Palo Alto Baylands

Comprehensive Conservation Plan DRAFT

Prepared for:

City of Palo Alto

March 2019

CITY OF PALO ALTO

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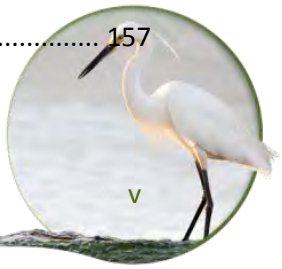

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Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
Bay	San Francisco Bay
Bay Area	San Francisco Bay Area
Baylands	Palo Alto Baylands Nature Preserve
Bay Trail	San Francisco Bay Trail
BCCP	Baylands Comprehensive Conservation Plan
BCDC	San Francisco Bay Conservation and Development Commission
Cal-IPC	California Invasive Plant Council
Caltrans	California Department of Transportation
City	City of Palo Alto
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Comprehensive Plan	*City of Palo Alto Comprehensive Plan*
EIR	environmental impact report
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
Flood Control Basin	Palo Alto Flood Control Basin
Future Tidal Marshes Tool	Future San Francisco Bay Tidal Marshes planning tool
Interim Byxbee Park Master Plan	*Palo Alto Baylands Preserve, Byxbee Park Hills Interim Park Concepts Narrative*
IPCC	Intergovernmental Panel on Climate Change
KEY	Key Areas
LID	Low Impact Development
MHHW	mean higher high water
NRM	Natural Resources Management
OEI	Olofson Environmental, Inc.
OM	Operations and Management
OPC	California Ocean Protection Council

PA	Public Art
PAF	Public Access and Facilities
Parks and Recreation Master Plan	*Palo Alto Parks, Trails, Natural Open Space and Recreation Master Plan*
PE	Public Engagement
Point Blue	Point Blue Conservation Science
Public Art Master Plan	*City of Palo Alto Public Art Master Plan*
RWQCP	Regional Water Quality Control Plant
SAFER Bay	Strategy to Advance Flood Protection, Ecosystems and Recreation along the Bay
Sailing Station	Palo Alto Baylands Sailing Station
SCVWD	Santa Clara Valley Water District
SFBRA	San Francisco Bay Restoration Authority
SFCJPA	San Francisquito Creek Joint Powers Authority
SFEI	San Francisco Estuary Institute
Silicon Valley 2.0	*Silicon Valley 2.0 Climate Adaptation Guidebook*
Tidal Marsh Recovery Plan	*Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California*
U.S. 101	U.S. Highway 101
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1 Introduction

The Palo Alto Baylands Nature Preserve (Baylands) is an approximately 1,976-acre open space located along the edge of San Francisco Bay (Bay) in northern Santa Clara County (Figure 1). The Baylands include multiple habitats including wetlands, uplands, and marshes that provide important habitat for imperiled species such as the salt marsh harvest mouse (*Reithrodontomys raviventris*), Ridgway's rail (*Rallus obsoletus*), and western burrowing owl (*Athene cunicularia*). The Baylands provide a wide variety of recreational and educational benefits: wildlife viewing, hiking, bike riding, water sports, and use of public lands for art installations. The Baylands also include recreational facilities such as the Palo Alto Municipal Golf Course and the Baylands Athletic Center. Nonrecreational facilities within the Baylands include the Palo Alto Airport, the Baylands Ranger Station, and the City of Palo Alto (City) Regional Water Quality Control Plant (RWQCP). Operations and management of the Baylands are the responsibility of the Palo Alto Open Space, Parks & Golf Division.

The *Palo Alto Parks, Trails, Natural Open Space and Recreation Master Plan* (Parks and Recreation Master Plan) (City of Palo Alto 2017a) contains policies for the protection of natural habitat, natural ecosystems, and ecological principles throughout Palo Alto. The Parks and Recreation Master Plan calls for the development of a comprehensive conservation plan for the Baylands to "…identify strategies to balance ecosystem preservation, passive recreation, and environmental education. The protection of biological resources from visitor use impacts shall be the priority in these open space preserves" (City of Palo Alto 2017a).

1.1 Purpose of the Baylands Comprehensive Conservation Plan

The purpose of the Baylands Comprehensive Conservation Plan (BCCP) is to build upon the Baylands Master Plan Update (City of Palo Alto 2008) to articulate guiding principles for holistic management of the Baylands for the next 15 years and beyond. Implementation of the plan will provide continued opportunities for recreation access, education, and art while protecting natural resources, such as wildlife and functioning habitats. The BCCP also addresses trends such as climate change and sea level rise with the inclusion of an assessment of potential future impacts, combined with potential adaptation strategies.

The BCCP includes actions and best management practices (BMPs) that address natural resources management, public access and facilities, public engagement, public art, and operations and management. The BCCP also provides conceptual site plans for the recently acquired former ITT Property/Emily Renzel Wetlands and a master plan for Byxbee Park, a former landfill that has been closed, capped, and dedicated as parkland. The BCCP is a vision for the Baylands for the next 15 years; the intent of the plan is for this vision to be achieved within that time frame.

1.2 Planning Process

The BCCP builds upon previous plans and planning efforts: the 2008 Baylands Master Plan Update, the *City of Palo Alto Comprehensive Plan* (Comprehensive Plan), the *Palo Alto Baylands Preserve, Byxbee Park Hills Interim Park Concepts Narrative* (Interim Byxbee Park Master Plan), the City's Parks and Recreation Master Plan, and the *City of Palo Alto Public Art Master Plan* (Public Art Master Plan). The BCCP was developed with input from City of Palo Alto staff, including Baylands rangers, staff from other City departments, and Baylands partners.

Public involvement was critical for the preparation of the BCCP. The planning process included public and stakeholder outreach and engagement, which included four stakeholder workshops, presentations to the Palo Alto Parks and Recreation Commission, a user survey, site tours, and stakeholder review of draft deliverables. Chapter 3 and Appendix A present details of public and stakeholder engagement and outreach efforts.

1.3 Planning Framework

The BCCP is consistent with, and advances, the goals and policies set forth in other City plans including the Comprehensive Plan, Parks and Recreation Master Plan, and Public Art Master Plan.

Palo Alto Comprehensive Plan

The Comprehensive Plan, the City's general plan, contains goals and policies that reflect the community's priorities. The BCCP is consistent with the goals and policies of the Comprehensive Plan, particularly the following policies:

- **Policy N-1.1:** Preserve, protect, and enhance public and private open space and ecosystems.
- **Policy N-1.4:** Protect special-status species and plant communities.
- **Policy N-1.5:** Preserve and protect the Bay, marshlands, salt ponds, sloughs, creeks, and other natural water or wetland areas as open space, functioning habitats, and elements of a larger, interconnected wildlife corridor.
- **Policy N-1.7:** Carefully manage access and recreational use of environmentally sensitive areas.
- **Policy N-1.13:** Evaluate and mitigate the construction impacts associated with park and recreational facility creation and expansion.
- **Policy N-3.1:** All creeks are valuable resources for natural habitats, connectivity, community design, and flood control, and need different conservation and enhancement strategies.
- **Policy N-3.2:** Prevent the further channelization and degradation of Palo Alto's creeks.
- **Policy N-3.4:** Recognize that riparian corridors are valued environmental resources whose integrity provides vital habitat for fish, birds, plants and other wildlife, and carefully monitor and preserve these corridors.

- **Policy N-3.5:** Preserve the ecological value of creek corridors by preserving native plants and replacing invasive, nonnative plants with native plants.
- **Policy N-3.8:** Work with Santa Clara Valley Water District (SCVWD), the San Francisquito Creek Joint Powers Authority (SFCJPA), and other relevant regional and nongovernmental agencies to enhance riparian corridors, provide compatible low-impact recreation and ensure adequate flood control.
- **Policy N-4.13:** Encourage Low Impact Development (LID) measures to limit the amount of pavement and impervious surface in new development and increase the retention, treatment and infiltration of urban stormwater runoff. Include LID measures in major remodels, public projects, and recreation projects where practical.

Palo Alto Parks, Trails, Natural Open Space and Recreation Master Plan

The City's Parks and Recreation Master Plan provides a vision for all parks, trail, and open spaces in the city of Palo Alto, including the Baylands, and includes goals and policies that further the needs of the community. The BCCP specifically addresses multiple policies of the plan, including the following policies:

- **Policy 1.I:** Encourage volunteerism and stewardship.
- **Policy 3.B:** Incorporate art into park design.
- **Policy 4.A:** Protect natural habitat.
- **Policy 4.B:** Connect people to nature and the outdoors.
- **Policy 4.D:** Promote, expand, and protect habitat.
- **Policy 5.D:** Explore alternative uses for newly acquired parkland.
- **Policy 5.G:** Pursue other/private funding sources.
- **Policy 6.H:** Coordinate with other City plans.
- **Policy 6.I:** Engage other City departments.
- **Policy 6.J:** Participate and support regional plans.

Palo Alto Baylands Master Plan

The Baylands Master Plan Update (City of Palo Alto 2008) serves as the overarching plan and vision for the Baylands. The BCCP advances the vision and policies of the plan, including the following Environmental Quality policies:

- Ensure that the landfill area ultimately becomes an environmental asset and a continuation of the natural green space.
- Recognize and maintain the relationship between the urbanized Embarcadero Road corridor in the northwest and the remaining recreation-oriented three-quarters of the Baylands. Allow no more urban intrusion.
- Keep marshes open to the Bay along the entire shoreline.
- Control access to environmentally sensitive marshland and upland meadow habitat.
- Restore the diversity of plants and animals to disturbed upland sites.
- Ensure there is sufficient native food and cover for wildlife.

- See that the landfill ultimately becomes an environmental asset and a continuation of the natural open space.
- Maintain both the salt water and freshwater marshes that have been created.
- Clean up all areas outside the antenna field.
- Remove the antenna field and replace it with marshland.
- Allow natural processes to restore the marsh in the former harbor.
- Maintain the 11 acres of restored marsh at Harbor Point.
- Open the Harriet Mundy Marsh area to tidal action and reclaim the area as marshland.
- Prohibit access to Hooks Island.
- Complete the management plan for the Baylands.
- Provide screen planting along the southerly urbanized edge of the private property facing the former ITT Property/Emily Renzel Wetlands.
- Maintain access to the regional trail system.

1.4 Content of the Plan

Five overarching themes emerged from input collected during the public and stakeholder engagement process. These themes formed the basis of planning elements of the BCCP, and appropriate feedback was included in the plan. Additional key areas, including the Byxbee Park Master Plan and the concepts for the former ITT Property/Emily Renzel Wetlands, were included in the scope of work for the BCCP. The elements of the plan include:

- Natural Resources Management
- Public Access and Facilities
- Public Engagement
- Public Art
- Operations & Management
- Key Areas:
  - Byxbee Park Master Plan
  - Former ITT Property/Emily Renzel Wetlands

1.5 Organization of the Plan

The BCCP is organized into the following chapters:

Chapter 1: Introduction

This chapter includes general background information, summarizes the planning process, and outlines the contents and organization of the document.

Chapter 2: Existing Conditions

Chapter 2 provides a description of the Baylands' current physical conditions, natural resources, public access and facilities, public outreach efforts, and operations and management practices.

Chapter 3: Public and Stakeholder Engagement

Chapter 3 details public and stakeholder outreach and engagement efforts completed as part of the planning process. Themes that emerged from the public and stakeholder engagement process were guiding elements during the planning process and were included in the plan.

Chapter 4: Planned Future Improvements and Changes to Land Uses and Activities

Chapter 4 describes projects in and around the Baylands that are planned to be implemented during the next 15 years.

Chapter 5: Vision, Goals, and Objectives

Chapter 5 presents a vision for the Baylands for the next 15 years and beyond. This chapter includes goals and objectives developed through the public and stakeholder process that will direct future management and operations in the Baylands.

Chapter 6: Opportunities and Challenges Analysis

Chapter 6 identifies and documents opportunities and challenges for implementing the vision, goals, and objectives of the plan.

Chapter 7: Climate Change and Sea Level Rise at the Baylands

Chapter 7 includes an assessment of potential future sea level rise and climate change scenarios at the Baylands. The chapter includes two assessments: an exposure analysis for assets within the Baylands, and an analysis of potential habitat changes. The end of the chapter presents high-level adaptation actions for reducing exposure and preparing the Baylands for potential future conditions.

Chapter 8: Action Plan and Best Management Practices

The key Chapter 8 summarizes prioritized implementation actions and BMPs that will achieve the vision and goals of the plan, except for Byxbee Park and the former ITT Property/Emily Renzel Wetlands (which are addressed in Chapters 9 and 10). This chapter also describes potential partners, funding sources, and timelines for implementing the recommended actions. The action plan also includes a repeatable prioritization methodology that can be applied regularly as site conditions and priorities change.

Chapter 9: Design Plan for Byxbee Park

Chapter 9 presents the Byxbee Park Master Plan, developed through the public and stakeholder process. The master plan includes a parking plan, public access and facilities, and a habitat management plan.

Chapter 10: Concepts for the Former ITT Property/Emily Renzel Wetlands

Finally, Chapter 10 of the plan includes a preferred use concept for the former ITT Property/Emily Renzel Wetlands that was developed from a list of common objectives and key design elements, based on interviews with staff and stakeholders, research, and site visits.

2 Existing Conditions

The 1,976-acre Baylands is a jewel within the South Bay's wetlands (Figure 1). The Baylands provide a wide variety of recreational and educational benefits to the public and support the Bay's important ecosystem functions. The Baylands' myriad natural wetlands, marshes, and uplands are ecologically important, as they provide important habitat for imperiled species such as the salt marsh harvest mouse (*Reithrodontomys raviventris*), Ridgway's rail (*Rallus obsoletus*), and western burrowing owl (*Athene cunicularia*).

The Baylands provide unique nature and recreational experiences for the San Francisco Bay Area (Bay Area) community. Facilities and intersecting trails throughout the Baylands allow for wildlife viewing, hiking, bike riding, water sports, and use of public lands for art installations. The Baylands also include facilities for other recreation opportunities such as the Palo Alto Municipal Golf Course and the Baylands Athletic Center. Nonrecreational facilities within the Baylands include the Palo Alto Airport, the Baylands Ranger Station, and the RWQCP.

City Baylands rangers have partnered with Save the Bay, a nonprofit that aims to protect and restore San Francisco Bay, with the goal of restoring and enhancing the Baylands' habitats. The Baylands is home to Save the Bay's plant nursery, which provides approximately 20,000 plants for restoration projects around the Bay's shoreline. The Baylands also provide a backdrop for education programs that promote environmental stewardship and volunteerism. The City and its partners work together to manage the Baylands holistically for ecosystem function, safety, and public access.

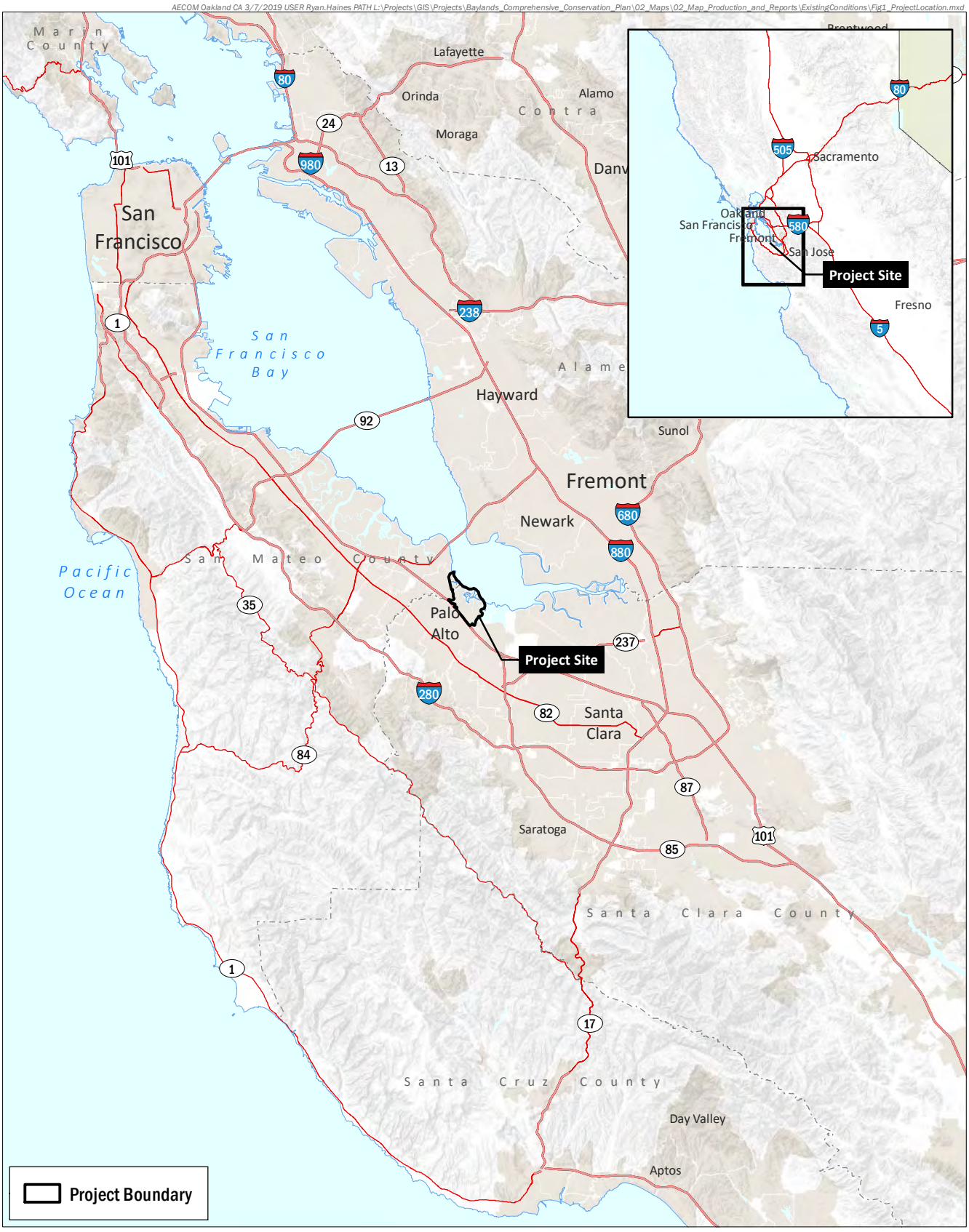

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FIGURE 1

Project Location

2.1 Natural Resources

The Baylands, located along San Francisco Bay, are characterized by flat topography near sea level with the exception of Byxbee Park, a former landfill that has been capped and is characterized by rolling hills.

2.1.1 Habitat Types

The Baylands, located along the South Bay shoreline (Figures 1 and 2), historically supported a mosaic of diverse vegetation types. Today, approximately 36 percent of the Baylands is composed of tidal marsh and other wetland habitats (SFEI 2016). Tidal marsh vegetation can be subdivided into tidal salt marsh and tidal brackish marsh, depending on the salinity of the water supporting the wetland. These vegetation types have different dominant plant species. The Baylands provides foraging and nesting habitat for overwintering shorebirds and waterfowl that migrate seasonally along the Pacific Flyway. Approximately 50 species of shorebird and waterfowl are residents in and migrants of the Baylands. Common species observed include mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), lesser yellowlegs (*Tringa flavipes*), willet (*Tringa semipalmata*), long-billed curlew (*Numenius americanus*), whimbrel (*Numenius phaeopus*), snowy egret (*Egretta thula*), and sandpiper (*Calidrid* spp.).

Several habitat types are found throughout the Baylands: tidal salt marsh, tidal brackish marsh, diked or muted salt marsh, freshwater marsh, nonnative annual grassland, aquatic, and riparian habitat. Table 1 and Figure 3 detail the locations of these habitat types within the Baylands.

Table 1. Habitat Types and Locations

Habitat Type	Location(s)
Tidal Salt Marsh	-Faber-Laumeister Tract -Harbor Point -Harriet Mundy Marsh/Sand Point -Hooks Island
Muted Salt Marsh	-Palo Alto Flood Control Basin -Former ITT Property/Emily Renzel Wetlands -Mayfield Slough -Los Altos Treatment Plant
Brackish Marsh	-Unnamed slough (near the Regional Water Quality Control Plant outfall)
Freshwater Marsh	-Emily Renzel Freshwater Pond
Annual Nonnative Grassland	-Byxbee Park -Trails -Levees -Lagoon shoreline -Inner harbor southwest shoreline
Riparian	Along the banks of: -Adobe Creek -Matadero Creek -San Francisquito Creek
Aquatic	-Duck Pond -Inner Harbor -Lagoon -Adobe Creek -Matadero Creek -San Francisquito Creek

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FIGURE 2

Project Vicinity

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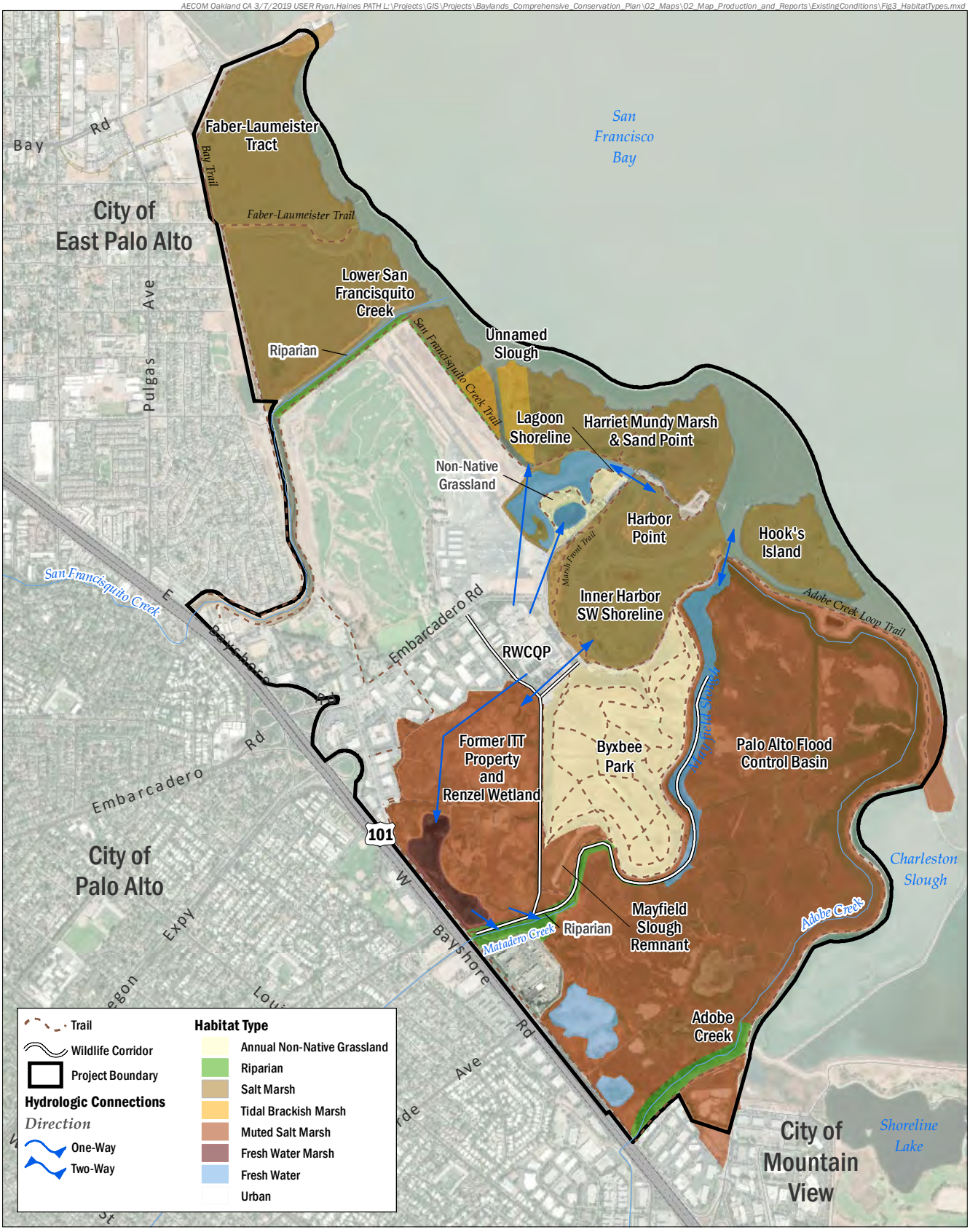

AECOM, 2017
National Hydrography Dataset, 2017
Esri, 2019

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FIGURE 3
Habitat Types

2.1.1.1 Salt Marsh

Tidal salt marsh, or salt marsh, in the Baylands is subject to tidal action and dominated by Pacific cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia* spp.). Other common species present include dodder (*Cuscuta salina*), gumplant (*Grindelia stricta*), alkali-heath (*Frankenia salina*), and invasive species including pepper grass (*Lepidium latifolium*). Populations of the federally listed endangered salt marsh harvest mouse and Ridgway's rail (discussed in Section 2.1.3, "Special-Status Species," below) are found only in this habitat type. Other more common species include black rail (*Laterallus jamaicensis*), Virginia rail (*Rallus limicola*), and sora (*Porzana carolina*). Habitat areas identified as salt marsh include Faber-Laumeister Tract, Harbor Point and the inner harbor channel, Harriet Mundy Marsh, Hooks Island, and Sand Point.

2.1.1.2 Muted Salt Marsh

Diked or muted salt marsh in the Baylands consists of areas of historic tidal salt marsh that has been cut off from full tidal influence by dikes or levees, but that maintains wetland features (Goals Project 2015). Vegetation communities in muted salt marsh are similar to those in salt marshes; typically, however, fewer native plant species are present, and nonnative plant species are a large component (Goals Project 2015). Areas of the Baylands characterized by muted salt marsh are dominated by nonnative plant species including common reed (*Phragmites australis*), arundo (*Arundo donax*), and tall wheatgrass (*Thinopyrum ponticum*), with other common plant species present including pickleweed, bulrush species, and cattails (*Typha* spp.). Muted salt marsh is found in the Palo Alto Flood Control Basin (Flood Control Basin), the former ITT Property/Emily Renzel Wetlands, the site of the former Los Altos Treatment Plant, and the Mayfield Slough (Figure 3).

Tidal action and freshwater outflows in the Flood Control Basin are controlled by the existing tide gate system, creating conditions in which the basin receives muted tidal flows. As a result, the northern area of the Flood Control Basin closest to the tide gate experiences more saline conditions than the southern area. The southern portion of the basin is mostly dry, with marsh panne formations present throughout this area, indicating seasonal ponding. A large open area in the northeastern corner of the basin is denuded of vegetation and supports roosting by numerous seabirds throughout the day. The southern and eastern portions of the Flood Control Basin are dominated by invasive common reed and creeping wildrye, with pickleweed, alkali heath, and nonnative grasses and herbaceous species common throughout the basin.

2.1.1.3 Brackish Marsh

Brackish marsh occurs in areas of the Baylands where freshwater locally reduces salinity, namely the unnamed slough where RWQCP treated water is discharged south of San Francisquito Creek. This vegetation community is characterized by the dominance of bulrush (*Bolboschoenus* spp.). Brackish salt marsh provides habitat for the saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*), a regional subspecies found in the Baylands. This regional subspecies is found primarily in tidal salt marshes throughout the Bay Area, with about 60 percent of yellowthroats occupying brackish marsh (Shuford and Gardali 2008).

2.1.1.4 Freshwater Marsh

The 15-acre Emily Renzel Freshwater Pond is was created 1992 as part of the Emily Renzel Wetlands restoration project, using a perimeter earthen berm and a pipeline extending from the RWQCP that provides tertiary-treated wastewater to the pond that is then

discharged into Matadero Creek. The freshwater marsh feature is dominated by cattails, and likely supports species associated with this habitat type such as sora rails, herons and egrets, and passerine species, as well as amphibian and turtle species.

2.1.1.5 Annual Nonnative Grassland

The Baylands' nonnative grassland vegetation community is characterized by annual grassland species introduced from Europe. Before the introduction of European grazing and agriculture in California, native grasslands consisted of perennial "bunchgrass" communities. Grassland communities throughout the Bay Area have since shifted to Euro-Asian grassland species that have become naturalized to the region. Areas identified as nonnative grassland are dominated by wild oats (*Avena* spp.), Italian ryegrass (*Festuca perennis*), stinkwort (*Dittrichia graveolens*), various nonnative thistle species, and fennel. Native species that are fairly common in the Baylands include coyote brush (*Baccharis pilularis*) and creeping wildrye (*Elymus triticoides*). Areas where trails and levees intersect the Baylands are dominated by grassland comprising nonnative annual grasses and invasive forbs including fennel (*Foeniculum vulgare*), wild mustard (*Brassica* spp.), nonnative shrub and tree species, and various nonnative annual grasses and thistles (*Cirsium* spp., *Carduus* spp.). This habitat type is found in Byxbee Park, along most trails and levees, the lagoon shoreline, and the inner harbor southwest shoreline. The grassland community of Byxbee Park supports a variety of wildlife species, with known occurrences of nesting burrowing owl and black-tailed jackrabbit (*Lepus californicus*). These areas can also provide important hunting and foraging habitat for many raptors that rely on grassland habitat, such as white-tailed kite (*Elanus leucurus*).

