

6.18 INDIA BASIN SHORELINE PARK

GENERAL DESCRIPTION AND LOCATION

The India Basin Shoreline Park (India Basin) Natural Area is located adjacent to Hunters Point Boulevard in San Francisco, at the shore of San Francisco Bay (Figure 1-1). India Basin is the only Natural Area within the San Francisco Recreation and Park Department (SFRPD) system that borders on San Francisco Bay. The Natural Area, located in the park's southern section, comprises approximately 6.2 acres of the entire 11.8-acre park (Figure 6.18-1). Only the southern third of the entire park is considered a Natural Area.

As the only Natural Area adjacent to the Bay, India Basin has high unique natural resource and recreational values that include: recreational trail use on a segment of the Bay Trail; shoreline access to the Bay for fishing, kayaking and other water-dependent recreation; one of only a few tidal salt marsh wetlands in the City; suitable habitat for a variety of shore birds and foraging habitat for raptors; and views of the San Francisco Bay.

Phase 1 improvements, which included walkways, picnic tables with barbecue units, benches and a restored wetland, were completed in 1996. In 1998, the Recreation and Park Commission approved a conceptual plan for Phase 2 improvements, such as grading pathways, irrigation, and landscaping. The benches, pathways, and irrigation have been completed. Trailside landscaping was completed in December 2005. A restoration project was conducted at India Basin Natural Area in 2000 as part of a mitigation project associated with the San Francisco International Airport. The overall goal of this project was to enhance wetland functions and create a salt marsh area suitable for use by a variety of species. This project involved the enhancement of 0.4 acres of degraded tidal wetland, and the development of an additional 2.4 acres of tidal wetland and approximately 1.2 acres of tidal upland vegetation (DPW 2000). As of June 2002, the wetland creation and enhancement and trail development had been completed. Installation of additional trailside planting, wetland buffer and upland planting is continuing by the Natural Areas Program. Additionally, shrubs, trees, and grasses are being planted on the levee slopes in an effort to improve the quality and structural diversity of the Natural Area.

GEOLOGY, HYDROLOGY, AND TRAILS

The entire park consists of fill material, with paved and earthen trails and native plant and habitat landscaping (Figure 6.18-2). Elevations within the Natural Area range from sea level to approximately 25 feet above sea level. The hydrology of the Natural Area is influenced by the tidal actions of San Francisco Bay. Most of San Francisco Bay adjacent to India Basin is less than 10 feet deep. Some of these shallow mudflats are exposed at low tides.

VEGETATION

Based on aerial photo interpretation and ground-truthing, the vegetation of the Natural Area at India Basin was classified into four series (Table 6.18-1; Figure 6.18-3). These series are within three sub-formations: approximately 48 percent of the area is grassland, 51 percent is wetland (original and restored) and slightly over 1 percent is developed.

Grassland, Wetland, and Other

One wetland series, saltgrass/pickleweed, was mapped at India Basin. Saltgrass/pickleweed wetlands occur in many small patches (totaling 0.53 acres) along the shoreline of the Natural Area. This acreage includes approximately 2.61 acres of a restoration area that has been planted in saltgrass/pickleweed wetlands. Annual grasslands (2.96 acres) occur on and above the levee (above mean high water).

Sensitive Plant Species

Two species of sensitive plants, marsh gumplant (*Grindelia stricta* var *angustifolia*) and alkali heath (*Frankenia salina*), are found within the wetlands at India Basin (Figure 6.18-4). Additionally, the saltgrass/pickleweed wetland at India Basin is one of two areas within the entire Natural Areas System where this series occurs (the other population can be found at Sharp Park [Section 6.4]). The California Natural Diversity Data Base (CNDDDB) does not report the occurrence of any sensitive plant species at India Basin (CNDDDB 2005).

