



3.0 AFFECTED ENVIRONMENT

This chapter provides an overview of existing environmental conditions on Alcatraz, and establishes the baseline for the impact analysis presented in Chapter 4. Full references for documents cited in this EIS are provided in Chapter 7.

3.1 Biological Resources

3.1.1 RELEVANT REGULATIONS

This section provides an overview of relevant regulations, followed by a description of the existing biological resources on Alcatraz Island. The vegetation and wildlife species are presented first, followed by species of interest and species that have been listed by the State of California and/or federal government ("special status species"). The information presented in the section is based on a review of literature, including the results of ongoing waterbird monitoring on Alcatraz Island. A complete list of the documents used in preparing this section, including those directly cited, is presented in Chapter 7.

3.1.1.1 FEDERAL LAWS, REGULATIONS AND POLICIES

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA), USFWS and NMFS have authority over projects that may affect the continued existence of a federally listed species. If a federal action may result in the "take" of a federally listed species, a federal consultation under Section 7 of ESA is required. Under ESA, the definition of take includes kill, harm, or harass. USFWS has interpreted the definition of harm to include significant habitat modification.

Take of a federally listed species may be approved through a Section 7 consultation between USFWS and another federal agency, if the proposed project is sponsored by or under another federal agency's jurisdiction. Because the Alcatraz Island Historic Preservation and Safety Construction Program is a federal project with a federal lead agency, the National Park Service, Section 7 consultation would be applicable. If the proposed project would result in take of a federally listed species, the National Park Service would be required to initiate consultation with USFWS (and/or NMFS) and to provide them available information regarding the potential effect of the proposed project on a listed species. This procedure would require the National Park Service to prepare a biological assessment of the effect of the permit action (but not necessarily the effect of the entire project) on the listed species or critical habitat. The biological assessment, if required, for listed species or those with critical habitat within the project area (spring-run and winter-run chinook, central valley and central California coast steelhead) will be attached to the final EIS as an appended item. National Park Service, as the lead federal agency, will determine if the project would result in "no effect" to listed threatened or endangered species or critical habitat, "not likely to adversely effect", or if the project "may effect" these species. The NMFS (or USFWS) would either concur or disagree with the lead federal agency's determination. Initiation of formal or informal consultation or cessation of discussion on the issues would depend upon the lead agency's determination and concurrence/disagreement by NMFS or USFWS. If formal consultation is required, USFWS (and/or NMFS) will issue a biological opinion stating whether the permit action is likely to jeopardize the continued existence of the listed species. If the federal lead agency does not concur with the findings in the Biological Opinion, it may request further discussion to resolve the issues. If the proposed Historic Preservation and Safety Construction Program would impact a federally listed species, consultation under Section 7 of the ESA would be required.



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Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, implements domestically a series of treaties between the United States and Great Britain (on behalf of Canada), Mexico, Japan, and the former U.S.S.R., which provide for international migratory bird protection and authorize the Secretary of the Interior to regulate the taking of migratory birds. MBTA provides that it shall be unlawful, except as permitted by regulations, "at any time, by any means, or in any manner, to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird, included in the terms of conventions" with certain other countries (16 U.S.C. 703). This includes direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by MBTA can be found in Title 50, Code of Federal Regulations §10.13, and includes some species of waterbirds that currently nest on Alcatraz Island. Loss of non-native species, such as house sparrows, European starlings, and rock doves, is not covered by this statute, whereas impacts to most other native non-game bird species are covered. This federal code offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of non-game, migratory birds.

Marine Mammal Protection Act

The Marine Mammal Protection Act of 1972 (MMPA), most recently reauthorized in 1994, established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters. The term "take" is statutorily defined to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal." Harassment was defined under the 1994 amendments as any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal in the wild, or has the potential to disturb a marine mammal in the wild by causing disruption to behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering. Under the MMPA, the Secretary of Commerce is responsible for the conservation and management of pinnipeds and cetaceans. This authority has been delegated to the NMFS. The MMPA allows for incidental take for other than for scientific research and commercial fisheries only after an involved public process.

Magnuson-Stevens Fishery Management and Conservation Act

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267) requires all federal agencies to consult with NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the agency, that may adversely affect Essential Fish Habitat (EFH). EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." "Waters" include aquatic areas and their associated physical, chemical and biological properties. "Substrate" includes sediment underlying the waters. "Necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types utilized by a species throughout its life cycle. NMFS would provide recommendations on conserving EFH to federal or state agencies for activities that would adversely affect EFH. NMFS has determined that the San Francisco Bay Estuary provides EFH for coastal pelagic species and west coast groundfish. Specifically, for Central San Francisco Bay, this includes 18 fish species.

Clean Water Act

Section 404 of the Clean Water Act (CWA) establishes a requirement to obtain authorization or a permit prior to any activity that involves any discharge of dredged or fill material into "Waters of the United States," including wetlands. Waters of the United States include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Pursuant to Section 404 of the CWA, the United States Army Corps of Engineers (USACE) regulates and issues authorization or permits for such activities. Nearly all surface waters and wetlands



in California meet the criteria for waters of the United States, including tidal waters and non-tidal waters. Activities that require authorization or a permit under Section 404 include placing fill or riprap, grading, mechanized land clearing, dredging, excavation and leveling. Any activity that results in the deposit of dredge or fill material within the "Ordinary High Water Mark" of waters of the United States usually requires a permit, even if the area is dry at the time the activity takes place.

The USACE also requires concurrence from the San Francisco Bay Conservation and Development Commission (BCDC) and the Regional Water Quality Control Board (RWQCB) prior to issuing a permit or authorization for work in the San Francisco Bay. The BCDC reviews the project to determine if the project is consistent with the Amended Coastal Zone Management Program for San Francisco Bay. The RWQCB regulates potential discharges and water quality in San Francisco Bay.

Rivers and Harbors Act

Under Section 10 of the Rivers and Harbors Act of 1899, the construction of structures in, over, or under, excavation of material from, or deposition of material into "navigable waters" are regulated by USACE. Navigable waters of the United States are defined as those waters subject to the ebb and flow of the tide shoreward to the mean high water mark or those that are currently used, have been used on the past, or may be susceptible to use to transport interstate or foreign commerce. A Letter of Permission or permit is required from USACE prior to any work being completed within a navigable water. USACE permit authority under the Rivers and Harbors Act of 1899 is not subject to EPA oversight or any other restrictions of the Clean Water Act and, in some cases, the Rivers and Harbors Act alone will apply to activities occurring in water of the United States.

Natural Resource Management Guidelines

National Park Service has developed specific guidelines for the management of natural resources (NPS-77). These guidelines provide for management of native and non-native plant and animal species. They are designed to assist parks in developing resource management plans and action plans for specific park programs in all park management zones: natural, cultural, park development, and special use zones as described in the National Park Service Management Policies and articulated in each park general management plan.

The National Park Service Management Policies (2001) direct the National Park Service to preserve natural resources, processes, systems, and values of units of the national park system in an unimpaired condition, to perpetuate their inherent integrity and to provide present and future generations with the opportunity to enjoy them. Natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities. The National Park Service will strive to understand, maintain, restore, and protect the inherent integrity of the natural resources, processes, systems, and values of the parks. The natural resources, processes, systems, and values that the National Park Service preserves are described generally in the 1916 NPS Organic Act and in the enabling legislation or presidential proclamation establishing each park.

3.1.1.2 STATE LAWS AND REGULATIONS

Although federal agencies are not required to comply with the State of California Fish and Game Code, the National Park Service would make every reasonable effort to conduct its actions consistent with relevant state laws and regulations.

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA; Fish and Game Code §2080 *et seq.*), which is administered by the California Department of Fish and Game (CDFG), state-listed Threatened or Endangered



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species are protected from "take." Threatened and Endangered species are listed in Title 14, California Code of Regulations §§670.2 and 670.5. Section 2080 of CESA prohibits take of any of these species. The take of state-listed species incidental to otherwise lawful activities requires an incidental take permit, pursuant to §2081(b) of CESA.

State Fish and Game Code §3513—Adoption of MBTA

Section 3513 of the California Fish and Game Code provides for adoption of MBTA's provisions. It states, "It is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act." As with MBTA, this state code also offers no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds.

3.1.2 VEGETATION AND WILDLIFE

3.1.2.1 VEGETATION

Before occupation by Europeans, Alcatraz Island was sparsely vegetated (Delgado and Associates, 1992). By 1853, trees and shrubs were planted and terraced gardens were cultivated (Pollack and Howell, 1991). This practice presumably continued until 1963 when the prison was closed (Lutsko Associates, 1992). Soils that were brought to the Island from the mainland and other islands in the San Francisco Bay contained seeds of native plants, including coyote brush (*Baccharis pilularis*), California poppy (*Eschscholzia californica*), and California blackberry (*Rubus ursinus*), which have since become established on the Island (Pollack and Howell, 1991).

Most of the vegetation on Alcatraz Island is dominated by non-native plant species, although approximately 5 percent of the Island has native coastal prairie or coastal scrub communities. Within these areas, certain native pioneer species, such as coyote brush, are becoming established in areas that were formerly cultivated. In general, Alcatraz Island consists of grassland, shrubs, historic gardens, non-native trees, cliffs and other barren areas, and historic buildings and paved areas.

The landscape vegetation consists of a diverse group of non-native ornamental shrubs and trees, and is considered part of the cultural resource on the Island. These provide most of the vegetative structure and habitat for wildlife on the Island. Shrubs are the most dominant plant form and include rose (*Rosa* spp.), mirrorbush (*Coprosma baueri*), fig (*Ficus carica*), blackberry (*Rubus* spp.), agave (*Agave* spp.), Australian tea tree (*Leptospermum laevigatum*), mimosa (*Albizia lophantha*), coyote brush, plume acacia (*Acacia* spp.), and ivy (*Hedera helix*). Tree species include eucalyptus (*Eucalyptus* spp.), Victorian boxwood (*Pittosporum crassifolium*), and Monterey cypress (*Cupressus macrocarpa*). A small stand of native grassland dominated by creeping wildrye (*Leymus tritoides*) is located along the Northeast Perimeter Trail near the Power House Complex; this is one of the largest grassland areas on the Island. Another smaller stand is present in the Cistern area. Ruderal vegetation occurs along the edges of walkways, buildings, and building remains. Dominant species found in these areas include wild oats (*Avena* spp.), wild radish (*Raphanus sativa*), mustard (*Brassica* spp.), and cheeseweed (*Malva parviflora*). Rocky cliffs and bluffs are found primarily along the Island perimeter, and there is a small rock outcrop adjacent to the northwest corner of the Parade Ground. While some of the steeper cliffs on Alcatraz (e.g., between the Model Industries and New Industries Buildings) are barren of vegetation, the southwestern cliffs support various succulents, agave, sourgrass, sweet alyssum, wild radish, and large shrubs in the areas where Brandt's cormorants, western gulls and pigeon guillemots nest. These provide nesting material and protection for gulls, cormorants and guillemots (Thayer, pers. comm., 2000). An extensive grassy area occurs above the cliffs along the northeastern shore. The more gently sloping cliffs support a variety of introduced plants (Pollack and Howell, 1991).



3.1.2.2 ADDITIONAL WILDLIFE SPECIES

During much of the year, nesting waterbirds are the most common wildlife species on Alcatraz Island. Although these species are not afforded special status by state and federal agencies, they are protected under the Migratory Bird Treaty Act and are of interest in the San Francisco Bay area, and are addressed in this EIS. In addition to colonial waterbirds, several other bird species have been documented as breeding on the Island, including Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), common merganser (*Mergus merganser*), Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), brown-headed cowbird (*Molothrus ater*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), and house finch (*Carpodacus mexicanus*) (Hatch, pers. comm., 2000). A pair of Heerman's gulls (*Larus heermanni*) attempted unsuccessfully to nest in 1979 through 1982 (Boarman, 1989).

The Alcatraz Bird Census (ABC) has been conducted yearly since 1993 to document birds using the Island during the fall and winter months. Eighty-nine species were identified during censuses conducted from September 1998 to January 1999. The 10 most frequently identified species during these censuses, in descending order, were western gull (*Larus occidentalis*), white-crowned sparrow (*Zonotrichia albicollis*), song sparrow (*Melospiza melodia*), double-crested cormorant (*Phalacrocorax auritus*), common raven (*Corvus corax*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), fox sparrow (*Passerella iliaca*), European starling (*Sturnus vulgaris*), and yellow-rumped warbler (*Dendroica coronata*) (Carré, 1999). In addition to birds, several other vertebrates occur on Alcatraz Island, including deer mouse (*Peromyscus maniculatus*), California slender salamander (*Batrachoseps attenuatus*), Norway rat (*Rattus norvegicus*), and bat species. Seals and sea lions are protected under the Marine Mammal Protection Act. Small numbers of seals and sea lions haul out on or near Alcatraz. They are addressed further in Section 3.1.2.3. Deer mice are common and widespread across most of North America and are abundant on the Island. Mark/recapture studies indicated that the areas of highest mice concentrations were the rubble piles, the shrubbery west of the Cellhouse, and along the eastern shore (Pollack, no date). Howell has found that deer mice prefer grassland habitats on the Island.