2.1.1.6 Riparian

Riparian habitat borders the edges of creeks in the Baylands and is characterized by lush understory vegetation and high biodiversity (Goals Project 2015). Within the Matadero Creek and Adobe Creek corridors, riparian forest is dominated by willow (*Salix* spp.), California sycamore (*Platanus racemosa*), walnut (*Juglans* spp.), and nonnative eucalyptus (*Eucalyptus* spp.) and acacia (*Acacia* spp.). Common understory species include California blackberry (*Rubus ursinus*), elderberry (*Sambucus* spp.), wild rose (*Rosa californica*), and nonnative grasses. Riparian corridors are of great ecological importance for the Bay, as they feature very high biodiversity in species composition and support the greatest total number of plant and animal species (Goals Project 2015). Riparian habitat is found along the banks of Matadero Creek and Adobe Creek, which empty into the Flood Control Basin, and San Francisquito Creek (Figure 3).

2.1.1.7 Aquatic

The Duck Pond and adjacent tidal lagoon provide foraging, nesting, and roosting habitat for various shorebirds and waterfowl throughout the year. A grove of palm trees located northwest of the Duck Pond is protected with fencing and designated as a bird sanctuary for herons and egrets, which utilized this area as a rookery during breeding season in 2005–2010 (City of Palo Alto 2008; Bicknell, pers. comm., 2017). The tidal lagoon is connected to the bay through two culverts underneath Embarcadero Road. The lagoon is characterized by fine-grained silt and clay soils that become inundated twice daily by tidal action and support an extensive invertebrate community including diatoms, polychaete worms, mussel species, amphipods, and crustaceans (USFWS 2013a). Native horn snails (*Cerithidea californica*) occupy the mudflats within the tidal lagoon in the marsh near the Baylands Nature Center. Invasive eastern mud snail (*Ilyanassa obsolete*) now dominates many of the mudflat areas once occupied by the horn snail. These invertebrates are an

important food source for waterfowl and larger shorebirds.

2.1.2 Critical Habitat

No U.S. Fish and Wildlife Service (USFWS)–designated critical habitat is present in the Baylands. However, the USFWS *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* focuses on recovery of federally listed endangered and threatened species occurring in the Baylands through habitat restoration and conservation efforts (USFWS 2013a). The nearest designated critical habitat for the Western snowy plover (*Charadrius nivosus* ssp. *nivosus*), a federally listed threatened species, is adjacent to the Baylands near Ravenswood Open Space Preserve.

2.1.3 Special-Status Species

Many of the endemic species that reside in Bay Area tidal marshes are federally listed as threatened or endangered, or are otherwise considered special-status species by the regulatory agencies, including the California Department of Fish and Wildlife. The *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (USFWS 2013a) addresses 11 special-status plant and wildlife species; three of these species presently occur in the Baylands.

2.1.3.1 Ridgway's Rail

The Ridgway's rail is a marsh-dwelling bird with short rounded wings, large feet, and long toes, and secretive habits that make it difficult to detect (USFWS 2013b). This species was federally listed as endangered on October 13, 1970 (USFWS 2013b). The range of Ridgway's rail may have extended from the tidal marshes of Humboldt Bay to Morro Bay, but the species is now localized to the Bay Area, where it occurs only within the tidal and brackish salt marshes of Suisun, San Pablo, and San Francisco bays, including the South Bay. The species is currently restricted to less than 10 percent of its former geographic range, with Baywide habitat loss as the primary threat.

Ridgway's rails are found almost exclusively in tidal and brackish salt marsh habitats with unrestricted tidal flows, and require well-developed tidal channel networks connected to upland areas that provide escape refugia and nesting habitat (USFWS 2013b). The tidal marshes of the Baylands, including the former Palo Alto Harbor and Hooks Island, currently support a population of approximately 15–29 individuals (Point Blue 2011; OEI 2016). Faber-Laumeister Tract supports approximately 82 individuals (Point Blue 2011; OEI 2016).

The Baylands are along the urban edge of Palo Alto, East Palo Alto, and Mountain View, where tidal marsh habitat is a patchwork of high-quality narrow fragments with limited or absent upland refugia. A reduction in upland refugia combined with anticipated sea level rise poses a future threat to this species, and current opportunities for upland migration from high-tide events are very limited, if not completely absent. Other threats include predation by terrestrial predators and encroachment by invasive *Spartina alterniflora and Lepidium* spp. on the tidal marshes of the Baylands.

2.1.3.2 Salt Marsh Harvest Mouse

The salt marsh harvest mouse is generally restricted to saline or subsaline marsh habitats around San Francisco Bay and, with some exception, brackish areas in the Suisun Bay area (USFWS 2013a). The distribution of salt marsh harvest mouse correlates with the presence of pickleweed and native cordgrass vegetation in tidal and diked salt marshes, where saline conditions are required for suitable habitat to support the species' food source and nesting habits.

Similar to Ridgway's rail, populations of salt marsh harvest mice in the Baylands appear to be limited by the distribution of high-tide cover and refugia habitat. During high-tide events, the salt marsh harvest mouse seeks refuge in upland habitat and climbs to the top of vegetation to avoid inundation. The importance of landward migration opportunities to the survival of this species indicates that anticipated sea level rise will present a severe threat in the long term, particularly in the Baylands, where opportunities for upland migration from high-tide events are very limited or absent because of the surrounding urban edge.

2.1.3.3 Western Burrowing Owl

Western burrowing owl is a California Species of Special Concern because of declining populations related to loss of habitat. In California, burrows are most commonly dug by ground squirrels, but owls also use badger or fox dens or holes. Before 2005, eight to 10 nesting pairs of burrowing owl occupied the dry grassland areas of the former ITT Property/Emily Renzel Wetlands and Byxbee Park. By 2005, nesting burrowing owls had vanished from the area, and there are currently no documented occurrences of nesting; however, several owls have been sighted in and around Byxbee Park (Anderson, pers. comm., 2017). The adjacent shoreline property in Mountain View supports one of the largest populations of burrowing owl in Santa Clara County, as implementing various management strategies has enhanced and protected burrowing owl habitat (City of Mountain View 2012a).

2.1.4 Wildlife Corridors

The Baylands provide crucial habitat for migratory shorebirds and waterfowl traveling along the Pacific Flyway during seasonal migrations by providing foraging, resting, and nesting habitat. The large tracts of natural area present in the Baylands also provide some of the best remaining contiguous marsh and wetland habitat in the Bay Area. However, these areas have lost the majority of adjacent upland habitat and tidal transition zones, which act as important travel corridors for wildlife of the tidal marshes. These areas are important for wildlife escaping high-tide events, particularly salt marsh harvest mice and Ridgway's rails. The migration habits of the Baylands' wildlife coincide with tidal flows, with many species moving through the tidal wetland habitat via channelized streams, tidal marsh vegetation, and riparian corridors.

Human-made features such as trails and levees in the Baylands may act as travel corridors for interior mammalian species to reach more outer portions of the tidal flats that are not normally accessible by overland travel. Local wildlife species known to use these structures for travel include coyote (*Canis latrans*), mule deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), bobcat (*Lynx rufus*), and raccoon (*Procyon lotor*).

These corridors may also be accessed by feral cats (*Felis catus*) and other nonnative terrestrial species, exposing marshland wildlife populations to increased predation pressures. Nonnative predators such as feral cats and red foxes (*Vulpes vulpes regalis*) have been shown to prey on Ridgway's rails, light-footed clapper rails (*Rallus longirostris levipes*), and California black rails during high-water events (Evens and Page 1986; Foin et al. 1997; Harding et al. 2001).

These same human-made features are known to create passage obstacles for wildlife species in tidal marshes, particularly during storm surges and extreme high tides (Eddleman and Conway 1998). Human-made levees, dikes, and seawalls may obstruct dispersing Ridgway's rails and other rail species, which are less mobile and rely on vegetation cover for movement. Similarly, salt marsh harvest mice will move to denser upland vegetation but may become stranded on levees and other structures during extreme high-tide events, leaving them vulnerable to predation.

2.1.5 Mitigation and Restoration Areas

Restoration projects completed in the Baylands since 1988 include Harbor Point, the harbor itself, and the Emily Renzel Wetlands. The Harbor Point project, completed in 1997, restored 11 acres of salt marsh and since has maintained intact functioning habitats. Since 1987, the former Palo Alto Harbor has been allowed to naturally fill with silt, with results observed in 2007 indicating that enough natural silting had occurred to provide soil to support plants.

The Emily Renzel Wetlands, a beneficial use project completed in 1992, created a 15-acre freshwater marsh through installation of an earthen berm and a pipeline extending from the RWQCP that provides tertiary treated wastewater to the freshwater marsh, where it is then discharged to Matadero Creek. The restoration project also restored 12 acres of saltwater marsh along the northern edge of the former ITT Property/Emily Renzel Wetlands. The saltwater marsh is connected to the former yacht harbor via pipe, allowing muted tidal flow to occur. Water from the restored freshwater marsh also is discharged into Matadero Creek to the north of the freshwater marsh outfall.

2.1.6 Hydrologic Connections

Features throughout the Baylands are connected through culverts, pipe, pumps, and through the tide gate. Tidal flow connects the harbor and the lagoon through a bridge topped culvert. Freshwater from Adobe, Barron, and Matadero creeks flows into the Flood Control Basin. Muted tidal flow connects the Flood Control Basin to the Bay through the tide gate. Fresh water from San Francisquito Creek flows directly into the Bay. Muted tidal flow connects the Emily Renzel Wetlands and the inner harbor through and underground pipe, where the salt water then disperses throughout the wetlands, and is discharged through a levee by pipe into Matadero Creek. Approximately 95 percent of the recycled wastewater from the RWQCP discharges to the Bay through and underground pipe to an unnamed slough located south of San Francisquito Creek. The remainder of the treated wastewater flows through underground pipe to the Emily Renzel Freshwater Pond, where it is then discharged through a levee by pipe into Matadero Creek. The Duck Pond also receives recycled freshwater from the RWQCP by underground pipe.

2.2 Public Access and Facilities

The Baylands have been used by people since the Ohlone tribe of the Bay Area used the tidal marshes for foraging and hunting. During the late 1800s, settlers established themselves in the area and utilized the marshlands for agriculture, constructing dikes and levees and filling the wetlands for development. In the past 50 years, continued land use changes and development have resulted in the presence of managed salt ponds, a landfill (converted to Byxbee Park), a radio communications station (the former ITT Property/Emily Renzel Wetlands), the RWQCP, the Palo Alto Airport, and the Palo Alto Municipal Golf Course (Figure 4).

Today, the Baylands provide unique natural and recreational experiences for Bay Area communities. Facilities and intersecting trails throughout the Baylands allow wildlife viewing, hiking, bike riding, water sports, and use of public lands for art installations, viewing, and recreation. Acquisition of new properties and planned expansion of the trail networks will enhance access to the different sites on and surrounding the Baylands, while providing connectivity to other City park facilities and the surrounding communities including Palo Alto, East Palo Alto, and Mountain View.

2.2.1 Existing Trails

The Baylands, including Byxbee Park, contain the most extensive trails network in the City's open space system. More than 16 miles of multiuse trails provide access to the Baylands' unique mixture of habitats and wildlife. Trails within the Baylands also provide regional connectivity, including to the San Francisquito Creek Trail, which connects the Baylands to the San Francisco Bay Trail (Bay Trail) and the city of East Palo Alto. Farther south, the Renzel Trail connects the Baylands to the city of Mountain View and points beyond. A pedestrian bridge at Embarcadero Road connects the Baylands to the greater Palo Alto area west of U.S. Highway 101 (U.S. 101).

Within the Baylands there are many popular trails for hiking and bicycling, including the 5.6-mile Adobe Creek Loop, 0.7-mile Duck Pond Loop, and 1-mile Marsh Front trails. Most Baylands trails are on flat, easy terrain and comply with the Americans with Disabilities Act, although the terrain on a few Byxbee Park trails is hilly and steep in places. Trails in the Baylands are constructed of oyster shell, baserock, or decomposed granite, or are paved. Many trails are located atop levees, and are designed to reduce impacts on habitat while still providing access for wildlife viewing. No trails currently exist on or connect to the newly acquired former ITT Property/Emily Renzel Wetlands. Only one trail provides access to the Flood Control Basin; that trail floods during extreme rain events. The access to the Baylands Boardwalk from the Lucy Evans Baylands Nature Interpretive Center is currently restricted to a 200-foot segment while the boardwalk is undergoing rehabilitation.

Social trails (informal trails created by foot traffic from people or animals) occur throughout the Baylands, with the majority located in Byxbee Park. Other social trails are adjacent and parallel to the Adobe Creek Trail, on the Flood Control Basin side. These trails are often created when bicyclists, hikers, and runners look for more challenging terrain.

City of Palo Alto, 2014-17
Esri, 2019

AECOM

FIGURE 4
Site Features

2.2.2 Other Public Access Areas

Other public access areas within the Baylands include the Palo Alto Baylands Sailing Station (Sailing Station), the Baylands Athletic Center, the Palo Alto Municipal Golf Course, the Duck Pond, the EcoCenter (formerly Sea Scout House), the Lucy Evans Baylands Nature Interpretive Center, picnic areas, and parking lots. The Sailing Station consists of a pier that leads to a dock via a gangway and provides Bay access for small hand-launched, nonmotorized boats such as kayaks, canoes, and sailboats, in addition to sailboards and windsurfing boards.

Baylands Athletic Center

The Baylands Athletic Center is a 6-acre facility consisting of a lighted baseball field with a 500-seat grandstand, one lighted softball field with bleachers, a parking lot, restrooms, and concession facilities. The fields are scheduled for organized league play in the spring and fall and are open to casual users at other times (City of Palo Alto 2017a). Many organized walking/running events begin at the Baylands Athletic Center. The Golf Course Reconfiguration Project added 10.5 acres of land to the Baylands Athletic Center site for future use.

Palo Alto Municipal Golf Course

The Palo Alto Municipal Golf Course is a 169.8-acre, 18-hole public golf course. Since summer 2016, the golf course has been undergoing reconfiguration, with 10.5 acres of existing golf course to be incorporated into the Baylands Athletic Center. Approximately 7.4 acres of the golf course will be incorporated into SFCJPA's San Francisquito Flood Reduction Project. The reconfigured course will encompass approximately 156 acres and will include 18 holes, a clubhouse, a parking lot, a practice range, practice putting greens, and a new on-course restroom.

Duck Pond

The Duck Pond is a very popular location of the Baylands for public access. It was built in 1930 as a saltwater swimming pool before being converted to a duck pond in 1947. The Duck Pond is no longer tidal or brackish and is filled with 8.5 million gallons of recycled water from the RWQCP. The Duck Pond area consists of the Duck Pond, an adjacent trail, a parking lot, and one portable toilet.

EcoCenter

Across Embarcadero Road from the Duck Pond is the EcoCenter, formerly known as the Sea Scout House. Built in 1941 as a base for the Sea Scouts, the EcoCenter now houses the Environmental Volunteers, an environmental education nonprofit organization, and was rehabilitated in 2008. The EcoCenter is open to the public free of charge and includes touchscreen science displays, hands-on nature exhibits, and environmental education programs. It serves as a launch point for Baylands hikers, and as a resource for marshland ecology education and the advancement of environmental stewardship in California.

Lucy Evans Baylands Nature Interpretive Center

The Lucy Evans Baylands Nature Interpretive Center is built on pilings at the edge of Harriet Mundy Marsh (Figure 4). The Baylands Nature Interpretive Center Improvements Project, completed in April 2017, added eight interpretive stations, improved deck access surrounding the center, nest platforms for swallows, and glass-viewing windows providing improved views of the marsh. The Baylands Boardwalk, located behind the center, extends to the edge of the marsh and into the Bay; however, the boardwalk is in poor structural condition and

public access is restricted to a 200-foot segment of the boardwalk. Planned improvements to the boardwalk will be completed by 2020.

2.2.3 Nonrecreational Features and Facilities

Palo Alto Airport

The 101-acre Palo Alto Airport, located north of Embarcadero Road, is a general-aviation field owned and operated by the City. It has one paved runway measuring approximately 2,443 feet by 70 feet and is the 10th busiest single-runway airport in California.

Regional Water Quality Control Plant

The 25-acre RWQCP is operated by the City and treats wastewater for Los Altos, Los Altos Hills, Mountain View, Palo Alto, Stanford University, and the East Palo Alto Sanitary District. The facility has significantly reduced the amount of pollutants in the Bay by removing organic pollutants from wastewater. Tertiary treated water is discharged to an unnamed slough south of San Francisquito Creek, and also to the Emily Renzel Freshwater Pond. Recycled water from the plant is to fill the Duck Pond and is used to irrigate restoration sites within the Baylands.

Levees

A series of locally and federally constructed levees and dikes protect critical infrastructure and features within the Baylands. The Palo Alto Airport is protected by a levee that is topped by the San Francisquito Creek Trail. The RWQCP is protected by a levee topped by the Marsh Front Trail. Byxbee Park is protected by perimeter dike that is topped by a perimeter trail. The dike surrounding the Flood Control Basin is topped by the Adobe Creek Loop Trail. Additional levees and dikes are located along the boundary of Faber-Laumeister Tract and the City of East Palo Alto.

Tide Gate

The tide gate, located at the end of Mayfield Slough, includes a two-way gate that allows Bay water to flow into the Flood Control Basin under controlled conditions. Improvements to the tide gate were made in 1993 and 2002 to maintain the marsh environment within the Flood Control Basin. Baylands rangers are responsible for operating the tide gate, with the objectives of allowing adequate space within the Flood Control Basin for rain flow from Adobe, Matadero, and Barron creeks; managing habitat in the Flood Control Basin; and controlling vectors in the basin. A bridge over the tide gate connects Byxbee Park with the Adobe Creek Loop Trail (Figure 4).

Palo Alto Flood Control Basin

The 618-acre Flood Control Basin collects flows from Adobe, Matadero, and Barron creeks and includes Mayfield Slough (Figure 4). The basin was built in 1956 to prevent floods in Palo Alto. The water level in the Flood Control Basin is typically between -2.2 and -2.0 feet. The basin comprises muted tidal wetland habitat. Historically the flood basin was salt marsh, and since the 1930s a levee system and tide gate have reduced salt water flow into the basin.

Plant Nursery

The plant nursery, located near the Duck Pond, is operated by Save the Bay, a nonprofit organization that has partnered with the City of Palo Alto for habitat restoration, habitat enhancement, weed management, and environmental education at the Baylands. The plant nursery was built in 2004 and includes the nursery, a shade structure, and a shed.

The entire plant nursery is located on City-owned property (Figure 4).

The fruitful partnership between Save the Bay and the City produces approximately 20,000 plants per year from the plant nursery (Olson, pers. comm., 2017). Of these, approximately 8,000 plants are installed in the Baylands each year, and 12,000 plants are installed at other Save the Bay restoration sites around the Bay.

Other Nonrecreational Facilities

Other nonrecreational facilities in the Baylands include the Baylands Ranger Station, restrooms, water fountains, public phones, and garbage cans (Figure 4). The ranger station is housed in the former Harbor Master's House adjacent to the Duck Pond and is on the City's Historic Resources Inventory List.

2.3 Public Engagement

2.3.1 Interpretive Messaging/Signage

Signage and interpretive messaging is located throughout the Baylands. Many different styles of signage are present, including wayfinding signs, trail marker signs, signs listing park regulations, and interpretive displays. Signs are made of various materials including rustic wood, aluminum, and other weather-resistant panels.

Interpretive messaging is found throughout the park and describes environmental processes, wastewater treatment processes at the Emily Renzel Wetlands, and descriptions of wildlife and habitats that occur within the Baylands. Like the other signage in the Baylands, the interpretive messaging comprises multiple graphic designs, styles, and materials.

2.3.2 Volunteer Programs

The Baylands are home to several volunteer programs, including Ranger programs, partnerships with Save the Bay and Grassroots Ecology, and one-off efforts such as Boy Scouts projects and 1-day volunteer events by school classes (Bicknell, pers. comm., 2017). Save the Bay relies heavily on volunteers to accomplish their objectives in the Baylands. Volunteers for Save the Bay focus on plant propagation at the plant nursery, removal of nonnative/invasive species and weeding, and installation of native plants. Baylands rangers work closely with Save the Bay and Grassroots Ecology to focus volunteer efforts on habitat restoration and enhancement.

2.3.3 Organized Recreational Camps and Programs

Organized programs and recreation camps at the Baylands are offered by the Baylands rangers and partners including Bay Camps, Environmental Volunteers, Palo Alto Junior Museum and Zoo, and the Audubon Society. Active programs led by the Baylands rangers include hikes, canoeing with a ranger, and bike riding with a ranger. These programs are designed to attract visitors to the Baylands and to teach them about the area's history and ecology. Additionally, Baylands rangers offer programs to the public, school groups, families, scout troops, and other City departments that focus on pollution in the Bay, the history of the Baylands, and bird identification.

Other programs in the Baylands focus on environmental education. The City-operated Bay Camp, a weeklong science camp for students in kindergarten through sixth grade, engages youth in activities to educate them about the Baylands and Bay ecology. Similarly, Environmental Volunteers hosts environmental education programs at the EcoCenter, including hands-on programs and interactive displays and exhibits. The Junior Museum and Zoo and the

Audubon Society also offer programs for groups of elementary school–age children to learn about the Baylands.

2.3.4 Recreation

Recreation at the Baylands includes running, hiking, biking, kayaking, canoeing, windsurfing, dog walking, fishing, hunting, sailing, paddle boarding, and kite-surfing. Casual users engage in the majority of recreation at the Baylands; however, organized running activities such as the Moonlight Run & Walk also occur. Groups of 25 or more must obtain a use permit for all activities in the Baylands. Additional recreation activities in the Baylands include picnicking, open-air painting, birdwatching, geocaching, wildlife observation, operation of amateur ham radios, and barbequing.

2.4 Public Art

Palo Alto has supported public art since the 1970s, and the City's collection includes more than 300 pieces. A few of the treasures of the outdoor collection are located in and around the Baylands and include murals, land art, and sculptures (Figure 4). The largest public art work by Peter Richards and Michael Oppenheimer is located in Byxbee Park and comprises several elements that were installed in 1990, including *Chevrons*, *Pole Field*, and *Wind Wave*. Other pieces of public art located in the Baylands include sculptures such as *Bliss in the Moment* by James Moore, located along Embarcadero Road at the Flood Control Basin; *Riding the Currents* and the companion mural *Currents*, both by Martin Webb, at the RWQCP; *Kaikoo V* by Betty Gold and *Birdie* by Joyce Hsu on Embarcadero Road at the entrance to the Palo Alto Municipal Golf Course; *Streaming* by Ceevah Sobel at the pump station at East Bayshore Road and San Francisquito Creek; and *Foraging Island* by Mary O'Brien and Daniel McCormick in Byxbee Park.

The Public Art Master Plan (City of Palo Alto 2016a) proposes additional installations throughout the Baylands, including opportunities at the Friendship Bridge and Adobe Creek Bridge and throughout Byxbee Park. The Public Art Master Plan also recommends developing a public art plan specific to the Baylands and the Embarcadero Road corridor east of U.S. 101.

2.5 Operations & Management

2.5.1 Vegetation Management

2.5.1.1 Weed Management

The City of Palo Alto has an integrated pest management protocol in which using chemicals in pest management is minimized or avoided altogether. As a result, controlling weed species in the Baylands involves frequent mowing and hand pulling. Pest management control with a weed torch is sometimes used in areas that cannot be mowed (Bicknell, pers. comm., 2017). Table 2 lists weed existing weed species known to occur in the Baylands. Weed species in the Baylands include nonnative invasive species, and species that are native in origin but growing in a way that is a concern to the site, including a monotypic stand of *Phragmites australis* in the Flood Control Basin, and coyote brush in Byxbee Park, where concern exists that the deep taproot can damage the clay landfill cap. Coyote brush is not considered to be a species of concern in other parts of the Baylands.

Spartina alterniflora has been a concern in the Baylands since 1997, when it became a threat to displace native cordgrass. The California Coastal Conservancy's San Francisco Estuary Invasive Spartina Project has conducted treatment of invasive spartina annually

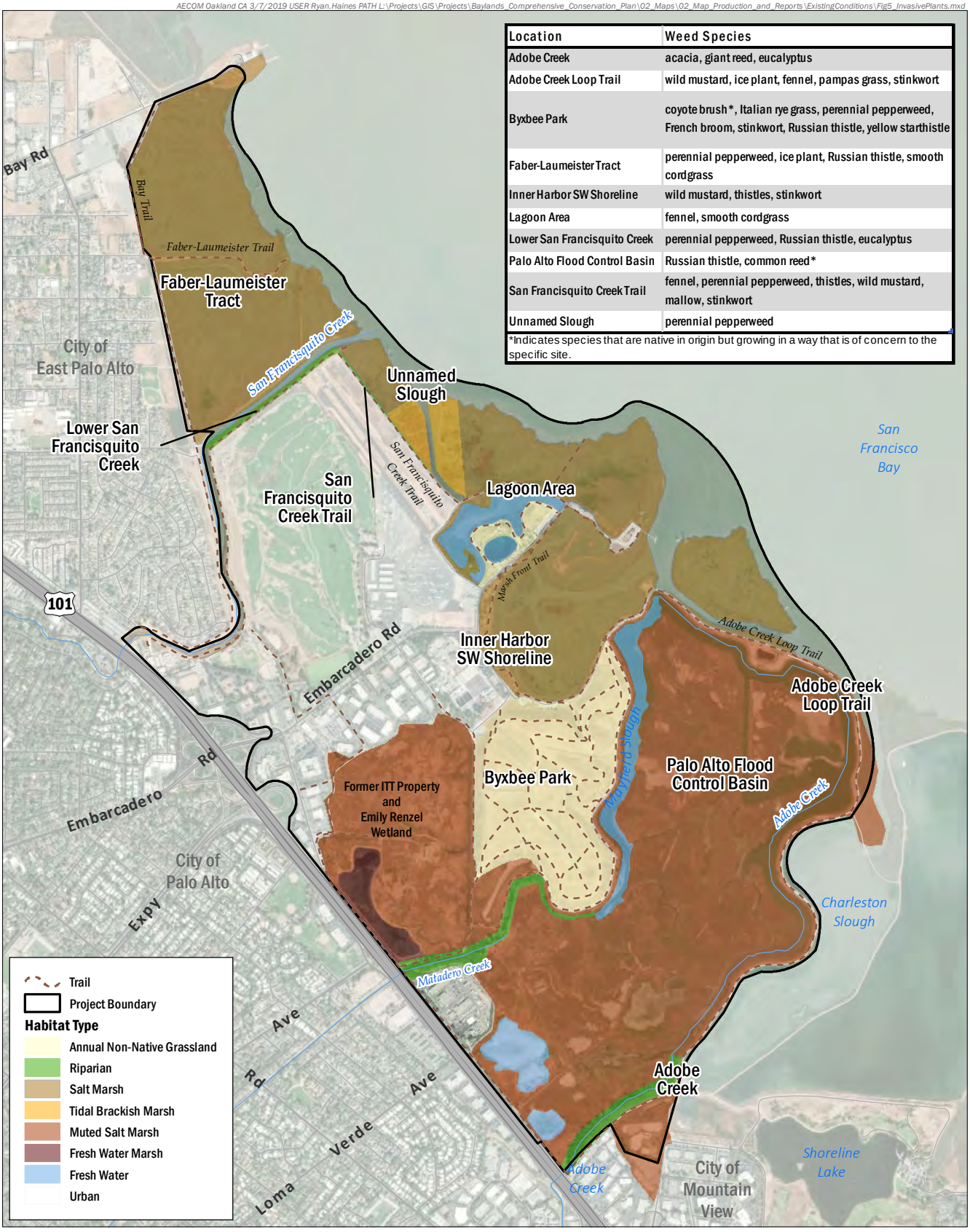
since 2002. Methods of control included hand application of herbicides. The treatment of spartina has been very effective in controlling the spread of invasive spartina in the Baylands, but has not eradicated the species.

Nonnative *Phragmites australis* is dominant in the Flood Control Basin (Figure 5). Approximately 22 acres of phragmites were treated with herbicide under a grant from the local Water District. However, the control was not successful and phragmites continues to dominate the Flood Control Basin (Anderson, pers. comm., 2017).

Table 2. Existing Weed Species

Species Name	Common Name
Acacia spp.	acacia
Arundo donax	giant reed
*Baccharis pilularis**	coyote bush
Brassica spp.	wild mustard
Carpobrotus chilensis	sea fig; ice plant
Centaurea solstitialis	yellow starthistle
Cirsium vulgare, Carduus pycnocephalus	thistles
Cortaderia sellanoa (or *C. jubata*)	pampas grass; jubata grass
Dittrichia graveolens	stinkwort
Eucalyptus spp.	Eucalyptus
Festuca perennis	Italian rye grass
Foeniculum vulgare	fennel
Genista monspessulana	French broom
Lepidium latifolium	perennial pepperweed
Malva spp.	mallow
*Phragmites australis**	common reed
Salsola tragus	Russian thistle
Spartina alterniflora	smooth cordgrass

*Indicates species that are native in origin but growing in a way that is a concern to the site.
Source: City of Palo Alto; data compiled by AECOM in 2018.