Invasive Plant Species

The only upland vegetative series, annual grassland, is dominated by invasive species. Invasive smooth cordgrass (*Spartina alterniflora*) occurs at the nearby Shoreline Park and efforts are underway to address this invasive weed through the Bay-Area-wide Invasive Spartina Project. This species is highly invasive and can out-compete native vegetation. In addition, it can survive more inundation than the native California cordgrass (*Spartina foliosa*) with which it also appears to hybridize (Ayres et al. 1999).

WILDLIFE

Birds

The habitat of India Basin may provide some foraging habitat for raptors and shorebirds. The grassland, wetland, and mudflat habitats of India Basin may provide foraging habitat for raptors such as red-tailed hawks (*Buteo jamaicensis*), which are commonly seen foraging in grasslands and perched in trees. The extensive mudflats of India Basin provide extensive foraging habitat for a wide variety of shorebirds. As these populations increase with fall migrants and winter residents, they provide prey for resident and migrant peregrine falcons (*Falco peregrinus*); a

state endangered species. Habitat for smaller birds is limited by the lack of scrub and mosaic habitats throughout the Natural Area.

Sensitive Bird Species and Important Bird Habitat

There are ten species of birds that are considered locally sensitive that have been observed at India Basin (Table 6.18-2). Several of these species are found at no other Natural Areas: black oystercatcher (*Haematopus bachmani*), pelagic cormorant (*Phalacrocorax pelagicus*), Brandt's cormorant (*Phalacrocorax penicillatus*), and pigeon guillemot (*Cepphus columba*). None of these species, or the other seven sensitive species that have been observed here, breed within India Basin. The CNDDDB does not report the occurrence of any special-status species of birds from India Basin (CNDDDB 2005). The habitat of India Basin provides potential foraging habitat for several species of raptors, including red-tailed hawks and peregrine falcons, both of which are sensitive species.

Three areas have been delineated as important bird habitat within India Basin (Figure 6-18-4). The first two are the restored wetlands and mudflats that currently support nesting American avocet (*Recurvirostra americana*) and killdeer (*Charadrius vociferus*). The saltgrass/pickleweed areas are too small to provide nesting or roosting habitat for sensitive birds such as the California black rail (*Laterallus jamaicensis coturniculus*) or California clapper rail (*Rallus longirostris obsoletus*). Both species are protected under the State or Federal Endangered Species Acts. The more extensive saltgrass/pickleweed area in the Natural Area may provide habitat for common yellowthroat (*Geothlypis trichas*). Restoration of high-quality pickleweed marsh may eventually create habitat for California clapper rail and California black rail; however, neither species currently exists at this location. The third important bird habitat area includes the grasslands in the southern portion of the Natural Area, which provide habitat for western meadowlark (*Sturnella neglecta*) and foraging habitat for raptors.

Mammals

To date, no mammal surveys have been conducted at the India Basin. The CNDDDB does not report the occurrence of any sensitive mammal species within the area (CNDDDB 2005). Creation of dense pickleweed stands as part of restoration efforts may eventually create habitat for the endangered species such as the salt marsh harvest mouse (*Reithrodontomys megalotis*). Currently, habitat for this species does not exist within the Natural Area. There is an anecdotal report of red fox (*Vulpes fulva*) from India Basin. Other larger mammals such as raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*) and Virginia opossum (*Didelphis virginiana*) are typical of urbanized parks in general and are expected to occur within the India Basin Natural Area.

Reptiles/Amphibians

To date, no surveys for reptiles or amphibians have been conducted in the India Basin area. The CNDDDB does not report the occurrence of any sensitive reptile or amphibian species within the area (CNDDDB 2005). Common reptiles such as western fence lizard (*Sceloporus occidentalis*) and western terrestrial garter snake (*Thamnophis elegans*) may occur on site.