Norway rats were first observed on the Island in 1998. This species is widespread and occurs in association with human habitation, as well as in natural environments. They are prolific, breeding more or less continuously when they reach breeding age (Jameson and Peeters, 1988). The presence of Norway rats on Alcatraz Island is of concern because of their potential as predators on waterbird eggs and chicks on the Island. Rats have also been known to reduce or eliminate native rodent populations on islands (Collins, 1979).

California slender salamanders are small, lungless salamanders that do not require water for breeding, although they lay their eggs in moist ground, usually under rotting logs (Stebbins, 1985). Preliminary surveys on Alcatraz Island have revealed that large populations of slender salamanders are present in the Dock area (in the adjacent hillside), in the northeast section of the Agave Path near the Dock, and near the Parade Grounds (Martin, pers. comm. referenced in LSA Associates, Inc., 1993). The northern end of the Island tends to have moister substrate and may support a higher concentration of salamanders than the rest of the Island. Neither the salamander nor its eggs can tolerate salt spray, so they are confined to upland areas of the Island. The Alcatraz population of slender salamander is dormant during dry summer months, spending this period in deep burrows. Populations on Alcatraz Island are either endemic to the Island or were introduced inadvertently with soil brought to the Island during construction projects (Martin and Lawson, 1991).

3.1.2.3 SPECIES OF INTEREST

This section discusses wildlife species that are considered to be of interest, but are not formally listed or otherwise afforded special status by state or federal resource agencies. These species include monarch butterfly (winter roost sites are CDFG special concern), Pacific herring (CDFG species of concern in the San Francisco Bay), harbor seal (*Phoca vitulina*), California sea lion (*Zalophus californicus*), and eight waterbird species (nesting populations on Alcatraz are considered regionally important). The waterbird species discussed below are those



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that nest on the Island: Brandt's cormorant, pelagic cormorant (*Phalacrocorax penicillatus*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), black-crowned night-heron (*Nycticorax nycticorax*), black oystercatcher (*Haematopus bachmani*), western gull (*Larus occidentalis*), and pigeon guillemot (*Cepphus columba*).

For each waterbird species, a description of habitat, regional population, historic and current population on Alcatraz, reproductivity and sensitivity to disturbance is provided. Table 3.1-1 provides an overview of the nesting seasons and peak sensitivity periods for these species. Peak sensitivity periods were determined based on review of available data on waterbirds from Alcatraz Island and elsewhere. The table provides graphic representation of the most sensitive time periods within the breeding season for each waterbird species on the Island. It should be emphasized that these are protected species that are sensitive throughout their breeding season, and that Table 3.1-1 is intended to highlight the periods of greatest vulnerability. The original intent was to use the table as a tool to predict and minimize the impact of construction activities through phasing. However, due to location of the proposed repairs, differences in peak sensitivity periods between species and the interrelationship among species during disturbance events, the majority of the breeding season (February–August) is considered sensitive. The location of nesting areas, population size and other relevant information is below.

Monarch Butterfly (winter roosting site). Monarch butterflies (*Danaus plexippus*) winter along the Pacific Coast in roost sites, from northern Mendocino County to Baja California, Mexico. These winter roost sites are of special concern to CDFG. They are usually located in wind-protected tree groves (e.g.,



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Table 3.1-1 Waterbird Nesting Seasons and Peak Sensitivity Periods on Alcatraz Island



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eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Alcatraz Island is a small but significant site used briefly during fall migration by monarchs migrating to coastal areas to overwinter. Approximately 100 to 300 monarch butterflies have been reported by National Park Service staff during mid- to late September on vines on the east side of the Island, and approximately 500 monarch butterflies were observed on September 28, 1984, near the chapel. They are usually present for a 1- to 5-day period and may be observed flying over any portion of the Island (National Park Service file information). The eucalyptus and cypress trees present on the east side of the Island represent potential roost sites. Monarch butterflies do not appear to be adversely impacted by human activity and/or noise, provided there is no direct disturbance within the roost site vegetation (Monroe, pers. comm., 1999).

Pacific Herring. Pacific herring (*Clupea harengus pallasii*) spawn each year along the perimeter of Alcatraz Island. The normal spawning season in the San Francisco Bay occurs from October through April, although it begins in December along the perimeter of the Island (USACE et al., 1998). Although eelgrass beds provide the primary habitat for spawning and rearing of juvenile fish, herring utilize both natural and unnatural substrates for spawning. As a result, potential spawning habitat at Alcatraz Island includes the Dock area. However, this is a small portion of the spawning habitat available for Pacific herring in the San Francisco Bay.

Marine Mammals. Harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californicus*) and occasional northern elephant seals (*Mirovunga angustirostris*) are known to occur in San Francisco Bay. Incidental observations by Point Reyes Bird Observatory seabird biologists (Thayer, pers. comm., 2000) and from National Park Service files (Howell, NPS files, 1982-1990) indicate that California sea lions haul out on an infrequent and irregular basis year-round on the rocks below the foghorn on the northwest tip of the Island, below the Model Industries Building. A total of five incidental observations in 1998 and 1999 ranged from 10 to 16 animals at this site. Harbor seals haul out on an irregular basis on Little Alcatraz, a small rock just northwest of Alcatraz. The maximum number counted on Little Alcatraz was 14, with all observations occurring at a +1.5 foot (mean sea level [msl]) tide or less. One or two harbor seals haul out sporadically year-round on the rocks along the Agave Trail, and at the tidepools at the south end of the Island (Thayer, pers. comm., 2000). Harbor seals and California sea lions also frequent the waters around the island, and one immature northern elephant seal was observed offshore in 1998. On one occasion, a harbor seal raised a pup in the area of the Power House, although it is unknown if she gave birth to the pup on the Island (LSA Associates, Inc., 1993).

Brandt's Cormorant. Brandt's cormorants are restricted to marine and estuarine habitats, primarily coastal waters, but also large bays and occasionally estuaries and coastal lagoons. Breeding colonies are usually located on islands but are also found on the mainland near promontories and on isolated cliffs. Nests are built on the ground, usually in flat or gently sloping areas on the windward side of islands or on ledges of steep cliffs (Wallace and Wallace, 1998).

Regional Status. The nesting colony on Alcatraz Island is the only known existing Brandt's cormorant colony in the San Francisco Bay (Fairman et al., 1998), although 4 nests were recorded on Yerba Buena Island in 1990 (Carter et al., 1992). The number of nesting Brandt's cormorants on the Point Reyes National Seashore in 1979-1997 has ranged from 73 in 1985 to 1,200 in 1979 (McChesney et al., 1998). In general, 300 to 400 pairs have nested each year. Nesting cormorants on Año Nuevo Island in 1992-1999 ranged from 50 to 737, although 300 to 400 pairs nested in most years (Point Reyes Bird Observatory, preliminary data). The colony on the Farallon Islands is the largest in the region. In 1989, 7,600 nests were counted on Southeast Farallon Island and West End Island (Carter et al., 1992); 3,172 nests were estimated on these islands in 1999 (Mills et al., 1999). The Farallon Island population of Brandt's cormorants has declined significantly over the last decade, which has increased the importance of the coastal colonies at Point Reyes, Año Nuevo and Alcatraz.

Historic and Current Status of Alcatraz Population. The first confirmation of breeding on Alcatraz Island occurred in 1991, when 3 nesting pairs were observed. The number of nests increased to at least 231 in 1996, then decreased in 1997 and 1998 to 215 and 124, respectively. However, a peak number of 248 nests occurred in 1999. This



fluctuation between 1996 and 1999 was primarily due to changes in the North subcolony, which was occupied early in the breeding season but then abandoned in 1998, but was reoccupied by 63 nesting pairs in 1999 (Thayer et al., 1999; Point Reyes Bird Observatory, 1999, preliminary data). Abandonment of this subcolony in 1998 was probably influenced by oceanographic conditions brought on by El Niño (Thayer et al., 1999).

Brandt's cormorant nesting on Alcatraz Island occurs in up to five subcolonies on the west side of the Island referred to as the Model Industries, Laundry, North, South, and South Bricks subcolonies. Refer to Figure 3.1-1 for the location of Brandt's cormorant subcolonies on Alcatraz Island. Data for all subcolonies has been collected since 1997. From 1997 to present, 73 percent to 82 percent of all nests have been located in the North and South subcolonies. Model Industries was the smallest subcolony until 1999 when 30 nests were located there (Point Reyes Bird Observatory, 1999, preliminary data).

It should be noted that Brandt's cormorants use the cliffs south of the south subcolony extensively for roosting (Figure 3.1-1). Up to 300 birds, a number of which were immature individuals, have been counted on the cliffs during the first half of the season in both 1997 and 1998 (through mid-June). Only about 150 birds frequented this area in 1999, perhaps due to the increased use of a second roosting area below the north foghorn below the Model Industries Building. Groups of up to 70 cormorants were observed at the north foghorn roost in 1999, with up to 600 Brandt's and double-crested cormorants seen in feeding and bathing flocks directly off the north cliffs. Some courtship behaviors (e.g., advertising, billing) were observed among these birds.

In general, numbers of roosting birds seemed highest in the early morning, declined during midday and afternoon, and then increased substantially during the late afternoon. Attendance of roosting cormorants appeared to decline as the season progressed. Some of the birds roosting on these cliffs early in the season may have later bred at sites in the North, Laundry, and Model Industries subcolonies as timing of breeding in these areas was later than at the South subcolony. The south and north cliffs of Alcatraz may serve as important sites for Brandt's cormorants for resting and for development of breeding behaviors in young birds.

Late in the season, use of the South subcolony roosting area increased again, along with use of the seawall below the Laundry Building. Brandt's cormorant chicks continue to be fed by their parents after they have "fledged" (i.e., started wandering), and even for a period after they start to fly. As chicks grow older, they demand food from their parents more and more aggressively, often chasing their parents from the nest site and even from the subcolony. The South subcolony roosting area and the seawall became heavily used creching (gathering) sites during this period, where many parents returned to feed fledglings (Thayer, 1999).

The western and northern cliffs are also used as roosting areas by hundreds of Brandt's and double-crested cormorants during the fall and winter months, but on an unpredictable basis (Carré, 1999; Howell, NPS files).



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Figure 3.1-1 Brandt's Cormorant Nesting Subcolonies on Alcatraz Island



Reproduction on Alcatraz Island. The Brandt's cormorant nesting season on Alcatraz Island occurs from early March through September. Timing of egg laying has varied between years, but it begins as early as April, with pre-breeding courtship and nest building beginning in early March. Fledging was assumed when chicks were large enough to wander from their nests, and could no longer be assigned to a particular nest, but were not yet fully feathered or able to fly. This occurs as late as early September, although young may still be present in the colonies until late September. However, there has been a marked difference in timing of nesting between subcolonies and between years. In 1999, birds began laying eggs two to three weeks earlier in the South subcolony than in the Laundry and Model Industries subcolonies, and six weeks earlier than in the North subcolony. Consequently, the latest fledging dates occurred in late July in the Southern and Laundry subcolonies, mid-August at Model Industries, and early September in the North subcolony (Point Reyes Bird Observatory, 1999, preliminary data).

Productivity of Brandt's cormorants ranged from 1.61 to 2.34 chicks per nest between 1999 and 1998. Overall, the productivity of Brandt's cormorants on Alcatraz Island appears to be significantly higher than productivity rates on the outer coastal areas including Point Reyes National Seashore and the Farallon Islands. Brandt's cormorant productivity appears to be adversely affected by El Niño events, even within the San Francisco Bay environment.

Sensitivity to Disturbance. A monitoring program to assess the effects of disturbance on seabirds nesting on Alcatraz Island was conducted in April-July of 1997 and 1998 and March-August of 1999 (Fairman et al., 1998; Thayer et al., 1999; Point Reyes Bird Observatory, 1999, preliminary data). Results suggest that Brandt's cormorants are most sensitive to disturbance during the early stages of the nesting cycle. In 1998, two pairs building nests in the South subcolony were flushed by researchers monitoring night-heron subcolonies, and did not return to continue their nesting attempt. In addition, the North subcolony was entirely abandoned for the 1998 breeding season following a series of off-island disturbances in April through June. In 1999, the North subcolony was temporarily abandoned due to a two-day disturbance caused by a jet ski incident. Consequently, egg laying occurred four to six weeks later than in the other subcolonies. However, despite the large number of disturbances that caused numerous birds to flush, including mates of incubating or brooding birds, no incidents were observed that resulted in flushing actively incubating or brooding adults. This does not indicate, however, that flushing of incubating birds never occurs. Numerous disturbance incidents that resulted in flushing of adults have been observed from vantage points where the actual nests were not visible, although the adults could be seen when flushed. In April 2000, an inflatable zodiac approached within 130 feet of the south subcolony, stopped, then departed at a high rate of speed. At least 100 cormorants flushed from the active nesting area. Many adults attending nests were likely flushed, although the actual nests (and incubating birds) were not visible at the time. Throughout the breeding season, Brandt's cormorants may be less tolerant of island-based disturbance, particularly when visible to nesting birds. Visible island-based disturbances occur less frequently and may be in closer proximity to nesting colonies than water-based disturbances.