Location	Weed Species
Adobe Creek	acacia, giant reed, eucalyptus
Adobe Creek Loop Trail	wild mustard, ice plant, fennel, pampas grass, stinkwort
Byxbee Park	coyote brush*, Italian rye grass, perennial pepperweed, French broom, stinkwort, Russian thistle, yellow starthistle
Faber-Laumeister Tract	perennial pepperweed, ice plant, Russian thistle, smooth cordgrass
Inner Harbor SW Shoreline	wild mustard, thistles, stinkwort
Lagoon Area	fennel, smooth cordgrass
Lower San Francisquito Creek	perennial pepperweed, Russian thistle, eucalyptus
Palo Alto Flood Control Basin	Russian thistle, common reed*
San Francisquito Creek Trail	fennel, perennial pepperweed, thistles, wild mustard, mallow, stinkwort
Unnamed Slough	perennial pepperweed

*Indicates species that are native in origin but growing in a way that is of concern to the specific site.

AECOM, 2017
Esri, 2019

AECOM

FIGURE 5

Existing Weed Species

2.5.1.2 Irrigation

Habitat restoration and enhancement sites are irrigated largely by hand, using recycled water from the RWQCP (Bicknell, pers. comm., 2017; Olson, pers. comm., 2017). Baylands rangers water once per month during the winter as needed, and two to three times per month in the spring and summer. The amount of water used for irrigation varies by season, with water use being as high as 3,800 gallons per month in the summer months. Save the Bay irrigates habitat restoration and enhancement areas by hand up to four times per year, but usually waters new plantings only once per year.

The "vegetative islands" at Byxbee Park are irrigated from a 2,000-gallon water tank, using recycled water from the RWQCP. This mechanical irrigation system uses the leachate air system to pump water to the irrigation lines. The system is largely experimental and resulted from a focus on habitat, trees, and shrubs during the public visioning phase of the planning process for landfill closure.

2.5.1.3 Routine Vegetation Management

Routine vegetation management is the responsibility of the Baylands rangers and consists largely of mowing vegetation along the edges of trails to allow public access. Rangers also mow other grassy areas for fire control. In addition to mowing, Rangers regularly trim shrubs and trees, particularly around trails, to allow public access to the Baylands.

2.5.2 Restoration Practices

Restoration efforts consist largely of enhancing existing habitats to improve ecosystem function. The Baylands rangers work closely with partners such as Save the Bay and Grassroots Ecology to utilize volunteers to focus on removing nonnative species and planting native species. Restoration activities vary by season: planting occurs largely in the fall and winter; plants are propagated in the spring and summer; and nonnative plants are removed year round, with more concerted efforts in the winter and summer. Currently, areas of the Baylands that are prioritized for restoration or enhancement are those that are easily accessible to volunteers, can be addressed during the available volunteer hours, or have been identified in the field as potential restoration areas.

Mowing or weed-whacking is the first step in preparing a site for restoration or enhancement. This action is typically undertaken in the spring or summer. Preparation begins with soil amendments, such as sheet mulching using cardboard or wood chips. The mulch is then placed on the restoration site and left for a season, usually summer. After mulching, the site is planted with native plants from the plant nursery, usually in fall or winter. The site is then maintained through hand pulling of nonnative and weedy species. The new plantings are irrigated as needed; however, seasonal precipitation in the fall and winter is often enough to aid in the establishment of the plantings. Save the Bay conducts quantitative monitoring for vegetative cover at sites where it has conducted restoration and enhancement. Baylands rangers do not conduct quantitative monitoring on sites where they have conducted restoration.

2.5.3 Wildlife Management

The U.S. Department of Agriculture has provided predator control services in the Baylands on and off over the past 20 years, with the objective of protecting endangered species such the Ridgway's rail and burrowing owl from mammalian predators. Target species for control include feral/free-ranging cats, raccoons, striped skunks, red foxes, and feral/free-ranging dogs.

The Interim Byxbee Park Master Plan includes a management plan for the western burrowing owl (City of Palo Alto 2015). This plan includes three areas for burrowing owl nesting habitat and includes details plans for artificial burrows seeded with grasses. However, because this plan requires burrowing into the landfill cap, it required approval from regulatory agencies, and the approval has not yet been granted. As a condition of the permits required for landfill closure, ground squirrel abatement is currently implemented in Byxbee Park. The City is attempting to balance the ecosystem benefits that squirrels provide with the regulatory requirements imposed. The purpose of ground squirrel control is to project the clay cap layer that encases and seals buried refuse and contains methane within the sealed area.

2.5.4 General Maintenance

Other maintenance and management activities in the Baylands include controlling litter and installing and rehabilitating park facilities such as benches, tables, and fences. General maintenance also includes trail maintenance activities such as trailside mowing, tree and shrub trimming, and general upkeep.

2.6 Key Areas

2.6.1 Byxbee Park

The 137-acre former City landfill has been closed, capped, dedicated as parkland and opened to the public in phases as refuse disposal capacity was reached. Final landfill closure and cap construction was completed in and opened to the public in 2015 and features trails, benches, restrooms, interpretive signage, and public art. The park is typically used for walking, hiking, biking, wildlife viewing, and dog-walking. Vegetation in Byxbee Park consists largely of nonnative grasslands, with four sets of "vegetative islands," irrigated from recycled water from the RWQCP, that support native shrubs and other native plantings. The main purpose of management and maintenance activities in Byxbee Park is to guard public safety, enhance recreational opportunities in the area, protect the landfill cap, and minimize impacts on air and water quality from potential landfill gas and leachate.

2.6.2 Former ITT Property/Emily Renzel Wetlands

The 36.5-acre former ITT Property/Emily Renzel Wetlands located in the Emily Renzel Wetlands was acquired by the City in 2016 and has been dedicated at parkland. The former antenna field was originally part of a 200-acre marshland area purchased and built into a radio telegraph transmitting station to serve as the hub of Pacific Coast ship-to-shore communications. The 200 acres were bought by ITT in 1930 and later recognized as an integral part of the Baylands rehabilitation plan in the 1970s. The City purchased 154 acres in 1977 and dedicated the property as parkland in 1982, excluding the 36.5-acre easement that remains in use by ITT. In 1992 the Emily Renzel Wetlands project completed that created a 15-acre freshwater pond, and restored muted tidal flow to 12 acres of salt marsh along the northern edge of the former ITT Property/Emily Renzel Wetlands. The saltwater marsh is connected to the former yacht harbor via pipe, allowing muted tidal flow to occur. Water from the freshwater pond and salt marsh is discharged into Matadero Creek.

Two buildings, an access road, and antennas are on the former ITT Property/Emily Renzel Wetlands. The *Palo Alto Baylands Master Plan* (City of Palo Alto 2008) contains recommendations for removing the antenna field and replacing it with marshland, with the goal of unifying the land with the rest of the Baylands.

3 Public and Stakeholder Involvement

Public and stakeholder involvement has been an integral part in the development of the BCCP. To ensure that input from the public and stakeholders was incorporated into the plan, a stakeholder engagement plan was developed. In addition, a Stakeholder Advisory Group and project Web site were established, and all project meetings were open to the public. The Parks and Recreation Commission and a Baylands user survey provided additional feedback opportunities. The following sections describe public and stakeholder involvement for the BCCP, and Appendix A summarize stakeholder and public input.

3.1 Stakeholder Engagement Plan

Early in the BCCP planning process, the stakeholder engagement plan was developed to serve as a road map for stakeholder engagement activities. The main goals of the BCCP engagement process were to solicit input and ideas from stakeholders and the public; collect feedback on key deliverables; filter stakeholder comments through the City's planning team; and integrate the comments and feedback into the BCCP as appropriate. In addition, the stakeholder engagement process sought to foster buy-in and ongoing support among participants.

3.1.1 Identification of Target Audiences and Key Stakeholders

A key component of the stakeholder engagement plan was the establishment of the Stakeholder Advisory Group. This group served an advisory role for development of the vision, goals, and objectives; opportunities analysis; action plan and BMPs; Byxbee Park Master Plan; and former ITT Property/Emily Renzel Wetlands alternatives components of the BCCP. The Stakeholder Advisory Group participated in several meetings leading up to various project milestones. The group was composed of City staff members from multiple departments; Save the Bay staff members; representatives from Grassroots Ecology, Environmental Volunteers, and the Santa Clara Audubon Society; members of the Parks and Recreation Ad Hoc Committee; and other interested community members and government agencies.

3.1.2 Project Web Site

A Web site hosted by the City was developed in November 2017 to post and share project deliverables and meeting notices, located at the following address:

https://www.cityofpaloalto.org/gov/depts/csd/parks/preserves/baylands_comprehensive_conservation_plan.asp

3.1.3 Public Participation

Following feedback received in the first Stakeholder Advisory Group meeting, future meetings were opened and advertised to the general public. Flyers were placed at various points throughout the Baylands and a meeting notice was posted on the project Web site. In addition, Baylands rangers administered a park user survey to Baylands visitors over the course of multiple weeks to gather wider input for the development of the BCCP.

3.2 Stakeholder Engagement Activities

As described below, the primary mechanisms for engaging stakeholders during development of the BCCP were meetings of the Stakeholder Advisory Group, reviews of deliverables, and a survey of Baylands users. At the beginning of each key project milestone, the planning team requested stakeholders' input and ideas to obtain buy-in and participation during task development. The City distributed select draft deliverables to stakeholders for review, collected and reconciled the comments received, and incorporated appropriate comments and input into the final deliverables. Table 3 details the chronology of stakeholder involvement.

3.2.1 Meetings

Five Stakeholder Advisory Group meetings were held during development of the BCCP. The meetings were scheduled to maximize participation by group members. The themes that emerged from each meeting were documented and distributed to the Stakeholder Advisory Group and are included in Appendix A.

3.2.1.1 First Stakeholder Advisory Group Meeting

The first meeting, held on October 18, 2017, was a brainstorming session to solicit ideas and input, brainstorm vision statements, identify goals and objectives for the BCCP, and identify concerns. Information gathered at this first meeting was used to develop the draft vision, goals, and objectives of the BCCP.

3.2.1.2 Second Community/Stakeholder Advisory Group Meeting

The second Stakeholder Advisory Group meeting, held on December 5, 2017, focused on identifying opportunities for the former ITT Property/Emily Renzel Wetlands and Byxbee Park. Input gathered at this meeting was used to develop use alternatives at the former ITT Property/Emily Renzel Wetlands, and formed the basis for elements to be included in the Byxbee Park Master Plan.

3.2.1.3 Third Community/Stakeholder Advisory Group Meeting

The third meeting, held on February 15, 2018, was a working session to refine the future steps in the planning process. The intent of this meeting was to develop the opportunities

analysis, identify BMPs, and start defining the objectives of plan implementation. Input gathered at the second meeting was used to develop the final vision, goals, and objectives.

3.2.1.4 Fourth Community/Stakeholder Advisory Group Meeting

The fourth meeting, held on November 29, 2018, focused on gathering input on the draft action plan and the draft Byxbee Park Master Plan. Feedback received from this meeting was incorporated into the early development of both plans.

3.2.1.5 Fifth Community/Stakeholder Advisory Group Meeting

The fifth and final meeting will be a presentation on the draft BCCP. This meeting, scheduled for May 28, 2019, will focus on the planning process and the methods of incorporating stakeholder input into the plan.

3.2.2 Stakeholder Review of Draft Deliverables

Key draft deliverables were posted on the project Web site and distributed to the Stakeholder Advisory Group for review. The goal was to obtain input and help from stakeholders early in the development of deliverables. Appropriate comments and information were incorporated into the final deliverables. Stakeholder and public engagement for key areas of the BCCP – Former ITT property/Emily Renzel Wetlands and Byxbee Park – are discussed in more detail below.

Stakeholders reviewed the following project deliverables:

- Draft Vision, Goals, and Objectives
- Draft Future Planned Projects
- Draft Opportunities Analysis and BMPs Report
- Draft Former ITT Property/Emily Renzel Wetlands Design Concepts (discussed briefly below)
- Draft Action Plan
- Draft Byxbee Park Design Plan (discussed briefly below)
- Draft BCCP

3.2.2.1 Design Concepts for the Former ITT Property/Emily Renzel Wetlands

Four design concept scenarios were developed for the potential future uses of the former ITT Property/Emily Renzel Wetlands. The concept scenarios were circulated to City staff, the Parks and Recreation Commission, and the Stakeholder Advisory Group for review and posted on the project's Web site. A preferred concept was developed based on the feedback received.

3.2.2.2 Byxbee Park Design Plan

The conceptual design for Byxbee Park incorporates feedback from park users, staff members, and the Stakeholder Advisory Group. This conceptual design was provided to the City and stakeholders for additional review.

3.2.3 Baylands User Survey

In April and May 2018, Baylands rangers administered a six-question survey questionnaire to Baylands visitors. The purpose of the survey was to provide additional input to development of the BCCP, beyond the feedback received during focused stakeholder meetings. Approximately 73 people completed the survey, including a mix of adults and youth.

Table 3. Chronology of Stakeholder/Public Involvement

Date	Activity
October 2017	First Stakeholder Advisory Group meeting
November 2017	Project web site established
November 2017	Stakeholder Advisory Group tour of the former ITT Property/Emily Renzel Wetlands
December 2017	Second Stakeholder Advisory Group/public meeting
February 2018	Third Stakeholder Advisory Group/public meeting
March 2018	Stakeholder Advisory Group review of draft vision, goals, and objectives
April–May 2018	Baylands user survey conducted
June 2018	Stakeholder Advisory Group review of future planned projects
June 2018	Consultant presentation to Parks and Recreation Commission
September 2018	Stakeholder Advisory Group review of draft concepts for the former ITT Property/Emily Renzel Wetlands
October 2018	Stakeholder Advisory Group review of opportunities and challenges analysis and best management practices
December 2018	Fourth Stakeholder Advisory Group/public meeting
February 2019	Stakeholder Advisory Group review of the action plan
February 2019	Stakeholder Advisory Group review of final concepts for the former ITT Property/Emily Renzel Wetlands
February 2019	Stakeholder Advisory Group review of the Byxbee Park design plan

4 Planned Future Improvements and Changes to Land Uses and Activities

Several long-term planning projects in and around the Baylands have the potential to affect future land uses at the Baylands. The following sections describe projects located within or near the Baylands. Many of the projects identified below provide opportunities for coordination with the BCCP.

4.1 Capital Improvement Projects

4.1.1 San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project, Highway 101 to San Francisco Bay

The San Francisquito Creek Joint Powers Authority is a regional government agency whose members include the Cities of Palo Alto, Menlo Park, and East Palo Alto; San Mateo County Flood Control District; and SCVWD. To reduce flooding from San Francisquito Creek, SFCJPA's flood reduction project, covering the area from U.S. 101 to the Bay, proposed to construct flood reduction facilities including an overflow terrace at marsh elevation. The project also proposed to set back the levee and complete improvements to widen the channel, construct floodwalls in the upper reach, and extend the Friendship Bridge across marshland via a boardwalk. The first phase of construction ended in December 2018. Additional future phases of the project are detailed below.

4.1.1.1 Tidal Marsh and Upland Habitat Enhancements in and around Faber Tract Marsh

The SFCJPA flood reduction project includes upland habitat enhancements in and around the Faber Tract Marsh, including high-tide refugia islands and enhancements to the marsh's perimeter berm. In December 2017, work began on habitat restoration features in the Faber Tract and outer Faber Tract. Signage will be installed and in-channel marsh will be installed in spring 2019. The project will conduct annual inspections and postproject reporting for 3 years (SFCJPA 2019).

4.1.2 San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project Upstream of Highway 101

SFCJPA is preparing a draft environmental impact report (EIR) that will study a range of alternatives that could be undertaken to reduce flows and reduce flood potential in the flood-prone reach of San Francisquito Creek upstream of U.S. 101. The public review

period for the draft EIR is expected to be completed in April 2019 (SFCJPA 2019).

4.1.3 Strategy to Advance Flood Protection, Ecosystems and Recreation

SFCJPA's Strategy to Advance Flood Protection, Ecosystems and Recreation along San Francisco Bay (SAFER Bay) seeks to reduce the risk of coastal flooding and remove properties from areas within the Federal Emergency Management Agency (FEMA) 100-year floodplain and accommodate 3 feet of sea level rise. The project will restore and sustain existing marsh habitat for flood attenuation in coordination with regional flood control efforts. The project will also increase recreational opportunities by improving bayfront levees in collaboration with the Bay Trail Program. In October 2016, SFCJPA completed a bayfront levee feasibility study that described 19 alternatives over nine reaches covering 7 miles of shoreline. A draft EIR is anticipated to be released in 2019, followed by finalized designs and a final EIR.. The current schedule calls for construction to begin in late 2019 pending approval and permits from federal, state, and local agencies.

4.1.4 Golf Course Reconfiguration Project

The Palo Alto Golf Course Reconfiguration Project was prompted by the SFCJPA project to realign the San Francisquito Creek channel for increased flood protection. The project converts 7.4 acres of current golf course land into marshland habitat within the expanded San Francisquito Creek channel to provide increased flood protection. The project also features 40 percent less turf on the remaining golf course (53 acres); creates 55 acres of native Baylands vegetation and wetland areas on the golf course; replaces aging irrigation and drainage systems and reduces potable water usage by 35 percent; and repurposes 10.5 acres of golf course lands for athletic fields or other park and recreational needs.

4.1.5 Baylands Athletic Center 10.5-Acre Expansion/Improvements

The City's capital plan includes a project in fiscal year 2019 to conduct public outreach and develop conceptual plans for the future use of a 10.5-acre expansion of the Baylands Athletic Center from land that was previously part of the golf course. The City's Parks and Recreation Master Plan (City of Palo Alto 2017a) calls for evaluating the optimal use for the 10.5-acre area.

4.1.6 Horizontal Levee

The City is considering implementing an expanded version of an experimental levee design tested by the Oro Loma Sanitary District. The experiment used a bayside transitional slope planted with a mix of upland and hydrophytic vegetation to manage nutrient loads, remove particulates, and manage floodwater. The City and its partners are exploring the possibility of expanding the technology to a larger geographic area and connecting the experimental levee design to tidal action. This project is the preliminary design phase with grant funding secured from the San Francisco Estuary Partnership.

4.1.7 Lucy Evans Baylands Nature Interpretive Center/Boardwalk Improvements

The City is completing improvements to the Lucy Evans Baylands Nature Interpretive Center and Baylands boardwalk. The existing boardwalk at the Baylands Nature Interpretive Center has been closed since 2014 because of structural failure. This ongoing project includes updating and repairing exhibits and signage; replacing decking, railings, and exterior wood siding; and reconfiguring the restrooms to improve accessibility and better serve visitors, children, and classes. The construction may need to be phased over 2 years because of the lengthy permitting process and construction window limitations established to accommodate wildlife breeding activities. The capital project to construct a new boardwalk is planned to be completed in winter 2020.

4.1.8 Airport

4.1.8.1 Apron, Runways, and Taxiways

The City is implementing the Airport Apron Reconstruction Project as a result of a 2015 Federal Aviation Administration (FAA) request for a pavement maintenance management plan. The plan identified 38 acres of pavement needing repairs, most critically on the airport apron. This project is expected to be completed in 2020. The Airport Apron Reconstruction Project also includes an assessment of the lighting, signage, and possible vault improvements to inform the Airfield Electrical Improvements Project. This project, scheduled to begin in 2019, follows the findings of the electrical infrastructure assessment.

The pavement maintenance management plan identified additional areas needing maintenance outside of the immediate safety concerns being addressed by the Airport Apron Reconstruction Project. These additional integrity deficiencies will be addressed by the Runway and Taxiway Reconstruction and Drainage Project, scheduled for completion in 2022.

4.1.8.2 Airport Facilities

The City will construct an automated weather observation system to provide airport users with more detailed weather information in real time. The project will provide more accurate and timely weather information to airport users when the FAA-staffed tower is closed and will contribute to the safe and economic operation of the airport. This project is scheduled for completion in 2019 with funds from the City's Capital Improvement Project budget, combined with federal funds.

The City is completing an airport layout plan required by the FAA to ensure that the City remains eligible for federal grant funds. The City has submitted a plan to the FAA for approval that includes existing facilities and planned development, air traffic activity, noise contours, environmental documentation, and 20-year demand forecasts. This project is expected to be completed in 2021.

4.1.9 Byxbee Park Completion

Interim plans for Byxbee Park were developed in 2015 to complete the conversion of the closed Palo Alto Landfill to a park. A separate project to complete Byxbee Park is scheduled for fiscal year 2020. The use of $2.8 million of park impact fees in fiscal year 2020 was included in the City Council–approved infrastructure plan. The conceptual design for completing Byxbee Park will be created during implementation of the BCCP.

Soil will be added to areas of Byxbee Park to approved grades where settling and subsidence has occurred. The work will occur in the spring of each year and will be limited to 10 acres or less per year.

4.1.10 Baylands Flood Protection Levees

Improvements to Baylands flood protection levees are in the design and environmental review stages. The project covers flood protection levees in the Baylands between San Francisquito Creek and the city of Mountain View. The flood protection levee improvement project is a component of the SAFER Bay Project, implemented by SFCJPA in coordination with SCVWD and the City of Mountain View to provide protection from a 100-year flood event. Funding for this project is scheduled for 2019.

The Baylands Emergency Access Levee Repair Project funds improvements to the earthen levee between Harbor Road near the Lucy Evans Baylands Nature Interpretive Center and the perimeter levee of the airport to 6 inches above the levee's original height.

This project is necessary to mitigate the effects of subsidence and restore the width and height of the earthen flood protection levee. The permitting process has been delayed because of concerns regarding potential mitigation measures and is scheduled for completion in fall 2019.

4.1.11 Highway 101 Pedestrian/Bicycle Overpass Project

The Highway 101 Pedestrian/Bicycle Overpass Project is a priority project in the *City of Palo Alto Bicycle + Pedestrian Transportation Plan* (City of Palo Alto 2012), providing safe, year-round access across U.S. 101 in south Palo Alto to the Baylands and regional employment centers. This ongoing project is funded by the City's Capital Improvement Project and $4 million in grants, one each from the Santa Clara County Recreation Trails Program and the One Bay Area Grant Program, and a $1 million contribution from Google. Construction is currently funded for 2019 through 2020.

4.1.12 Regional Water Quality Control Plant—Effluent Outfall Pipe Project

The RWQCP is pursuing the potential construction of an additional outfall pipe to convey effluent (cleaned and treated wastewater) to San Francisco Bay. The new pipe would run adjacent to the existing outfall pipe, which releases effluent near the Palo Alto Airport. Construction efforts would also include maintenance for the existing 52-year-old outfall pipe, and pump replacement for effluent discharged to nearby Emily Renzel Freshwater Pond adjacent to East Bayshore Road. The project would ensure reliable transport of treated effluent under projected climate change and sea level rise scenarios. The new, larger outfall pipeline would increase capacity to counteract sea level rise, while the new Emily Renzel Freshwater Pond Pump would allow for increased flows to the marsh.

4.2 Maintenance Projects

4.2.1 Regional Water Quality Control Plant/Emily Renzel Freshwater Pond

In April, 2018, the City began maintenance activities to repair the constructed freshwater pond at the Emily Renzel Wetlands. Since 1992, when the pond was built, cattails and sediment have filled in the pond, restricting the flow of water through the site, and the berm constructed nearly three decades ago requires repairs to stop leaks and ensure long-term integrity. To reduce maintenance costs associated with leak repairs, the site was drained, excess sediment and cattails were removed, and the berm was be repaired. Pipeline maintenance is scheduled to be completed in spring 2019.

4.3 Restoration Efforts

4.3.1 South Bay Salt Pond Restoration Project

The South Bay Salt Pond Restoration Project is the largest tidal wetland restoration project on the West Coast and consists of restoration at three pond complexes. The Alviso Complex is immediately southeast of the Baylands and the Ravenswood Complex is north of the Baylands in East Palo Alto and Menlo Park. The final environmental impact statement/EIR for the project was published in 2016. Phase 1 of the South Bay Salt Pond Restoration Project constructed tidal and muted wetlands and enhanced managed ponds, trails, and access features. Phase 2 will restore additional former salt ponds and enhance the project's long-term goals of restoration. The goal of Phase 2 is to restore 50 percent of the acreage to tidal marsh. Activities at the Alviso ponds in Phase 2 include breaching levees to open ponds A1 and A2W to tidal action; constructing habitat islands for birds; constructing upland transitional habitat along Mountain View Shoreline Park; building public access trails and viewing platforms; and raising levees along the Coast Casey Forebay and the southern end of Charleston Slough.

5 Vision, Goals, and Objectives

5.1 Purpose and Background

5.1.1 Purpose

The purpose of the BCCP is to develop goals, policies, prioritized action steps, and BMPs enabling the City to holistically manage the 1,976-acre Baylands over the next 15 years and beyond by balancing ecosystem protection, environmental education, and recreational uses. The Baylands Master Plan (updated in 2008) laid out policies and goals for management of the Baylands. The BCCP builds on the master plan to incorporate clear direction for managing the Baylands, using an ecosystem-based approach that strikes the appropriate balance of conservation and recreation goals, and considers future projects and current trends such as climate change and sea level rise.

The planning team has conducted workshops with key stakeholders, City staff, and the public to solicit ideas and input, identify goals and priorities, determine opportunities, and identify concerns.

5.1.2 Background

The Baylands Master Plan, originally published in 1978, provided a framework and guide for actions in the Baylands that also sought to preserve and enhance the area's unique resources. The 2008 update to the master plan calls for completion of the BCCP as a document that may include specific programs to achieve the goals and policies of the Baylands Master Plan. Some of the goals established in the 2008 Baylands Master Plan are listed below.

- Recreation activities and facilities at the Baylands are to exist in harmony with resource preservation.
- Existing and proposed activities are to be compatible with the ecological and physical constraints and opportunities of the natural Baylands systems.
- Transform Byxbee Park from landfill into a rolling pastoral park that would be an environmental asset and a continuation of the natural open space.

The vision, goals, and objectives of the BCCP build on the goals of the master plan and include goals and actionable objectives developed from the stakeholder engagement process.

5.2 Vision for the Baylands and the Comprehensive Conservation Plan

The Baylands is an ecological safe haven where the habitat, wildlife, and natural resources entrusted to Palo Alto are protected and preserved. The Baylands is a sanctuary that rekindles the human spirit through introspection and passive recreation, and offers a living link to our cultural history.

Implementing the BCCP will help guide protection of the preserve's habitat, wildlife, and natural resources; ensure that stewardship and nature-friendly recreational opportunities are available for park visitors to enjoy the Baylands now and in the future; and help the City manage the Baylands in a way that allows the preserve to thrive in the face of challenges such as sea level rise and climate change.

5.3 Goals and Objectives of the Baylands Comprehensive Conservation Plan

5.3.1 Natural Resources Management

5.3.1.1 Natural Resources

- **NRM Goal 1**: Maintain, protect, and preserve existing functioning native habitats, ecosystem functions, and wildlife corridors.
  - **NRM Objective 1.1:** Identify existing functioning habitats and wildlife corridors.
  - **NRM Objective 1.2:** Establish procedures for prioritizing and preserving existing functioning habitats and wildlife corridors.
- **NRM Goal 2:** Manage the Baylands as habitat for native species and the preservation of biodiversity.
  - **NRM Objective 2.1**: Identify locations, opportunities, and constraints for ecological processes and habitats that support native and diverse biological resources.
  - **NRM Objective 2.2:** Restrict access to areas that support sensitive native biotic resources.
- **NRM Goal 3:** Enhance and restore degraded habitats and habitat corridors.
  - **NRM Objective 3.1:** Identify locations of sensitive and degraded areas in the Baylands that should be prioritized for restoration.
  - **NRM Objective 3.2:** Identify feasible and appropriate locations and opportunities for enhancing and restoring riparian habitat.
  - **NRM Objective 3.3:** Create a strategy to prioritize the areas that should be enhanced or restored.
- **NRM Goal 4:** Protect and enhance hydrologic connectivity.
  - **NRM Objective 4.1:** Identify existing hydrologic connections.
  - **NRM Objective 4.2:** Identify opportunities for feasibly enhancing hydrologic connectivity.

5.3.1.2 Sea Level Rise

- **NRM Goal 5:** Incorporate climate change and sea level rise into long-term management and policies.
  - **NRM Objective 5.1:** Determine which areas of the Baylands and the adjacent city are most vulnerable.