MANAGEMENT AREAS

India Basin has been divided into three Management Areas (MA-1a, MA-2a, and MA-2b) (Figure 6.18-5). The more sensitive and important habitat, salt marsh wetland, has been delineated as MA-1a. The buffer area between the restored wetlands and the upland habitat at India Basin, including the knee-high water refuge habitat for animals, has been delineated as MA-2a. The annual grasslands, scrub, and oak habitat areas under development located inland of the other two Management Areas are delineated as MA-2b.

ISSUES AND RECOMMENDATIONS

Several conservation and recreation-related issues have been identified for India Basin. Recommendations developed for each of these issues will guide restoration, enhancement, and maintenance work. In the following discussion, system-wide issues and recommendations (GR-1 for example; see Chapter 5) that apply to the entire Natural Area at India Basin are presented first within each topic area, followed by site-specific issues and recommendations. Site-specific recommendations are keyed to the Management Area in which they should occur.

Site Improvements – Implementation of management recommendations at India Basin Shoreline Park would not change significantly the overall look of the park and would result in:

- protection and enhancement of grassland and upland refuge habitat;
- protection and enhancement of salt marsh wetlands and shorebird habitat;
- beautification of some park entry points with designed native plant gardens;
- enhancement of critical upland buffer habitat, including shrubs and trees;
- improved wildlife habitat; and
- upland erosion control to protect restoration areas and the San Francisco Bay.

Implementation of the following recommendations will result in a stable and productive salt marsh at India Basin that will benefit resident and migratory birds. Additionally improved recreational opportunities, improved water quality, and reduced erosion are all potential benefits of this plan.

Vegetation

Issues relating to vegetation management at India Basin involve the protection of sensitive species and habitats, typically through the control of invasive plants (GR-1) and management of sensitive species and vegetation series of limited distribution (GR-2). No trees will be removed from India Basin. Grassland recommendations as specified in GR-3 will maintain and improve habitats. Issues relating to the general safety of visitors and surrounding homes, fire hazards posed by vegetation and trees, and illicit activities must be considered during management of the Natural Areas (GR-13). In addition to these general recommendations, the following site-specific issues should be addressed.

Issue IB-1: Wetland and grassland habitats and populations of sensitive species are at risk of diminishing due to habitat loss and invasive species. Invasive vegetation such as bur clover is encroaching into the restored salt marsh vegetation at India Basin. Smooth cordgrass, which occurs at the park, can grow prolifically if left unchecked. Both of these species can out-compete native vegetation and create a mono-culture that provides essentially no habitat value.

Recommendation IB-1a: To maintain and enhance the existing salt marsh habitat, and prevent smooth cordgrass and other invasive species from colonizing, monitor the salt marsh for this and other invasive species (MA-1a). Reduce and contain any infestations of invasive species, such as bur clover, vetch and pampas grass, within the upland Management Areas (MA-2a and MA-2b).

Recommendation IB-1b: Removal of invasive species from within the wetland and upland areas creates opportunities to maintain and enhance salt marsh and grassland habitats. The upland areas (MA-2b) shall be maintained and enhanced as a grassland-coastal scrub mosaic that includes trees to provide shade and habitat complexity, scrub vegetation to provide shelter and food sources for animals, and grasslands. Planting plans shall be developed using diversity, cover, and density targets generated from reference sites within and around San Francisco (see Appendix B). Where appropriate, for example, at the park entrance, modify the plant list and installation design to create a landscaped entrance.

Recommendation IB-1c: In order to prevent extinction of rare or uncommon species at India Basin, SFRPD shall augment populations of alkali heath and marsh gumplant by direct seeding or planting in MA-1a.

Wildlife

Wildlife issues at India Basin involve the protection and enhancement of habitat, including shelter and food resources. Vegetation management during the breeding season can impact nesting birds (GR-4), an impact that should be avoided. Reduction in predation pressures will

benefit all animals within the Natural Area (GR-7). In addition to these general recommendations, the following site-specific issues should be addressed.

Issue IB-2: Wildlife populations at India Basin are limited by a lack of cover, food sources, and structural complexity in upland habitats.

