avian predator management at Alameda Point is a focus of this PMP, as a suite of avian predators have been documented depredating California least tern adults, chicks, and eggs at the Alameda Point colony. The types of avian predators that depredate terns at the Alameda Point colony vary year-to-year depending on the presence, numbers, and breeding status of avian predators in the area, and therefore close monitoring and an understanding of these species' ecology will inform predator management for least terns.

2.2.1 Monitoring of Avian Predators

Monitoring of the presence, breeding status, and behavior of avian predators is critical to determine if control (described below in Section 2.2.2) is necessary. Monitoring activities on City properties will occur between 25 March and 7 August and will include:

- Building inspections: The tops of all buildings within 600 feet (ft) of the VA transfer parcel, which includes buildings west of 1st Street, will be inspected for avian predators once per week. Early detection of avian predators is one of the most important components of the PMP. Any observed avian predator nest will be monitored to determine if control measures are necessary. In past years, red-tailed hawks have nested in this area, on Building 25 (Photo 1), and were observed depredating least terns. Control measures including egg-oiling and lethal removal have been implemented on nesting red-tailed hawks on this building. Other species that may nest on building tops include common ravens and American crows, and American kestrels and barn owls could potentially nest in cavities and crevices in or on buildings.

- Monitoring in NWT: Buildings and trees within the regional park of the NWT will be monitored for avian predator nests once per week. Any observed avian predator nest will be monitored to determine if control measures are necessary. Avian predators such as red-tailed hawks, American crows, common ravens, great horned owls (if nesting material is present), and loggerhead shrikes may nest in trees or shrubs once they are established in the NWT. American kestrels may nest in this area if cavities in trees or artificial structures are present.
- Behavioral observations: While conducting monitoring and other predator management activities, behavioral observation of avian predators will be conducted to locate their nests. In addition to the inspections described above, conducting behavioral observations is often necessary to locate predator nests, particularly for species like American kestrels that nest in inconspicuous places (e.g., tree cavities, drain pipes). Also, searching for prey remains or other sign of avian predators (e.g., owl pellets, feathers) is an effective method for locating perching sites of predators.
- Prevention of wildlife feeding: Observations of avian predators being fed by the public or gaining access to anthropogenic food sources (e.g., in open dumpsters) will be reported to the City so that corrective actions can be taken. The feeding of any native and non-native wildlife species that are potential predators of least terns will be prohibited by deed restrictions after the land conveyance (see Section 3.1 below), and therefore predator management personnel will assist the City with identifying violations of this measure.
- Habitat management: Predator management personnel will make suggestions to the City regarding vegetation management, removal or modifications of structures, or other habitat modifications if such management activities could reduce the potential for avian predation on least terns. Removing available perches would minimize vantage points used for hunting and could ultimately reduce predator abundance on Alameda Point. The modification of structures by blocking cavities potentially used for nesting may be effective. Also, predator management personnel will document and report to the City any observations of anti-perching devices (see Sections 3.3, 3.4, and 3.5 below) that are in need of repair or replacement.

2.2.2 Avian Predator Control

Monitoring of avian predator presence and behavior will determine if control measures are necessary to reduce predation on least terns. The specific measures used will be based on monitoring results and coordination with tern colony managers to determine the most effective method for each situation encountered. For instance, lethal removal will only be considered as a last resort if other measures would not be effective in preventing predation on least terns. The following control measures may be implemented by predator management personnel:

- Nest removal/habitat modifications: The removal of nesting substrate is the most effective measure in preventing avian predators from establishing nests on Alameda Point. Removal of nesting substrate is most critical early in the nesting season when avian predators may still be establishing nest sites. For instance, red-tailed hawks will reuse old nests and great horned owls will use the old nests of hawks, and thus early detection and removal of existing nests is an effective deterrence

method for these and other avian predators. Predator management personnel will also coordinate with the City to modify habitats (e.g., on rooftops), if such modifications would prevent avian predators from nesting.