- **NRM Objective 5.2:** Employ adaptive management strategies to natural resource management to adapt to climate change.
- **NRM Objective 5.3:** Encourage pilot study of a "horizontal levee" and other innovative sea level rise adaptation strategies.
- **NRM Objective 5.4:** Coordinate with regional planning efforts and projects such as SFCJPA's SAFER Bay Project and Resilient by Design.
- **NRM Objective 5.5:** Coordinate with regional planning efforts to identify high-level protection measures for critical infrastructure such as the Palo Alto Airport, the RWQCP, and U.S. 101.
- **NRM Objective 5.6:** Promote the development of educational programs that focus on sea level rise and adaptive strategies.

5.3.2 Public Access & Facilities

5.3.2.1 Recreation/Access

- **PAF Goal 1:** Provide opportunities for recreation/access via a habitat-compatible trail network to enable wildlife observation and ensure that future generations develop an appreciation for wildlife, other wildlife-compatible recreational activities, and connections to the greater Palo Alto area.
  - **PAF Objective 1.1:** Identify and develop recommendations for connection points for trails to the greater Palo Alto area.
  - **PAF Objective 1.2:** Identify areas for wildlife observation that will limit disturbance to habitats and wildlife, such as areas near existing infrastructure including roads and parking lots.
- **PAF Goal 2:** Provide appropriate facilities for visitors to the Baylands.
  - **PAF Objective 2.1:** Identify appropriate locations for facilities and park amenities such as parking, restrooms, benches, and water fountains.

5.3.2.2 Former Los Altos Treatment Plant

- **PAF Goal 3:** Identify alternatives for land uses at the former Los Altos Treatment Plant site.
  - **PAF Objective 3.1:** Identify locations for potential restoration opportunities and actions at the Los Altos Treatment Plant site. Develop priorities and recommendations for actions to improve the site's ecological health.

5.3.2.3 Palo Alto Airport

- **PAF Goal 4:** Promote ecologically sensitive policies for areas at and near the Palo Alto Airport.
  - **PAF Objective 4.1:** Coordinate projects and planning efforts with airport management staff to align with the City's federal obligations of operating a public use airport.
  - **PAF Objective 4.2:** Collaborate with airport management staff to promote safety and implement wildlife management measures near runways.

5.3.3 Public Engagement

5.3.3.1 Public Engagement

- **PE Goal 1:** Promote thoughtful, well-advertised, and transparent community involvement opportunities that encourage participation by partner organizations, community groups, and environmental education programs to foster greater public engagement in the Baylands.

- **PE Objective 1.1:** Invite community groups, stakeholders, partner organizations, and environmental education programs to participate in visioning workshops.
- **PE Objective 1.2:** Connect with visitors to the Baylands to engage and encourage feedback, foster buy-in, and educate the public.

5.3.4 Public Art

5.3.4.1 Public Art

- **PA Goal 2:** Include appropriate environmental art in the Baylands that builds on Palo Alto's Public Art Master Plan.
  - **PA Objective 2.1:** Identify appropriate locations for additional public art installations and artist engagement.
  - **PA Objective 2.2:** Promote ecologically and/or educationally beneficial art that minimizes disturbance to natural areas.
  - **PA Objective 2.3:** Collaborate with Parks and Open Space staff members, partner organizations, and stakeholder groups to ensure diverse community engagement in environmentally based public art projects.

5.3.5 Operations & Management

5.3.5.1 Management

- **OM Goal 1:** Holistically manage the Baylands to strike the appropriate balance between recreation and natural resource protection, and ensure that existing and proposed activities are compatible with the ecological and physical constraints.
  - **OM Objective 1.1:** Identify ecological and physical constraints of the natural Baylands system.
  - **OM Objective 1.2:** Develop policies that promote activities that are ecologically beneficial.
  - **OM Objective 1.3:** Coordinate management actions and priorities with other City departments/divisions and local and regional planning activities such as SFCJPA's SAFER Bay Project.
  - **OM Objective 1.4:** Seek funding for additional planning and enhancements that further the implementation of projects envisioned in the BCCP.
  - **OM Objective 1.5:** Maximize use of partnerships to implement the BCCP vision.

5.3.5.2 Projects

- **OM Goal 2:** Strategically phase projects within the Baylands to minimize disturbance to wildlife and visitor use.
  - **OM Objective 2.1:** Identify planned and future projects, project proponents, and project timelines.
  - **OM Objective 2.2:** Ensure that proposed projects are sensitive to environmental impacts and maintain land use compatibility with surrounding uses and habitats.
  - **OM Objective 2.3:** Coordinate projects and plans with local and regional projects and planning efforts.

5.3.5.3 Invasive Species

- **OM Goal 3:** Reduce the extent of invasive species in the Baylands.
  - **OM Objective 3.1:** Create a methodology for determining which invasive weeds should be prioritized for removal.
  - **OM Objective 3.2:** Identify locations where invasive weeds should be prioritized for removal.
  - **OM Objective 3.3:** Implement an early detection eradication system.
  - **OM Objective 3.4:** Develop and implement a monitoring system to track long-term effectiveness.
  - **OM Objective 3.5:** Create/enhance an integrated pest management approach to incorporate best available science.

5.3.6 Key Areas

5.3.6.1 Byxbee Park

- **KEY Goal 1:** Finalize the 2015 Interim Byxbee Park Master Plan, which includes guidance for the completion of interpretive signage, incorporates policies for appropriate management of wildlife and native habitats, contains plans for trail connections to the former ITT Property/Emily Renzel Wetlands, and completes plans for parking at Byxbee Park.
  - **KEY Objective 1.1:** Develop a parking design for Byxbee Park.
  - **KEY Objective 1.2:** Create a methodology for determining which invasive weeds should be prioritized for removal.
  - **KEY Objective 1.3:** Identify and develop recommendations for potential trail connections to the former ITT Property/Emily Renzel Wetlands.
  - **KEY Objective 1.4:** Identify opportunities for additional locations to expand habitat islands.
  - **KEY Objective 1.5:** Determine the feasibility of opportunities to include burrowing owl habitat in Byxbee Park.

5.3.6.2 Former ITT Property/Emily Renzel Wetlands

- **KEY Goal 2:** Restore, protect, and enhance wetlands, uplands, and hydrologic connectivity to the site; develop a plan for the potentially historic building at the former ITT Property.
  - **KEY Objective 2.1:** Identify and maintain existing functioning habitats.
  - **KEY Objective 2.2:** Identify the locations of potential trails and connections that promote habitat-compatible access to the site that maintains important ecological process and functions.
  - **KEY Objective 2.3:** Develop use alternatives for the potentially historic building at the former ITT Property.
  - **KEY Objective 2.4:** Identify and develop recommendations for potential trail connections from the former ITT Property/Emily Renzel Wetlands to other parts of the Baylands.
  - **KEY Objective 2.5:** Incorporate current projects at the Emily Renzel Wetlands into future planning and site design.

6 Opportunities and Challenges Analysis

The opportunities and challenges presented in this chapter were identified for topics addressing the themes, goals, and objectives for the BCCP, which were developed through outreach to the public, agencies and stakeholders. The existing-conditions inventory and input from stakeholders, City staff, and Baylands partners also contributed to development of the lists of opportunities and challenges. Opportunities and challenges were identified for a variety of topics including natural resource management, public access, facilities, public art, public engagement, operations, management, and the key areas of Byxbee Park and the former ITT Property.

6.1 Natural Resource Management

Natural resource management was identified as a key theme for the BCCP. Many opportunities exist at the Baylands for habitat preservation, restoration, and connection. Both opportunities and challenges are listed below.

6.1.1 Habitat Preservation and Protection of Ecosystem Functions

6.1.1.1 Opportunities

- The Baylands boast areas of functioning ecosystems that support sensitive and special-status species, such as the salt marsh harvest mouse and Ridgway's rail. These areas can provide important seed banks, connection, and gene flow to local and regional habitats.
- Existing habitats that support common species and species diversity can be maintained through careful monitoring and follow-up restoration, which could include invasive species management and native plantings when necessary.
- Opportunities exist to expand and connect these functioning habitats.

6.1.1.2 Challenges

- Nonnative and invasive species at the Baylands threaten biodiversity.
- There is a declining trend in local populations of some special-status and sensitive species including burrowing owl (*Athene cunicularia*) and gray fox (*Urocyon cinereoargenteus*).

- User impacts, such as off-trail activities, littering, and vandalism, within the Baylands' habitats and ecosystem functions need to be avoided. The Baylands rangers and City staff have limited resources for enforcement of trail use regulations.
- Special-status species are subject to regulatory restrictions such as seasonal avoidance, habitat buffers, permitting, and mitigation.
- The Baylands rangers, City staff, and partner organization have limited resources for habitat monitoring.
- Regulatory requirements exist for control of ground squirrel populations at Byxbee Park.
- Surrounding urban land uses such as office buildings and homes can lead to the introduction of domestic predators, pests, and domestic animals diseases.
- There is interest in expanding trails and recreation activities that may be incompatible with habitat protection and preservation.

6.1.2 Enhancement and Restoration of Biodiversity and Degraded Habitats

6.1.2.1 Opportunities

- The 2008 Baylands Master Plan identified locations for restoration and enhancement.
- Degraded habitats are located near, or are connected to, existing functioning habitats and ecosystems.
- Restoration and enhancement efforts are ongoing at many locations throughout the Baylands.
- Large tracts of land at the Baylands, including Byxbee Park and the former ITT Property/Emily Renzel Wetlands, are available for preservation, restoration, and enhancement.
- Opportunities exist to expand structures for nesting birds including swallows.
- The Baylands rangers, Save the Bay, Environmental Volunteers, Santa Clara Valley Audubon Society, and Grassroots Ecology provide volunteer labor resources.

6.1.2.2 Challenges

- The Baylands are surrounded by urban development.
- Infrastructure, consisting of the RWQCP, the flood basin, the Palo Alto Airport, golf course, roads, and levees, is embedded within the Baylands.
- Hydrology and hydrologic connections have been altered throughout the Baylands.
- Climate change has resulted and continues to result in shifts in the Baylands' natural communities.
- Staff time and resources are limited for restoration activities.

6.1.3 Hydrologic Connectivity

6.1.3.1 Opportunities

- Tidal, muted tidal, and freshwater hydrologic connections are available.
- The Baylands are located on San Francisco Bay and are subject to tidal influences.
- Freshwater flows in from San Francisquito, Matadero, Adobe, and Barron creeks.
- Opportunities exist to explore expanding and enhancing hydrologic connections.

6.1.3.2 Challenges

- Some hydrologic connections are limited by pipe size.

- Channel maintenance and flow obstructions limit the effectiveness of the Baylands' hydrologic systems.
- Many hydrologic connections are part of a managed system including tidal connections to the Emily Renzel Wetlands and the Flood Control Basin. For example, they are artificially managed to maintain desired water levels and are not part of the "natural" hydrology of the Baylands.
- Hydrology and hydrologic connections have been altered throughout the Baylands.
- The long-term effects of climate change and sea level rise are difficult to predict.
- Water quality must be maintained.
- Numerous diverse opinions exist regarding the best courses of action.
- Flood control must be maintained within the flood basin.
- Mosquito abatement is required within the flood basin.

6.1.4 Climate Change and Sea Level Rise Adaptation

6.1.4.1 Opportunities

- The potential exists to adopt pilot adaptation strategies such as creating living or horizontal levees.
- Local and regional adaptation planning efforts are under way.
- Many willing partners, both private and public, are available locally and regionally.
- Grant funding may be available for actions to adapt to sea level rise and other effects of climate change.

6.1.4.2 Challenges

- Infrastructure within the Baylands must be protected from the effects of climate change, including sea level rise.
- Protection measures such as raising levees around the airport could be deemed unsafe for flight.
- Addressing the effects of large-scale change, such as the alteration of habitats and weather patterns by climate change, may be difficult.

6.2 Public Access and Facilities

6.2.1 Habitat-Compatible Trail Network

6.2.1.1 Opportunities

- The potential exists to create trails connecting the former ITT Property/Emily Renzel Wetlands to Byxbee Park.
- The existing trail network is well suited for walking, running, hiking, and bicycling.
- Connections to adjacent trails and regional pathways could be formalized and enhanced, and the trail network could be integrated with regional transportation and circulation plans.

6.2.1.2 Challenges

- Trail access must be balanced with habitat protection, as trails and human activity can have adverse effects on sensitive habitat.
- Some potential trail connections may require easements from private landowners and permits from regulatory agencies.

- The Baylands rangers and City staff have limited resources for enforcement of trail use regulations.

6.2.2 Reconfiguration of 10.5-Acre Golf Course

6.2.2.1 Opportunities

- 10.5 acres of parkland are available for multiple uses, including sports fields and restored habitats. The City will build upon previous outreach efforts to seek public input to create conceptual plans for use of the site.

6.2.2.2 Challenges

- The 10.5 acres are surrounded by diverse land uses including athletic fields, the golf course, office building, and San Francisquito Creek.
- Conflicting ideas have been expressed regarding the best use of the site.

6.2.3 Nonrecreational Facilities (Restrooms, Water Fountains, Benches)

6.2.3.1 Opportunities

- The public restroom at the Duck Pond/Baylands Ranger Station could be upgraded.
- The conceptual plan for Byxbee Park, developed as part of the BCCP, includes appropriate locations for park benches.

6.2.3.2 Challenges

- Funding for facility upgrades is limited and completing such upgrades requires considerable time.
- Vandalism and destruction of facilities are concerns.
- There is a lack of agreement regarding the right amount of developed infrastructure and facilities.
- Wildlife forage on human food waste throughout the preserve. Feeding wildlife can increase populations of pest species and decrease biodiversity.

6.2.4 Parking

6.2.4.1 Opportunities

- The parking lots at the Sailing Station and near the picnic area could be improved, and the Byxbee Park parking lot could be enlarged and improved.
- The golf course parking lot could be used as overflow for Baylands and Byxbee Park visitors.

6.2.4.2 Challenges

- Space for parking is limited, and there is a lack of agreement about the right amount of space that should be allocated to parking.

6.2.5 Palo Alto Airport

6.2.5.1 Opportunities

- The Baylands and the City could explore potential mutually beneficial projects with the airport including a land swap with the Palo Alto Airport, wildlife management, and potential funding opportunities from the FAA to help finance infrastructure protection measures from sea level rise for the airport levee system.

6.2.5.2 Challenges

- Regulatory or stakeholder issues complicate a potential land swap with the airport.
- Environmental considerations exist for infrastructure protection measures, and may require permits from regulatory agencies.
- The San Francisquito Creek Trail is located close to the end of the runway.

6.2.6 Former Los Altos Treatment Plant

6.2.6.1 Opportunities

- Natural areas could be dedicated as parkland.

6.2.6.2 Challenges

- Many competing ideas exist for use of the site.

6.2.7 Measure E Compost Facility at Byxbee Park

6.2.7.1 Opportunities

- The City can explore the potential future park use of the 10-acre Measure E compost facility site once the Measure E deadline expires in November 2021.

6.2.7.2 Challenges

- Until November 2021, the only permitted uses of the site are those described in Measure E.
- The site will not become available for alternate use until November 2021.

6.3 Public Engagement

6.3.1 Public Engagement and Volunteer Involvement

6.3.1.1 Opportunities

- Partnerships exist with organizations that promote volunteerism and offer programs at the Baylands, including Save the Bay, Environmental Volunteers, Santa Clara Valley Audubon Society, Grassroots Ecology, and the Baylands rangers. There are opportunities to expand these partnerships.
- Numerous projects throughout the Baylands engage visitors, including citizen science events such as bioblitzes.
- Environmental education programs are offered, including the Junior Museum's science classes, Bay Camp, interpretive programs led by rangers and naturalists, and events at the Lucy Evans Baylands Nature Interpretive Center and the Environmental Volunteers' EcoCenter.
- Many organized running and walking events bring people to the Baylands.
- Art events such as painting classes are held in the Baylands.

6.3.1.2 Challenges

- The Baylands rangers and City staff have limited time and resources to expand City programs and ensure that third-party programs are consistent with City goals, and do not adversely affect Baylands resources.
    - There is limited staff oversight for third-party events in the Baylands.

6.3.2 Interpretive Messaging

6.3.2.1 Opportunities

- A unifying theme/design could be created for interpretive displays, and existing signage could be refreshed and integrated with the new design.
- The Baylands could coordinate with the Interpretive Signage Program developed by the Junior Museum and Zoo to create signage for the San Francisquito Creek Trail to Cooley Landing.
- Multilingual, accessible signage could be developed to reflect visitors' diversity while explaining and describing the Baylands' natural and cultural history and its future.
- On-site signage could be supplemented or enhanced by materials on the Baylands Web site.

6.3.2.2 Challenges

- There are already many interpretive signs with differing design themes throughout the Baylands, with more planned.
- Vandalism is a concern for interpretive signage.

6.4 Public Art

6.4.1 Opportunities

- With its strong history of public art, the Baylands can incorporate ecologically sensitive, nature-inspired art that engages and educates visitors.
- Low-profile interpretive art about water and the Bay could be installed in multiple locations, including Harbor Point, near the Sailing Station. The art in these locations could have multiple uses, such as serving as a gathering spot or outdoor classroom.
- Opportunities for public art installations exist at many of the previously developed entrances to the Baylands.
- Adding public art can enhance visitors' experiences by allowing them to interact and engage with nature-facing interpretive art.
- An artist-in-residence at the RWQCP could bring attention to the plant and educate visitors about its operations.
- Embarcadero Road is heavily used and highly visible, and temporary or permanent interpretive art could be added along its alignment to mark the transition from the urban city fabric to the Baylands.
- Art along roadways and trails could provide pedestrian and bicycle safety features.

6.4.2 Challenges

- Disagreement exists about the need for, and the extent of, public art in the preserve.
- Feasible locations for public art installations are limited because art installations should be only be sited outside of sensitive habitats.

6.5 Operations and Management

6.5.1 Management

6.5.1.1 Opportunities

- Dedicated Baylands rangers perform most operations and management tasks.

- Opportunities exist and workload levels are sufficient to increase ranger staffing.

6.5.1.2 Challenges

- Funding for additional staff is limited, making it difficult to hire hourly staff.
- Co-management of Faber-Laumeister Tract between USFWS, Don Edwards San Francisco Bay National Wildlife Refuge, and the City of East Palo Alto can be complicated.

6.5.2 Repair and Maintenance

6.5.2.1 Opportunities

- Dedicated rangers perform much of the repair and maintenance at the Baylands.

6.5.2.2 Challenges

- Rangers must address multiple competing priorities: vegetation control, repair and maintenance of park facilities, park safety, and interpretive programs.

6.5.3 Planning/Projects

6.5.3.1 Opportunities

- The City can coordinate with other municipal, local, and regional planning projects: SFCJPA's SAFER Bay Project; management of the South Bay Salt Ponds; and projects led by San Mateo County, SCVWD, and the City of Palo Alto Department of Public Works.
- Grants and other project funding sources may be available.
- Baylands/park staff members can participate in stakeholder, planning, and policy working groups.

6.5.3.2 Challenges

- Timelines for planning efforts vary and may not overlap, which complicates collaboration and integration with other planning efforts.
- Multiple planning efforts can have different focuses and conflicting goals.
- Disagreements on the best courses of action often occur.

6.5.4 Management of Invasive Species

6.5.4.1 Opportunities

- Community volunteers are available to continue weeding and planting with ranger staff and stewardship partners.
- Contractors, stewardship partners, and staff equipment are available to mechanically control weeds.
- Stewardship partners provide guidance for maintenance and invasive species management.
- A long-term integrated pest management plan could be developed, including mapping location and extent of areas where invasive species and monitoring of success.

6.5.4.2 Challenges

- Staff time and resources are limited.
- The enthusiasm of volunteers needs to be sustained.

- The topography of different parts of the Baylands constrains some invasive species control methods.

6.6 Key Areas

6.6.1 Byxbee Park

6.6.1.1 Opportunities

- Opportunities may exist to enhance wildlife habitats in areas where fill dirt has been added to the landfill cap to counteract settling.
- Opportunities for additional plantings may exist in areas with engineered soils that may have a better potential so support shrubs and small trees.
- Volunteers are available to "adopt" habitat islands.
- A connection could be created between Byxbee Park and the former ITT Property/Emily Renzel Wetlands.
- Additional seating and interpretive messaging could be added at Byxbee Park.
- The parking area could be enhanced/expanded.
- An opportunity exists to expand the parkland once the prior designation for the composting facility expires.

6.6.1.2 Challenges

- Restrictions exist on the depth of roots and burrows that can be allowed on the landfill cap.
- Increasing the number of native plant habitat islands will require irrigation to be plumbed to the site.
- Staff time and resources are required for managing volunteers.
- Disagreements exist regarding the right amount of access and facilities.

6.6.2 Former ITT Property/Emily Renzel Wetlands

6.6.2.1 Opportunities

- Trail connections to Byxbee Park could be provided.
- The historic building on-site could be restored and repurposed for park use.
- The historic building on-site could be removed and the area restored with native plants.
- The trail network around the property can be expanded to provide better/additional connections.
- Opportunities for habitat restoration exist on-site.

6.6.2.2 Challenges

- Buildings may not be suitable for restoration, nor does the City have funds for doing so.
- Some stakeholders wish to keep the Emily Renzel Wetlands as habitat and minimize human access.
- Sensitive biological resources such and wetlands and special-status species known to occur on-site require permits from regulatory agencies for projects with potential impacts.

6.7 Additional Limitations and Restrictions

6.7.1 Physical Limitations and Restrictions

- Nonrecreational facilities in the Baylands such as the RWQCP and the Palo Alto Airport must be protected from sea level rise.
- Physical limitations within the Baylands include infrastructure such as roadways, buildings, and levees.

6.7.2 Regulatory and Governance

- The Baylands cross the jurisdictions of multiple management agencies including the City of Palo Alto, USFWS, SFCJPA, the San Francisco Bay Conservation and Development Commission (BCDC), State Lands Commission, Don Edwards San Francisco Bay National Wildlife Refuge, the City of East Palo Alto, the RWQCP, SCVWD, the Palo Alto Airport, the FAA, and the California Department of Transportation.

6.7.3 Staffing and Funding

- The Baylands rangers, City staff, and volunteers have limited time and resources.

7 Climate Change and Sea Level Rise at the Baylands

7.1 Executive Summary

Sea levels in the Bay Area have increased by 8 inches since recordkeeping began in the mid-1850s (NOAA 2018), and there has been significant acceleration of sea levels since 2011 (Ackerly et al. 2018). As water levels rise in the Bay, the frequency and areal extent of flooding will increase. Areas once considered to be outside the floodplain will begin to experience periodic coastal flooding or permanent inundation. The Baylands, located along the Bay, are vulnerable to future flooding.

The goal of this section is to describe the potential impacts of sea level rise on physical assets and natural resources in the Baylands and to describe high-level measures that the City can take to adapt to climate change and sea level rise. This discussion should be used as a starting point for planning efforts to address potential future impacts caused by sea level rise and climate change. The text includes descriptions of existing nearby planning efforts and aims to expand upon those efforts to focus on the Palo Alto Baylands.

The effort to map the Baylands' coastal flood exposure leveraged existing sea level rise layers prepared as a part of the BCDC program "Adapting to Rising Tides" (ART). The sea level rise exposure assessment for the Baylands involved completing a spatial analysis using a geographic information system to estimate the timing and extent of permanent inundation for the site's features and assets: flood control structures, access, and nonrecreational features and facilities. The habitat assessment mapping effort used elevation-based habitat maps produced by the Future San Francisco Bay Tidal Marshes planning tool (Future Tidal Marshes Tool) to understand changes to potential future habitat types in the Baylands.

The results of the exposure assessment show that many areas within the Baylands would experience a tipping point for coastal inundation, with 36 inches of sea level rise where portions of many flood control levees and berms may be overtopped, causing widespread inundation throughout the Baylands. Other areas of the Baylands, including the unprotected Harriet Mundy Marsh and Faber-Laumeister Tract, may be exposed to flooding with 12 inches of sea level rise. Byxbee Park, the City of Palo Alto's capped former landfill, will not be affected under any of the sea level rise scenarios assessed in this document because of its higher elevation.

The results of the habitat assessment show that under a no-management scenario—a scenario in which the landscape is not managed through levees, pumps, routine maintenance, or other

management actions—deposition of sediment and organic material at the Baylands will likely keep pace with sea level rise through the late 21st century. However, the rate at which this accretion will occur depends on the amount of available sediment and organic material. The results show that under most sea level rise and sedimentation scenarios, by 2050, the unprotected Harriet Mundy Marsh and Faber-Laumeister Tract would maintain a mid marsh habitat, but that much of the other Baylands habitat types would convert to higher elevation habitat types (e.g., mudflat to mid marsh). The exception is the high sea level rise and low sedimentation scenario, where rising sea levels would slowly outpace the sediment accretion rate, and the mid marsh and high marsh habitats could transition to low marsh and mudflat habitats.

Beyond sea level rise, changes in climatic conditions such as temperature and precipitation could alter future growing seasons, along with the amount of freshwater soil moisture available. These changes could ultimately lead to a change in the composition of plants and the wildlife that depend on them. Species with broader temperature and precipitation tolerance are likely to persist better than highly specialized species.

Potential high-level adaptation measures may include physical, governance, and initiative strategies that may be used to better prepare the Baylands for future environmental conditions resulting from sea level rise and climate change.

Physical adaptation measures may include the following:

- Raising and improving flood control structures such as levees and berms.
- Increasing the capacity of the Flood Control Basin.
- Elevating critical roadways, trails, and structures to minimize flood damage.
- Installing climate-smart restoration plantings to enhance the ecological function of degraded or destroyed areas to prepare them for the consequences of climate change (Point Blue 2018).
- Constructing tidal marsh transition zones.

Governance measures may include the following:

- Coordinating with neighboring stakeholders and regional and local planning efforts.
- Incorporating sea level rise language into guidance documents (e.g., Baylands Master Plan, Comprehensive Plan, City of Palo Alto Design Standards, and City of Palo Alto Storm Drain Master Plan) and emergency plans to provide a means for guiding future decision making.

The following informational initiatives could be taken:

- Monitoring changing conditions in the short term to inform the timing for implementing adaptation measures.
- Identifying and addressing data gaps by conducting studies to better understand flood risk at the Baylands.
- Identifying co-benefits, which have the potential to reduce impacts on human and ecological health at the same time.
- Securing funding for proposed adaption actions.

7.2 Predictions of Climate Change and Sea Level Rise

The global climate continues to exhibit rapid changes compared to the pace of natural variations observed throughout Earth's history. Widespread evidence exists to show climate

trend deviations. Scientists have documented increases in atmospheric and oceanic temperatures, melting of glaciers, reduction of ice sheets and snowpack, shifting rainfall patterns, intensification of storm events, and rising sea levels. Increasing atmospheric temperatures influence global sea levels: as average air temperatures rise, thermal expansion of warming ocean water occurs and land ice melts.

7.2.1 Latest Climate Science

In 2017, the California Ocean Protection Council (OPC) Science Advisory Team Working Group compiled, reviewed, and summarized the latest research on sea level rise (Griggs et al. 2017). The study's findings were incorporated into an updated sea level rise guidance document for the State of California, which OPC adopted in 2018 (OPC 2018). The update presents the latest peer-reviewed projections of sea level rise; describes an extreme scenario for sea level rise caused by rapid ice sheet loss from the West Antarctica ice sheet, and scenario selections using risk-based (probabilistic) planning capabilities. The 2018 update also lays out preferred approaches for planning for vulnerable assets, natural habitats, and public access.

7.2.2 Trends in Sea Level Rise and Future Projections for San Francisco Bay

Since the installation of the San Francisco tide station in the mid-1850s, local water levels have increased by 8 inches (NOAA 2018). Rising sea levels represent new challenges for San Francisco Bay. As Bay water levels rise, the frequency and areal extent of flooding will increase. Areas once considered to be outside of the floodplain will begin to experience periodic coastal flooding or permanent inundation.

Table 4 shows sea level rise projections for the Bay. Based on the latest climate science, sea levels in the Bay Area are likely (67 percent probability) to rise between 7.2 and 13.2 inches by the middle of the 21st century and between 12 and 40.8 inches by the end of the century. OPC recommends using the upper limit of the likely range for projects with a high tolerance to flooding (e.g., park trails).

Because there is uncertainty regarding future greenhouse gas emissions, sea level rise projections with a lower probability of occurring are also considered. In the Bay Area, there is a 0.5 percent probability (1-in-200 chance) that sea level rise will reach or exceed 22.8 inches by the middle of the 21st century and 82.8 inches by the end of the century (OPC 2018). OPC recommends using the lower probability projections (particularly the 0.5 percent probability projections) when planning for assets with a lower tolerance to flooding, such as water treatment facilities.

Table 4. Sea Level Rise Projections for San Francisco Bay

Year	Median (50% probability of exceedance [inches])	Likely Range (67% probability of exceedance [inches])	1-in-20 chance (5% probability of exceedance [inches])	1-in-200 chance (0.5% probability of exceedance [inches])	H++ (extreme risk aversion [inches])
2030	4.8	3.6 to 7.2	7.2	9.6	12
2050	10.8	7.2 to 13.2	16.8	22.8	32.4
2100	19.2 to 30	12 to 40.8	38.4 to 52.8	68.4 to 82.8	122.4

Notes:

- Projections represent a sea level rise increase above the 1991–2009 mean sea level.
- 2100 projection ranges depend on the future condition scenario, as described in the International Panel on Climate Change *Fifth Assessment Report (AR5)* (IPCC 2013).