Recommendation IB-2a: Maintenance and enhancement of the existing grassland-scrub mosaic (IB-1b) in MA-2a and MA-2b will benefit small bird and mammal populations at India Basin by improving habitat complexity and food supplies. Plant species selected shall create structural diversity, and provide food and shelter for wildlife. Species will be planted in mixed groups to maximize habitat complexity and a multitude of food sources.

Recommendation IB-2b: Install low-growing plants that will create a partial vegetated screen between the trail and MA-2a. This landscaped trail edge should discourage encroachment and provide a buffer at the human/wildlife interface.

Soils, Erosion, and Public Use

The erosion and public use issues at India Basin are relatively minor. The existing designated trails (1885 feet) at India Basin appear to be stable and are not impacting existing sensitive habitats. These trails shall remain and the Natural Area monitored for creation of new social trails (GR-11). Existing erosion problems are addressed through implementation of GR-11 and GR-12 (Section 5). Interpretive signs regarding the ecosystem of India Basin should also be considered (GR-14).

Issue IB-3: Erosion is occurring on the face of the levee. Construction of the path through the area did not allow for drainage off of or behind the pathway, further exacerbating the erosion problems.

Recommendation IB-3a: SFRPD shall continue to increase the vegetation density in this area. Specific problem areas may require more aggressive control measures such as installation of coir rolls, erosion control fabric, brush boxes, brush wattling (see Section 5.3 for specific erosion control Best Management Practices), or changes to the path to improve drainage. All control measures shall include installation of native plants to ensure the long-term stability of the slope.

Issue IB-4: Salt marsh vegetation is a sensitive habitat at India Basin. Off-leash and off-trail activities can degrade this habitat and harm wildlife, especially nesting birds. On-trail use with on-leash dogs would greatly reduce this impact; however, leash laws are currently rarely enforced.

Recommendation IB-4a: There are 3.1 acres of salt marsh habitat at India Basin located next to or surrounding trails. If park users (and dogs) stay on trails, no further access restrictions or fencing would be required. However, if lack of enforcement and

compliance with leash laws continues and/or damage to sensitive habitat areas is observed SFRPD should consider restricting access to these sensitive habitat areas, as described in the Dog Policy, including physical barriers. Permanent physical barriers are viewed as a last resort to be used only after signage and other soft solutions have been shown to be ineffective. If fences are installed, public access would still be allowed on designated trails; however, low trailside fencing would be installed to discourage people and dogs from drifting off-trail (see Appendix H for examples of low rustic fencing). In the case of India Basin, fencing would only need to be installed along the earthen paths leading to the wetland and not along the paved road. An estimate of 400 linear feet of fencing would be required to line the paths.

Table 6.18-1. Vegetation series mapped at India Basin Shoreline Park.

	Vegetation Series	Total Acreage
Grassland	annual grassland	2.96
Wetland	saltgrass/pickleweed marsh*	0.53
Other	restored area	2.61
	developed	0.08
	Subtotal	2.69
Grand Total		6.17

* Indicates vegetation type is dominated by native species.

Table 6.18-2. Sensitive species presently and historically known to occur at India Basin Shoreline Park.

Species	Common Name	Status Federal, State, CNPS	Occurrence Status
ANIMALS			
<i>Haematopus bachmani</i>	Black Oystercatcher	LS	Presently occurs
<i>Phalacrocorax penicillatus</i>	Brandt's Cormorant	LS	Presently occurs
<i>Anas strepera</i>	Gadwall	LS	Winter resident
<i>Phalacrocorax pelagicus</i>	Pelagic Cormorant	LS	Presently occurs
<i>Cepphus columba</i>	Pigeon Guillemot	LS	Presently occurs
<i>Falco sparverius</i>	American Kestrel	LS	Presently occurs
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	-	Presently occurs
<i>Aechmophorus clarkii</i>	Clark's Grebe	LS	Presently occurs
<i>Pandion haliaetus</i>	Osprey	LS	Presently occurs
<i>Sayornis saya</i>	Say's Phoebe	LS	Winter resident
PLANTS			
<i>Frankenia salina</i>	Alkali-heath	LS	Presently occurs
<i>Grindelia stricta</i> var. <i>auquistifolia</i>	Marsh Gumplant	LS	Presently occurs