- Hazing: The harassment of avian predators by chasing, noise-making, or other means can be effective in deterring a predator from remaining near the tern colony. This method may be most useful for avian predators that are problematic to capture or that nest in areas outside of Alameda Point, such as peregrine falcons. Hazing of predators like peregrine falcons early in the tern breeding season can reduce the amount of hazing necessary during the peak of the season, as predators can become wary after being hazed.
- Egg oiling: The oiling of avian predator eggs prevents eggs from developing and hatching, and thus eliminates the period when avian predators increase hunting activities in order to provision for their young (in contrast, egg removal is often less effective because predators may lay replacement eggs). This method may be used if a nesting pair of raptors or other predator species is located in the vicinity of the tern colony but the adults have not been observed depredating least terns. If the adults do not increase their foraging efforts to provision their young, predation of least terns may be prevented. Typically, nest removal would be performed to prevent predators from establishing nests in the first place, but egg oiling may be used if for some reason a predator nest is established and eggs are laid.
- Trapping and relocation: Trapping and relocation of avian predators can be effective at removing a source of least tern predation without using lethal means. This method may require a higher degree of effort but may be preferred over lethal methods, or required for removal of certain species, such as peregrine falcons which are "Fully Protected" in California. Trapping may involve the use of a bal-chatri traps, net traps (e.g., bow net), or other methods. The area of relocation would depend on the species and availability of suitable habitat, and State and federal permit conditions. For instance, USDA Wildlife Services is currently allowed to trap peregrine falcons and relocate them, but only within State boundaries. Because peregrine falcons are able to travel long distances quickly, relocation of falcons would likely occur in portions of the State far from Alameda Point. If trapping and relocation of adult avian predators is conducted, it may be necessary to take their eggs or nestlings to a wildlife care facility. Currently, the Ohlone Humane Society in Newark will accept eggs or chicks. Ohlone or other wildlife care facilities may require City funding when accepting eggs or young of removed avian predators.
- Lethal removal: If hazing, nest removal, egg oiling, or relocation is determined to be infeasible or ineffective by the predator management personnel and tern colony managers, lethal removal of avian predators may be necessary. Situations where lethal removal may be preferable include avian predators that repeatedly attack the tern colony and/or continuously re-nest on Alameda Point. Lethal removal includes shooting, or trapping and euthanizing in a safe location. Shooting may include the use of rifles (such as a suppressed .22), shotguns, and pellet guns. The use of firearms on City property will need to be approved by the City.
- If, prior to the arrival of least terns, eggs of a potential avian predator of least terns are identified and determined to represent a significant threat to least terns, the City's predator manager will contact

the Migratory Bird Treaty Act (MTBA) permit holder to request that the MTBA permit holder contact the USFWS MTBA permit coordinator for authorization to addle or oil the eggs.

2.3 Mammalian Predator Management

Mammalian predator management mainly involves lethal control of mammalian predators, with the exception of domestic dogs and cats with collars. Captured domestic dogs and collared cats would be brought to the nearest animal shelter, such as the Alameda Animal Shelter or Second Chance Cat Rescue, both located in Alameda.

2.3.1 Mammalian Predator Monitoring

Monitoring will be conducted to inform mammalian predator management activities. Monitoring for the presence of mammalian predators will generally occur concurrently with other activities, such as those described above under Section 2.2 (*Avian Predator Management*). Specific mammalian monitoring activities include:

- Annual inspections: Annual inspections of vent screens and other potential denning sites will be on buildings in the NWT, Civic Core Area, and Marina Area. Open vents and other openings can provide denning or refuge sites for mammalian predators. The predator management personnel will report missing or damaged screens to the City so that replacement and repairs can be made.
- Spotlight surveys: During nighttime trapping efforts (see Section 2.3.2 *Mammalian Predator Control* below), and periodically through the tern nesting season, spotlighting surveys will be conducted to search for nocturnal mammalian predators. Spotlighting surveys will be used to inform and focus mammalian predation control efforts.
- Prevention of wildlife feeding: Observations of mammalian predators, particularly feral cats, being fed by the public, or observations of mammalian predators gaining access to food through open dumpsters or other means, will be reported to the City so that corrective actions can be taken. The City is required by the BO to prohibit feral cat feeding stations and feral cat colonies on all lands conveyed from the Navy, and will install education signage describing the prohibition. By reporting feral cat feeding, predator management personnel can assist with the City with enforcing this measure.
- Habitat management: Predator management personnel will make suggestions to the City regarding vegetation management or other habitat modifications if such management activities could reduce the potential for mammalian predation on least terns. For instance, dense ornamental shrubs can harbor mammalian predators and block the view of vents, such that it is difficult to determine if vent screens are in place. Also, vacant lots with dense vegetation.are areas where cat feeding stations may occur.

2.3.2 Mammalian Predator Control

As described above, mammalian predator management mainly includes the lethal control, with the exception of dogs and cats with collars. The locations and extent of trapping will be determined by predator management personnel in coordination with tern colony managers. Monitoring will be used to determine where trapping is needed and effort will be adjusted based on trapping and subsequent monitoring results. Unless mammalian predation significantly increases, mammalian trapping efforts will be focused on periods when avian predation pressure is lowest on the tern colony, such as the end of the tern breeding season; during this time, behavioral observations of avian predators are less important than early in the season when predators may still be establishing nests/territories or during the peak of breeding at the tern colony, providing more time for predator management personnel to engage in trapping for mammalian predators. The following control measures may be implemented by predator management personnel:

- Cage traps: Cage traps are the most common method of capturing mammals. Cage traps are baited and set at night and retrieved by morning. Any captured mammal, with the exceptions of dogs and collared cats will be euthanized using approved methods, such as lethal injection or shooting in a safe location.
- Leg-hold traps: Padded leg-hold traps are used infrequently, and only to target red foxes, as red foxes are extremely difficult to capture in cage traps. Leg-hold traps are baited at night and retrieved in the morning. The use of leg-hold traps would be limited to areas where there is limited human access.
- Snares: Snare traps, including the "powered neck snare", are also used to capture animals, such as red foxes, that are difficult to capture in cage traps. Like cage and leg-hold traps, snare traps are baited at night and retrieved in the morning.
- Shooting: Shooting is an effective method for controlling red foxes, and this method is generally effective for controlling most mammalian species. Shooting may include the use of rifles (such as a suppressed .22), shotguns, and pellet guns. The use of firearms on Alameda Point will need to be approved by the City.

2.4 Adaptive Management

The monitoring and predator control methodologies described in Sections 2.2 and 2.3 above are meant to be adaptive, in that other methods may be implemented on an as-needed basis. The predator management personnel will coordinate with the tern colony manager and City staff on an ongoing basis, and ineffective or particularly effective techniques will be identified and discussed. Therefore, monitoring and control techniques may be modified if previous efforts were not successful or another measure is deemed more appropriate. For instance, if measures performed only during the period 25 March through 7 August are not effective at reducing predation pressure by nesting birds (which may establish nests prior to 25 March), the timing of nest surveys and removal may need to be altered. Other control techniques not mentioned above may be attempted on a case-by-case basis if, for instance, a particular individual predator is observed repeatedly depredating terns at the colony, as has happened in previous years. In some instances, a combination of measures may be required to be successful; therefore various combinations may have to be

attempted until desired results are achieved. In the case of mammal control, monitoring may indicate that certain mammalian predators use particular areas of Alameda Point more than others, perhaps using certain areas as movement corridors. In that case, tracking surveys or other techniques may be conducted in order to focus trapping efforts. Therefore an increase in trapping effort in those areas, and a reduction in others, could increase the efficacy of the overall trapping efforts.

Also, the overall level of effort is meant to be adaptable as well. The City is required by the BO to fund 20 hours per week of predator management from 25 March through 7 August. However, that level of effort should be considered an average effort spread across the 4.5 month period; a higher level of effort may be needed during the peak nesting period, or extra effort may be needed at times when a problematic tern predator is difficult catch or locate. Effort should be prioritized based on the highest perceived predation threat to the tern colony, as determined through coordination between the predator management personnel and the tern colony managers. During those periods, effort needs to be shifted such that the overall program is successful.

2.5 Reporting and Success Criteria

An annual report of the predator monitoring and control efforts described above in Sections 2.2 and 2.3 will be produced by the contracted predator management personnel and provided to the City. Currently, the USDA Wildlife Services provides an annual report which is appended to the USFW's monitoring report, and both reports are provided to the Navy. The annual report will contain the following sections:

- Monitoring Methods and Results – a description of all monitoring activities that were conducted during the year and a summary of all information collected during the year on the presence of predators at Alameda Point
- Control Methods and Results – a description of all avian and mammalian control measures attempted during the year; this description will include the types of control and when and where they were used at Alameda Point
- Discussion – a discussion section evaluating the effectiveness of the monitoring and control methods
- Recommendations – a discussion of recommendations for the next year outlining recommended changes in monitoring or control activities

Specific quantitative success criteria for predator monitoring and control cannot be defined because the types and numbers of least tern predators at the Alameda Point colony vary widely from year to year. Each nesting season brings unique challenges to predator control that often require adaptive measures, as addressed in Section 2.4 above. For instance, the bulk of the monitoring and control effort may be concentrated on locating and removing one individual predator responsible for the majority of tern predation. Correlating least tern reproductive success based on the removal of one predator, or even numerous predators, is difficult. There are a number of other factors that contribute to the success or failure of the least tern colony, including food availability, weather (e.g., heat stress, flooding), or environmental contaminants (Marschalek 2012). Therefore, the USFWS currently evaluates the success of predator management at the tern colony not just by the overall reproductive success of the terns or by the number of predators removed, but through a

qualitative assessment of a combination of factors, including environmental factors. The success of this PMP will be also be evaluated by the tern colony manager and the City in a similar way. If the tern colony continues to be productive and observed predators of least terns are controlled such that the tern population remains similar or increases and reproductive success does not decline significantly due to predation, then the PMP will be considered successful. If continued predation is observed without effective control, then the PMP will be modified to address predation issues in coordination with the tern colony manager and the City.

2.6 Predator Management Funding

Funding for predator management and monitoring on lands conveyed from the Navy to the City will be provided by the City. A cooperative agreement will be made between the City and the USDA Wildlife Services or another USFWS-approved organization to perform predator management in accordance with this PMP.

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