The latest sea level rise guidance also includes an extreme scenario that extends to 122.4 inches by 2100. OPC recommends using this scenario when planning for projects with an extremely low flood tolerance, such as nuclear power plants.

7.3 Analysis Methodology

The following sections present the methodology for assessing the impacts of sea level rise on the Baylands. Methods used included conducting a literature review of local studies of sea level rise and flood protection, assessing sea level rise exposure to determine the potential timing and extent of impacts on Baylands assets, and conducting habitat modeling to estimate the evolution of marshes as they are exposed to rising Bay levels.

7.3.1 Literature Review

Previous studies of sea level rise and climate change have been conducted at or near the Baylands. These studies are summarized below.

7.3.1.1 Strategy to Advance Flood Protection, Ecosystems and Recreation along the Bay—Draft Feasibility Reports

The San Francisquito Creek Joint Powers Authority was founded by the Cities of East Palo Alto, Menlo Park, and Palo Alto, San Mateo County Flood Control District, and SCVWD in 1999, the year after a major flood occurred (SFCJPA 2016). SFCJPA and its member agencies seek to protect people, property, and public infrastructure in East Palo Alto, Menlo Park, and Palo Alto from Bay coastal flooding; restore habitat in the Bay's tidal marsh ecosystem; and enhance recreation opportunities along the Bay shoreline (SFCJPA 2016).

SFCJPA and its member agencies are planning the SAFER Bay Project to protect its communities located within the FEMA 1 percent (100-year) flood zone from Bay coastal flooding (SFCJPA 2015, 2016). The goal of SFCJPA is to implement the SAFER Bay Project and thereby remove these communities from FEMA's coastal floodplain, while enabling adaptation to climate change by using tidal marsh areas for flood protection in a way that sustains marsh habitat and facilitates marsh restoration (SFCJPA 2015). SAFER Bay aims to align with regional efforts that promote adaptation to sea level rise in the context of developed shoreline areas, including the South Bay Salt Ponds Restoration Project and other restoration efforts. It is designed to support the objectives of the San Francisco Estuary Partnership's 2016 *Comprehensive Conservation and Management Plan* (SFCJPA 2016).

SAFER Bay is divided into two project areas: SAFER Bay North, from the Redwood City/Menlo Park border south to San Francisquito Creek; and SAFER Bay South, from San Francisquito Creek south to the Palo Alto/Mountain View border. SAFER Bay is divided into 11 reaches. Restoration options have been proposed for each reach: modifying existing levees, establishing new levees, establishing ecological transition zones, and constructing floodwalls at Matadero Creek to the 100-year water surface elevation (Figure 6). Reaches 1–9 are located in SAFER Bay North and associated with East Palo Alto and Menlo Park. Reaches 10 and 11 are located in SAFER Bay South and extend from San Francisquito Creek to the Palo Alto/Mountain View border. Reaches 8–11 overlap the Baylands.

Figure 6. Project Reaches and Restoration Options in the Strategy to Advance Flood Protection, Ecosystems and Recreation along the Bay

Source: SFCJPA 2015

7.3.1.2 SAFER Bay North 2016 East Palo Alto and Menlo Park Feasibility Report

The SAFER Bay North feasibility report recommends installing transition zone habitat in the Baylands adjacent to existing tidal marshes at the Laumeister and Faber Tract marshes (Reaches 8 and 9) because these marshes support special-status species, including Ridgway's rail (formerly known as California clapper rail; *Rallus longirostris obsoletus*) and salt marsh harvest mouse (*Reithrodontomys raviventris*) (SFCJPA 2015).

Reach 8—Laumeister Marsh

Reach 8 extends from Bay Road to Runnymede Street in East Palo Alto (Figure 6). The SAFER Bay North feasibility report recommends restoring Reach 8 by building a new levee on the Bay side of the existing levee, with a restored transition zone habitat. Transition zone habitat would increase the quantity and quality of habitat for rails and harvest mice and would provide a greater opportunity for creating high-tide refugia and improved marsh resiliency to sea level rise.

Reach 9—Faber Tract Marsh

Reach 9 extends from Runnymede Street in East Palo Alto to the O'Connor Pump Station in Palo Alto (Figure 6), which is the terminus of SFCJPA's San Francisco Bay to Highway 101 Project for flood projection, ecosystem restoration, and recreation. The SAFER Bay North feasibility report recommends coordinating with partners for restoration actions, which consist of constructing a new levee with restored transition zone habitat along Faber Tract from the Runnymede Street Outfall to the O'Connor Pump Station at the Friendship Bridge, avoiding the East Palo Alto Sanitary District sewer line (SFCJPA 2015). Restoration of such a transition zone adjacent to Faber Tract Marsh would significantly enhance marsh habitat that supports Ridgway's rail and salt marsh harvest mouse. It also would increase the resiliency of the tidal marsh to sea level rise and help to meet the objectives of USFWS's *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (Tidal Marsh Recovery Plan) by creating high-tide refugia (SFCJPA 2015).

7.3.1.3 SAFER Bay 2015 South Baylands Draft Feasibility Report

In SFCJPA's SAFER Bay South project area, the project aims to protect the cities of Palo Alto and Mountain View from flooding. SAFER Bay South consists of Reaches 10 and 11, which traverse the Baylands from San Francisquito Creek to the Palo Alto/Mountain View border (Figure 6). The project objectives include reducing the risk of flooding; incorporating features that facilitate climate change adaptation by using tidal marshes for their ecological function; expanding opportunities for recreation and connectivity; minimizing future maintenance; and creating partnership opportunities.

Figure 6 shows the restoration options for Reaches 10 and 11. No recommendations were made for a preferred option for each reach.

Reach 10—Palo Alto Airport

Reach 10 begins at the San Francisquito Creek levee at the Friendship Bridge in Palo Alto, wraps around the Palo Alto Airport along the landward side of the Baylands tidal marsh wetlands, and ties into higher ground at Byxbee Park. The 2015 SAFER Bay South Draft Feasibility Report considered three options for flood control through levee creation and associated restoration along Reach 10, as described below.

Reach 10, Option 1 (shown in red in Figure 6) consists of installing a levee that would tie into the San Francisquito Creek Project, running along the Bay side of the Palo Alto Airport and continuing southeast before terminating in Byxbee Park. This option presents the opportunity to restore transition zone habitat on the outboard side of the levee east of Embarcadero Road. Option 1 would require installing floodgates at the runways or elevating the runways.

Reach 10, Option 2 (shown in light pink in Figure 6) is similar to Option 1. Under this option, the levee adjacent to the airport would be closer to the runway, allowing more space for restoration of a transition zone at a gentle slope. Option 2, however, would result in the loss of seasonal wetlands (diked former tidal marsh) because the habitat would be converted to high marsh and transitional habitat. Thus, this option represents an ecologically beneficial trade-off between seasonal wetlands and tidal marsh/transitional habitat (SFCJPA 2015).

Under **Reach 10, Option 3** (shown in bright pink in Figure 6), the levee would wrap around the Bay side of the Duck Pond and Baylands Ranger Station rather than being located adjacent to the airport. This option would require installation of a pipe connecting the Duck Pond to the Bay to control flows into the leveed basin (SFCJPA 2015). Option 3 would have greater impacts on tidal marsh habitat than the other two options; however, transition zone habitat could be added on the outward (Bay) side of the levee (SFCJPA 2015).

Reach 11—Palo Alto Flood Control Basin

Reach 11 extends from Byxbee Park to a tie-in point at the City of Mountain View border near Coast Casey Forebay. The SAFER Bay 2015 South Baylands Draft Feasibility Report considered three options for flood control through levee creation and associated restoration along Reach 11, as described below (SFCJPA 2015).

Reach 11, Option 1 (shown in bright green in Figure 6) consists of enhancing the existing levee where it begins at the north end of Byxbee Park, wraps around the outside of the perimeter levee for the Flood Control Basin, and ties in at the City of Mountain View border near Coast Casey Forebay. The option does not allow for significant restoration of transition zone habitat because space is not available. Option 1 would fill and otherwise affect diked salt marsh habitat in the basin along roughly 2 miles of levee improvements (SFCJPA 2015).

Reach 11, Option 2 (shown in bright blue in Figure 6) consists of installation/enhancement of three levees. The first levee extends from the south end of Byxbee Park and runs southwest along the Emily Renzel Wetlands, then along the north side of Matadero Creek to East Bayshore Road. The second levee extends from East Bayshore Road along the south side of Matadero Creek and around the southern end of the Baylands along East Bayshore Road to Adobe Creek. A third, proposed levee would continue along the Adobe Creek Loop Trail on the south side of Adobe Creek, from East Bayshore Road to a tie-in at the City of Mountain View border near Coast Casey Forebay (SFCJPA 2015). This option would require raising floodways along Matadero, Barron, and Adobe creeks.

According to the SAFER Bay 2015 South Baylands Draft Feasibility Report, Reach 11, Option 2 provides a significant opportunity to restore tidal marsh and transition zone habitat on a large scale along the Bay side edge of the Baylands, and to further the objectives of USFWS's Tidal Marsh Recovery Plan. This restoration could also include reconnecting the Flood Control Basin to tidal exchange; restoring the basin to marsh; and removing the existing levee

between the Flood Control Basin and Charleston Slough to create a large, contiguous marsh with freshwater input from Adobe Creek.

Reach 11, Option 3 (shown in yellow in Figure 6) consists of two levees. The first levee extends from the southern edge of Byxbee Park, through the Flood Control Basin, and along the north side of Adobe Creek to East Bayshore Road. The second levee would run along Adobe Creek to the City of Mountain View, the same as in Option 2. Under this option, the northern portion of the Flood Control Basin could be restored to tidal marsh habitat and Adobe Creek would be directly connected to the Bay. As with Option 2, floodwalls would be required along Adobe and Matadero creeks, and opportunities for a tidal marsh transition zone would be created along the Bay side.

7.3.1.4 Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California

The Tidal Marsh Recovery Plan, proposed by USFWS, is the largest ever tidal marsh recovery effort on the West Coast. The goal of this effort is the comprehensive restoration and management of tidal marsh ecosystems (USFWS 2013a). The Tidal Marsh Recovery Plan aims to restore the habitats of five species that are federally listed as endangered: two endangered animals, the Ridgway's rail and salt marsh harvest mouse, and three endangered plants, Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*), soft bird's-beak (*Chloropyron molle* ssp. *molle*), and California sea-blite (*Suaeda californica*).

The Baylands are located within the Tidal Marsh Recovery Plan's Central/South Bay recovery unit, which identifies three species for recovery: California sea-blite, Ridgway's rail, and salt marsh harvest mouse. Ridgway's rail and salt marsh harvest mouse are known to occur in the Baylands, particularly in outer Bayside marshes. According to the Tidal Marsh Recovery Plan, "[c]overed species in this recovery unit face unique management issues that vary substantially from other recovery units (e.g., invasive *Spartina* control, the current planning and implementation of extensive tidal marsh restoration, and high human density and recreational pressure)" (USFWS 2013a:152).

Restoration and sea level rise adaptation efforts should be planned to align with the Tidal Marsh Recovery Plan to ensure the success of these federally listed endangered tidal marsh species and their unique habitats.

7.3.1.5 Shoreline Regional Park Community Sea Level Rise Study Feasibility Report and Capital Improvement Program

The City of Mountain View led the *Shoreline Regional Park Community Sea Level Rise Study Feasibility Report* and Capital Improvement Program in 2012 to address long-term flood protection from sea level rise for Mountain View's Shoreline Regional Park Community (City of Mountain View 2012b). The Shoreline Regional Park Community is located adjacent to the Baylands, just south of the Flood Control Basin, and is susceptible to overflow flooding from the Flood Control Basin. The study recommends the following adaptation projects in the vicinity of the Baylands:

- **Charleston Slough and Palo Alto Flood Control Basin Levee Improvement**: As a shared effort by the Cities of Palo Alto and Mountain View, improve a 6,600-foot section of the levee that separates Charleston Slough and the Flood Control Basin by raising the elevation of the levee crest and providing erosion protection.
- **Coast Casey North Levee Improvement:** Construct a coastal levee to help protect property in Mountain View's northwest corner from flooding caused by the Bay. The levee would extend 1,300 feet from the high ground of Mountain View's Shoreline Park

landfill to the boundary with Palo Alto.

- **Coast Casey Pump Station Improvement:** Improve pump station capacity at the Coast Casey Stormwater Pump Station to counter sea level rise impacts on the pump station's hydraulics.

7.3.1.6 Palo Alto Flood Control Basin Hydrology July 2016 Update

In 2016, SCVWD published a study that examined the hydraulic performance of the Flood Control Basin during a variety of tidal and watershed conditions. The study focused on exploring ways to improve the tidal barrier system during large flood events and potential future sea level rise of up to 66 inches.

The study found that the Flood Control Basin has sufficient volume to store storm runoff generated during high-flow events under existing conditions. However, as tides start to rise beyond the elevation originally accounted for in the structure's design, the basin may become too small to effectively control backwater flooding conditions. As sea level rises, the time period when stored floodwater can be released to the Bay will be compressed, thereby limiting the duration of discharge into the Bay. In addition, the gravity-driven tide gate will be less efficient at quickly draining stored floodwater because the pressure differential between water levels in the basin and in the Bay will be lower. As the duration and rate of discharge to the Bay is affected, the water level in the Flood Control Basin may exceed its design. An impact scenario not explored by the 2016 study is the potential for Bay water levels to exceed the elevation of the Flood Control Basin's levee.

7.3.1.7 Adapting to Rising Tides (San Francisco Bay Conservation and Development Commission)

ART is a regional collaborative interagency program supported by BCDC, the California Department of Transportation, the Bay Area Toll Authority, the Metropolitan Transportation Commission, and the Bay Area Regional Collaborative. ART projects address climate change vulnerability and adaptation projects (BCDC 2018a, 2018b). As part of the ART program, the Bay Shoreline Flood Explorer tool (https://explorer.adaptingtorisingtides.org/home) was developed to help Bay Area communities prepare for the impacts of current and future flooding caused by sea level rise and storm surges. ART Bay Area, a project in the ART program, involves conducting a regional vulnerability assessment of the Bay Area's transportation infrastructure, Priority Development Areas and Priority Conservation Areas as identified in *Plan Bay Area*, and vulnerable and disadvantaged communities (BCDC 2018c).

7.3.1.8 Future San Francisco Bay Tidal Marshes Planning Tool (Point Blue Conservation Science)

The Future San Francisco Bay Tidal Marshes planning tool (Future Tidal Marshes Tool; http://data.prbo.org/apps/sfbslr/) used by Point Blue Conservation Science (Point Blue) projects future habitat evolution in response to different scenarios for sea level rise and sedimentation (Veloz et al. 2014). The models that generate the maps provide a range of projections to address the uncertainty in future rates of sea level rise and availability of suspended sediment. The models identify the areas of the landscape that are vulnerable or resilient to sea level rise, enabling planners to make informed decisions about sea level rise adaptation and restoration potential (Veloz et al. 2014).

The Future Tidal Marshes Tool assesses marsh accretion as modeled by ESA PWA using the Marsh-98 model. The model assumes that the rate at which the elevation of the marsh plain changes depends on the availability of suspended sediment and organic material, the water's depth, and the duration of inundation periods. If enough suspended

sediment is available, then the tidal marsh's elevation can accrete to keep pace with increased inundation from sea level rise (SFCJPA 2016; Orr et al. 2003). Outputs from the model show the projected future composition of marsh habitat (e.g., percent subtidal, mudflat, low marsh) based on the elevation. Point Blue's Future Tidal Marshes Tool can be used to assess future elevation-based habitat types, allowing the user to toggle between differing degrees of sea level rise, sedimentation, and organic materials over time (Veloz et al. 2014). This tool was used for this analysis, as described in Section 7.3.2.2, "Habitat Models/Mapping."

7.3.1.9 Silicon Valley 2.0 Climate Adaptation Guidebook (County of Santa Clara)

The *Silicon Valley 2.0 Climate Adaptation Guidebook* (Silicon Valley 2.0) is a Santa Clara County–wide effort to understand and minimize the anticipated impacts of climate change and to prepare the County of Santa Clara to collaborate across agencies and municipalities for adaptation (County of Santa Clara 2015). The project developed the geo-economic Silicon Valley 2.0 Climate Change Preparedness Decision Support Tool (http://www.siliconvalleytwopointzero.org/) to evaluate the vulnerability of key assets to potential climate change scenarios and the consequences of such scenarios on those assets. The assessment of climate vulnerability evaluated sea level rise, riverine flooding, wildfire, extreme heat, drought, and air quality deterioration. Various elements of shoreline flood protection were assessed, including engineered flood protection (dikes and levees), nonengineered berms, and wetlands. Natural landscapes such as the Baylands were assessed qualitatively at a high-level habitat scale. Habitats related to the Baylands that were assessed included coastal wetland, riparian and riverine, and grassland habitats. Water and wastewater, including water treatment plants, were also assessed.

Silicon Valley 2.0 recommends the following climate adaptation strategies for shoreline flood protection related to the Baylands:

- Conduct an overtopping analysis of existing shoreline flood protection assets.
- Use the updated FEMA Flood Insurance Rate Maps to identify the source of flooding (e.g., riverine versus coastal) associated with 100-year flood events.
- Increase pump station capacity and provide protection for pump stations.
- Enhance monitoring and/or maintenance programs for levees and floodwalls.
- Increase the design criteria for current and future flood protection projects from 100-year flood events to higher impact flood events.
- Model projected change in the frequency and magnitude of riverine flooding caused by precipitation in the County.

Silicon Valley 2.0 recommends the following climate adaptation strategies for ecosystems related to the Baylands:

- Develop climate-smart planting palettes and education campaigns to support restoration of plants that are projected to better survive under changing climate conditions. Climate-smart restoration and land conservation is the process of enhancing the ecological function of degraded or destroyed areas in a manner that prepares them for the consequences of climate change (Point Blue 2018).
- Maximize the retention of local water supply and quality through climate-smart land conservation and stewardship.
    - Protect biodiversity through multi-agency and multi-county conservation of climate-smart wildlife corridors.

- Implement a fine-scale habitat assessment utilizing climate water deficit data as a proxy for future vegetation health and persistence under changing climate regimes.
- Prioritize cold water habitat conservation and restoration through amendments to habitat conservation plans and in-creek projects.
- Develop best practice standards for water retention design for habitat restoration and habitat creation projects on natural lands.
- Increase climate messages in ongoing water conservation public awareness campaigns.
- Understand vector-based impacts of climate and address invasive species through the pursuit of stronger state laws and programs.

7.3.2 Data Analysis

Sea level rise mapping models were used to assess the exposure of Baylands features and habitat evolution caused by changing water levels. All data layers were leveraged from readily available sources and no additional modeling was completed for this effort.

7.3.2.1 Flood Models/Mapping

Inundation maps are a valuable tool for evaluating the potential exposure of habitats, infrastructure, and other assets to future water level conditions. The maps are a useful means to evaluate the timing and extent of flooding that may be experienced based on projections of sea level rise. Inundation maps also help planners to identify critical flooding thresholds where an entire area may be compromised.

The effort to map the Baylands' coastal flood exposure used existing sea level rise layers prepared as a part of BCDC's ART program (AECOM 2016; BCDC 2018b). The ART mapping provides the geographical extent and depth of inundation for the Bay Area's nine counties using a combination of 10 sea level rise scenarios, tidal datums, and extreme tides modeled to represent local conditions along the shoreline. In addition to areas directly exposed to flooding and inundation, the model identifies low-lying, hydraulically disconnected areas that may experience drainage issues caused by backflow through the stormwater collection system during high tides; elevated groundwater levels; or ponding during times of heavy rain. Also included in the ART mapping dataset are maps for all 10 scenarios that depict where the Bay may overtop the shoreline. The inundation maps do not account for wave height, rainfall, or other potential variations in conditions that could affect the depth of inundation at any given location.

Four sea level rise amounts—12, 24, 36, and 66 inches—were selected for flood exposure (Figure 7 through Figure 10). The scenarios represent mid-range to high-end projections for the years 2050 and 2100 based on the state's latest sea level rise guidance (OPC 2018). To evaluate future daily exposure to inundation, projections of future sea level rise were added to the average high-tide elevation, represented by mean higher high water (MHHW). The MHHW + 66-inch scenario is equivalent to the extent of flooding that could occur during a 100-year coastal storm event with 24 inches of sea level rise (the high-range projection for 2050).

The assessment of the Baylands' exposure to sea level rise involved conducting a spatial analysis in a geographic information system to estimate the timing and extent of permanent inundation of flood control structures, access, and nonrecreational facilities. Sea level rise layers were overlaid on the locations of site features to estimate exposure to future water level conditions.

7.3.2.2 Habitat Models/Mapping

Understanding the vulnerabilities of Baylands habitat to sea level rise is important for future land management and species conservation. The marshes at the Baylands provide valuable ecosystem services and habitat for a diversity of plant and animal species. Habitat modeling is a valuable means of predicting future changes to tidal marsh habitats that will result from sea level rise and climate change, to enable better understanding and preparation for how these systems may change. The Future Tidal Marshes Tool was used to project the evolution of habitat in the Baylands in response to different sea level rise and sedimentation scenarios.

For this effort, projected habitat change was assessed using the elevation parameter, which shows marsh elevation and habitat type in meters relative to MHHW. A time horizon of 2050 and a sea level rise rate of approximately 65 inches per century were selected (e.g., 65 inches by 2110). According to the model, sea levels are projected to rise by approximately 24 inches by 2050. Future Baylands habitats were assessed under two scenarios: a low-sedimentation, low-organic-materials scenario, and a high-sedimentation, high-organic-materials scenario. These scenarios were selected to explore the range of possible future conditions. A baseline map from 2010 was used to compare the projected results to near-present-day habitat conditions. All future habitat scenarios assume full tidal action and do not take into account land management of elevation, including levees, even if a levee is present.

N

0 0.5 Miles

AECOM, 2017

CITY OF PALO ALTO

AECOM

FIGURE 7

Innundation Map Depicting 12-Inch Sea Level Rise

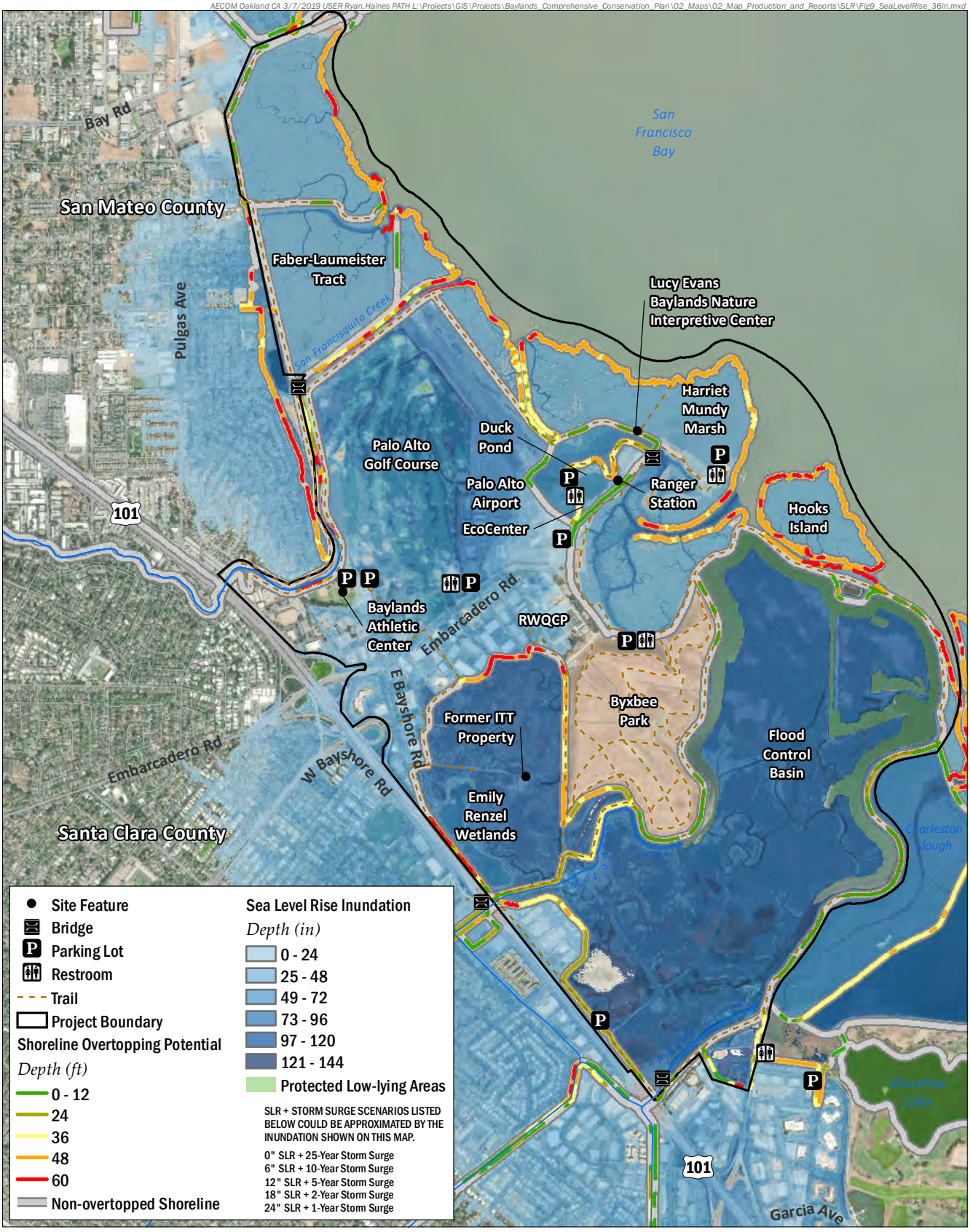
N

0 0.5 Miles

AECOM, 2017

FIGURE 8

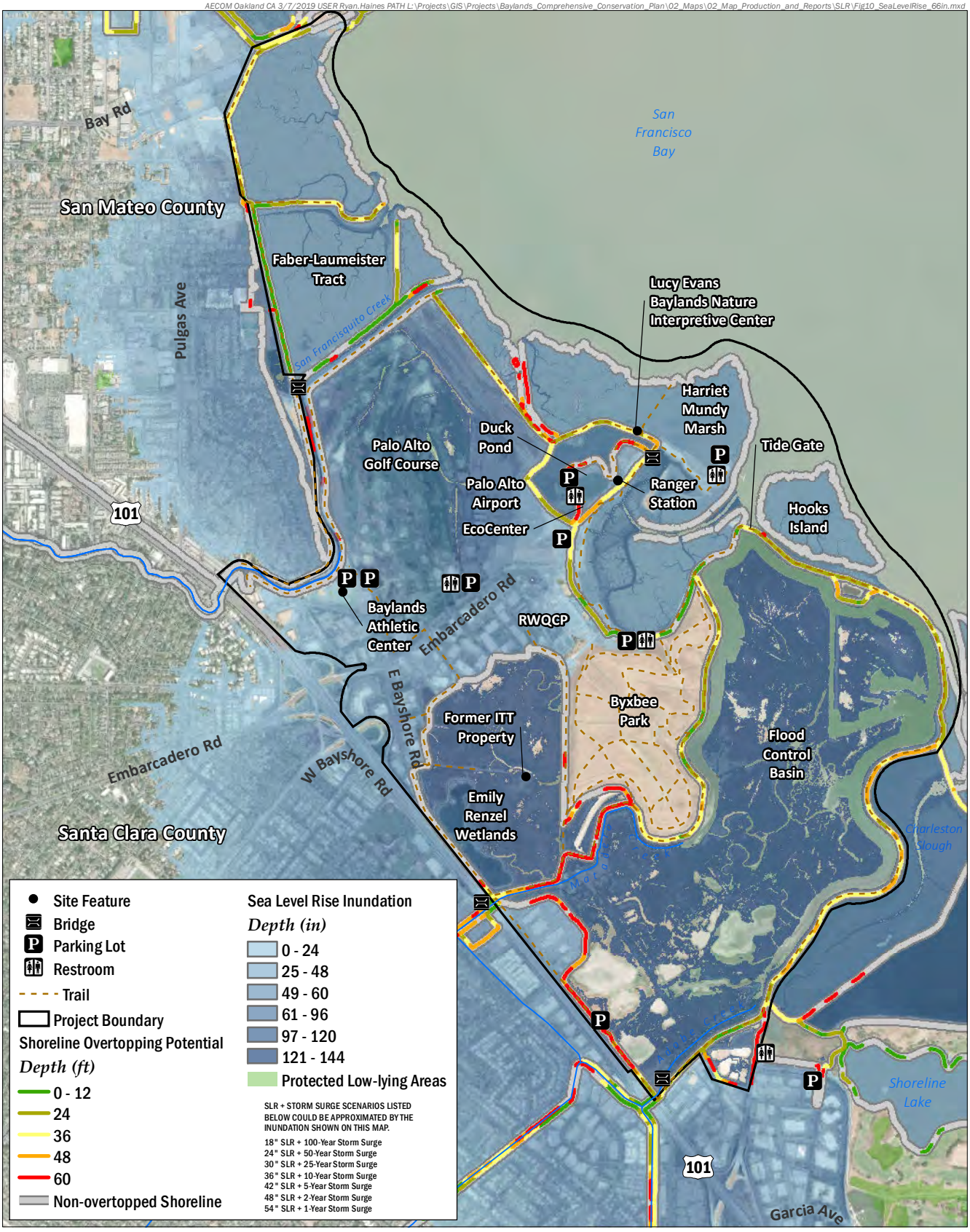
Inundation Map Depicting 24-Inch Sea Level Rise



AECOM, 2017

FIGURE 9

Inundation Map Showing 36-Inch Sea Level Rise



AECOM, 2017

FIGURE 10

Inundation Map Depicting 66-Inch Sea Level Rise

7.4 Impacts

An initial assessment of the Baylands' exposure to sea level rise was performed, using inundation maps to evaluate the potential vulnerability of Baylands features and assets to permanent inundation. A "no action" scenario was assumed to examine the effect of not implementing strategies to protect existing assets.