Status Key:

Federal Status

- FE* Endangered. Species in danger of extinction throughout all or significant portion of its range.
- FT* Threatened. Species likely to become endangered within foreseeable future throughout all or a significant portion of its range.
- FPE* Proposed for listing as endangered.
- FC* Candidate for listing as endangered. Candidate information now available indicates that listing may be appropriate with supporting data currently on file.
- FSC* Species of Concern. Former Category 2 Candidate for listing as endangered.
- FPD* Proposed de-listing.

California State Status

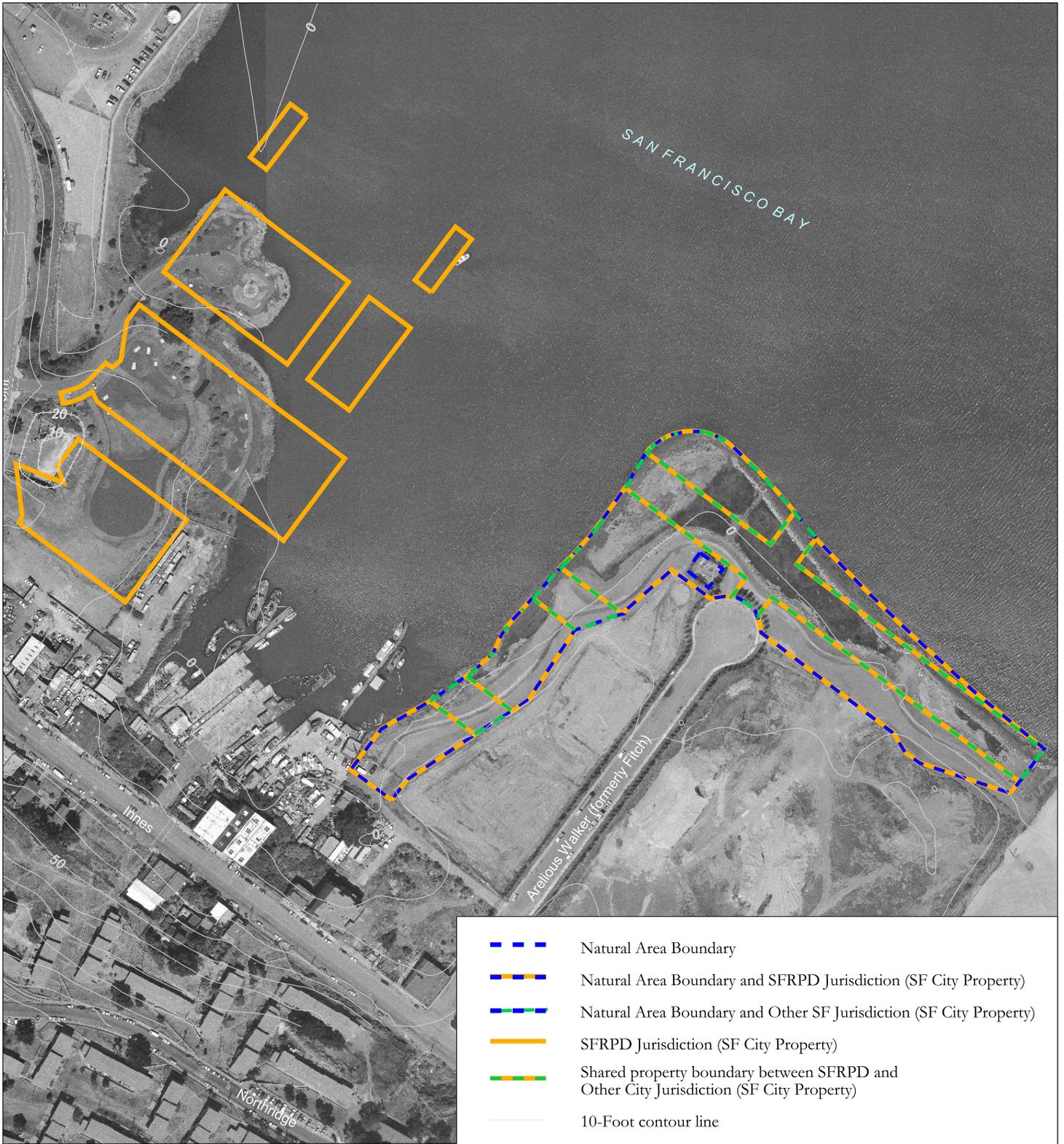
- SE* Endangered. Species whose continued existence in California is jeopardized.
- ST* Threatened. Species, although not presently threatened with extinction, that is likely to become endangered in the foreseeable future.
- SSC* Species of Concern.
- SFP* State Fully Protected under Sections 3511 and 4700 of the Fish and Game Code.
- Sens* Considered a sensitive species by the California Department of Forestry.