Brandt's cormorants may be more tolerant of island-based disturbance associated with elevated noise levels when it is not visible to nesting birds. During the 1997 nesting season, a video was filmed inside the Laundry Building. The filming took place over a few hours at mid-day. Music played in the Laundry Building did not seem to significantly disturb Brandt's cormorants nesting nearby. Researchers observed several cormorants look in the direction of the noises, but none were flushed from their nests (Fairman et al., 1998). This is probably a result of activity being confined to the building, so participants were not visible to the cormorants.

Based on results from disturbance monitoring, peak sensitivity for Brandt's cormorants on Alcatraz Island occurs early in the nest cycle, during courtship, nest building, and nest initiation. Apparently, Brandt's cormorants on Alcatraz Island are fairly tolerant of external disturbance while they are actively incubating eggs or brooding young (Thayer et al., 1999). The onset of the peak sensitivity period appears to correspond with the beginning of pre-breeding activities, which occurs as early as early March, and continues until the end of egg laying, which occurs as late as early July (Point Reyes Bird Observatory, 1999, preliminary data).



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Pelagic Cormorant. Pelagic cormorants breed in rocky areas in a variety of near shore habitats including outer coast, bays, estuaries, harbors, and lagoons. They nest in loose colonies or solitarily on cliffs of forested, grassy, and rocky islands and headlands. They will also use human-made structures such as beacons, bridges, wharves, and abandoned towers. Pelagic cormorants prefer narrow ledges on high, steep inaccessible cliffs (Hobson, 1997).

Regional Status. Alcatraz Island is one of only a few locations in the San Francisco Bay where pelagic cormorants nest. Two nests were documented on Yerba Buena Island in 1990 (Carter et al., 1992), and nesting was confirmed at Brooks Island Jetty near Richmond in 1997 and 1998 (Spear, pers. comm., 1999). Data from other colonies include an estimated 133 nests on the Point Reyes National Seashore in 1989 (Carter et al., 1992) and 28 nests on Año Nuevo State Reserve in 1999 (Thayer et al., 1999). An estimated 400 nests were present on the southern Farallon Islands in 1987, and 111 nests were counted on Southeast Farallon Island and West End Island in 1999 (Carter et al., 1992, Mills et al., 1999). The Farallon Island pelagic cormorant population has declined significantly over the last decade, which has increased the importance of the coastal colonies at Point Reyes, Año Nuevo and Alcatraz.

Historic and Current Status of Alcatraz Population. Nesting pelagic cormorants were first observed on Alcatraz Island in 1986, when approximately six nests were located. Because most nest sites are not visible from the Island, boat surveys have been conducted since 1997 to obtain more accurate counts of breeding pairs. The number of pelagic cormorant nests were 20, 12, and 19 in 1997, 1998, and 1999, respectively. The majority of nests occurred on the northwest side of the Island, below the Model Industries and Laundry Buildings. Nesting has also occurred above Barker Beach. Refer to Figure 3.1-2 for the location of pelagic cormorant nesting subcolonies on Alcatraz Island.

Reproduction on Alcatraz Island. The pelagic cormorant nesting season on Alcatraz Island occurs from February through August. Pre-breeding activity has been observed as early as mid-February on the Island, and the first eggs are laid as soon as mid-April. The first chicks hatch in mid-May and the last chicks fledge as late as mid-August (Thayer et al., 1999; Point Reyes Bird Observatory, 1999, preliminary data). Unlike dates provided for Brandt's cormorants, these fledging dates refer to when young are fully feathered and able to fly.

Information on productivity is very minimal due to the difficulty of observing chicks during boat surveys. As a result, only nests visible from the Island can be used to provide information on productivity. In 1998, 3 nests were monitored, and all of them fledged at least one chick (Thayer et al., 1999). In 1999, 16 nests were monitored, and productivity was 1.94 chicks per nest (Point Reyes Bird Observatory, 1999, preliminary data).



Placeholder for

Figure 3.1-2 Pelagic Cormorant Nesting Subcolonies on Alcatraz Island



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Sensitivity to Disturbance. There is no direct information from Alcatraz Island regarding when pelagic cormorants are most sensitive to disturbance. However, it is likely to be similar to that of Brandt's cormorants, which are most sensitive to disturbance during the early stages of the nesting cycle, prior to incubation. Consequently, the peak sensitivity period is expected to correspond with the beginning of pre-breeding activities, which may occur as early as mid-February, and continue until the end of egg laying, which occurs as late as mid-May (Point Reyes Bird Observatory, 1999, preliminary data).

Great Egrets. Great egrets nest primarily in habitat associated with marshes, swamps, tidal estuaries, and fresh- and brackish-water margins. They usually nest in colonies, although some nest in isolated pairs. Platform nests are made of sticks and built in shrubs and trees, generally within 40 feet of the ground but sometimes almost 100 feet up in a tree (Ehrlich et al., 1988).

Regional Status. Alcatraz Island is one of numerous nesting locations for great egrets in the San Francisco Bay Area. They were recorded nesting at six sites in the southern Bay in 1982–1997 and 17 sites in the northern Bay in 1991 (Kelly et al., 1993). Results from various monitoring programs suggest an average of 700 to 800 great egret nests per year in the Bay Area, and these populations appear to have been stable in recent years (Kelly, pers. comm., 2000).

Historic and Current Status of Alcatraz Population. Great egrets nested on Alcatraz in 1995–1997. Two nests were observed near the Dock night-heron subcolony in 1996, and one nest was found in this area in 1995. In 1997, one nest was found in the Bench night-heron subcolony. Since 1997, no great egrets have nested on Alcatraz.

Reproduction on Alcatraz Island. Information on great egret nesting on Alcatraz Island is available from only one nest, which was initiated unusually late, in early July, and fledged 2 young in October (Hatch, pers. comm., 1999). Data collected in 1967–1979 at a colony in coastal Marin County showed an overall mean nest initiation date of April 30, with annual means ranging from April 14 to May 25. The earliest nest initiation occurred March 15 and the latest the first nest was initiated was April 29 (Pratt and Winkler, 1985). Based on published incubation and nestling periods for great egret (Ehrlich et al., 1988), these nest initiation dates would result in hatching dates ranging from April 7 to June 20 and fledging dates ranging from May 19 to July 8.

Sensitivity to Disturbance. There is no direct information from Alcatraz Island regarding when great egrets are most sensitive to disturbance. However, based on data from other nesting sites, they are known to be most sensitive to disturbance early in the nesting season, prior to incubation (Kelly, pers. comm., 2000). Once great egrets are incubating, they become fairly resilient to disturbance and do not tend to flush easily. There is another sensitive period for the first month after the chicks hatch. During this time, the adults are more easily flushed, leaving unattended chicks vulnerable to opportunistic predation (Kelly, pers. comm., 2000). The peak sensitivity period corresponds with the onset of pre-breeding activities in early March and continues until egg laying is complete, which may occur as late as early June.

Snowy Egrets. Snowy egrets nest in habitat associated with marshes, lakes, ponds, and other shallow coastal waters. In general, they nest low in vegetation, 5 to 10 feet from the ground, although they will nest up to 30 feet above the ground and occasionally place nests on the ground in marsh vegetation (Ehrlich et al., 1988).

Regional Status. Alcatraz Island is one of several nesting locations for snowy egrets in the San Francisco Bay Area. They were recorded nesting at 7 sites in the southern Bay Area in 1982–1997 and 7 sites in the northern Bay Area in 1991–1997 (Kelly and Fischer, 1998; Ryan and Parkin, 1998). Results from various monitoring programs suggest an average of 500 to 600 snowy egret nests per year in the Bay Area in the mid-1990s. However, approximately 400 to 500 nests were present in the southern Bay Area alone in the mid-1980s. This is primarily a result of desertion of the Bair Island colony and a two-thirds reduction in the Mallard Slough colony (Ryan and Parkin, 1998). Desertion of the Bair Island colony may have been due to predation by red fox. These results suggest a recent decline in the southern Bay Area population and the San Francisco Bay Area as a whole.



Historic and Current Status of Alcatraz Population. Snowy egrets have nested on the Island each year since 1997. There were 3 nests in 1997, 11 nests in 1998, and 8 nests in 1999 (Hothem, 1999; Hothem, pers. comm., 1999). All of the nests have been located in the Tunnel Area, except for one nest in the Foghorn Area in 1999 (Hothem, pers. comm., 1999). Refer to Figure 3.1-3 for the location of nesting snowy egrets on Alcatraz Island.

Reproduction on Alcatraz Island. The snowy egret nesting season on Alcatraz Island occurs from late March to early July. In 1998 and 1999, dates of nest initiation ranged from late April to late May. Most chicks hatched in late May, although some hatched as late as mid-June. Nest outcome and fledge dates are only known for two nests, which fledged young in early June (Hothem, pers. comm., 1999). However, based on data collected elsewhere in the Bay Area (1989–1992), nest initiation can occur as early as late March and as late as mid-June, hatching dates range from late April to early July, and fledging occurs from mid-June to late August (Hothem, pers. comm., 2000). Two of the 3 snowy egret nests on Alcatraz hatched young in 1997, and 10 of the 11 nests hatched young in 1998. Six of 8 nests that were monitored in 1999 hatched one or more chicks, and 3 of them eventually fledged at least one chick (to 10 days of age). Two of the other nests failed before hatching: one was destroyed by a predator, and the other was not monitored long enough to determine its fate. Overall numbers of fledged young are unknown because most nests could not be revisited due to sensitive location (i.e., night-heron chicks were present in the area, and disturbance and subsequent predation by western gulls is highest after the gull chicks hatch in early June).

Sensitivity to Disturbance. There is little direct information from Alcatraz Island regarding when snowy egrets are most sensitive to disturbance, although it is expected to be similar to great egrets, which are most sensitive early in the nesting season, prior to incubation (Kelly, pers. comm., 2000). Point Reyes Bird Observatory biologists observed snowy egrets flushing as a result of disturbance during April (Thayer, pers. comm., 2000). Snowy egrets may also experience another sensitive period for the first two weeks after the chicks hatch, when the adults are more easily flushed, but the chicks should not be left alone. After two weeks of age, chicks may normally be left unattended, but are themselves sensitive to disturbance. At this age they become potential “runners” (not yet able to fly) and can be flushed dangerously far from their nests. They continue to be vulnerable to disturbance for at least a week after being left unattended by parents. Chicks begin flying at around four to five weeks of age (Kelly, pers. comm., 2000). The peak sensitivity period corresponds with the onset of pre-breeding activities in early March and continues until egg laying is complete, which may occur as late as mid-June.

Nesting colonies of snowy egrets and black-crowned night-herons on other islands in central and southern San Francisco Bay have been abandoned in recent years, following disturbance, or predation by non-native red fox and raptors (Kelly et al., 1995; Ryan and Parkin, 1998). Disturbance by humans (including tree trimming and other activities/disturbances within residential areas) has been associated with abandonment of at least 7 snowy egret/black-crowned night-heron colony sites in suburban areas of the northern San Francisco Bay region during the 1990s (Kelly, pers. comm., 2000).



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Placeholder for

Figure 3.1-3 Snowy Egret Nesting Subcolonies on Alcatraz Island



Black-Crowned Night-Heron (rookery). Black-crowned night-herons are colonial breeders that nest in a variety of fresh, salt, and brackish water habitats, provided there is suitable wetland habitat nearby for foraging. Night-herons nest in a wide variety of habitats, including cattails, bulrush, and other emergent vegetation, islands with shrubs (including Alcatraz Island, Bair Island, West Marin Island, Brooks Island, Red Rock, and Lake Merritt in San Francisco Bay Area), trees in neighborhoods, in groves of trees tens to hundreds of feet off the ground up to several miles from water, and in areas with little or no vegetation (e.g., rubble piles at Alcatraz Island). Nests are built at a wide range of heights and on a variety of substrates, including deciduous and evergreen trees, vines, and cattails. Night-herons build platform nests constructed of sticks, twigs, or stems of whatever vegetation is available (Davis, 1993). On Alcatraz Island, night-herons construct nests in woody vegetation, including mirrorbush, fig, blackberry, ivy, Australian tea tree (*Leptospermum laevigatum*), rose, mimosa (*Albizia lophantha*), Victorian boxwood tree, and Monterey cypress, with the majority of nests built in mirrorbush.

Regional Status. Black-crowned night-herons nest at several colonies in the San Francisco Bay Area, but since at least 1990, Alcatraz Island has supported one of the largest colonies (Hothem, 1999). Night-herons nested at 7 sites in the southern Bay Area in 1982–1997 and 8 sites in the northern Bay Area in 1990–1995. Results from various monitoring programs suggest an average of 700 to 800 night-heron nests per year in the Bay Area in the mid-1990s. Apparently, however, there has been a notable decline in the southern Bay Area from nearly 600 nests in 1982 to 300 to 400 in the mid-1980s and 200 to 250 by the mid-1990s (Ryan and Parkin, 1998). Numbers of nests in the northern Bay Area do not appear to have decreased during the 1990s, ranging from an estimate of 377 in 1991 to 481 in 1998, with a peak of 729 in 1995. Although this is due in large part to the peak in the population on Alcatraz Island in the mid-1990s, the difference may partly reflect relatively greater detectability of hidden nests on Alcatraz, where observers directly entered nesting areas, than at other colonies which were monitored from the perimeter (Kelly, pers. comm., 1999). For example, in 1992, the boat survey of West Marin Island counted less than 50 night-heron nests, while the on-the-ground survey conducted by Roger Hothem located approximately 300 nests (Hothem, pers. comm., 2000). Actual numbers of night-herons counted during boat surveys represent gross estimates. Regional estimates, therefore, represent relative numbers due to the difficulty in detecting night-herons (Kelly et al., 1993; Ryan and Parkin, 1998).