Some sections of the Baylands, such as the unprotected Harriet Mundy Marsh and Faber-Laumeister Tract, are already exposed to the MHHW + 12-inch scenario during the exceptionally high tides known colloquially as "King Tides." However, the Baylands do not experience a tipping point for coastal inundation until the MHHW + 36-inch scenario occurs. During that scenario, portions of many protective levees and dikes would be overtopped, causing widespread inundation throughout the Baylands. Because the MHHW + 36-inch scenario is equivalent to a 50-year coastal storm event under existing conditions, portions of the Baylands could experience temporary flooding during a storm today. Also, nearly all of the Baylands (except for Byxbee Park) are located in low-lying protected areas, making these areas susceptible to flooding during heavy rain, which may cause local ponding.

Table 5 summarizes the analysis of inundation exposure by geographic location. The table lists the asset category (flood control, access and recreation, or nonrecreational features) that corresponds to each feature in parentheses after the asset name. Additional details regarding inundation pathways and potential consequences for the specific assets in each category are detailed in the following sections.

Table 5. Summary of Sea Level Rise Exposure for Baylands Assets

Baylands Assets	Sea Level Rise and Equivalent Storm Surge Scenario			
	MHHW + 12-Inch (King Tide)	MHHW + 24-Inch (5-year storm)	MHHW + 36-Inch (50-year storm)	(100-year storm + 24-inch sea level rise)
Major Roadways				
Embarcadero Road (access and recreation)			✓	✓
East Bayshore Road (access and recreation)			✓	✓
Byxbee Park				
Trails (access and recreation)				
Interpretive signs (access and recreation)				
Byxbee parking lot (access and recreation)				✓
Restroom (access and recreation)				
Regional Water Quality Control Plant				
Regional Water Quality Control Plant (nonrecreational features)			✓	✓
"You Are Here" sign (access and recreation)			✓	✓
Permanently installed art (*Riding the Currents*) (access and recreation)			✓	✓

Baylands Assets	Sea Level Rise and Equivalent Storm Surge Scenario			
	MHHW + 12-Inch (King Tide)	MHHW + 24-Inch (5-year storm)	MHHW + 36-Inch (50-year storm)	(100-year storm + 24-inch sea level rise)
Palo Alto Municipal Golf Course				
Golf course (access and recreation)			✓	✓
"You Are Here" sign (access and recreation)				✓
Permanently installed art (*Birdie/Kaikoo V*) (access and recreation)			✓	✓
Golf course parking lot (access and recreation)			✓	✓
Restroom (access and recreation)			✓	✓
Palo Alto Airport				
Runway (nonrecreational features)			✓	✓
Airport terminal (nonrecreational features)			✓	✓
Emily Renzel Wetlands				
Former ITT Property and access road (nonrecreational features)			✓	✓
Matadero Creek bridge (access and recreation)				✓
Interpretive signs (access and recreation)			✓	✓
"You Are Here" sign (access and recreation)				✓
Wildlife viewing platform (access and recreation)			✓	✓
Renzel Trail and Faber Bike Path (access and recreation)			✓	✓
Harriet Mundy Marsh and San Francisquito Trail				
Sailing Station parking lot (access and recreation)				✓
Sailing Station (access and recreation)	✓	✓	✓	✓
EcoCenter (nonrecreational features)	✓	✓	✓	✓
Interpretive signs (access and recreation)	✓	✓	✓	✓
"You Are Here" sign (access and recreation)			✓	✓
Lucy Evans Baylands Nature Interpretive Center (access and recreation)			✓	✓
Nature center boardwalk* (access and recreation)	✓	✓	✓	✓
Wildlife viewing platform (access and recreation)	✓	✓	✓	✓
Restroom (access and recreation)				✓
Trails (access and recreation)	✓	✓	✓	✓
Flood Control Basin				
Tide gate (flood control)			✓	✓
Flood Control Basin parking lot (access and recreation)			✓	✓
Animal services center (nonrecreational features)			✓	✓
"You Are Here" sign (access and recreation)			✓	✓

Baylands Assets	Sea Level Rise and Equivalent Storm Surge Scenario			
	MHHW + 12-Inch (King Tide)	MHHW + 24-Inch (5-year storm)	MHHW + 36-Inch (50-year storm)	(100-year storm + 24-inch sea level rise)
Adobe Creek Loop Trail (access and recreation)			✓	✓
Faber-Laumeister Tract				
East Palo Alto Marsh Trail (access and recreation)			✓	✓
Friendship Bridge (access and recreation)				
Duck Pond				
Baylands Ranger Station (nonrecreational features)			✓	✓
"You Are Here" sign (access and recreation)			✓	✓
Duck Pond parking lot (access and recreation)			✓	✓
Restroom (access and recreation)			✓	✓
Save the Bay nursery (nonrecreational features)			✓	✓
Baylands Athletic Center and Central Business Plaza				
San Francisquito Creek stormwater pump station (nonrecreational features)		✓	✓	✓
"You Are Here" signs (access and recreation)			✓	✓
Permanently installed art (*Streaming*) (access and recreation)				
Athletic center and ballpark parking lots (access and recreation)			✓	✓
Baylands Athletic Center (access and recreation)				✓
Former Los Altos Treatment Plant Site				
Adobe Creek Bridge (access and recreation)				✓
Restroom (access and recreation)			✓	✓
Terminal Boulevard parking lot (access and recreation)			✓	✓

Notes:
Flood Control Basin = Palo Alto Flood Control Basin; MHHW = mean higher high water; Sailing Station = Palo Alto Baylands Sailing Station

* The boardwalk is scheduled for upgrades in early 2019. Once complete, it will have the same elevation as the Lucy Evans Baylands Nature Interpretive Center and will likely not be exposed until the MHHW + 36-inch SLR scenario.

7.4.1 Flood Control

The Flood Control Basin is a 618-acre floodwater retention basin that receives inflow from Matadero, Adobe, and Barron creeks and the Coast Casey Stormwater Pump Station. Incoming floodwaters are stored in the basin and released to the Bay through a gravity-driven tide gate structure when water levels in the Flood Control Basin exceed the Bay's tidal elevation. As the Bay's tides rise, the tide gate closes to prevent Bay water from entering the basin. The City of Palo Alto opens the tide gate in the summer to allow water to circulate in the basin.

During the MHHW + 36-inch scenario, the tide gate and levee barriers would become vulnerable to overtopping by elevated Bay tides. The depth of flooding caused by such overtopping ranges from 12 to 24 inches along the basin's north and east sides and

from 24 to 60 inches on the south and southwest sides of the basin levee (Figure 9). When Bay waters would enter the basin, the capacity and efficiency of the flood control structure may be reduced further. Coastal floodwaters may spill into neighboring basins and wetlands, and may back up the lower reaches of nearby creeks. The potential also exists for scouring of the levee walls, and for levee failure during overtopping events. Depending on its size, extent, and location, levee failure could lead to widespread flooding of adjacent development and loss of the Flood Control Basin.

7.4.2 Public Access and Facilities

The Baylands accommodate a wide range of public and recreational activities such as running, cycling, water sports, golfing, picnicking, and wildlife viewing. Flood exposure to roads, trails, and other public access areas was evaluated to assess the impacts of human use of the Baylands.

7.4.2.1 Access to and within the Baylands

Embarcadero Road and East Bayshore Road are the primary access routes into the Baylands and connect the area's major assets. During the MHHW + 36-inch scenario, floodwater would overtop protective levees and dikes, and both roads would be exposed to permanent inundation. Once these primary routes are inundated, overland access to Baylands assets would be extremely limited.

The Adobe Creek and Matadero Creek bridges were identified as vulnerable to future flooding conditions. Although much of the area surrounding the bridges would be inundated under the MHHW + 36-inch scenario, the bridge approaches would not be exposed to coastal flooding until the MHHW + 66-inch scenario occurs. Loss of bridge crossings would access to and within the Baylands. Depending on bridge design and flood velocity, the bridges may also sustain long-term structural damage.

7.4.2.2 Trails

The Baylands have a network of public, multiuse trails extending through the region for more than 18 miles. Trails located along the Bay in the unprotected Harriet Mundy Marsh, including approximately 1 mile of the San Francisquito Creek Trail, are first exposed to inundation during the MHHW + 12-inch scenario (King Tides).

The MHHW + 36-inch scenario represents a tipping point when portions of nearly all of the area's trails are exposed to permanent inundation. Byxbee Park is the only area of the Baylands not anticipated to be permanently inundated under the sea level rise scenarios evaluated. However, as sea levels rise, the former landfill at Byxbee Park should be protected to prevent the release of contaminants.

Permanent inundation would affect much of the access to the Baylands' trail system. Flooding would inhibit regional connectivity, as the San Francisquito Creek Trail also provides a link to the Bay Trail, the city of East Palo Alto, and points beyond. Similarly, flooding of the Renzel Trail would eliminate a pedestrian link to other sites outside of the Baylands, including the city of Mountain View.

The many location maps and interpretive signs located along the trails are vulnerable to future inundation. However, signage has a high capacity for adaptation and can be relocated relatively easily.

7.4.2.3 Other Public Access Areas

The Baylands provide access to numerous public access and recreation opportunities, educational facilities, and wildlife access areas. Assets such as the Sailing Station, Sailing Station parking lot, Lucy Evans Baylands Nature Interpretive Center boardwalk, and

wildlife viewing platform, located in the unprotected Harriet Mundy Marsh, are the first to be exposed to permanent inundation during the MHHW + 12-inch scenario.

Overtopping of the protective levees and dikes during the MHHW + 36-inch scenario would expose most public access areas and facilities. Permanent inundation of public facilities would result in a loss of recreational options in the area and require removal or relocation of buildings.

Many permanent art installations are located throughout the Baylands and may be exposed to coastal inundation, especially during the MHHW + 36-inch scenario. Depending on their construction materials, many of the pieces may be sensitive to water, but can be relocated.

7.4.2.4 Nonrecreational Features and Facilities

In addition to public recreation, the Baylands has several nonrecreational features and facilities, including several critical assets such as the Palo Alto Airport and the RWQCP. An inundation exposure analysis was completed to evaluate how future water levels may affect these assets in the absence of additional flood protection.

7.4.2.4.1 Palo Alto Airport

The Palo Alto Airport terminal and runway are located close to the Bay and largely protected by a Bayfront levee that is not accredited under FEMA's flood protection standards. Both the runway and the terminal would be first exposed to coastal inundation during the MHHW + 36-inch scenario. Inundation would cut off access to the airport, which may also limit emergency response capabilities.

7.4.2.4.2 Regional Water Quality Control Plant

The RWQCP would be exposed to permanent inundation under the MHHW + 36-inch scenario. Many of the plant's features are highly sensitive to water, which could lead to large amounts of damage if they are exposed, even temporarily. Pollutants may be introduced to the Bay if plant operations cease.

7.4.2.4.3 Former ITT Property

The buildings at the former ITT Property and access road would be vulnerable to coastal inundation during the MHHW + 36-inch scenario. Even temporary flooding could damage the buildings.

7.4.2.4.4 Other Nonrecreational Facilities

The EcoCenter, located in the unprotected Harriet Mundy Marsh, would be subject to coastal inundation during the MHHW + 12-inch scenario. By the MHHW + 36-inch scenario, facilities such as the Baylands Ranger Station and the Save the Bay plant nursery would be exposed to inundation. Permanent inundation would result in a loss of use for the area, cessation of ranger station operations, and a loss of growing space for many plants used in local restoration projects.

The San Francisquito Creek Stormwater Pump Station, located along East Bayshore Road near San Francisquito Creek, may be exposed to inundation during the MHHW + 24-inch scenario. Pump stations contain electrical and mechanical components highly sensitive to flood exposure. Rising sea levels may also overwhelm the capacity of the pump station and cause localized flood conditions in the southwest portion of the Baylands, which is served by the pump.

7.4.3 Natural Resources

7.4.3.1 Habitats

Elevation-based habitat maps were produced by Point Blue's Future Tidal Marshes Tool for the present day (baseline year set to 2010) and 2050. Figure 11 displays the baseline (2010) map, showing the present-day elevation and associated general habitat types, according to the Future Tidal Marshes Tool. The results are driven by elevation compared to MHHW; therefore, the habitat types shown serve as a general proxy for their associated elevations. The map can be interpreted as the expected default habitat type by elevation under a no-management scenario (e.g., levees, pumping).

As shown in Figure 11, the elevation-based estimates of the Baylands' present-day habitat types include higher elevation mid marsh (depicted as dark green) along the Bayside marshes including Faber Marsh, Laumeister Marsh, and tidal marshes on the Bay side of the Baylands levees, and in the Palo Alto Harbor and Hooks Island areas. Because of their higher elevation, Byxbee Park and the area between the Palo Alto Municipal Golf Course and the harbor are shown as upland habitat (depicted as light green), which accurately represents the present-day habitat type. The golf course, based on its low-lying elevation alone, is represented as mudflat in the model (depicted as brown), although it is actually managed as an upland golf course system. The remaining Baylands areas are shown mostly as being at subtidal and mudflat elevations, which is consistent with the Flood Control Basin's role as a flooding catchment basin. Low marsh (depicted as bright green) is shown scattered throughout the mid marsh and mudflat habitats. Subtidal areas (depicted as light blue) are areas of elevation below the tidal inundation line and are generally consistent with the present-day locations of standing water.

Figure 12 shows the Baylands' elevation-based habitat types for the year 2050 under a low-sedimentation, low-organic-materials scenario. This scenario represents one end of the range of potential future habitat scenarios. Figure 13, which shows the elevation-based habitat types for the year 2050 under a high-sedimentation, high-organic-materials scenario represents the opposite end of the range.

Both scenarios show sediment accretion and an overall rise in the elevation of the Baylands preserve. The low-sedimentation, low-organic-materials scenario depicts mild accretion of marsh habitats and overall elevation, while the high-sedimentation, high-organic-materials scenario depicts conversion of nearly the entire Baylands area beyond Byxbee Park and Mayfield Slough to mid marsh.

Under the potential low-sedimentation, low-organic-materials scenario, the landscape is expected to remain at a lower elevation, close to baseline conditions. Deposition of organic materials and sedimentation would lead to marsh accretion, shown as a transition from the lower lying subtidal areas to higher elevation mudflats. Under this scenario, the Bayside's present-day mid marsh wetlands would remain mid marsh wetlands. The Palo Alto Municipal Golf Course, if unmanaged, would accrete sediment and rise in elevation, transitioning to low marsh. Byxbee Park is expected to remain upland; however, the sliver of upland between the golf course and the park would be reduced in scale and an increase in wetland area may occur along the edges.

According to the model mapping results, under the potential high-sedimentation, high-organic-materials scenario, the landscape would accrete sediment, raising the overall elevation to potentially support mid marsh wetlands throughout the entire Baylands (Figure 13). Under this scenario, the Bayside wetlands are expected to remain at a mid marsh

elevation and Byxbee Park would remain at an upland elevation. The open water of Matadero Slough in the Flood Control Basin would remain as subtidal open water in this scenario.

It is important to remember that the models predict changes to the landscape's elevation under a no-management scenario and do not predict changes incorporating land management, such as dredging and other elevation-controlling activities. Furthermore, the model does not consider existing levees. Therefore, the selected scenarios should be interpreted as showing how the landscape could change if the levees no longer functioned. Raising the existing levees and implementing further flood protection solutions, assuming that water management of the marshes and Flood Control Basin would remain as is, would allow habitats landward of the levees to remain more similar to existing conditions. Management of the Baylands landscape and elevations will be essential to determining the future conditions suitable for maintaining marshland habitats.

Table 6 shows a summary of sea level rise exposure and projected habitat type conversion for Baylands habitat assets, based on Point Blue's Future Tidal Marshes Tool.

Table 6. Summary of Sea Level Rise Exposure and Projected Habitat Type Conversion

Present-Day Habitat Type/Location	Sea Level Rise Scenario[1]	Projected Future Habitat Type[2]	
		2050 Low-Sediment, Low-Organic-Materials Scenario[3]	2050 High-Sediment, High-Organic-Materials Scenario[3]
Aquatic: -Duck Pond -Lagoon -Emily Renzel Freshwater Pond	MHHW + 36-inch	Conversion to low marsh Maintenance as lagoon Open water	Mid marsh
Salt marsh: -Harriet Mundy Marsh -Faber-Laumeister Tract	MHHW + 12-inch	Mid marsh (through 2100)	Mid marsh (through 2100)
Muted salt marsh: -Flood Control Basin (present-day subtidal and mudflat habitats) -Emily Renzel Wetlands (marsh) -Former ITT Property	MHHW + 36-inch	Mudflat Mudflat Mid marsh	Mid marsh
Riparian corridors: -Matadero Creek -Mayfield Slough -Adobe Creek -San Francisquito Creek	MHHW + 12-inch	Riparian corridor conversion to brackish marsh streambank	Riparian corridor conversion to brackish marsh streambank
Uplands habitat: -Byxbee Park	N/A	Upland	Upland

Notes:
Flood Control Basin = Palo Alto Flood Control Basin; MHHW = mean higher high water; N/A = not applicable
1 The sea level rise scenario that was mapped at which the habitat type is first projected to be affected.
2 Data from Point Blue Conservation Science's Future San Francisco Bay Tidal Marshes planning tool.
3 Projected habitat type changed based on a no-management scenario.

N

0 0.5 Miles

Point Blue Conservation Science, 2018; Esri Imagery, 2016

FIGURE 11

Baseline Elevation-Based Habitat Map for Year 2010

AECOM Oakland CA 3/7/2019 USER Ryan.Haines PATH L:\Projects\GIS\Projects\Baylands_Comprehensive_Conservation_Plan\02_Maps\02_Map_Production_and_Reports\SLR\Habitat\Fig12_2050_LowSed_LowOrg.mxd

Point Blue Conservation Science, 2018; Esri Imagery, 2016

FIGURE 12

Elevation-Based Habitat for Year 2050: Low Sediment/Low Organic Materials

AECOM Oakland CA 3/7/2019 USER Ryan.Haines PATH L:\Projects\GIS\Projects\Baylands_Comprehensive_Conservation_Plan\02_Maps\02_Map_Production_and_Reports\SLR\Habitat\Fig13_2050_HighSed_HighOrg.mxd

N

0 0.5
Miles

Point Blue Conservation Science, 2018;
Esri Imagery, 2016

AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 13

Elevation-Based Habitat for Year 2050: High Sediment/High Organic Materials

7.4.3.2 Aquatic

7.4.3.2.1 Duck Pond and Lagoon

The Duck Pond and tidal lagoon are low-lying areas of the Baylands that are currently protected by a series of levees and dikes for up to MHHW + 36 inches of sea level rise. Once sea levels rise above this level, the area would be exposed to permanent inundation, resulting in a transition of habitats.

Based on existing conditions, the habitats in this area consist of open water. Under the low-sedimentation, low-organic-materials scenario, the landscape would likely remain similar to present-day conditions up to MHHW + 36 inches of sea level rise. The Future Tidal Marshes Tool predicts that beyond MHHW + 36 inches of sea level rise, the lagoon would remain open water and the Duck Pond may accumulate sediment and organic material and fill in to transition into a low marsh habitat. A grove of palm trees northwest of the Duck Pond is protected by fencing and designated as a bird sanctuary for herons and egrets, which used this area as a rookery during breeding season in 2005–2010. Rising sea levels may cause this palm tree grove to become exposed to brackish water. Although palm trees support a higher level of salinity than other tree species, significant increases in salinity through intrusion of brackish water could reduce the viability of these trees. In addition, the areas fringing the lagoon could begin to fill in and covert to low marsh.

The Future Tidal Marshes Tool predicts that under the high-sedimentation, high-organic-materials scenario, marsh habitats would accrete and the Duck Pond and lagoon could become mid marsh habitat if sea levels exceed MHHW + 36 inches and the surrounding levees no longer protect the area.

7.4.3.2.2 Emily Renzel Freshwater Pond

The present-day Emily Renzel Freshwater Pond is fed by tertiary-treated wastewater from the RWQCP. If sea level rise causes salt water to intrude into the pond, the present habitat type would likely transition to a brackish marsh habitat and the plant community would likely change accordingly. Existing freshwater wetland plants would likely decline and new brackish water–tolerant plant species would establish. Cattail could remain present depending on the amount of salinity, but other more saline-tolerant species could also establish.

According to the Future Tidal Marshes Tool, under the low-sedimentation, low-organic-materials scenario at 2050, the Emily Renzel Wetlands and the Emily Renzel Freshwater Pond would convert to mudflat. Under the high-sedimentation, high-organic-materials scenario at 2050, the Emily Renzel Freshwater Pond would accrete to mid marsh habitat.

7.4.3.3 Salt Marsh

Salt marsh in the Baylands is subject to tidal action, and tidal brackish marsh occurs in areas of the Baylands where freshwater locally reduces salinity, such as the unnamed slough south of San Francisquito Creek. For salt marsh habitats, the Future Tidal Marshes Tool was used to assess the effects of sea level rise on the composition of marsh habitat. As shown in Table 6, the Harriet Mundy Marsh and Faber-Laumeister Tract would be exposed to sea level rise at MHHW + 12 inches and MHHW + 36 inches, respectively.

The Future Tidal Marshes Tool predicts that under the low-sedimentation, low-organic-materials scenario, the habitats at Faber-Laumeister Tract, Harbor Point and the inner harbor channel, Harriet Mundy Marsh, Hooks Island, and Sand Point would remain as

mid marsh habitat into 2100. Habitat types are projected to maintain accretion rates comparable to future sea levels. Lower lying areas that currently consist of mudflat and higher areas of high marsh are projected to become more equilibrated in elevation and to convert to mid marsh habitat. The high-sedimentation, high-organic-materials scenario is also projected to maintain accretion rates comparable to future sea levels, with little to no expected change in marsh habitats.

According to the Future Tidal Marshes Tool, the only scenario in which elevation-based marsh habitat is projected to change type is a scenario of high sea level rise and low sedimentation. In this scenario, the rising sea levels would slowly outpace the sediment accretion rate, and the mid marsh and high marsh habitats could transition to low marsh and mudflat habitats.

7.4.3.4 Muted Salt Marsh

The Flood Control Basin, the Emily Renzel Wetlands, the site of the former Los Altos Treatment Plant, and the newly acquired former ITT Property would protected by levees tying into Byxbee Park for up to MHHW + 36 inches of sea level rise. Existing habitat types consist of managed diked or muted salt marsh.

7.4.3.4.1 Palo Alto Flood Control Basin

Beyond MHHW + 36 inches, the Flood Control Basin would be overtopped, exposing the habitats landward of the levees to sea level rise. According to the Future Tidal Marshes Tool, under the potential low-sedimentation, low-organic-materials scenario, the Flood Control Basin would accumulate sediment and convert from present-day subtidal and mudflat elevations to a homogenous mudflat elevation. The model infers that the elevation of these areas would increase slightly as a result of the increase, albeit low, in sediment and organic materials, thus allowing more marsh habitat to accumulate as the overall elevation rises.

Under the potential high-sedimentation, high-organic-materials scenario, these areas are expected to accumulate sediment and organic materials at a greater rate than under the low-sedimentation, low-organic-materials scenario. The elevation increase could lead to a conversion to a mid marsh elevation habitat complex, with the channel areas remaining open water.

7.4.3.4.2 Emily Renzel Wetlands and Former ITT Property

The present-day Emily Renzel Wetlands and the former ITT Property comprise muted tidal wetland habitat. Sea level rise scenarios for MHHW + 36 inches and MHHW + 66 inches show that these areas, under a no-management scenario, will likely be inundated under several feet of water as Bay water overtops levee structures, fills in the Flood Control Basin, and flows into the Emily Renzel Wetlands. According to the Future Tidal Marshes Tool, under the low-sedimentation, low-organic-materials scenario at 2050, the Emily Renzel Wetlands and the former ITT Property would convert to mudflat. Under the high-sedimentation, high-organic-materials scenario at 2050, the Emily Renzel Wetlands and former ITT Property would accrete and convert to mid marsh habitat.

7.4.3.5 Riparian Corridors

The habitats and riparian corridors of Matadero Creek and Mayfield Slough, Adobe Creek, and San Francisquito Creek will be largely affected by the increased salt water inflow up the creek corridors as sea level rises. As sea level rises, the tideline location where freshwater and salt water converge will move upstream, causing the amount of salt water to

increase throughout the Baylands' riparian corridors.

The Matadero Creek and Adobe Creek riparian corridors currently consist of a mix of native and nonnative riparian species that largely depend on fresh groundwater, acquiring water for survival through their root systems. The habitat composition of the riparian corridors could be affected as the creeks become more saline. The riparian tree species that presently grow alongside the creeks depend on fresh groundwater and have little salinity tolerance. If saline water intrudes into the local groundwater sources, the health of the established tree populations may decline, thereby reducing the amount of riparian tree habitat. Saline-tolerant species such as pickleweed may replace the trees along the creeks, shifting the creeks' estuarine habitats farther inland and pushing the freshwater-dominant riparian corridors farther upstream. This transition will have secondary impacts by reducing the number of freshwater-dependent shade tree canopies in the Baylands.

7.4.3.6 Upland

The upland habitat of Byxbee Park comprises annual nonnative Euro-Asian grassland species that have become naturalized to the region. This habitat is not expected to be substantially affected by sea level rise under any condition, as it is located at a higher elevation than any of the evaluated sea level rise scenarios. Although most of Byxbee Park would remain unchanged under the modeling scenarios, the Bay side of the landfill levee road may evolve and become more marsh-like if the surrounding habitats are converted to brackish marshland or brackish open water. Other climate stressors, such as temperature and precipitation, could alter future growing seasons and the amount of freshwater soil moisture available. Changes in growing seasons and soil moisture content may cause changes in the composition of plants and the wildlife that depend on existing conditions. Species with broader temperature and precipitation tolerances are likely to persist better than highly specialized species.

7.4.4 Wildlife

Impacts on wildlife will be driven primarily by habitat transitions. Based on the MHHW + 36-inch sea level rise scenario, the Duck Pond and tidal lagoon would accrete and to fill in with marsh vegetation. Under this scenario, the grove of palm trees currently located northwest of the Duck Pond could decline, eliminating suitable nesting habitat for herons and egrets.

The tidal lagoon currently serves as important foraging and nesting habitat for shorebirds and waterfowl that migrate seasonally along the Pacific Flyway. As the existing habitat changes from mudflats to mid marsh, the invertebrate community and migratory birds dependent on mudflats may be affected.

The present-day outer tidal mid marsh habitats are projected to be unaffected by rising sea levels through the late-century projections, with the exception of a high sea level rise, low-sedimentation scenario. The stable mid marsh habitat will continue to provide habitat for mid marsh–dependent wildlife, including the federally listed endangered salt marsh harvest mouse and Ridgway's rail, and the state-listed threatened California black rail (*Laterallus jamaicensis*),which are found only in this habitat type. Other more common species occurring in mid marsh that will continue to be supported include Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*).

If Bay levels exceed the Flood Control Basin's walls, as expected during the MHHW + 36-inch sea level rise scenario, much of the Baylands will be inundated with salt water. Increased saline water creates an opportunity for expansion of tidal marsh species, including rail species and the salt marsh harvest mouse. Seabird roosting habitat may transition as

large open areas become inundated or filled in with dense marsh vegetation.

A freshwater pond is located in the muted tidal Emily Renzel Wetlands. Wildlife species associated with freshwater ponds include sora, rails, herons, egrets, and passerine species, as well as amphibian and turtle species. If sea levels exceed levee elevations and inundate the Emily Renzel Wetlands, the berm surrounding the freshwater pond could become overtopped and infiltrated with brackish water, affecting the freshwater plant communities and wildlife associated with the pond.