California Native Plant Society

- 1A Plants presumed extinct in California
- 1B Plants that are rare or endangered in California and elsewhere.
- 2 Plants that are endangered in California, but more common elsewhere.
- 3 Plants about which more information is needed.
- 4 Plants of limited distribution (a watch list).
- LS Locally Significant.

Golden Gate Audubon Society

- LS Locally Significant.



- - - Natural Area Boundary
- - - Natural Area Boundary and SFRPD Jurisdiction (SF City Property)
- - - Natural Area Boundary and Other SF Jurisdiction (SF City Property)
- SFRPD Jurisdiction (SF City Property)
- Shared property boundary between SFRPD and Other City Jurisdiction (SF City Property)
- 10-Foot contour line

Source: Aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1-foot resolution, 2001; property boundary data derived by San Francisco Recreation and Park Department (RPD) 2005 from data provided by San Francisco Department of Telecommunications and Information Services, 2002; natural area boundary data created by San Francisco State University Institute for GISc from information provided by RPD's Natural Areas Program (NAP), 2005; contour lines provided by San Francisco Department of Conservation; all data are California State Plane Zone III, NAD 83.

Created by Debra Dwyer, San Francisco State University Institute for GISc, May 5, 2002, revised August 21, 2005.

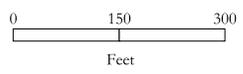
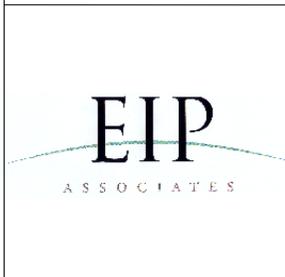
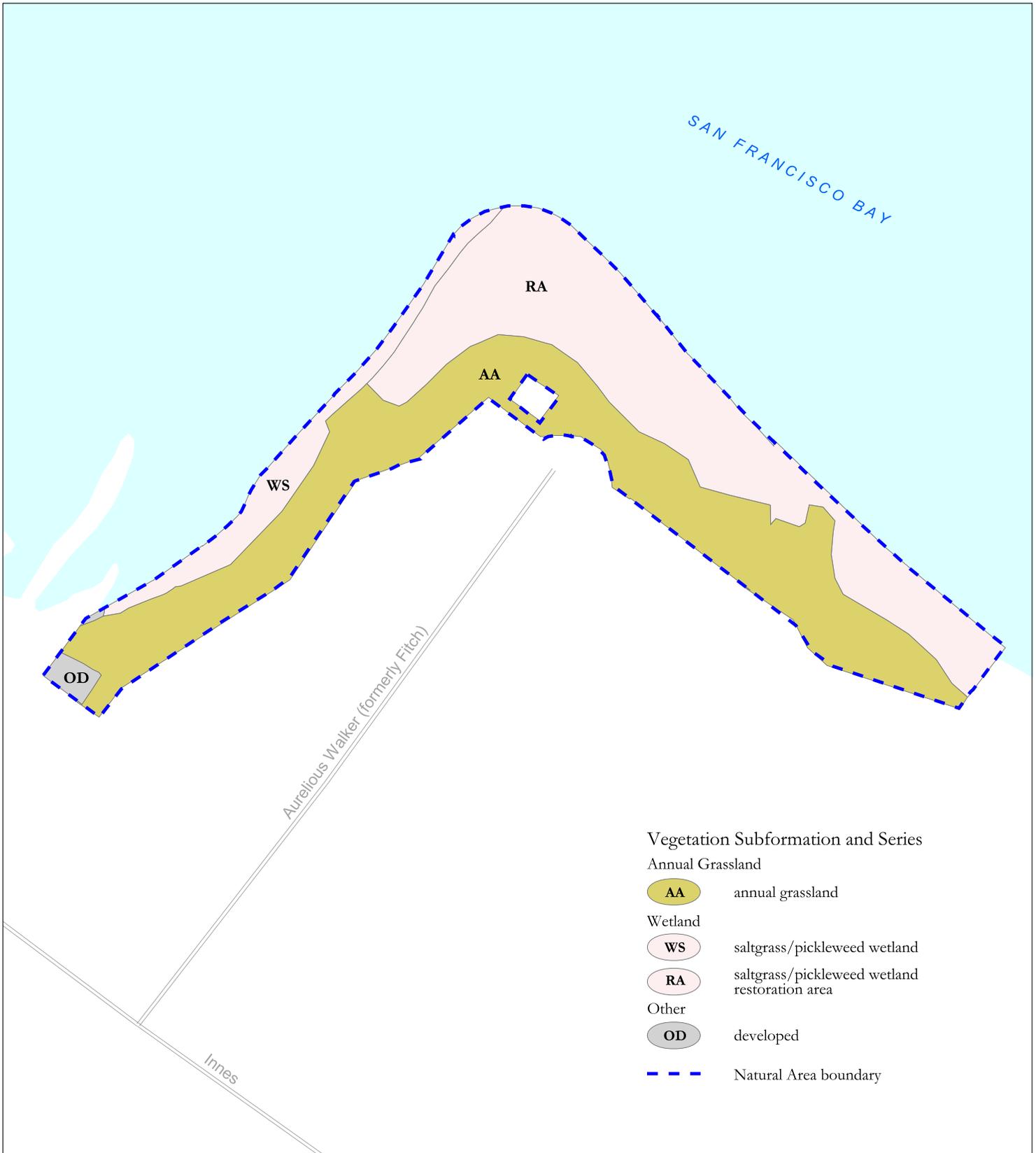


FIGURE 6.18 - 1
AERIAL PHOTOGRAPH,
PROPERTY BOUNDARIES,
AND NATURAL AREAS

India Basin
Shoreline Park
 Significant Natural Resource Areas
 Management Plan
 San Francisco, California





Source: Vegetation data collected by San Francisco Recreation and Park Department Natural Areas Program (NAP), San Francisco State University Biology Department, and EIP Associates, 1999-2000; vegetation digitized by Geotopo, Inc., 2000; edited and corrected by San Francisco State University Institute for GISc (SFSUGIS), 2000; natural area boundary created by SFSUGIS from data determined by NAP, 2005; streets data excerpted from ArcView StreetMap by Environmental Systems Research Institute, Inc. ESRI, copyright 1998-2001.

Created by Debra Dwyer of San Francisco State University Institute for GISc November 2, 2001, revised October 13, 2005.