Historic and Current Status of Alcatraz Population. The first reported nesting of black-crowned night-herons on Alcatraz Island occurred in 1975 (NPS files). Nests occur in 11 subcolonies on the Island: Auxiliary Dock, Dock, Bench, Rubble, Tunnel, Greenhouse, Recreation Yard, Foghorn, Power Plant, Wall, and Shower. In 1999, chicks were heard from at least one nest on the steep slope below the southwestern side of the Cellhouse. Because the site was inaccessible to the biologist, it was not possible to determine the exact number of nests, but one to three were estimated. The subcolonies are spread over the Island, yet the majority occur in the southern area. Refer to Figure 3.1-4 for the location of black-crowned night-heron subcolonies on Alcatraz Island. Nests in each subcolony have been monitored since 1990.

The total number of active night-heron nests has ranged from a low of 124 in 1991 to a high of 341 in 1996. These totals reflect the minimum number of nests, because late or replacement nesting attempts are not counted after early June if the subcolony is in close proximity to large numbers of western gulls. Since 1996, the number of nests has declined each year (Hothem, 1999), and there were only 163 nests in 1999 (Hothem, 1999, preliminary data). The vast majority of nests (83 percent) in 1999 were located on the south coast (i.e., Auxiliary Dock, Dock, Bench, Rubble, and Tunnel). Over the years of the study, there has been a general decrease in the percentage of nests in the central area (i.e., Greenhouse, Recreation



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Figure 3.1-4 Black-crowned Nigh-heron Nesting Subcolonies on Alcatraz Island



Yard, Wall, and Shower) and a general increase in the percentage of nests on the south coast. The main decrease has occurred at Greenhouse. It is believed that night-herons stopped utilizing this area, in part, as a result of the increase in fig stem density, making it difficult to penetrate the vegetation. The concurrent increase in nests on the south coast is likely due to the dramatic increase in vegetation in the Rubble and Tunnel subcolonies.

Reproduction on Alcatraz Island. The nesting season for black-crowned night-herons on Alcatraz occurs from early March through September. Courtship and nest building begin about one week prior to the first egg being laid (Palmer, 1962). The earliest date of nest initiation (the day the first egg is laid) has been fairly consistent, ranging between mid- and late March. Although night-herons only have one brood per season, they will re-nest if the first brood is unsuccessful. As a result, nest initiation has occurred as late as July 24 (Hothem, 1999). The latest dates for complete colony departure have varied substantially, ranging from August 10 to October 6, although in most years (6 of 9) it has occurred by mid-September (Hothem, 1999).

Nest success of night-herons on Alcatraz has fluctuated substantially between 1990 and 1999. Similar variations in productivity have been documented at other locations throughout the species' range. The reasons for fluctuation in productivity have not been documented and are unknown.

Sensitivity to Disturbance. Effects of disturbance to black-crowned night-herons associated with researchers entering colonies have been well documented. Little data, however, are available on disturbance impacts associated with visitors and construction-related activities. Research has shown that black-crowned night-herons are most sensitive to disturbance in the early stages of the nesting cycle, during courtship and nest construction when they are establishing territories (Tremblay and Ellison, 1979; Parsons and Burger, 1982; Erwin 1989). Disturbance during the pre-laying period may result in almost complete abandonment with less adverse impacts during the egg and chick period, although Tremblay and Ellison (1979) did observe abandonment and nestling mortality as a result of some post-hatching disturbance. Disturbance mortality may be the result of complete abandonment, breakage of eggs, as well as exposure of unprotected eggs and young to adverse temperatures and/or predation. It has been noted by Kelly (pers. comm.) that heron colonies are highly variable in their response to humans. Night-heron colonies at Napa and Santa Rosa, for instance, tolerate limited human presence while other colonies flush easily at the approach of people. Work by Erwin (1989) with mixed species colonies revealed that night-herons always flushed before other species of herons and egrets.

Based on monitoring conducted on Alcatraz Island, territory establishment and early breeding activities typically occur from March through May. The peak sensitivity period is expected to correspond with the beginning of pre-breeding activities, which may occur as soon as early March, and continue until the end of egg laying, which occurs as late as late July. In addition, night-heron chicks and adults on Alcatraz are susceptible to attack and predation by western gulls, particularly after most gull chicks hatch in early June. Disturbance to gulls and/or night-herons during this period increases attacks on night-herons. Night-heron eggs are also susceptible to predation by gulls and common ravens when eggs are left unattended as a result of disturbance. Nocturnal predation by great-horned owls on adult herons and egrets is also suspected on Alcatraz and may have caused some birds to abandon the Island during 2000.

Researchers and National Park Service staff have noted that response to disturbance on Alcatraz varies between subcolonies and may be attributable, in part, to density of vegetation and proximity to visitors. Acclimation of night-herons to people may reduce the effects of disturbance in subcolonies closer to the public, while more isolated subcolonies are more easily disturbed by human presence. Researchers and National Park Service staff have also noted that night-herons on Alcatraz and in Santa Rosa and Napa appear to be less sensitive to human presence beneath their colonies than when approached from above.

During activities related to a premiere for the movie "The Rock" in early June, night-heron behavior was monitored for response to crane operations at the Sallyport and Morgue areas, groups of visitors, public address systems on ferry boat tours, and aircraft overflights. The Wall and Power Plant night-heron subcolonies were



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monitored during crane operations. Researchers observed a number of adults and chicks in alert postures, flight, normal chick "chattering," and alarm calling. Alarm calls occurred less often, usually when disturbance was loud or close to the individual. As activities increased in these areas the night-herons retreated into the vegetation and remained hidden and silent until activity stopped late at night. Immediately after work stopped and lights were turned off, night-heron chicks and adults resumed normal activity as observed prior to arrival and operation of the barge and crane. Observations indicated that large night-heron chicks habituated to heavy equipment operation and construction activities within one day (Hatch, 1996). The most visible, but unquantifiable, effect of the premiere activities appears to have been increased aggression of gulls directed toward fledgling night-heron chicks that were inexperienced flyers or still unable to fly. The timing of the premiere coincided with peak gull hatching, when gulls normally display increased aggression. The year following the premiere, both the Wall and Fog Horn night-heron subcolonies experienced a decline in numbers of nests. It is unknown whether the decline is directly attributable to the premiere event, or other off-site events occurring during that breeding season.

Nesting colonies of snowy egrets and black-crowned night-herons on other islands in central and southern San Francisco Bay have been abandoned in recent years, following disturbance, or predation by non-native red fox and raptors (Kelly et al., 1995; Ryan and Parkin, 1998). Disturbance by humans (including tree trimming and other activities/disturbances within residential areas) has been associated with abandonment of at least 7 snowy egret/black-crowned night-heron colony sites in suburban areas of the northern San Francisco Bay region during the 1990s (Kelly, pers. comm., 2000).

Black Oystercatcher (nesting). Black oystercatchers select territories on marine shorelines that provide both foraging and nesting sites. Although they avoid vegetated habitats, oystercatchers use a variety of nest sites, including mixed sand and gravel beaches, cobble beaches, exposed rocky shorelines, and offshore boulders. Nest structure ranges from bare rock or sod to a composite of rock flakes and shell fragments (Andres and Falxa, 1995).

Regional Status. The expansion of breeding black oystercatchers into the San Francisco Bay occurred in the mid-1980s. Nests were confirmed on Brooks Island in 1985, and there was one nest on Yerba Buena Island and Marin Island in 1990. In 1989, 3 nests were recorded on the Point Reyes National Seashore, 5 nests on Año Nuevo Island, and 15 nests on the southern Farallon Islands (Carter et al., 1992). In 1999, 3 nests on Año Nuevo Island and 15 nests on Southeast Farallon Island were confirmed (Mills et al., 1999; PRBO, 1999, preliminary data).

Historic and Current Status of Alcatraz Population. Black oystercatchers were first observed nesting on Alcatraz in 1995, when a nest was discovered above the seawall below the Laundry Building (Hatch, pers. comm.). Refer to Figure 3.1-5 for the location of the black oystercatcher nesting area. It is thought that Alcatraz Island can only support one pair of breeding oystercatchers, due to the small size of the Island and their highly territorial behavior. Nesting was confirmed in 1995–1998. One chick was presumed



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Figure 3.1-5 Black Oystercatcher Nesting Subcolonies on Alcatraz Island



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fledged each year from 1995 to 1997, but no chicks fledged in 1998. In 1999, a pair was present in the same area during the pre-breeding season, but the site was abandoned in mid-April (see below) (Point Reyes Bird Observatory, 1999, preliminary data).

Reproduction on Alcatraz Island. The black oystercatcher nesting season on Alcatraz Island occurs from mid-February to August. Adults have been observed in the nesting area as early as mid-February, and eggs have been observed in late April. In 1997, chicks hatched in late May, while in 1998, small chicks were not observed until late June. In 1997, a fully feathered chick was observed in early July (Thayer et al., 1999, Fairman et al., 1998). The chicks present in 1998 did not fledge but if they had survived, they would not have been fully feathered until early August. Because the chicks observed in 1995–1997 were mostly to fully feathered, nesting attempts in those years are presumed to have been successful. The nest in 1998 was not successful and a nesting attempt was not confirmed in 1999 (Point Reyes Bird Observatory, 1999, preliminary data).

Sensitivity to Disturbance. There is no known information regarding when black oystercatchers are most sensitive to disturbance. Human disturbance is known to cause breeding pairs to abandon nest sites (Andres and Falxa, 1995), but there is no indication of when during the breeding period they are most sensitive to disturbance. In 1999, a pair of oystercatchers was present at the breeding site in March and early April, but they abandoned the area following an incident on April 17 when two jet skis moored to the Island in the breeding area. The oystercatchers continued to be seen and heard elsewhere on the Island, but did not return to the breeding area until June 13 (Point Reyes Bird Observatory, 1999, preliminary data). It is presumed they did not nest in 1999 as a result of this incident. Oystercatcher chicks are vulnerable to predation by gulls and ravens since they are precocial (born mobile, downy and follow the parents) but are unable to fly for at least 5 weeks.

Western Gull. Western gulls breed on islands along the Pacific coast. Nests are usually on offshore islands, although rocky islets, abandoned piers, and channel markers may also be used. Preference is given to dry, well-drained substrates in rocky or vegetated areas with cover for protection from predators and shelter from prevailing winds. Western gulls often nest in large colonies, but many pairs nest solitarily. The nest is a bowl-shaped depression scraped into the substrate, and is typically lined with vegetation and feathers (Pierotti and Annett, 1985).

Regional Status. Western gulls breed in numerous locations on the coast and within the San Francisco Bay. In 1990, Carter et al. (1992) estimated 1,636 nests at 59 sites within the bay, including 463 nests (28 percent) on Alcatraz Island. In 1989, an estimated 691 nests were present on the Point Reyes National Seashore and 11,123 on the southern Farallon Islands (Carter et al., 1992). In 1999, an estimated 9,883 were present on Southeast Farallon Island (Mills et al., 1999). Data from Año Nuevo Island include estimates of 691 nests in 1989, 637 in 1998 and 775 in 1999 (Carter et al., 1992; Point Reyes Bird Observatory, 1999, preliminary data).

Historic and Current Status of Alcatraz Population. Western gulls likely nested on Alcatraz Island before Europeans occupied the Island in the mid-1800s. In approximately 1973, western gulls re-colonized the Island (Pollack and Howell, 1991). Annual western gull surveys on Alcatraz were initiated in 1990 (Bell, 1990).

The number of gull nests observed was relatively consistent in 1995–1998, ranging from 455 to 541. In 1999, the number was considerably higher (699), but this may be due, in part, to additional areas being surveyed and a change in survey personnel. Nests are distributed across most of the Island, although a high proportion of nests occur on the southeastern section of the Island, primarily on the Parade Ground. In each year since 1995, this area has accounted for 22 percent to 27 percent of nests on the Island. The Cistern located on the northern portion of the Island has also had a relatively high proportion of nests, ranging from 10 percent to 13 percent (Brown, 1999; Point Reyes Bird Observatory, 1999, preliminary data). Both of these are primarily flat, concrete areas.



Reproduction on Alcatraz Island. The western gull nesting season on Alcatraz Island occurs from mid-April through August, however, pre-breeding activity starts as early as January when males return and begin to establish territories. The gulls begin nest building in mid-April and lay eggs from late April through early June, although they will lay a replacement clutch if the first is destroyed. The peak hatching period occurs in early June, and most chicks fledge from early July to late August (Annett and Pierotti, 1995; Point Reyes Bird Observatory, 1999, preliminary data).

Western gulls on Alcatraz generally produce 1 to 2 fledglings per year (Bell, 1991; Brown, 1998; Brown, 1999). This is considerably higher than western gulls on Southeast Farallon Island where productivity has declined drastically in the past decade (Mills et al., 1999).