Along riparian corridors, an increase in brackish water and saline conditions may cause the riparian tree canopy to decrease. A loss of riparian habitat will result in a loss of nesting areas for many canopy-dependent wildlife, including songbird and raptor species.

The upland nonnative grassland habitat at Byxbee Park is expected to remain largely unchanged by sea level rise, given its higher relative elevation. Therefore, it is assumed that the wildlife species found in Byxbee Park will remain consistent. However, the loss of surrounding marsh habitat will cause upland habitat to become isolated and less connected to surrounding upland habitats, potentially reducing overall habitat quality.

Beyond sea level rise, changes in climatic conditions such as temperature and precipitation could alter future growing seasons, along with the amount of freshwater soil moisture available. These changes could ultimately lead to a change in the composition of plants and the wildlife that depend on them. Species with broader temperature and precipitation tolerance are likely to persist better than highly specialized species.

7.5 Management Adaptations to Sea Level Rise

The following discussion presents a range of high-level risk reduction solutions for habitats, wildlife, flood control, access and recreation, and nonrecreational features and facilities, to be evaluated for implementation within the planning time frame of the BCCP. Adaptation strategies may include physical, governance, and informational strategies that may be used to better prepare the Baylands for future environmental conditions as a result of sea level rise.

7.5.1 Flood Control

The Flood Control Basin's tide gate and levees are overtopped during the MHHW + 36-inch scenario, which may reduce the ability of the structures to provide flood protection. Potential adaptation strategies are discussed below.

Physical

- Expand the flood retention capacity area by connecting with other basins (SCVWD 2016).
- Introduce pumps to efficiently discharge stored floodwaters (SCVWD 2016).
- Modify the elevation of the levee walls and tide gate (SCVWD 2016).
- Replace the tide gate structure to improve the functionality of the flood barrier system (SCVWD 2018). (Project completion is scheduled for mid-2022.)
- Construct horizontal/living levees (such as an expanded version of the Oro Loma Sanitary District's experimental levee) and tidal marshes to provide large-scale flood protection for a greater geographic area, and to create the potential for increased tidal action (SFCJPA 2015).

Governance

- Incorporate sea level rise language into guidance documents (e.g., Baylands Master Plan, Comprehensive Plan, City of Palo Alto Design Standards, and City of Palo Alto Storm Drain Master Plan) and emergency plans to provide a means for guiding future decision making.
- Use comparable sea level rise scenarios across City departments and external agencies, and in compliance with various local legislative requirements, to provide a consistent level of protection for the region.

Informational

- Develop monitoring programs to evaluate the impacts of sea level rise on Baylands operations and physical damage caused by ongoing flooding events.
- Identify and address data gaps by conducting studies to better understand the flood risks to the Baylands' critical infrastructure.

7.5.2 Public Access and Facilities

To maintain uninterrupted Baylands access, the following strategies are considered for roadways and trails.

7.5.2.1 Access to and within the Baylands

Critical roadways are exposed during the MHHW + 36-inch scenario, which will limit access to Baylands assets and could inhibit emergency access. Potential adaptation strategies are discussed below.

Physical

- Elevate critical roadways to maintain public and staff access to and within the Baylands.
- Add alternative transportation routes within the Baylands area to increase the redundancy of roadway access.
- Upgrade current pedestrian paths to be used as alternative emergency evacuation routes during flood events.

Governance

- Incorporate coastal flooding scenarios into emergency planning and decision-making processes that involve evacuations to avoid flood damage and ensure public safety in the Baylands.

7.5.2.2 Trails

Nearly all multiuse trails, interpretive signs, and public art are exposed to flooding during the MHHW + 36-inch scenario, thus limiting recreational use of the Baylands and diminishing regional trail connectivity. Potential adaptation strategies are discussed below.

Physical

- Reroute pedestrian trails to increase redundancy for visitor and staff access.
- Elevate low-lying trails or incorporate a boardwalk into trail design to maintain access during high-water events.
- Abandon or relocate low-lying trails that experience frequent flooding to allocate resources to protecting other Baylands assets.
- Relocate, elevate, or adapt interpretive signage and public art, as necessary, to maintain their function.

Governance

- Incorporate sea level rise language into guidance documents (e.g., Baylands Master Plan, Comprehensive Plan, City of Palo Alto Design Standards, and City of Palo Alto Storm Drain Master Plan) and emergency plans to provide a means for guiding future decision making.
- Incorporate language about sea level rise and flood protection measures into trail plans and maintenance plans to provide a mechanism for adapting future trail placement and/or preserving trails.

Informational

- Install signage along trails regarding flood protection and future flood challenges to update visitors about ongoing climate adaptation programs and opportunities.
- Establish an ongoing monitoring program to track instances of trail flooding, and thus to provide a means to quickly identify trails, or trail sections, that experience repeat flooding conditions. This information can also inform the process of adapting vulnerable trails (e.g., boardwalk installations) or relocating trails for which maintenance is not cost effective.

7.5.2.3 Nonrecreational Features and Facilities

The Palo Alto Airport, the RWQCP, and the former ITT Property are exposed to sea level rise during the MHHW + 36-inch scenario, which may cause flood damage to sensitive assets and cut off access to critical facilities. Potential adaptation strategies are discussed below.

Physical

- Flood-proof facilities where possible to prevent damage from temporary flooding conditions. Flood-proofing techniques include:
  - elevating structures to allow floodwaters to pass through quickly, thereby minimizing flood damage;
  - making buildings watertight up to expected flood heights; and
  - flood-proofing electrical equipment.
- Add backup power at on-site facilities, with sufficient fuel for several days, to minimize interruptions to critical assets.

Governance

- Incorporate sea level rise into Baylands and Palo Alto design standards for new infrastructure and improvements to protect critical elements of facility design.
- Collaborate with adjacent landowners, agencies, and organizations to find a shared, multi-objective, regional solution that can be planned and implemented through a joint effort.

Informational

- Conduct a study regarding the influence of sea level rise on groundwater levels and the associated impact of increased liquefaction potential during earthquakes to inform future site and emergency planning for critical facilities.
- Establish a flood emergency management plan for vulnerable facilities to limit on-site employees' injuries and potential loss of life.
- To inform long-term planning and priority setting, develop and maintain an asset management plan that includes asset-specific information such as location, age, elevation, condition, and replacement cost.
- Perform an economic analysis of critical assets to evaluate the cost of protecting the assets versus retreating or relocating the assets to sites less vulnerable to coastal flooding.

7.5.3 Natural Resources

If future sea levels overtop the levees during the MHHW + 36-inch scenario, nearly all Baylands habitat will transition to new habitat types, depending on the amount of sediment. Potential adaptation strategies are discussed below.

Physical

- Construct tidal marsh transition zones consistent with USFWS's Tidal Marsh Recovery Plan to enhance the habitat of threatened species that are vulnerable to sea level rise.
- Create strategic openings in the levees to connect interior habitats to the Bay and allow the growth of tidal marsh habitat to preserve vulnerable habitat areas.

- Implement climate-smart restoration plantings, consistent with the Silicon Valley 2.0 adaptation strategy, to promote vegetation with a wider climate tolerance zone.
- Create new tree roosting habitat for birds in areas with a freshwater source suitable of supporting riparian species to expand vulnerable habitats.

Governance

- Consider the ecological impacts of water modifications on the landscape by collaborating with the Baylands Group, Point Blue, USFWS, and others during planning efforts.
- Take a community approach to habitat and wildlife restoration and persistence at the Baylands.
- Collaborate directly with regional and local planning efforts and surrounding partners, including SAFER Bay, Silicon Valley 2.0, and the neighboring Cities of Mountain View and East Palo Alto.

Informational

- Form a stakeholder working group and technical advisory committee to aid in development, management, funding, and implementation of actions to protect the Baylands.
- Implement climate-smart restoration plantings to increase the likelihood of long-term establishment.
- Implement water conservation and management initiatives for future-focused management of wetlands habitats.
- Install public signage to inform the public of sea level rise and landscape connectivity.

8 Action Plan and Best Management Practices

8.1 Introduction

This action plan draws from prior elements developed as part of the BCCP. The action plan seeks to advance the vision of the BCCP through prioritized action steps that clearly direct the management of the Baylands. The plan uses an ecosystem-based approach that strikes the appropriate balance of ecosystem protection, environmental education, and nature-friendly recreational opportunities now and in the future, and that considers challenges such as climate change and sea level rise.

The action plan also supports the goals and policies of the City's Parks and Recreation Master Plan (City of Palo Alto 2017a), such as:

- **Policy 1.I:** Encourage volunteerism and stewardship.
- **Policy 3.B:** Incorporate art into park design.
- **Policy 4.A:** Protect natural habitat.
- **Policy 4.B:** Connect people to nature and the outdoors.
- **Policy 4.D:** Promote, expand, and protect habitat.
- **Policy 5.D:** Explore alternative uses for newly acquired parkland.
- **Policy 5.G:** Pursue other/private funding sources.
- **Policy 6.H:** Coordinate with other City plans.
- **Policy 6.I:** Engage other City departments.
- **Policy 6.J:** Participate and support regional plans.

The action plan also furthers the policies of the Baylands Master Plan (City of Palo Alto 2008), such as controlling access to environmentally sensitive areas; restoring diversity of plants and animals; ensuring sufficient native food and cover for wildlife; maintaining trails; and supplying quality interpretive signs.

This action plan provides guidance for future actions and project implementation by major topic area, including natural resources management, public access and facilities, public engagement, public art, and operations and management. The action plan includes the following five plans:

- Habitat conservation and restoration plan
- Climate change and sea level rise adaptation plan
- Interpretive messaging plan
- Public art plan
- Weed management plan

The action plan aims to achieve the goals and objectives of the BCCP by including specific actions, BMPs, and desired timelines, and by identifying lead implementing parties, potential partners, and potential funding sources for recommended actions. The repeatable prioritization methodologies included are intended to be applied periodically throughout the life of the BCCP as conditions and priorities change.

Additional BMPs were developed to help achieve BCCP planning goals not specifically addressed in the five plans listed above. The BMPs included are practices, guidelines, methods, or techniques that are effective and practical means of achieving goals and objectives. The BMPs were developed from a range of sources: prior plans, stakeholder input, research, and review of BMPs applied by leaders in the field of integrated resource planning.

Recommended actions for conservation and restoration include applying the proposed methodology, to identify functioning and degraded habitats. Short-term actions include continuing to manage access to people and pets, managing weeds and installing climate-smart native plantings, monitoring habitat, and securing funding for long-term actions. Long-term actions include conducting feasibility and technical studies and constructing restoration projects.

Actions to adapt to climate change and sea level rise include short-term actions such as monitoring, collaborating with adjacent landowners, establishing resilient habitat for wildlife, and conducting long-term planning. Long-term actions include physical interventions such as elevating or relocating assets.

Operations and management actions focus on weed management, as nonnative invasive plants are on the greatest threats to biodiversity, habitat function, and wildlife. These species spread quickly, displace native plants, prevent native plant growth, and create monocultures. The change in native biodiversity affects the structure, quality, and quantity of wildlife habitat, and sometimes hydrology.

8.2 Natural Resources Management

8.2.1 Habitat Conservation and Restoration Plan

The habitat conservation and restoration plan seeks to achieve the following BCCP Natural Resources Management (NRM) goals as identified in BCCP Chapter 5: Vision, Goals, and Objectives.

- **Goal 1:** Maintain, protect, and preserve existing functioning native habitats, ecosystem functions, and wildlife corridors.
- **Goal 2:** Manage the Baylands as habitat for native species and the preservation of biodiversity.
- **Goal 3:** Enhance and restore degraded habitats and habitat corridors.
- **Goal 4:** Protect and enhance hydrologic connectivity.

To help achieve these goals, this habitat conservation and restoration plan identifies and prioritizes areas in the Baylands for wildlife and habitat conservation, restoration,

and hydrologic enhancement. Managing natural resources helps support, sustain, and safeguard ecosystems and the services that they provide including clean air, clean water, healthy soil, flood protection, and genetic variability. Natural resources management also promotes biodiversity of habitats and wildlife, and can enhance visitor experiences and sense of place. This habitat conservation and restoration plan should be used to identify the areas of the Baylands that should be prioritized for conservation and restoration, and the conservation actions that should be implemented in those areas.

This habitat conservation and restoration plan describes the existing functioning habitats, wildlife corridors, and degraded habitats invaded by weeds. The plan includes a methodology for prioritizing areas for conservation and restoration based on key considerations that include feasibility with existing resources, existing wildlife habitat and linkages, chance of long-term success, safety, or previous identification as a potential restoration opportunity. The plan includes a multi-pronged approach to conservation and restoration, with recommendations of three types of conservation actions—preservation, enhancement, and restoration—based on the condition and quality of the habitats. The plan also includes a discussion of timing, BMPs, partnerships, and funding that can be leveraged to implement the actions.

8.2.1.1 Management Priorities

This section describes a methodology for prioritizing areas for habitat preservation, enhancement, and restoration. The methodology should be applied periodically to reevaluate priorities. This section applies the methodology for existing functioning habitats and degraded habitats in the Baylands to produce a prioritized management list. It should be noted that priorities may change as conditions change, or as wildlife use changes.

8.2.1.1.1 Prioritization Methodology

The methodology involves prioritizing areas based on key considerations that include achievability with existing resources; conservation or preservation of existing wildlife habitats and linkages/corridors; conservation of existing habitats that support sensitive species; level of impact; weed vector reduction; safety; long-term success of habitat and corridors; and areas in the Baylands that have been identified previously for potential restoration or enhancement.

First-Priority Key Considerations:

- Areas where implementation of recommended conservation actions is achievable with existing resources.
- Potentially areas where the greatest opportunities exist for minimizing harmful weed vectors, particularly along trails and other public access areas.
- Areas supporting existing, functioning habitats, wildlife corridors, and habitats that support sensitive wildlife species such as the Ridgway's rail and salt marsh harvest mouse.

Second-Priority Key Considerations:

- Areas where implementation of conservation actions will improve safety, reduce flood control concerns, minimize impacts on levees and berms, and avoid impacts on the landfill cap at Byxbee Park.
- Areas that have a high chance of long-term success.
- Byxbee Park and the former ITT Property, which are identified as key planning areas in the BCCP.

- Areas where conservation and restoration of hydrologic connectivity will have the greatest benefit, such as the Flood Control Basin and Mayfield Slough remnant.

Third-Priority Key Considerations:

- Areas previously identified in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008), such as the lagoon and inner harbor shorelines; and areas that have been identified throughout the BCCP planning process, including the stakeholder engagement process and identified in the goals and objectives and the opportunities and challenges analysis, and that are not included in first- or second-degree priority lists.

Fourth-Priority Key Considerations:

- Other areas identified as degraded, or invaded by weeds.

8.2.1.1.2 Conservation and Restoration Priority List

This section includes a prioritized list of areas in the Baylands that have been identified for preservation, enhancement, or restoration to conserve the habitat for wildlife. Table 7 shows the results of applying the methodology described in the previous section; includes conservation actions that can be taken at each location in the short and long term; and identifies an implementing party. Figure 14 shows areas that have been prioritized for preservation, enhancement, or restoration. Conservation action types were assigned to locations based on habitat quality and condition, identified through field visits and City and stakeholder input.

8.2.1.2 Conservation Actions

Conservation actions fall into three categories: preservation, enhancement, and restoration. Preservation is recommended for areas where functioning habitats, including wildlife linkages, already exist. Enhancement is recommended to maintain previously restored areas, or areas degraded by weeds or currently of low biodiversity or habitat value to sensitive wildlife species. Restoration is recommended for areas where desired habitat currently does not exist. This section describes necessary steps that can be taken to preserve, enhance, and restore the habitats and specific areas listed above.

8.2.1.2.1 Preservation

The goal of preservation is to keep functioning habitats that support wildlife intact and prevent habitat degradation in the future. Preservation is recommended for areas that are currently functioning, have high habitat value, support local and migratory wildlife, and have the highest chance of long-term success. Preservation generally requires the least level of effort and specific actions to preserve can be implemented successfully by rangers or volunteers. Preservation actions include access restrictions for people and pets to reduce encroachment on wildlife, light weed management accompanied with installation of climate-smart native seeding and planting, and habitat monitoring. Preservation activities should be documented to inform future management activities and to monitor success.

Management of Access

Managing access by people and pets to sensitive habitats and continuing to prohibit access to areas closed to public access is essential to preserving existing functioning habitats. Limiting access will minimize impacts on wildlife species from human activities and habitats by minimizing vectors for weeds, reducing disturbance to habitat and wildlife, and minimizing trash. It will also prevent establishment of social trails and other unauthorized use.

Weed Management and Climate-Smart Native Plantings

Invasion by nonnative species is second only to habitat loss among the greatest threats to global biodiversity. Weeds displace native species, diminish the biodiversity of native species, and can affect wildlife by altering food supply, habitat structure, and potentially hydrology. To preserve habitat, weed management should be accompanied by native plant seeding and planting in an effort to promote native diversity and foster resilient natural areas. In the short term, light weed management of incipient populations should be implemented. Light weed management will entail management of weeds, according to the weed management plan in this action plan (Section 8.6.1). Actions will generally be performed infrequently by a small number of staff members, volunteers, or partners using light equipment.

Weed management should be accompanied by planting of climate-smart native species, appropriate for the intended habitat type, that provide a similar ecological function. Climate-smart native restoration practices, as described in Point Blue's Climate-Smart Restoration Toolkit (http://rdjzr2agvvkijm6n3b66365n-wpengine.netdna-ssl.com/wp-content/uploads/2018/12/CSRToolkit.pdf), allow habitats to adapt under different future climate change scenarios. These practices provide multiple benefits for wildlife including seed, fruit, and nectar sources for pollinators, insectary plants, and cover/refugia (Point Blue 2018). Native species that provide important insect and wildlife benefits should also be considered.

Climate-smart native plants include native species that are also resilient to disturbance, are drought and salt tolerant, and are likely to survive sedimentation and sea level rise (Thalmayer et al. 2016). For example, climate-smart native species for the marsh-upland transition zone include purple needle grass (*Stipa pulchra*), salt grass (*Distichlis spicata*), gumplant (*Grindelia stricta*), marsh goldenrod (*Euthamia occidentalis*), and pickleweed (*Salcornia pacifica*). Example species appropriate for riparian areas may include arroyo willow (*Salix scouleriana*) and California blackberry (*Rubus ursinus*). Example species appropriate for upland areas can be found in the Byxbee Park Master Plan (in this BCCP).

It should be noted that the native species appropriate for selection may change as conditions change. See Point Blue's Climate-Smart Restoration Toolkit for a current list of climate-smart native species that could be installed in the Baylands. Areas appropriate for climate-smart native tree planting should be identified and setbacks should be established.

Table 7. Conservation and Restoration Priority List

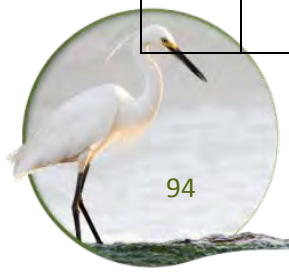
Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
First	Trail System	Various	-Trails (except for Byxbee Park) are the primary weed problem hotspots identified by Baylands rangers, and weeds along trails are a conduit for moving seeds around and exacerbating habitat degradation. -Action areas along trails are easily accessible to rangers and volunteers, and these areas are the most visible to the public. -Highly degraded and invaded (pepperweed, fennel, mustard, thistles, stinkwort, wild radish, tall wheat grass, New Zealand spinach, pampas grass, ice plant, and mallow). -Trails and the adjacent areas are used as linkages for wildlife movement.	Enhancement	Short Term -Weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
First	Wildlife Corridors/ Linkages	Various	-Provide connectivity and linkages for wildlife movement and migration. -Terrestrial wildlife species such as grey fox and raccoon use these areas. -Planting of dense vegetation can provide cover and refugia for wildlife using these corridors.	Enhancement	Short Term -Weed management -Planting climate-smart native plantings that provide refugia, food, and insectary sources	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Survey of wildlife usage and movement patterns -Maintenance of plantings and areas managed for weeds -Feasibility studies for expansion of wildlife connectivity linkages	-Rangers -Volunteers -Partners
First	Harbor Point	Salt marsh	-11 acres of salt marsh were restored in 1997. -Existing functioning habitat that supports native plant and wildlife species is generally intact. -Results of habitat models show that this area will maintain mid-marsh with sedimentation and sea level rise. -High chance of long-term success.	Preservation	Short Term -Continue current practice to keep this area closed to public access -Light weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners

Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
First	Harriet Mundy Marsh/Sand Point	Salt marsh	-Existing functioning habitat that supports native plant and wildlife species is generally intact. -Results of habitat models show that this area will maintain mid-marsh with sedimentation and sea level rise. -High chance of long-term success. -Preservation actions will preserve and maintain intact habitats.	Preservation	Short Term -Continue current practice to keep this area closed to public access -Light weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
First	Hooks Island	Salt marsh	-Existing functioning habitat that supports native plant and wildlife species is generally intact. -Results of habitat models show that this area will maintain mid-marsh with sedimentation and sea level rise. -High chance of long-term success.	Preservation	Short Term -Continue current practice to keep this area closed to public access -Light weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
Second	Byxbee Park	Nonnative annual grassland	-Key area for BCCP. -Heavily invaded (stinkwort, Russian thistle, French broom, and yellow star thistle are nonnative invasive weeds; coyote brush is a native plant that is not desirable because its tap root can penetrate the clay cap). -Has engineered clay cap that must be maintained and limits what can be planted; limited areas of engineered soils have more capacity to support perennial plants. -Known occurrences of burrowing owl.	Enhancement	Short Term -Weed management -Climate-smart native plantings -Manage habitat according to Byxbee Park Master Plan as part of this BCCP -Continue to discourage development in areas designated in the Burrowing Owl Management Plan -Continue to promote the implementation of the Burrowing Owl Management Plan	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners

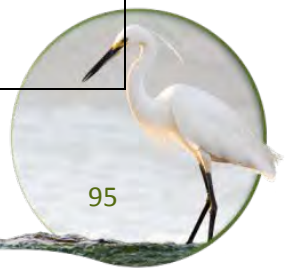
Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
Second	Former ITT Property/Emily Renzel Wetlands	Muted salt marsh	-Key area for BCCP. -Somewhat invaded by weeds. -Hydrologic connections can be improved/restored. -The Emily Renzel freshwater pond provides habitat for aquatic species. -High chance of long-term success.	Restoration	Short Term -Weed management -Secure funding for long-term actions -Install climate-smart native plantings in areas of recent disturbance	-Rangers -Volunteers -Partners
					Long Term -Implement elements proposed in the former ITT Property/Emily Renzel Wetlands preferred concepts (as part of this BCCP) -Technical studies to explore feasibility of improving hydrologic connections -Install dendritic channels	-City of Palo Alto RWQCP
Second	Faber-Laumeister Tract	Salt marsh	-Adjacent levee trails are degraded and invaded (fennel, mallow, and thistles). -Functioning habitat is generally intact. Some weeds in the marsh (Russian thistle, ice plant, pepperweed). -Results of habitat models show that this area will maintain mid-marsh with sedimentation and sea level rise. -High chance of long-term success. -Home to a high number of endangered Ridgway's rails.	Enhancement	Short Term -Coordinate all actions with USFWS -Weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Coordinate all actions with USFWS -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
Second	Adobe Creek	Riparian	-*Arundo* invasion along both sides of the creek. -*Arundo* can clog waterways and cause flooding and safety issues.	Enhancement	Short Term -Weed management -Climate-smart riparian native plantings (e.g., willows) -Identify locations to extend or expand wildlife corridors	-Rangers -Volunteers -Partners -City of Palo Alto -SCVWD
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners -SCVWD

Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
Second	Palo Alto Flood Control Basin	Muted salt marsh	-Degraded and invaded (phragmites, Russian thistle, tall wheat grass). -Large-scale phragmites management effort. -Restoration of the Flood Control Basin can benefit a large area. -Models show overtopping of Flood Control Basin levees at 36 inches of sea level rise. -Areas in the Flood Control Basin adjacent to Matadero Creek support terrestrial wildlife species.	Restoration	Short Term -Explore feasibility of periodic tidal inundation -Coordinate planning with SCVWD -Secure funding for long-term actions -Coordinate future flood control and sea level rise adaptation actions with regional and local agencies and partners	-City of Palo Alto -SCVWD -SFCJPA
					Long Term -Feasibility/technical studies to better understand the hydraulics and salinity of the basin -Site design -Impact assessment and permitting -Site preparation -Construction -Climate-smart native plantings -Monitoring -Maintenance of plantings and areas managed for weeds	-City of Palo Alto -SCVWD
Third	Nursery shoreline (northeast of Save the Bay nursery/Duck Pond)	Muted salt marsh	-Identified as potential restoration area in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008) and WRA and Santina study (City of Palo Alto 2008). The plan called for technical studies on the hydrologic connection and sedimentation of the lagoon and restoration of fill at the southern shoreline of the lagoon. -This area is connected to the Bay through a set of culverts. -Former home of egret rookery. -Results of habitat models show that this area is likely to convert to low-mid marsh by 2050, with sedimentation and sea level rise.	Restoration	Short Term -Secure funding for long-term actions	-City of Palo Alto
					Long Term -Feasibility/technical studies -Site design for long-term success and wildlife habitat -Impact assessment/permitting -Construction -Climate-smart native planting -Monitoring -Maintenance of plantings and areas managed for weeds	-City of Palo Alto

Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
Third	Mayfield Slough remnant	Muted salt marsh	-Identified as potential restoration area in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008). -Identified as potential restoration area in the BCCP stakeholder process. -Hydrologic connectivity can be improved. -Used by terrestrial wildlife and bird species including Wilson's snipe.	Restoration	Short Term -Secure funding for long-term actions	-City of Palo Alto
					Long Term -Feasibility/technical biology and hydrologic studies -Site design -Impact assessment/permitting -Construction -Climate-smart native planting -Monitoring -Maintenance of plantings and areas managed for weeds	-City of Palo Alto
Third	Lagoon shoreline	Nonnative annual grassland	-Identified as potential restoration area in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008). -Degraded and invaded (fennel, stinkwort).	Enhancement	Short Term -Weed management -Climate-smart native plantings	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
Third	Lagoon culvert	Aquatic	-Identified as a potential restoration project in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008). The plan calls for a study on how improved/enlarged culverts can or will affect habitat/silting of the harbor and lagoon.	Restoration	Short Term -Secure funding for long-term actions	-City of Palo Alto
					Long Term -Feasibility/technical hydrologic studies -Site design -Impact assessment and permitting -Construction	-City of Palo Alto
Third	Inner harbor southwest shoreline	Nonnative annual grassland	-Identified as potential restoration project in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008) and WRA and Santina study (City of Palo Alto 2008). The plan called for excavation and restoration of fill in the southern yacht harbor along Embarcadero Road. -Degraded and invaded (tall wheat grass, mustard, thistles, stinkwort). -Area has been identified as a potential location for a	Restoration	Short Term -Coordinate with the RWQCP to explore feasibility of a horizontal levee -Install native plants in previously disturbed locations -Secure funding for long-term actions	-City of Palo Alto -RWQCP