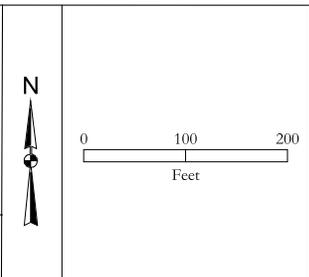


FIGURE 6.18 - 3
VEGETATION
India Basin Shoreline Park
Significant Natural Resource Areas
Management Plan
San Francisco, California



Sensitive Species and Important Bird Habitat

- - - Natural Area boundary
- Marsh Gumplant
- Marsh Gumplant area
- Alkali-Heath
- Important Bird Habitat
- vegetation series boundary



Source: Sensitive species data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2001-2005; vegetation data collected by NAP, San Francisco State University Biology Department, and EIP Associates, 1999-2000; vegetation layer digitized by Geotopo, Inc., 1999 - 2000; edited and corrected by San Francisco State University Institute for GISc (SFSUGIS), 2000; important bird habitat data digitized by NAP from information provided by the Golden Gate Audubon Society, 2005; natural area boundary created by SFSU IGIS from data determined by NAP, 2005; streets data excerpted from ArcView StreetMap 2000 data, copyright Environmental Systems Research Institute, Inc. (ESRI), 1998-2000.

Created by Debra Dwyer of San Francisco State University Institute for GISc, November 2, 2001; revised October 16, 2005.

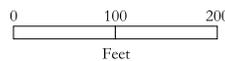
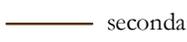
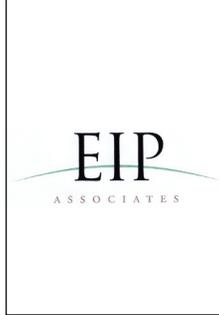


FIGURE 6.18 - 4
SENSITIVE SPECIES
AND IMPORTANT
BIRD HABITAT
India Basin Shoreline Park
Significant Natural Resource Areas
Management Plan
San Francisco, California



Mgmt Area	Action
MA-1a	<ul style="list-style-type: none"> Maintain salt marsh wetland Augment sensitive plant populations Discourage public access in wetland except on designated trails. Install fences if necessary
MA-2a	<ul style="list-style-type: none"> Maintain and enhance a grassland-scrub wetland buffer
MA-2b	<ul style="list-style-type: none"> Maintain and enhance a grassland-scrub mosaic with trees for shade and habitat Beautify entrances by landscaping with showy habitat plants
Natural Area Wide Management Actions <ul style="list-style-type: none"> Reduce and contain herbaceous and woody weeds No invasive tree removal unless specified above Prevent recruitment of invasive trees unless specified above Total trails to remain: 1,885 linear-feet Provide access on designated trails only Social trails subject to closure Total invasive trees to remove: 0; Total invasive trees to remain: 0 Implement erosion control as required (GR-12) Implement wildlife enhancements as appropriate 	

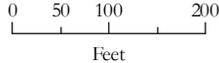
Management Areas		Trails	
	management area 1		primary
	management area 2		secondary



Source: Management areas and trails data collected by San Francisco Department of Recreation and Park Natural Areas Program (NAP), 2005; trails data digitized by San Francisco State University Institute for GISc (SFSUGIS), 2005; streets data excerpted from Environmental Systems Research Institute (ESRI), Inc.'s Street-Map 2000 data copyright ESRI 1998-2001; aerial photography San Francisco Department of Public Works, 2002, Orthophoto - San Francisco - 1-foot resolution - 2001; all data are in California State Plane Zone III projection, NAD 1983; map produced using ArcGIS 9.0 software by ESRI.

Map created May 29, 2005 by Debra Dwyer, San Francisco State University, Institute for Geographic Information Science, revised August 21, 2005.





0 50 100 200
Feet

FIGURE 6.18 - 5
MANAGEMENT AREAS
AND TRAIL PLAN
India Basin Shoreline Park
Significant Natural Resource Areas
Management Plan
San Francisco, California