Sensitivity to Disturbance. Of all the species on Alcatraz, western gulls are probably the least likely to abandon a nesting colony due to disturbance as they are highly adaptable and generally breed in the same location for their entire life. Western gulls are most sensitive to disturbance during the time between when their young hatch and fledge (Gillett et al., 1975; LSA Associates, Inc., 1993; Spear, pers. comm., 1999). Consequently, the peak sensitivity period for western gulls is early June to mid-August. If they are disturbed during this period, nestlings/fledglings are susceptible to being pecked by other gulls within the colony. When disturbed, chicks leave their nests and run through the colony. As a result, they may get lost or run into territories held by other gulls. Small chicks may be consumed outright by other gulls, while larger chicks may suffer severe pecking, often to death. Chicks are vulnerable to predation by ravens during the day and by owls at night. Nest loss contributes to mortality of young in other nests, because birds that have lost eggs or chicks often roost in the nesting area and may prey on eggs and chicks in the remaining nests during periods of disturbance (Hand, 1980; Spear, pers. comm., 1999). In addition, crushing of eggs and chicks in nests often occurs when adults land on them after being disturbed and caused to flush (Brown, 1996). Disturbance monitoring has also concluded that if gulls are disturbed during the chick-hatching and rearing period, they become more aggressive toward other nesting bird species.

There are some indications that continuous or more frequent human presence may be less disruptive to western gulls than sporadic bursts of traffic from irregular contact with researchers or visitors (Bell, pers. comm.). Western gull productivity on Alcatraz has been higher in some years in areas adjacent to constant visitor traffic, but this may be a function of nest sites that are more sheltered from exposure to the elements (Thayer, et al., 2000). Robert and Ralph (1975) found that western gulls habituated to regular intrusion by researchers on the Farallon Islands. However, western gull nests in close proximity to constant human traffic on Alcatraz create other problems, including aggressive attacks on people, harassment of gulls by visitors, as well as sanitation and disease concerns.

Western gull disturbance monitoring was conducted during activities associated with "The Rock" premiere, which coincided with the peak gull hatching period. Multi-level monitoring was conducted throughout this event to assess the impacts of increased human traffic, equipment noise, and exterior lighting on gull behavior and reproductive success (Brown, 1996). Results from censuses conducted prior to and following the disturbance showed that approximately 23 percent (approximately 100 nests) of the western gull nests were lost during the period of the event. However, almost half of this nest loss occurred on the Parade Ground, where activity from the event was limited; these losses are more likely due to disturbance from other unrelated incidents that occurred during the same week as the premiere.

Detailed monitoring of the Cistern subcolony, which was adjacent to the premiere activities, revealed several effects on nesting gulls (Brown, 1996). During the full showing of the film, approximately 60 percent of the birds were driven from their nests numerous times. In addition, after-hours exterior lighting frequently illuminated nesting areas throughout the event and resulted in temporary nest abandonment by most of the subcolony. Mortality rates appeared to be substantially higher than normal. Nest loss and mortality during the



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event may have resulted from increased disturbance to nesting areas, including intrusion, elevated noise levels (movie soundtrack and crane operation), and excess lighting.

Pigeon Guillemot. Pigeon guillemots utilize rocky coastline with suitable nest sites near shallow water areas for foraging. They nest in burrows and cavities, often on small islands, and usually form small colonies, although they also nest in isolated pairs. Nests are built in existing cavities, but guillemots will also excavate burrows in earth or sand (Ewins, 1993).

Regional Status. Alcatraz Island is the only place in the San Francisco Bay where pigeon guillemots are known to nest. Outside the Bay in 1989, an estimated 308 nests were present on the Point Reyes National Seashore (Carter et al., 1992). On Año Nuevo Island, an estimated 8 nests were present in 1989 (Carter et al., 1992), 5 nests were confirmed in 1998, and 4 nests were confirmed in 1999 (Point Reyes Bird Observatory, 1999, preliminary data). On the southern Farallon Islands, estimates include 932 nests in 1989 and 234 nests in 1999 (Carter et al., 1992; Mills et al., 1999). The Farallon Island pigeon guillemot population has declined significantly over the last decade, which has increased the importance of the coastal colonies, including those at Point Reyes and Alcatraz.

Historic and Current Status of Alcatraz Population. Pigeon guillemots were first observed nesting on the Island in 1982, but monitoring of nesting birds has only been conducted since 1996. Nests are located along the southwest cliffs from the Model Industries Building to the cliffs above the tidepools. Refer to Figure 3.1-6 for the known and probable location of pigeon guillemot nests on Alcatraz Island. They are established in natural crevices, small holes between rocks, broken pipes, and man-made holes formed in the cliffs to hold support beams (Thayer et al., 1999). The nests are difficult to monitor from the Island because most of the crevices are in cormorant colonies or are out of reach, so boat surveys have been conducted since 1997. This has increased the ability to identify nest sites, but does not allow observation of their contents. A minimum of 17, 14, and 22 nests were located in 1997, 1998, and 1999, respectively. These are the numbers of sites that were confirmed as active nests by observation of chicks and/or delivery of fish to the site. These may be low estimates if some nests failed early, prior to chick hatching. Additional sites were considered probable nests, based on regular attendance by adults (Thayer et al., 2000; Point Reyes Bird Observatory, 2000, preliminary data). There were 4, 7, and 9 probable sites in 1997, 1998, and 1999, respectively. Four of the probable sites in 1999 were located on the northern side of the Island near the Power House, and in 2000 nesting was confirmed at the Power House location (Point Reyes Bird Observatory, 2000, preliminary data).

Reproduction on Alcatraz Island. The pigeon guillemot nesting season on Alcatraz Island occurs from early April through August. In 1999, the first guillemots were observed rafting on the water in early April and were first seen on the cliffs in mid-April. The first delivery of fish, indicating the presence of chicks, was observed in late May. Observations of chicks were very minimal, but several mostly feathered chicks were



Placeholder for

Figure 3.1-6 Pigeon Guillemot Nesting Locations on Alcatraz Island



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observed at 2 nest sites in mid- to late July and a fully feathered chick was observed in late August. Due to the difficulty in monitoring guillemot nests on Alcatraz Island, no information is available on their productivity.

Sensitivity to Disturbance. There is no information regarding when pigeon guillemots on Alcatraz Island are most sensitive to disturbance. In general, they are known to abandon a breeding attempt if disturbed too frequently or if the adult is trapped, particularly during early incubation and early nestling periods (Ewins, 1993). This suggests their peak sensitivity to disturbance occurs from late April to late June. Additionally, in 2000 ravens were observed investigating occupied cavities and attempting to prey on chicks (Thayer, pers. comm.).

3.1.2.4 SPECIAL-STATUS BIOLOGICAL RESOURCES

The following is a description of relevant plant and wildlife species that have been afforded special recognition by federal and state agencies. This discussion is based on a review of previous biological studies, and has been updated with new state and federal listings, as described below. Special-status biological resources also include unique habitats or plant communities that are of relatively limited distribution, or are of particular value to wildlife. Sources used for the determination of biological resources status are as follows:

- **Plants** – *Special Plants List* (CDFG, 1999), *Rarefind: A database application for the use of the CDFG's Natural Diversity Database* (CNDDDB, 1999), and *Inventory of Rare and Endangered Vascular Plants of California* (CNPS, 1994).
- **Wildlife** – *Special Animals List* (CDFG, 2000), and *Rarefind* (CNDDDB, 1999)
- **Fish** – NOAA Essential Fish Habitat website (<http://swr.ucsd.edu/>).
- **Habitats** – *Rarefind* (CNDDDB, 1999) and *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland, 1986).

Electronic searches of the California Natural Diversity Database (CNDDDB, 1999), and the California Native Plant Society's Database (CNPS, 1999) were conducted to identify special-status plant and wildlife species potentially occurring on Alcatraz Island. Table 3.1-3 provides a complete list of the special-status plant and wildlife species potentially occurring in the project vicinity. A total of 20 special-status plants and 18 special-status wildlife species were identified as potentially occurring in the project vicinity. Of these, only 1 plant and 11 wildlife species were identified as potentially occurring on Alcatraz Island. Special-status plant and wildlife species that are not expected to occur on Alcatraz Island are not discussed further in this document.

3.1.2.5 SPECIAL-STATUS PLANT SPECIES

One special-status plant species has the potential to occur on Alcatraz Island: San Francisco campion (*Silene verecunda* ssp. *verecunda*). This plant is a federal Species of Special Concern and is on the California Native Plant Society's 1B List (considered rare or endangered in California and elsewhere). San Francisco campion occurs in sandy, mudstone, shale, and serpentine soils in chaparral, grassland, and coastal scrub and prairie habitats. There is marginally suitable grassland and coastal scrub habitat present on the Island for this plant, but none were observed during surveys (Lutsko Associates, 1992).



3.1.2.6 SPECIAL-STATUS WILDLIFE SPECIES

Special-Status Fish

The project area includes four evolutionarily significant units of chinook (Central Valley spring-run and winter-run) and steelhead trout (Central California Coast and California Central Valley) and designated critical habitat for chinook salmon (winter-run and Central Valley spring-run) and Central California coast steelhead.

Chinook Salmon (winter-run, Central Valley spring-run)

Distribution and Abundance. No specific information is available regarding the current status of winter-run or Central Valley spring-run chinook salmon within the Golden Gate National Recreation Area's management area. It is assumed that chinook within the vicinity of Alcatraz are present as migrating juveniles or adults. This assumption is based on recent data by Dr. Bruce MacFarlane, NMFS-Tiburon Labs, which indicate that most juvenile chinook salmon are using the Central Bay as a migratory corridor, with most captured fish found in high-energy environments rather than fine-grained depositional areas (MacFarlane, pers. comm., 2000). With respect to the Central Bay, most juvenile chinook using the Central Bay are moving along the northern corridor through Raccoon Strait and around the Tiburon peninsula (MacFarlane, pers. comm., 2000). High numbers of outmigrating chinook have been found around channels (e.g., Raccoon Strait) and few to none in low-energy environments such as at Crissy Field (San Francisco County) and China Camp (Marin County).

Adult Seasonality. There is some variability on the actual periods of adult and smolt movements in the Bay-Estuary reported in the literature. It is likely that the variation is due to differences in water year conditions during the evaluations. Winter-run chinook salmon reportedly enter San Francisco Bay from November through June enroute to spawning grounds on the Sacramento River (NMFS, 1997), although Herbold et al. (1992) indicate that this entry starts in January. Spring-run chinook salmon enter the Bay, as their name may suggest, between March and May (Moyle et al., 1989), although Herbold et al. (1992) report the migration period extending through July with the peak in June.

Juvenile Seasonality. Midwater trawl data by CDFG shows seasonal occurrence of chinook salmon smolts regularly between April and June with occasional catches from July through September within the Central Bay portion of the San Francisco Bay (Herbold et al., 1992). However, no distinction of stock is available. Peak movements of outmigrating winter-run juveniles occur between January through April (NMFS, 1997), although Herbold et al. (1992) report outmigration extending from mid-August through April. The general outmigration period for spring-run juveniles extends from mid-November through the end of May (CDFG, unpublished data, 1992).

Steelhead (Central California Coast and Central Valley ESUs)

Distribution and Abundance. It is assumed that juvenile or adult steelhead could also be present within the San Francisco Bay-Estuary near Alcatraz Island. The Bay is likely used as a migratory corridor between riverine habitat and the ocean. Unlike chinook salmon, there have been no occurrences of steelhead in beach seine surveys conducted by CDFG (data courtesy of CDFG Bay-Delta Stockton office) between 1980 and 1987 at Horseshoe Cove (Marin County) and Crissy Field (San Francisco County) or in midwater and otter trawls conducted for an U.S. Army Corps of Engineers study around Alcatraz Island (Bechtel, 1994). No information is available regarding movement corridors for either juvenile or adult steelhead.

Adult Seasonality. Adult steelhead have a prolonged period of entry into the Bay-Estuary (August through March) (CDFG, unpublished data, 1992).

Juvenile Seasonality. Juvenile emigration from the Bay-Estuary occurs from November through May (CDFG, unpublished data, 1992).



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Essential Fish Habitat

Existing Physical Habitat. Water depths around Alcatraz Island range up to 75 feet (Bechtel, 1994). Rocky intertidal habitat encompasses most of the shoreline around Alcatraz. Developed areas, mainly on the eastern side of the island, contain typical bank protection such as rock riprap and docks. A study was conducted under contract to the U.S. Army Corps of Engineers to describe habitat and fish conditions around the designated Alcatraz dredged material disposal site. A single bottom core sample, roughly 750 feet from shore, in the vicinity of the east side of Alcatraz Island nearest the Dock, was described as containing "redistributed sands" and "dredged materials" (Bechtel, 1994).

Coastal Pelagic Species and West Coast Groundfish. The National Marine Fisheries Service has determined that the Central Bay portion of the San Francisco Bay Estuary (San Rafael Bridge to Golden Gate Bridge to Bay Bridge) provides essential fish habitat (EFH) for coastal pelagic species and west coast groundfish. Specifically, this includes 18 fish species (Table 3.1-2). To date, the National Park Service has not surveyed any sites within its jurisdiction to determine the status of either coastal pelagic or west coast groundfish. All data used by the National Park Service for these species comes from California Department of Fish and Game (Bay-Delta Office) and data collected under contract to the U.S. Army Corps of Engineers.

Table 3.1-2
Central San Francisco Bay Essential Fish Habitat Species Occurrence at Alcatraz

Common Name	Scientific Name	Lifestage	Fishery Management Plan (1)	Alcatraz Presence
Northern anchovy	<i>Engraulis mordax</i> (Girard)	E,L,J,A	CP	2,3
Jack mackerel	<i>Trachurus symmetricus</i>	E,L	CP	
Pacific sardine	<i>Sardinops sagax</i> (Jenyns)	J,A	CP	
English sole	<i>Parophrys vetulus</i> (Girard)	J,A	GF	3
Starry flounder	<i>Platichthys stellatus</i> (Pallas)	E,L,J,A	GF	
Brown rockfish	<i>Sebastes auriculatus</i> (Girard)	J,A	GF	3
Pacific sanddab	<i>Citharichthys sordidus</i> (Girard)	E,L,J,A	GF	
Lingcod	<i>Ophiodon elongatus</i> (Girard)	J,A	GF	
Sand sole	<i>Psettichthys melanostictus</i> (Girard)	L,J,A	GF	
Leopard shark	<i>Triakis semifasciata</i> (Girard)	J,A	GF	
Spiny dogfish	<i>Squalus acanthias</i> (Linnaeus)	J,A	GF	
Big skate	<i>Raja binoculata</i> (Girard)	J,A	GF	3
Pacific whiting (hake)	<i>Merluccius productus</i> (Ayres)	E,L	GF	
Kelp greenling	<i>Hexagrammos decagrammus</i> (Pallus)	J,A	GF	
Southern shark	<i>Galeorhinus galeus</i>	J,A	GF	
Curlfin sole	<i>Pleuronichthys decurrens</i> (Jordan and Gilbert)	J	GF	
Bocaccio	<i>Sebastes paucispinis</i>		GF	
Cabezon	<i>Scorpaenichthys marmoratus</i> (Ayres)	J,A	GF	
OTHER				
Pacific herring				2

KEY: CP=coastal pelagic, GF=West coast groundfish, E=eggs, L=larvae, J=juvenile, A=adult

- Burczynski, J. 1991. Hydroacoustic survey of fish distribution and reaction to dredge disposal activities in San Francisco Bay. Final Report. 19 pp. February 1991.
- Bechtel Corp. 1994. DRAFT Alcatraz Marine Habitat Study: Task 3 and 4, results of reconnaissance field study and quantitative field study design. 61 pp. May 1994.

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3. No author. Fisheries Management Plan (FMP) species distributions in San Francisco, San Pablo and Suisun Bays.
<http://swr.ucsf.edu/hcd/loclist.htm>

California Brown Pelican. California brown pelican (*Pelecanus californicus*) is a state and federally listed endangered species. Brown pelicans build nests on rocky or brushy slopes of undisturbed coastal islands (Cogswell, 1977). They are not known to nest north of Monterey County. They are present year-round in San Francisco Bay with peak numbers in occurring in summer and fall, after the breeding season is over, and small numbers in winter and spring (Hatch, pers. comm., 1999). Occasional observations of small numbers of brown pelicans roosting on the Island have been in the tidepool area on the southern shore and on the western cliffs. These locations are remote from proposed repair and construction activities. The brown pelican would not be affected by the Proposed Action or alternatives and is therefore not discussed further in this EIS.

**Table 3.1-3
Special-Status Species Potentially Occurring in the Project Area**

Species	USFWS	CDFG	CNPS	Habitat	Potential For Occurrence
Plants					
Adobe sanicle <i>Sanicula maritima</i>	FSC	—	1B	Chaparral, coastal prairie, meadows and seeps, valley and foothill grasslands	Unlikely to occur; assumed extinct at occurrence site (CNDDDB, 1999).
San Francisco gumplant <i>Grindelia hirsutula</i> var. <i>maritima</i>	FSC	—	1B	Sandy or serpentine slopes and sea bluffs in coastal scrub, valley and foothill grasslands	Unlikely to occur. No serpentine soils on Alcatraz Island.
Beach layia <i>Layia carnosa</i>	FE	SE	1B	Sparsely vegetated coastal dunes	Unlikely to occur; presumed extirpated from occurrence site (CNDDDB, 1999).
San Francisco lessingia <i>Lessingia germanorum</i>	FE	SE	1B	Open sandy soils and dunes in coastal scrub	Unlikely to occur; no suitable habitat.
Santa Cruz microseris <i>Stebbinsoseris decipiens</i>	FSC	—	1B	Open sandy, shaly, and serpentine areas	Unlikely to occur; no suitable habitat.
White-rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE	SE	1B	Open dry, rocky slopes and grassy areas in valley and foothill grasslands	Unlikely to occur; no suitable habitat.
San Francisco popcorn-flower <i>Plagiobothrys diffusus</i>	FSC	SE	1B	Clay flats and grassy areas in coastal prairie and valley and foothill grasslands	Unlikely to occur; no suitable habitat.
Hairless popcorn-flower <i>Plagiobothrys glaber</i>	—	—	1A	Alkaline meadows and coastal salt marsh	Unlikely to occur; no suitable habitat.
Marsh sandwort <i>Arenaria paludicola</i>	FE	SE	1B	Freshwater marsh	Unlikely to occur; no suitable habitat.
San Francisco Campion <i>Silene verecunda</i> ssp. <i>verecunda</i>	FSC	—	1B	Open sandy areas in coastal prairie and scrub, chaparral, valley and foothill grasslands	Potential habitat present in coastal scrub and grassland onsite.
Presidio manzanita <i>Arctostaphylos hookeri</i> ssp. <i>ravenii</i>	FE	SE	1B	Open, rocky serpentine slopes in chaparral, coastal prairie and scrub	Unlikely to occur; no suitable habitat.
Franciscan manzanita <i>Arctostaphylos hookeri</i> ssp. <i>franciscana</i>	FSC	—	1A	Serpentine outcrops in chaparral	Unlikely to occur; extirpated from occurrence site (CNDDDB 1999).
Alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	—	—	1B	Alkali flats in annual grasslands, vernal pools	Unlikely to occur; no suitable habitat.



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**Table 3.1-3
Special-Status Species Potentially Occurring in the Project Area**

Species	USFWS	CDFG	CNPS	Habitat	Potential For Occurrence
Marin western flax <i>Hesperolinon congestum</i>	FT	ST	1B	Serpentine areas in chaparral, valley and foothill grasslands	Unlikely to occur; no suitable habitat.
Presidio clarkia <i>Clarkia franciscana</i>	FE	SE	1B	Serpentine outcrops in coastal scrub, valley and foothill grasslands	Unlikely to occur; no suitable habitat.
San Francisco bay spineflower <i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	FSC	—	1B	Sandy soil on terraces and slopes in coastal scrub, prairie, and dunes	Unlikely to occur; no suitable habitat.
Kellogg's horkelia <i>Horkelia cuneata</i> ssp. <i>sericea</i>	FSC	—	1B	Old dunes and coastal sandhills in closed-cone coniferous forest and coastal scrub	Unlikely to occur; no suitable habitat.
Round-headed Chinese houses <i>Collinsia corymbosa</i>	—	—	1B	Coastal dunes and prairie	Unlikely to occur; no suitable habitat.
San Francisco owl's clover <i>Triphysaria floribunda</i>	FSC	—	1B	Serpentine grasslands	Unlikely to occur; no suitable habitat.
Fragrant fritillary <i>Fritillaria liliacea</i>	FSC	—	1B	Usually serpentine or clay soils in coastal prairie and scrub, valley and foothill grasslands	Unlikely to occur; no suitable habitat.
INVERTEBRATES					
Mission blue butterfly <i>Icaricia icarioides missionensis</i>	FE	—	—	Coastal scrub; perennial lupines needed as host plants and for nectar	Unlikely to occur; no perennial lupines observed during plant surveys (Lutsko Associates, 1992).
Bay checkerspot butterfly <i>Euphydryas editha bayensis</i>	FT	—	—	Metamorphic soils, such as serpentine	Unlikely to occur; no suitable habitat.
FISH					
Central California coast steelhead & Critical Habitat <i>Oncorhynchus mykiss</i>	FT	—		Fresh and salt water	May occur in vicinity of island during migration
Central Valley steelhead <i>Oncorhynchus mykiss</i>	FT	—		Fresh and salt water	May occur in vicinity of island during migration
Spring-run chinook salmon & Critical Habitat <i>Oncorhynchus tshawytscha</i>	FT	ST		Fresh and salt water	May occur in vicinity of island during migration
Central Valley fall/late fall-run <i>Oncorhynchus tshawytscha</i>	FC	CSC		Fresh and salt water	May occur in vicinity of island during migration
Winter-run chinook salmon & Critical Habitat <i>Oncorhynchus tshawytscha</i>	FE	SE	—	Fresh and salt water.	May occur in vicinity of island during migration.
AMPHIBIANS					
California red-legged frog <i>Rana aurora draytonii</i>	FT	CSC	—	Streams and ponds with emergent or riparian vegetation	Unlikely to occur; no suitable habitat.
BIRDS					
Ashy storm-petrel (rookery) <i>Oceanodroma homochroa</i>	FSC	CSC	—	Nest on islands, in crevices beneath loosely piled rocks or driftwood or in caves	Potential nesting crevices on island but too much light present at night (Hatch, pers. comm.).
California brown pelican (nesting) <i>Pelecanus occidentalis californicus</i>	FE	SE	—	Coastal islands for nesting; forage just outside surf line	Winter visitor.

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Table 3.1-3
Special-Status Species Potentially Occurring in the Project Area

Species	USFWS	CDFG	CNPS	Habitat	Potential For Occurrence
White-tailed kite (nesting) <i>Elanus Leucurus</i>	—	SP	—	Grasslands, meadows, and marshes for foraging; isolated trees for nesting	Uncommon visitor during migration; not expected to nest onsite.
Rufous-winged hawk <i>Buteo regalis</i>	FSC	CSC	—	Grasslands, sagebrush flats, desert scrub	Uncommon visitor during migration; no nesting in CA.
Merlin <i>Falco columbarius</i>	—	CSC	—	Grasslands, foothills, marshes, open coast	Uncommon visitor during migration; no nesting in CA.
American peregrine falcon <i>Falco peregrinus anatum</i>	—	SE	—	Nests and roosts on protected cliff ledges, usually adjacent to lakes, rivers, or marshes for foraging	Occasional occurrences during migration and winter months; not expected to nest onsite.
California black rail <i>Laterallus jamaicensis coturniculus</i>	FSC	ST	—	Tidal salt, brackish, and freshwater marshes	Unlikely to occur; no suitable habitat.
Northern harrier (nesting) <i>Circus cyaneus</i>	—	CSC	—	Wetlands and open fields	Occasional occurrences; not expected to nest onsite.
Burrowing owl <i>Athene cunicularia hypugea</i>	FSC	CSC	—	Grasslands and agricultural fields	Occasional occurrences; not expected to nest onsite.
Bank swallow (nesting) <i>Riparia Riparia</i>	—	ST	—	Banks and bluffs of sandy soil for nesting; meadows, prairies, marshes and open fresh water for foraging	Unlikely to occur; no suitable habitat.
MAMMALS					
Yuma myotis <i>Myotis yumanensis</i>	FSC	CSC	—	Roost sites include caves, mines, buildings, bridges and trees; maternity colonies occur in coast redwoods, Ponderosa pines, and oaks.	May roost on the site.
Southern sea otter <i>Enhydra lutris nereis</i>	FT	—	—	Near shore coastal areas with kelp	Unlikely to occur; no suitable habitat.

— not listed for this agency

U.S. Fish and Wildlife Service (USFWS) Federal Listing Categories:

FE Federal Endangered

FT Federal Threatened

FSC Federal Species of Special Concern

California Department of Fish and Game (CDFG) State Listing Categories:

SE California Endangered

ST State Threatened

SP California Fully Protected

CSC California Species of Special Concern

California Native Plant Society (CNPS) Categories:*

1B Plants rare, threatened, or endangered in California and elsewhere.

1A Plants presumed extinct in California.

* CNPS is a private non-profit organization that works closely with CDFG throughout the state. CNPS-developed information serves as an important source of data for consideration by CDFG and USFWS in recommendations for listing State or Federal threatened and endangered plant species.

Source: EDAW & NPS, 1999



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Raptors. Several species of raptors have been observed on Alcatraz Island, including peregrine falcon (*Falco peregrinus*), white-tailed kite (*Elanus leucurus*), red-shouldered hawk (*Buteo lineatus*), ferruginous hawk (*Buteo regalis*), American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), northern harrier (*Circus cyaneus*), and burrowing owl (*Athene cunicularia hypugae*). Peregrine falcon is a state-listed endangered species, white-tailed kite is fully protected by CDFG, and the remaining raptors are California Species of Special Concern. Although National Park Service is not required to comply with state regulations, it is National Park Service policy to comply with these regulations to the extent possible. Peregrine falcons nest on bridges in the San Francisco Bay and on the outer Marin coast. They are occasionally observed flying in the vicinity of the Island, but nesting has not been documented. White-tailed kite, ferruginous hawk, and merlin have been observed infrequently during migration, and red-shouldered hawk and American kestrel have been observed in winter (National Park Service file information). A single northern harrier was first seen on the Island in April 2000. Nesting has not been documented (Thayer, pers. comm., 2000). Burrowing owls have also been observed occasionally, but nesting has not been documented (AINHR, 1980-1999).

Bats. Eight special-status bat species are known or expected to occur in the Golden Gate National Recreation Area (GGNRA). A one-day bat survey was conducted on Alcatraz Island in 1992 (Pierson, 1992). Acoustic surveys detected a single pulse, possibly from a red bat (*Lasiurus borealis*) (not a species of concern) in the trees on the road to the Cellhouse, and one possible observation of a bat was recorded near the tunnel west of the Recreation Yard. Mist netting was conducted, but no bats were captured.

The factors most likely limiting bat activity on the Island are frequent winds and scarcity of prey. Although results of this one-day survey did not indicate use of the Island by species of concern, it should not be considered definitive in demonstrating their absence, because potential roost sites are present at the Sallyport, Building 64, and the rubble piles on the Parade Ground (Pierson, 1992). At the time of the survey, potential roost sites in the attic of Building 64 did not have suitable crevices and access to the attic was not available. However, these conditions may have changed since the survey was conducted, and accessible crevices may now be present. The rubble piles located in the Parade Ground would not be disturbed as a result of the Proposed Action or alternatives, and this particular site is therefore not addressed further in this EIS.



3.2 Cultural Resources

3.2.1 REGULATORY SETTING

The proposed activities on Alcatraz Island that involve cultural resources must comply with Sections 106 and 110 of the National Historic Preservation Act of 1966, as amended. As part of its ongoing compliance with Sections 106 and 110, the National Park Service has identified historic properties on Alcatraz Island:

- Alcatraz Island was listed in the *National Register of Historic Places* at the national level of significance in 1978 under criteria A and C with commerce, engineering, military, and social/humanitarian themes designated as the areas of significance.
- In 1986, the Alcatraz Island was designated a National Historic Landmark (NPS, 1993). Its period of significance was 1847–1971. In terms of the National Historic Landmarks Program, the history of the Island is nationally significant under: Theme 5 (political and Military Affairs), subtheme 5b (1830–1860), and subtheme 5c (1865–1914); Theme 7 (American at work), subtheme 7j (Engineering), facet 5 (Military Fortifications); Theme 9 (Society and Social Conscience), subtheme 6b (Social and Humanitarian Movements), facet 2 (Humanitarian Movements), and subfacet c (Prison Reform) (Haller, 1985).

Also as part of its ongoing Sections 106 and 110 responsibilities, the National Park Service has undertaken the following on Alcatraz Island:

- **Programmatic Agreement.** In 1992, the National Park Service signed a Programmatic Agreement with the California State Historic Preservation Officer and the Advisory Council on Historic Preservation for operation and maintenance undertakings the historic properties within Golden Gate National Recreation Area (NPS, 1992). Alcatraz Island is a part of the Golden Gate National Recreation Area and is included in this Programmatic Agreement.
- **Graffiti.** In 1979, the National Park Service prepared an inventory of the graffiti from the Indian Occupation of 1969–1971 (Noxon and Noxon, 1979). Subsequent efforts related to the preservation of the graffiti have included a conservation evaluation (Rosenthal, 1996) and subsequent treatment of the Free in the American Flag Shield over the Main Cellblock (Rosenthal, 1999), a supplementary inventory of the graffiti in 1997 (Salisbury, 1997), Historic American Buildings Survey photographic recordation (Grogan, 1998 and 1999), and ongoing discussions with Native Americans on the treatment and interpretation for the graffiti (Scolari, 2000).
- **Historic Landscape.** In 1992, the National Park Service drafted a cultural landscape report for Alcatraz Island that identified significant historic resources related to the historic landscape and made recommendations for preserving and protecting them (NPS, 1993). A report on *Landscape Stabilization and Maintenance Guidelines for Alcatraz Island* was prepared in 1998.
- **Development Concept Plan (DCP).** In 1993, the National Park Service prepared the *Alcatraz Development Concept Plan and Environmental Assessment* (NPS, 1993) that included cultural resource management treatments of preservation, rehabilitation, and restoration for the contributing features of the Alcatraz Island National Historic Landmark. The recommendations of the 1992 cultural landscape report were incorporated into the DCP.
- **Golden Gate National Recreation Area List of Classified Structures Management Category Summary.** In 1998, the National Park Service prepared a list of all structures within the Golden Gate National Recreation Area and listed the management category of each. This list included structures on Alcatraz Island.



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In addition to the actions described above, the National Park Service has done the following as part of its specific Section 106 responsibilities related to the Proposed Action:

- **Initiated Public Involvement.** In December 1998, the National Park Service prepared a Scoping Announcement/Notice of Intent for the Alcatraz Historic Preservation and Safety Construction Program that provided the background and alternatives that were being considered as part of the project. Copies of scoping letters received are provided in Appendix A. No specific comments were received related to cultural resources.
- **Initiated Consultation with the State Historic Preservation Officer (SHPO).** In March 1999, the National Park Service sent a letter to the California Office of Historic Preservation to inform the SHPO about the project, and indicate that it was being reviewed under the Golden Gate National Recreation Area Programmatic Agreement. The letter stated that "While the National Park Service finds that the undertakings fall within the exclusions of the PA, it also finds that potential impacts to the natural environment require a process of environmental review under the National Environmental Policy Act (NEPA). All twelve undertakings are intended to have beneficial effect on the Island's historic resources. However, the majority of the undertakings are large-scale construction undertakings of lengthy duration due to the size, complexity and current state of deterioration of the Island's historic structures. Other proposed undertakings will involve historic resources that are located near areas of sensitive natural resource habitat. The environmental review process is intended to assess potential environmental impacts for the construction activities of the undertakings" (NPS, 1999). The California SHPO concurred that the proposed undertakings were in compliance with the guidelines of the Programmatic Agreement (California SHPO, 1999).

3.2.2 SIGNIFICANCE OF ALCATRAZ

Alcatraz Island was included as a unit of the Golden Gate National Recreation Area in 1972 because of its historical significance. Alcatraz is of special importance to the history of the military, including the United States Coast Guard, the federal penal system, Native American rights movement, and the evolution of the National Park Service (NPS, 1993). Please refer to Section 1.1 for additional information on Alcatraz's historic significance.

Alcatraz Island has been the site of events that have had an important impact on the nation as a whole from before the Civil War through the Native American occupation of 1969–1971. Its significance in the areas of military history, social history, and maritime commerce is enhanced by the integrity of the resource which follows from the fact that access to the Island has been strictly limited by the United States Government throughout its history. Maritime commerce was aided by the first U.S. lighthouse on the Pacific coast built here in 1854; its successor (built in 1909) still serves. By the start of the Civil War, Alcatraz was the key fort in the center of the most important Pacific port in nineteenth-century America. The fort mounted the first permanent cannons on the west coast of the United States, and featured a brick and masonry defensive barracks that may have been unique in the annals of American military architecture (Haller, 1985).

In the areas of modern military and social history, Alcatraz is noteworthy because it was the first official army prison in the nation. When it became a civilian penitentiary in 1934, it quickly gained nationwide attention due to its association with many of the most infamous criminals of the gangster era and the bloody escape attempts made from there. It is representative of the far end of the penological spectrum, since it was a prison designed for punishment and incarceration only, rather than rehabilitation. It is of national importance in this regard because of its use as the repository of incorrigibles throughout the federal prison system. It is certainly the best known prison in American history and, arguably, along with France's "Devil's Island," may be the most famous prison in the world (Haller, 1985).

Alcatraz again gained short-lived national attention when "Indians of all Tribes" occupied the Island on November 20, 1969, to gain attention for the needs of their people. A state of siege existed until June 1971 when



all of the remaining Indians were ejected (Haller, 1985). The Indian Occupation of Alcatraz Island from 1969 to 1971 was an event that awakened the country to the needs and concerns of indigenous peoples. While the occupation lasted only a short year and a half, it recognized now as one of the primary catalysts for the Native American civil rights movement in the United States.

3.2.3 CONTRIBUTING FEATURES OF ALCATRAZ ISLAND NATIONAL HISTORIC LANDMARK

The physical features of Alcatraz Island are a record of these significant aspects of the Island's history. The evolution of Alcatraz Island may be divided into five periods, each representing a major change in the pattern of use and development of the Island. These periods are Pre-Development (up to 1846), the Military Defense Era (1847–1907), the Military Prison Era (1907–1933), the Federal Penitentiary Era 1933–1963, and the Public Lands Era (1963–present) (NPS, 1993). The contributing features to the Alcatraz National Historic Landmark district can be broken down into the following sub-areas that reflect these five periods (DCP–NPS, 1993):

Wharf Complex. The wharf complex, located on northeast side of the Island, includes the Dock, Building 64, the guardhouse complex, remains of the Officer's Club, and a number of associated outbuildings. The Dock has historically been the point of entry onto the Island and remains so today (NPS, 1993).

Cellhouse and Lighthouse. The Cellhouse and the remains of the Lighthouse complex dominate the summit, or upper terrace, of the Island. They are surrounded by the shell of the Warden's House, the recreation yard, prisoner's morgue, and associated minor structures. These buildings and structures represent the Military Prison–era prison, which was modified by the Bureau of Prisons to be a federal penitentiary in 1933. The Civil War–era citadel and water cisterns are located underneath the basement of the Cellhouse (NPS, 1993).

Industries Complex. The Power House complex and Model Industries Building, located on the northern end of the Island, were built during the Military Prison era, and the Laundry Building was built by the Bureau of Prisons during the Federal Penitentiary era. This area also contains significant archeological remains of Military Defense–era fortifications located along the western side of the Island (NPS, 1993).

Parade Ground. The Parade Ground is located on the southern end of the Island, on the lower terrace. When the federal penitentiary closed in 1963, the Parade Ground was surrounded by Works Progress–era housing that created a community for prison staff and their dependents. Although all of the structures located on the Parade Ground were demolished in 1971 by General Services Administration (GSA) following the end of the Indian occupation, the remaining rubble piles confer a sense of spatial relationship of the structures and are a record of a tumultuous period of the Island's history (NPS, 1993).

Cultural Landscape. Located on the western and southern sides of the Island are the remains of the landscape features (paths, retaining walls, etc.) and plant materials that were planted and maintained by families during the era that the Island was a federal penitentiary (NPS, 1993). The cultural landscape features are located in the proximity of the Sallyport and Slope Stabilization projects.

Island-Wide Circulation System. The Island-wide circulation system of roads and pathways reflects the changing functions of the Island over time and tells the story of access on the Island and how it was curtailed (NPS, 1993).

Military Defense Structures. Many Military Defense–era structures and landforms remain on Alcatraz Island, both buried under and integrated into later development. These structures and landforms represent the first significant use of Alcatraz Island as a military defense installation and are located throughout the Island (NPS, 1993).



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Small-Scale Features. Small-scale features from all eras of development on Alcatraz Island, such as retaining walls, planters, benches, light fixtures, and stairways, remain in the landscape and are located throughout the Island (NPS, 1993).

Fencing. Fencing was one of the primary landscape features used by the Bureau of Prisons to convert Alcatraz from a military prison into a federal penitentiary. In many locations the fencing fabric is gone, but fence standards remain in place, providing a sense of the extent and purpose of the Bureau of Prisons fencing (NPS, 1993). Also remaining is fencing installed by GSA immediately after the end of the Indian Occupation.

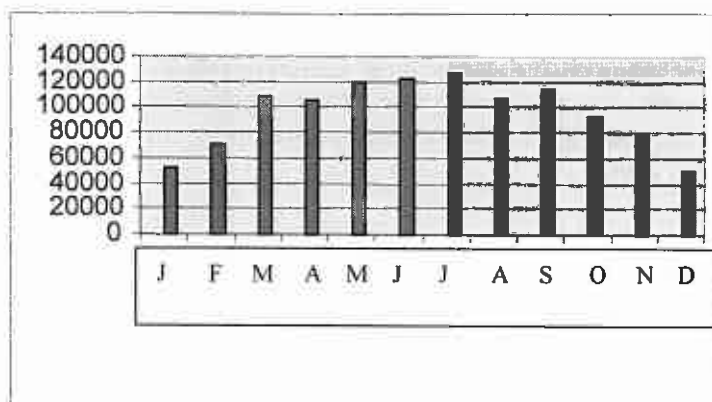


3.3 Recreation and Visitor Use

3.3.1 VISITOR USE AND INTERPRETATION

Alcatraz Island became part of the Golden Gate National Recreation Area in 1972. Since that time, it has become an increasingly popular destination for visitors of the park. Today, over 1 million people visit Alcatraz each year. Table 3.3-1 shows average monthly visitations, which is strong year-round, with peaks during the summer months.

Table 3.3-1
Average Monthly Visitation on Alcatraz (1996–1999)



Source: NPS Files, 2000

Over the years, the recreational and interpretive opportunities for Alcatraz visitors have continued to improve. During the early years as part of the National Park System, visitor use was primarily restricted to guided (i.e., ranger-led) tours, with a small museum that provided limited self-exploration opportunities. In 1987, the National Park Service completed an *Interpretative Prospectus* for the Island that redirected the approach to visitor use and interpretation. The prospectus envisioned opening the Island experience for visitors, including opportunities to enjoy the scenic beauty, and interpret the natural and cultural values of Alcatraz and currently guides the program uses on the Island along with the 1993 Development Concept Plan (DCP). The DCP identified which public access areas would be open year-round, open seasonally (during the non-breeding season) and closed year-round.

Today, the Island offers a variety of trails, programs, and exhibits that interpret the Island's history and natural resources, and allow visitors to explore Alcatraz at their own pace. The Island visitor center, which includes a theater, book store and exhibit space, is located at the Dock in the first floor of Building 64 (the Barracks). Regularly scheduled ranger-led tours of the Island are offered year-round. In the Cellhouse, self-guided audio tours and visitor bookstore are provided. Electric tram service is now provided, making the Island more accessible for all visitors.

In general, the southern half of the Island is open for public use and self-guided exploration with limitations during the seven-month breeding season for colonial waterbirds that nest on the Island. The Agave Trail provides scenic pedestrian access from the Dock along the southern end of the Island to the Parade Ground. The area along the trail and at the Parade Ground is a biologically sensitive area and is therefore closed to the general public during the breeding season (February through August). The primary attraction on Alcatraz is the Cellhouse, which is open year-round. The north end of the Island, although approved to provide year-round



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access along a trail in the 1993 DCP, is currently closed to visitors year-round, with some exceptions for ranger- or docent-led tours. This access, however, is restricted to the non-breeding season.

In addition to the seasonal restrictions for biologic resource protection, several areas and portions of buildings are closed due to public health and safety concerns. Safety concerns include structural instability, presence of hazardous substances and other public health and safety issues. Several safety concerns (i.e., seismic stability, spalling concrete, etc.) have also been identified in areas that are currently open to the public, and if the necessary repairs are not implemented additional closure of specific areas and potentially the Island as a whole could be necessary in the future. Restricting public access to the Island inhibits the opportunities for use, enjoyment and interpretation of Alcatraz. A detailed description of the existing conditions, including the repairs and current safety issues in these public areas, is provided in Chapter 2 under the No Action Alternative and the Proposed Action project descriptions.

During the daytime hours, ambient noise levels on Alcatraz Island are influenced primarily by human voices. Secondary noise sources, including on-site electric tram, aircraft overflights, ship traffic in the bay, water ferries, and wildlife (birds) also contribute to the existing daytime noise environment. These secondary daytime noise sources dominate the evening and nighttime noise environment during the hours of the day when public visitation is limited (EDAW, 2000).



3.4 Air Quality

The following is a discussion of the applicable air quality regulations and the existing regional air quality conditions in the vicinity of Alcatraz Island.

3.4.1 REGULATORY FRAMEWORK

The federal Clean Air Act (42 USC 7401 et seq.) and the California Clean Air Act mandate the establishment of national and state ambient air quality standards, respectively, for six criteria pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), inhalable particulate matter (PM₁₀) and lead. Areas in which the standards are not met are known as nonattainment areas. Alcatraz Island is located within the San Francisco Bay Area, which is currently designated as a federal nonattainment area for ozone and a state nonattainment area for ozone and PM₁₀.

Both the Organic Act of 1916, as amended and the Clean Air Act require federal land managers to protect a park's air quality values from adverse impacts. Section 118 of the Clean Air Act requires that federal facilities comply with existing federal, state, and local air pollution control laws and regulations. The National Park Service must ensure that in-park activities meet existing laws and regulations and that external sources of air pollution are controlled to the extent possible to protect the air quality and resource values of the Golden Gate National Recreation Area, including Alcatraz Island.

3.4.2 AIR QUALITY POLLUTANTS AND AMBIENT AIR QUALITY STANDARDS

Both the State of California and the federal government have established ambient air quality standards for several pollutants. For some pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). The pollutants of greatest concern in San Francisco County are CO, ozone and PM₁₀. Potential air emissions generated by the Proposed Action and alternatives are associated with construction activities. Construction-related emissions are generally short term in duration, but may still cause adverse air quality impacts. PM₁₀ is the pollutant of greatest concern with respect to construction activities.

3.4.3 EXISTING AIR QUALITY CONDITIONS

Alcatraz Island is located within San Francisco Bay Area Air Basin, which consists of San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Napa, and Marin counties, as well as portions of Sonoma and Solano counties. The Island is located within San Francisco County, which is designated as a federal nonattainment area for ozone and a state nonattainment areas for ozone and PM₁₀.

Winds at Alcatraz vary seasonally. Prevailing winds during the summer are westerly, while winter wind directions are more variable with northeast and west winds interrupted by periodic southeast gales. During storms, winds may reach speeds of 60 miles per hour or more. Generally, the location of Alcatraz allows for excellent air circulation, the air moving into the area is of very high quality. One of the primary sources of air pollution in the Bay Area region is automobile traffic—which is negligible on Alcatraz Island (i.e., an electric tram provides access for visitors, and one small truck is kept on the Island).



3.5 Hazardous Substances: Human Health, Safety, and the Environment

3.5.1 HAZARDOUS SUBSTANCES

The National Park Service Management Policies (2001), Chapter 9 Park Facilities, directs the parks to utilize the best management practices for all phases of construction activity. Under the direction of these policies, ground disturbance and site management will be carefully controlled to prevent undue damage to vegetation, soils, and archeological resources, and to minimize air, water, soil, and noise pollution. Protective fencing and barricades will be provided for safety, and to preserve natural and cultural resources. Effective storm water management measures specific to the site will be implemented, and appropriate erosion and sedimentation control measures will be in place at all times. Solid, volatile, and hazardous wastes will be stockpiled, transported, and disposed of, as appropriate, and in compliance with federal, state, and local laws and regulations. All materials will be recycled whenever possible.

Two hazardous substances that may be encountered during the repair and reconstruction projects on Alcatraz include asbestos and lead based paint. The GGNRA has the primary responsibility for identifying, managing, or removing hazardous substances on Alcatraz Island. Construction contracts for this project will include procedures for the sampling, identification, and cleanup of hazardous substances in accordance with applicable state and federal regulations.

Because buildings on the Island were constructed prior to 1978 when lead-based paint was banned for consumer use and before 1989 when the EPA imposed a ban on asbestos production and imports, buildings are assumed to contain these hazardous substances until proven otherwise. The extent of hazardous substances such as asbestos and lead-based paint that will be disturbed during rehabilitation and construction activities under the action alternatives will be determined prior to construction. The GGNRA will conduct surveys and sampling to identify, characterize, and quantify the nature the hazardous substances present in work areas and the extent that these materials will be disturbed by construction activity.

The GGNRA does not expect to encounter polychlorinated biphenyls (PCBs) during this project. A recent overhaul of the electrical system replaced the transformers containing PCBs while installing a new generator system on the Island. Some electrical lines will be replaced by the proposed action, yet no PCBs are anticipated because of the previous removal.

3.5.2 ASBESTOS

3.5.2.1 REGULATORY FRAMEWORK

The Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) regulates ACM (containing more than one percent asbestos). The EPA regulates asbestos as a hazardous waste under the Toxic Substance Control Act (TSCA), the Comprehensive Environmental Response and Liability Act (CERCLA), and the National Emission Standards for Hazardous Air Pollutants (NESHAP).

OSHA also regulates asbestos, focusing on the workers and procedures for the removing asbestos. Training and notifications are necessary for any employee handling asbestos, including sampling and removal, regardless of friability. Safety and health standards pertaining to employee or worker exposure to asbestos dust are covered under OSHA regulation 29 CFR 1910.1001. Required work practices are covered in the Construction Standard for the Asbestos Industry (40 CFR 1926.1101 or CFR Title 8 Section 1529).



In addition, because both TSCA and CERCLA list asbestos as a hazardous material, the Department of Transportation (DOT) in Title 49 of the Code of Federal Regulations has additional requirements regarding labeling and transportation of asbestos. Under California's Hazardous Waste Control Law, the California Department of Toxic Substances Control monitors compliance with applicable hazardous waste packaging, labeling, manifesting, transportation, and disposal requirements. All California shippers or transporters of hazardous waste must comply with these requirements.

3.5.2.2 EXISTING CONDITIONS

Asbestos is a mineral-based material that includes six fibrous silicate minerals that occur naturally in the earth's crust and are heat and chemical resistant. Because of the insulating and fire retardant properties, asbestos has been used extensively in a variety of construction materials including pipe and duct insulation, floor tiles, ceiling tiles, wall board, and roof and floor mastics. Asbestos presents a health hazard when asbestos particulates become airborne and are inhaled. Long-term overexposure to airborne asbestos can result in asbestosis (scarring of the lungs), lung cancer, and mesothelioma (cancer of the lining of the lungs and gut cavity).

Asbestos containing materials are divided into two categories to aid in assessing its potential hazard, friable and non-friable. Friable asbestos containing materials are those that when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable asbestos containing materials are those that when dry, may not be crumbled, pulverized, or reduced to powder by hand pressure. Friable ACM releases airborne asbestos particulates more readily than non-friable ACM. Preliminary assessments of the work areas will be conducted to evaluate the extent of potential ACM such as thermal insulation, surfacing materials, asphalt, and vinyl flooring. Some asbestos work has been done including limited removal of asbestos in the Cellhouse, however, new investigations will be conducted for work areas. Preliminary investigations indicate that structures that may contain asbestos include the Cellhouse, Building 64, and the Laundry Building. In addition, utility lines adjacent to the fuel lines in the utility chases may be insulated with ACM, although the fuel lines themselves appear metal. Exposure and removal of the fuel lines may disturb adjacent insulation that may contain asbestos. As stated in Chapter 2, Mitigation Measures, asbestos in or adjacent to work areas will be sampled, identified, and removed prior to the start of repair work. Additionally, the Slope Stabilization project has the potential to disturb asbestos that may occur naturally in the Island rock. If areas of rock are to be disturbed including drilling and demolition, the rock slope will be sampled by a certified asbestos inspector to determine if asbestos is bound in the rock and if so, if the asbestos would be exposed by work activity. Work areas will be surveyed prior to construction activity for the presence and extent of asbestos containing material that may be disturbed.

3.5.3 LEAD

3.5.3.1 REGULATORY FRAMEWORK

Federal regulation 40 CFR 261-272 established identification, handling and disposal requirements for hazardous waste including lead containing wastes. The Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X of the Housing and Community Development Act) established various programs for reducing exposures to lead, principally in paint. Title X calls for the reduction of lead in housing that is federally supported and outlines the federal responsibility towards its own residential units and the need for disclosure of lead in residences. The Interim Final Regulations of Lead in Construction Standards (29 CFR 1926.62) issued by the Department of Labor, Occupational Safety and Health Administration (OSHA), established permissible exposure limits and associated health and safety requirements for workers involved in lead-based paint activities. It is based in part on air sampling to determine the amount of lead dust generated by various activities. The EPA also has jurisdiction for setting standards for lead abatement under the Toxic Substance Control Act Title IV. The EPA controls the handling and disposal of hazardous waste generated during a removal project. The National Park Service also provides guidance, "Health Hazards of Asbestos, Lead, and Radon Gas in NPS Housing", which provides specific policies and procedures concerning the management of lead-based paint at parks.



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Under California's Hazardous Waste Control Law, the California Department of Toxic Substances Control monitors compliance with applicable hazardous waste packaging, labeling, manifesting, transportation, and disposal requirements. All California shippers or transporters of hazardous waste must comply with these requirements.

3.5.3.2 EXISTING CONDITIONS

Lead compounds were an important component of many historic paints. Lead, in the form of lead carbonate and lead oxides, had excellent adhesion, drying, and covering abilities. Lead-based paints were used extensively on wooden exteriors and interiors. Additionally, varnishes and window glazing putty used in the past contained lead compounds.

Lead presents a health hazard when fine dust or fume containing lead is inhaled or ingested. Lead dust and chips are generated by mechanical disturbance of lead paint, such as grinding or sanding. Welding or torch cutting surfaces with lead paint generates lead fume. Lead exposure by inhalation poses the greatest risk because lead fumes and fine dust are readily absorbed into the blood system. Most lead poisonings are the result of prolonged exposure, not a single event.

In 1978, lead-based paints sale for consumer use was banned. However, lead-based paint can still be found in historic buildings such as those on the Island. The Secretary of the Interior's Standards for the Treatment of Historic Properties, calls for removing, controlling, or managing the hazards rather than wholesale or even partial removal of the historic features or finishes. This is generally achieved through careful cleaning and treatment of deteriorating paint, friction surfaces and surfaces accessible to young children. Lead-based paint that is not causing a hazard is thus permitted to remain, and, in consequence, the amount of historic finishes features and trimwork removed from a property is minimized.

This EIS focuses on the handling and disposal of lead-based paint found in work areas that will be removed prior to construction and rehabilitation activities. The buildings and structures on the Island that are assumed to have lead-based paint and finishes until proven otherwise are Building 64, the Cellhouse, the Sallyport, the Water Tower, the Laundry Building and the Quartermaster Building. Additionally, lead may be found in the soil around the structures if extensive chipping or wear has occurred. Work areas will be surveyed prior to construction activity for the presence and extent of lead-based paint and finishes that may be encountered.