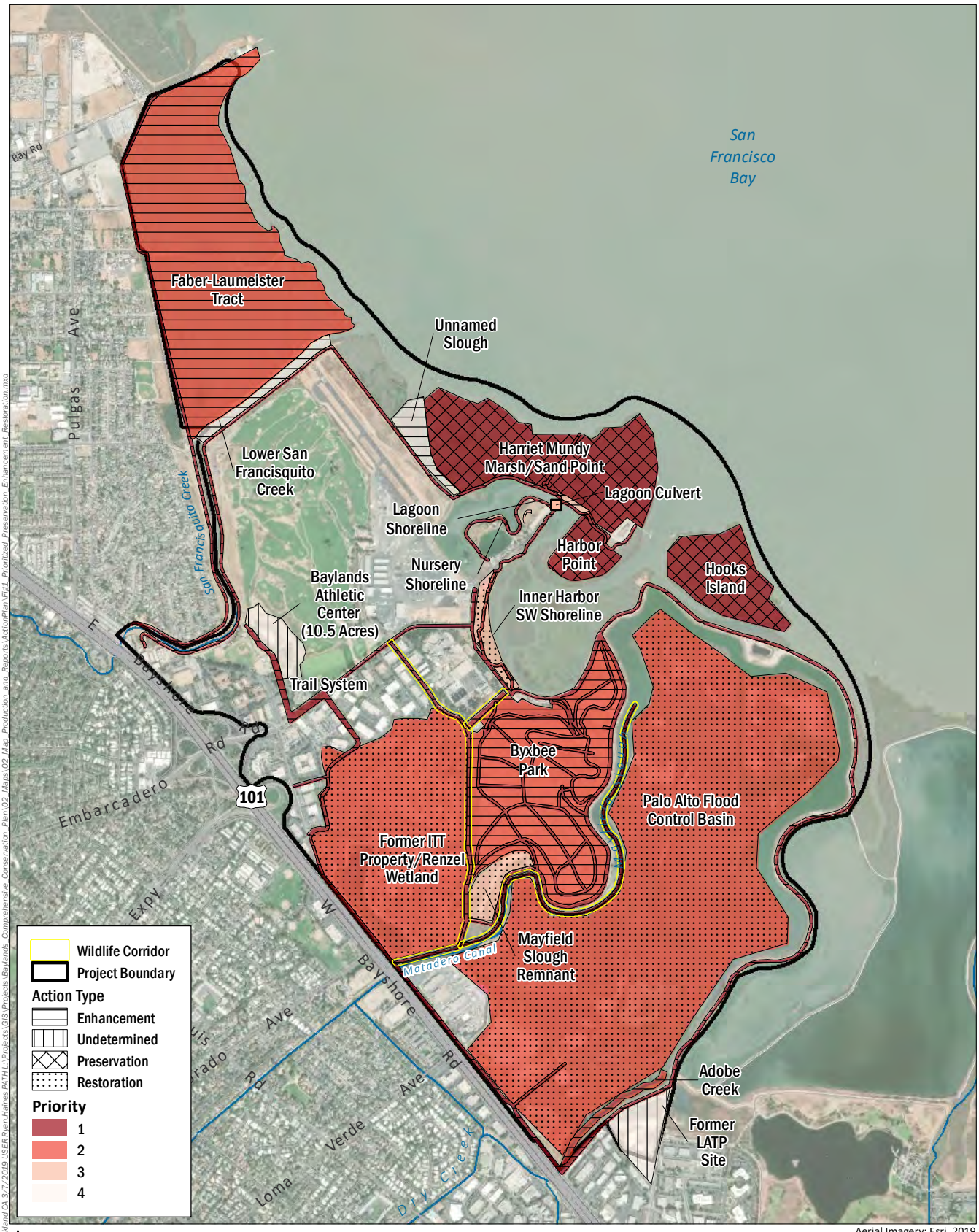
Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
			horizontal levee.		Long Term -Feasibility/technical studies -Permitting -Site planning and design -Climate-smart native planting -Monitoring -Maintenance of plantings and areas managed for weeds	-City of Palo Alto -RWQCP -Volunteers and partners can help with planting and monitoring
Fourth	Unnamed slough (near the RWQCP outfall)	Brackish wetlands (freshwater outfall for the RWQCP)	-Degraded habitat and invaded with weeds (pepperweed). -Stands of alkali bulrush because of freshwater outfall from the RWQCP.	Enhancement	Short Term -Weed management -Climate-smart native plantings -Continued monitoring of habitat conversion near the RWQCP outfall	-Rangers -Volunteers -RWQCP -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners
Fourth	Baylands Athletic Center 10.5 acres	Various	-10.5 acres dedicated as parkland following golf course reconfiguration.	Undetermined	-Obtain funding for the development of alternative use concepts as part of a comprehensive planning process -Assess the feasibility of potential land use alternatives -Conduct outreach with City staff, the public, and stakeholders to gather input and buy-in for potential land uses for the site	-City of Palo Alto
Fourth	Former Los Altos Treatment Plant	Various	-Portions of the site have a land use designation of “Public Conservation Land.”	Undetermined	-Obtain funding for the development of alternative use concepts as part of a comprehensive planning process. -Assess the feasibility of potential land use alternatives -Conduct outreach with City staff, the public, and stakeholders to gather input and buy-in for potential land uses for the site	-City of Palo Alto



Priority	Location	Habitat Type	Description/Rationale	Conservation Action Type	Conservation Actions	Implementing Party
Fourth	Lower San Francisquito Creek	Riparian	-Degraded habitat and invaded with weeds (pepperweed, Russian thistle). -SFCJPA project recently completed project in the area that enhanced habitat for Ridgway's rail.	Enhancement	Short Term -Weed management -Climate-smart riparian native plantings (e.g., willows) -Identify locations to extend or expand wildlife corridors -Monitor Ridgway's rail population	-Rangers -Volunteers -Partners
					Long Term -Monitoring -Maintenance of plantings and areas managed for weeds	-Rangers -Volunteers -Partners

Notes: Bay = San Francisco Bay; BCCP = Baylands Comprehensive Conservation Plan; City = City of Palo Alto; Flood Control Basin = Palo Alto Flood Control Basin; RWQCP = Regional Water Quality Control Plant; SCVWD = Santa Clara Valley Water District; SFCJPA = San Francisquito Creek Joint Powers Authority; USFWS = U.S. Fish and Wildlife Service

Sources: Anderson, pers. comm., 2018; City of Palo Alto 2008; data compiled by AECOM in 2018



AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 14

Prioritized Preservation, Enhancement, and Restoration Areas

Monitoring

Long-term annual surveying, monitoring, and mapping of existing habitats and wildlife should be conducted to detect emerging problems and trends, and to evaluate habitat conditions and the effectiveness of weed management and native plant establishment. Preservation activities should be adapted over time to attain an effective long-term level of preservation and maintenance. A repeatable monitoring methodology, including biological resources assessments, should be established to provide results that can be compared between years. This monitoring methodology should include documenting locations and cover of weed species and desirable native species, documenting survivorship of individual plantings, and conducting wildlife surveys. Monitoring may include photo stations or interpretation of aerial photos, along with field observations. Monitoring should be conducted annually and can be conducted by rangers, by ranger-trained volunteers, or through citizen science such as bio blitzes, or can be provided by partners such as Save the Bay, Grassroots Ecology, Environmental Volunteers, the Santa Clara Valley Audubon Society, the California Native Plant Society (CNPS), and academic institutions. Records of monitoring data should be summarized annually and should be made available to interested partners and City staff for use in determining effectiveness of actions. These data may also be used as supporting documentation when seeking funding for future planning, project implementation, and monitoring.

8.2.1.2.2 Enhancement

Enhancement actions are recommended to maintain previously restored areas and enhance habitats that are degraded by weeds. Enhancement actions require a higher level of effort than preservation actions; in particular, weed management and native planting should occur more frequently and extensively, cover larger areas, and may include the use of heavy equipment for site preparation such as weed removal or grading.

Weed Management and Climate Smart Native Plantings

The goal of weed management, accompanied by climate-smart native planting, is to prevent and reduce weedy infestations, and to promote native plant establishment, biodiversity, and wildlife habitat. Some enhancement actions, such as controlling *Arundo donax* along Adobe Creek, may require the use of heavy equipment and vegetation maintenance crews. Habitats adjacent to trails should be managed for weeds according to the weed management plan in this action plan (Section 5.1), accompanied by planting a wide band of climate-smart native plants, or by broadcasting an appropriate native seed mix, to provide cover and refugia for wildlife using these areas. Climate-smart native species such as willows could be established in riparian, freshwater marsh, or brackish marsh habitats to support sensitive species such as the San Francisco common yellowthroat. Weed management and native planting can be implemented by rangers, volunteers, or partners, and aided by vegetation maintenance crews. Weed management and native species planting that enhance habitats may require multiple years of control efforts to be effective and some weed species may never be fully eradicated

Monitoring

Monitoring as described above should be implemented to detect problems, evaluate habitat conditions, and determine the effectiveness of weed management and native plant establishment. Results of monitoring should inform adaptive management or remedial actions, if the data indicate that plantings are not progressing toward the desired outcome.

8.2.1.2.3 Restoration

The goals of restoration are to create, establish, or reestablish functioning habitat types that currently do not exist but may have been present in the past. Restoration actions require the highest level of effort and can take years to plan, permit, and implement. Short-term restoration actions include securing funding for long-term restoration actions, and conducting weed management accompanied by installing climate-smart native plantings.

Feasibility/Technical Studies

Feasibility and/or technical studies should be conducted to understand whether the proposed restoration actions are feasible, what actions can be taken, what the impacts on wildlife may be, and how actions may change a site, particularly where hydrologic connections can be improved. For example, the hydraulics and salinity of the Flood Control Basin should be studied and better understood to inform restoration planning and design and potential tidal inundation regimes. Some areas, like the lagoon/nursery shoreline and harbor, were identified in the *Palo Alto Baylands Master Plan* (City of Palo Alto 2008), to understand how improved/enlarged culverts may affect habitat/silting of the harbor and lagoon. Additionally, studies could be conducted to understand how restoration actions would affect wildlife habitat in the short term, and provide insight as to the long term.

Local knowledge should be used to inform the analyses of these studies; knowledge can come from rangers, local naturalists, and others who are familiar with the site. The results of feasibility/technical studies should form the basis for site planning and design, and environmental review and permitting.

Site Planning and Design

Site planning and design should be developed based on the findings of technical and feasibility studies. The plans may include alternatives and need to include concepts for habitat restoration, hydrological connections, and recommendations for planting palettes. Where appropriate and compatible with other goals of the BCCP, site planning and design may also include recreational amenities such as trails, benches, and signage. Site planning and design should be informed through a public and stakeholder engagement process, driven by long-term restoration goals, and conducted in the context of required environmental review and permitting.

Environmental Review and Permitting

Restoration plans should undergo environmental review as appropriate, and any necessary permits should be acquired before ground-disturbing activities are implemented. Plan concepts and alternatives should be evaluated based on their ability to achieve restoration objectives, and potential impacts on sensitive species and habitats should be avoided or minimized. Long-term gains in habitats and sensitive species benefits should outweigh short-term impacts. Permitting complexity and cost should also be considered during evaluation of alternatives.

Construction

Restoration activities may include construction of hydrological channels, landforms, and habitat features. Construction may require the use the heavy machinery and work crews, and should include the presence of environmental monitors, to ensure that permit conditions and mitigation measures identified during environmental review are implemented. Seasonal construction restrictions, based on permit conditions, also need to be taken into consideration.

Climate-Smart Native Plantings

Restoration should favor climate-smart native plantings and other native species. Areas along wildlife corridors should be planted with a wide band of diverse native plantings suitable to the site for use as wildlife cover and refugia. Trees should be planted in areas with a freshwater source, to encourage roosting habitat for egrets, herons, and other tree roosting or perching species. Roosting trees or artificial features, such as perches, should not be established in the immediate vicinity of salt marsh habitat, as they may serve as perches for predators on sensitive or protected salt marsh species such as the salt marsh harvest mouse and Ridgway's rail.

Monitoring

Monitoring (as described above) should be implemented to detect problems and evaluate habitat condition and the effectiveness of restoration actions and native plantings. Monitoring may also be required as a permit condition and may require reporting to regulatory agencies to demonstrate progress toward performance criteria.

8.2.1.2.4 Best Management Practices for Long-Term Maintenance

BMPs for long-term maintenance include the following:

Planning

- Use prioritization methodology to leverage staff and volunteer time, to achieve the best possible results of preserving and establishing functioning habitats and maximizing habitat value for wildlife.
- Identify areas that are recovering naturally and "help them along" through weed management and climate-smart native planting.
- In conjunction with weed management, plant native species, appropriate for the intended habitat type, that provide a similar ecological function to the species being removed.
- Provide buffers for existing native habitats, ecological systems, and wildlife corridors, both physically and temporally.
- Promote stewardship of natural resources through environmental education, volunteer activities, signage, and naturalist/ranger programs.
- To reduce overall negative impacts on natural resources, plan projects in accordance with the mitigation hierarchy process to achieve no net loss in biodiversity. In this process, the first step is to avoid impacts on natural resources when feasible. The second step is to reduce impacts that cannot be avoided. If a project is unable to avoid or minimize impacts, then restoration is the next step.
- Enforce regulations and City ordinances including those restrict off-leash dogs, feeding of wildlife, and unauthorized off-trail use.
- Use wildlife-compatible lighting at the lowest intensity possible while still meeting other lighting objectives.
- Keep current on best available science and regional trends, including climate-smart restoration practices, and plan local projects in the Baylands in accordance with the most recent science and best practices.
- Coordinate all actions at the Faber-Laumeister Tract with USFWS.

Monitoring

- Control the spread of sudden oak death in accordance with the Best Management Practices for Sudden Oak Death in the City of Palo Alto Open Space

District Regulations (City of Palo Alto 2007). Phytosanitary practices should be employed to prevent introducing *Phytophthora* spp. and other harmful pathogens into native environments.

- Keep detailed records of natural resource management actions, including environmental review and permitting records, and monitoring efforts and results.
- Develop metrics to measure the success of habitat restoration and enhancement. Implement a restoration monitoring plan that includes active management actions. Keep records of management actions and monitoring data.
- Conduct surveys to assess the health and quality of existing habitats. Identify the locations and conditions of existing habitats and natural systems; wildlife usage patterns; and wildlife corridors. Monitor these parameters over time and implement adaptive management techniques to maintain habitat connectivity and wildlife corridors.
- Maintain a database of habitat and wildlife inventory data to facilitate ongoing monitoring.
- Create a list of priority plant and wildlife species to survey and a protocol for surveying.
- Participate in and support local, regional, statewide, and nationwide monitoring efforts, as applicable.

Construction

- Practice "good housekeeping" and pollution prevention during active projects.
- If feasible, limit activities during the breeding season.
- If construction activities are planned during the breeding season of common and special-status birds, conduct a preconstruction survey of the construction zone and appropriate buffer (as determined by a qualified biologist or published protocols) within 1 week of the onset of construction. If breeding birds are documented, establish appropriate buffer zones around the occupied nests, to protect the birds until the young have fledged.
- Before and during construction, abide by all avoidance, minimization, conservation, and mitigation measures required as a result of environmental review or project specific permitting.
- Restore project areas, including staging areas, to pre-project conditions.
- Plant or disperse native seeds in areas denuded of vegetation by unauthorized trails.
- Avoid planting trees or installing perches in the immediate vicinity of salt marsh habitat, as they may serve as perches for predators of sensitive or protected salt marsh species such as the salt marsh harvest mouse and Ridgway's rail.
- Avoid locating facilities in areas delineated as jurisdictional waters of the United States, including wetlands; areas that qualify as waters of the state under the Porter-Cologne Water Quality Control Act of 1969; and areas subject to regulation by the California Department of Fish and Wildlife under Section 1602 of the California Fish and Game Code. Where avoidance is not feasible, such as for trail crossings, design facilities to minimize impacts.
- Determine the acreage of direct impacts (for example, fill of wetlands) and indirect impacts (for example, alterations to wetland hydrology) that would result from project implementation, and obtain necessary permits.

8.2.1.3 Timeline

The conservation actions detailed above will require long-term and short-term actions. Short-term actions (1–3 years) include managing weeds, installing climate-smart native plantings, and securing funding for long-term restoration actions. Long-term actions

include conducting ongoing monitoring, managing weeds as needed, securing long-term funding, conducting restoration design and environmental review, constructing restoration projects, and conducting long-term monitoring as required by permits and to track project success.

Habitat conditions, restoration priorities, and goals may change over time, and the prioritization methodology should be applied periodically to reflect these changes. The recommended timing for assessing conservation and restoration plans is as follows:

- **Annually:** Apply methodology and assess the conservation and restoration priority list when planning maintenance budgets.
- **Mid-term (3–5 years):** Set larger goals and assess successes and challenges; recalibrate the priority list.
- **Long term (lifetime of BCCP):** Assess the success of overall actions in light of local and regional trends.

8.2.1.4 Implementing Party

Volunteers

Ranger-led volunteer efforts can implement multiple conservation actions, including managing weeds, installing climate-smart native plantings, and monitoring. Partner organizations that can provide volunteers for these activities include Grassroots Ecology, Save the Bay, Environmental Volunteers, the Lucy Evans Baylands Nature Interpretive Center, CNPS, and the Santa Clara Valley Audubon Society. Volunteer groups may come from Scouts, companies, nonprofit organizations, schools, church groups, or community service groups, fraternities or sororities, or through artists and artist in residence projects.

Rangers

Rangers can implement weed management, climate-smart native plantings, and habitat monitoring. Rangers also should lead volunteers in these actions. Recordkeeping of conservation and restoration actions, habitat conditions, wildlife encounters, and monitoring data should be implemented or directed and overseen by rangers. In addition, rangers should be involved in the planning of restoration projects, and their intricate knowledge of the Baylands should be leveraged to achieve restoration goals.

City of Palo Alto

The City, particularly the Open Space, Parks & Golf Division, should lead planning, site design, securing funding, feasibility/technical studies, and environmental review and permitting for implementation projects. Some actions may require coordination with other City departments, including the RWQCP or other agencies, such as the SFCJPA and SCVWD. The City also should lead larger efforts that may require the use of heavy equipment or vegetation management crews.

Partners

Technical expertise and leadership can be provided by partners, such as Save the Bay, Grassroots Ecology, Environmental Volunteers, the Santa Clara Valley Audubon Society, CNPS, Point Blue, the San Francisco Estuary Institute (SFEI), and academic institutions or other groups as appropriate. Volunteer efforts from these organizations should be leveraged to implement weed management and climate-smart native plantings.

8.2.1.5 Funding

Funding for conservation and restoration actions can come from various sources, including annual City maintenance budgets, the City special projects budget, grants, and direct in-kind donations. Grants available for conservation and restoration actions can include Proposition 1 and Proposition 68 watershed restoration grants, San Francisco Bay Restoration Authority grants, Santa Clara County mini grants, flood mitigation assistance grants (from FEMA), California Sea grants, The Nature Conservancy grants, and other restoration grants. Additional funding sources will likely become available over the lifetime of the BCCP. The City and its partners could apply for grants to fund conservation and restoration actions by identifying available funding sources and preparing and submitting proposals. The City and its partners should develop relationships to take advantage of direct and in-kind donations from private organizations that can be leveraged to achieve restoration goals.

8.2.2 Climate Change and Sea Level Rise Adaptation Plan

The climate change and sea level rise assessment developed as part of the BCCP includes actions that can be taken in the short term and long term to address negative impacts from climate change and sea level rise on Baylands resources. This action plan leverages the BCCP's climate change and sea level rise assessment to develop a prioritized list of recommended actions to achieve NRM Goal 5 (Incorporate climate change and sea level rise into long-term management and policies). The results of applying the methodology are shown in Table 8, which identifies prioritized locations, actions, a timeline, the lead implementing party, potential partners, and potential funding sources for implementing adaptation measures.

8.2.2.1 Prioritization Methodology

The prioritization methodology includes prioritizing actions based on key considerations including first exposure to flooding because of sea level rise, severity of consequences, and achievability with existing resources. Actions fall into two categories: short term, which can be implemented in the next 5 years; and long term, which can be implemented in 5 years or longer.

As future conditions and City activities and priorities evolve, climate action priorities may change. Therefore, the prioritization methodology should be applied periodically for appropriate allocation of funds.

First-Priority Key Considerations:

- Areas projected to experience sea level rise exposure by 24 inches of sea level rise.
- Areas likely subject to high consequences (e.g., life safety, extreme flood risk, or large-scale impacts on the area) after being exposed to future sea levels.
- Areas where implementation of recommended actions is achievable with existing resources or that already have funds allocated.

Second-Priority Key Considerations:

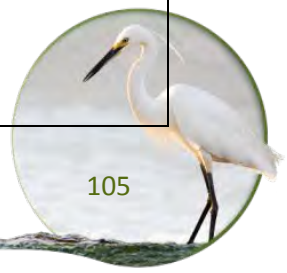
- Areas that are projected to experience sea level rise exposure by 36 inches of sea level rise and subject to moderate consequences as a result of exposure to future sea levels.
- Areas where implementing actions will improve suitable habitat for existing native species.

Third-Priority Key Considerations:

- Areas that are projected to experience flood exposure by 36 inches of sea level rise and subject to low consequences as a result of future sea levels.

Table 8. Sea Level Rise and Climate Change Adaptation Action Plan

Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
Short-Term Actions							
First	Develop monitoring programs to evaluate the impacts of sea level rise on Baylands habitats, wildlife, operations, and potential physical damage to Baylands assets.	Monitoring programs that track impacts because of storms requires little investment, can be started immediately, and provides strong evidence for areas that require adaptation.	-Flood Control Basin -Baylands -Baylands Region	0–5	-Rangers -RWQCP	-SFCJPA -SCVWD -Santa Clara Office of Sustainability (Silicon Valley 2.0 project [SV 2.0]) -RWQCP -Local universities	-SCVWD funds -Academic grants
First	Identify and address data gaps by conducting studies to better understand flood risk to habitats, wildlife, and critical infrastructure in the Baylands.	Partnering to perform additional studies requires little investment, can be started immediately, and can provide key information about vulnerable areas that are currently not well understood.	-Flood Control Basin -Baylands -Baylands Region	0–5	-City of Palo Alto	-Local universities -SV 2.0 -SFEI -SFCJPA -RWQCP -Palo Alto Airport	-City of Palo Alto annual budget -SCVWD funds -Academic grants
First	Collaborate with adjacent landowners, agencies, and organizations to find shared, multi-objective, nature-based, regional solutions that can be planned and implemented through a joint effort.	Collaboration requires little investment, can be started immediately, and may provide large-scale benefits to multiple stakeholders.	-Baylands Region	0–5	-City of Palo Alto	-Private landowners -SFCJPA -Local universities -Facebook, Inc. -Google -SCVWD -SV 2.0 -USFWS -Point Blue -Association of Bay Area Governments (ABAG) -San Francisco Bay Conservation and Development Commission (BCDC) -City of Mountain View -City of East Palo Alto -City of Menlo Park -San Mateo County	-City of Palo Alto annual budgets -Planning grants



Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
						-Santa Clara County	
First	Incorporate language about sea level rise and flood control measures into trail and maintenance plans, to provide a mechanism for adaptation of future trail placement and/or preservation.	Adding climate change language and policies requires little investment and may prevent costly damages by early consideration of future conditions.	-Baylands	0–5	-City of Palo Alto	N/A	-City of Palo Alto annual budget
First	Incorporate coastal flooding scenarios into emergency planning, to avoid flood damage and ensure public safety in the Baylands.	Adding climate change language and policies requires little investment and may prevent costly damages and disaster situations by early consideration of future conditions in emergency planning.	-Baylands -Baylands Region	0–5	-City of Palo Alto	-SFCJPA -ABAG -USFWS -City of East Palo Alto -City of Mountain View	-City of Palo Alto annual budget -Emergency planning grants
First	Add sea level rise language to guidance documents, to consider future sea levels early in the design process.	Adding sea level rise language and policies requires little investment and may prevent costly damages by consideration of future conditions early in project planning and design.	-Flood Control Basin -Baylands -Baylands Region -RWQCP -Palo Alto Airport	0–5	-City of Palo Alto	-SCVWD -SFCJPA	-California Sea Grant -City of Palo Alto annual budget

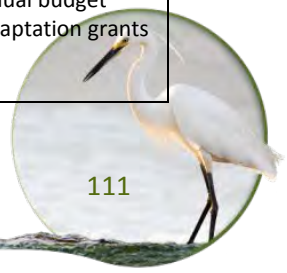
Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
First	Develop and maintain an asset management plan for assets such as buildings, roads, pump stations, and trails that includes asset-specific information, such as location, age, elevation, condition, and replacement cost, to inform long-term planning or prioritization.	Collecting specific asset information requires little investment, is critical for understanding specific future asset impacts, and provides a co-benefit of informing maintenance/replacement schedules.	-Baylands -City of Palo Alto	0–5	-City of Palo Alto	-SFCJPA -RWQCP -Palo Alto Airport -SCVWD	-City of Palo Alto annual budget
First	Form stakeholder working group and a technical advisory committee to aid in development, management, funding, and implementation of actions to protect Baylands habitats, infrastructure, and wildlife.	Forming a stakeholder group requires little investment and is necessary to pursue funding for future actions.	-Baylands Region	0–5	-City of Palo Alto	-SFCJPA -SFEI -RWQCP -Palo Alto Airport -SCVWD	-City of Palo Alto annual budget
First	Coordinate with City departments, external agencies, and local regulators to use comparable sea level rise scenarios for consistent level of protection for habitats, infrastructure, and wildlife.	Coordination requires little investment, can be started immediately, and may be necessary to provide effective large-scale protection for future conditions.	-Flood Control Basin -Baylands -Baylands Region -RWQCP -Palo Alto Airport	0–5	-City of Palo Alto	-SCVWD -SFCJPA -BCDC	-California Sea Grant -City of Palo Alto annual budget
First	Take a community approach to habitat and wildlife restoration and persistence in the Baylands.	Provides enhanced habitat for native species.	-Baylands Region	0–5	-City of Palo Alto	-Citizens of partner cities in the SFCJPA -Environmental Volunteers -Save the Bay -Santa Clara Valley Audubon Society -CNPS -Grassroots Ecology	-The Nature Conservancy -City of Palo Alto annual budget -Restoration grants

Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
First	Replace tide gate structures to improve the functionality of flood retention systems.	Failure of the tide gate will have big impacts on the region (financially, socially, and environmentally).	-Flood Control Basin	3–5	-SCVWD	-City of Palo Alto -City of Mountain View	-SCVWD funds
Second	Conduct a study of sea level rise influence on groundwater levels and the associated impact of increased liquefaction potential during earthquakes.	Although an important hazard to consider, groundwater impacts on liquefaction are poorly understood and groundwater data can be sparse. Collection of the data often is dependent on other agencies (e.g., U.S. Geological Survey [USGS]), and therefore the timing may not be an immediate action.	-Baylands Region	0–5	-SFCJPA	-Local universities -ABAG -BCDC -SFEI -FEMA -USGS	-FEMA -ABAG -Academic grants
Second	Perform an economic analysis of critical assets to evaluate the cost of protection versus the cost of retreat or relocation to a site less vulnerable to coastal flooding.	Although important for prioritizing actions and areas of implementation, it may be outside Baylands existing resources that are allocated for flood control.	-Baylands Region	3–5	-City of Palo Alto	-SFCJPA -BCDC	-City of Palo Alto annual budget -Planning grants
Second	Establish new tree roosting habitat for birds in areas with a freshwater source, suitable for supporting riparian species to expand vulnerable habitats.	Provides enhanced habitat for native species.	-Matadero Creek riparian corridor -Adobe Creek riparian corridor -San Francisquito Creek riparian corridor	3–5	-Rangers -City of Palo Alto	-USFWS -California Department of Fish and Wildlife -Santa Clara Valley Audubon Society -Environmental Volunteers -Grassroots Ecology	-City of Palo Alto annual budget -The Nature Conservancy -Restoration grants

Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
Third	Install signage along trails regarding flood control and future flood challenges, to update visitors regarding ongoing climate adaptation programs and opportunities.	Although effective in engaging the public, outcomes from implementing will not be critical to providing flood control.	-Flood Control Basin -Baylands -Baylands Region	0–5	-City of Palo Alto	-Local universities -SFCJPA -Environmental Volunteers -Lucy Evans Baylands Nature Interpretive Center	-Academic grant -City of Palo Alto annual budget
Long-Term Actions							
First	Elevate critical roadways to maintain public and staff access to and within the Baylands.	Loss of critical access ways during storm events is a life safety hazard.	-Embarcadero Road -Embarcadero Way	20	-City of Palo Alto	-SFCJPA -California Department of Transportation (Caltrans)	-San Francisco Bay Restoration Authority (SFBRA) -State of California -Federal Highway Administration
First	Establish horizontal levees and tidal marshes to provide regional flood control that expands marsh habitat.	A loss of flood control will have big impacts on the region (financially, environmentally, and socially). Also, horizontal levees provide higher quality habitat and co-benefits than traditional levees or sea walls.	-Flood Control Basin -RWQCP -Baylands Region	10–20	-SFCJPA -City of Palo Alto	-Facebook, Inc. -Google -Palo Alto Airport -BCDC -U.S. Army Corps of Engineers (USACE) -SCVWD	-State of California -USFWS -SFBRA -SFCJPA Cities -Private sector (e.g., Facebook, Inc.) -Caltrans
First	Upgrade current pedestrian paths to be used as alternative, emergency evacuation routes during flood events.	Loss of critical access ways during storm events is a life safety hazard.	-Adobe Creek Loop Trail	10	-City of Palo Alto	-SFCJPA	-City of Palo Alto annual budget
First	Introduce pumps at the Flood Control Basin–Bay interface to efficiently discharge stored floodwater. As sea level rises, gravity flow will no longer be sufficient to discharge stored floodwater and it will need to be pumped against high tide.	A loss of flood control will have big impacts on the region (financially, environmentally, and socially).	-Flood Control Basin	10–20	-SCVWD	-City of Palo Alto -City of Mountain View	-State of California -USFWS -SFBRA -SFCJPA cities -Private sector (e.g., Facebook, Inc.) -Caltrans
First	Modify the elevations of levee walls.	A loss of flood control will have big impacts on the region (financially,	-Flood Control Basin -Baylands Region	10–20	-SCVWD -SFCJPA	-City of Palo Alto -City of Mountain View -BCDC	-State of California -USFWS -SFBRA

Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
		environmentally, and socially).				-USACE	-SFCJPA cities -Private sector (e.g., Facebook, Inc., Google) -Caltrans
Second	Install climate-smart native plantings, consistent with Silicon Valley 2.0 adaptation strategy, to promote vegetation, with a wider climate tolerance zone.	Provides enhanced habitat for native species.	-Baylands	5–10	-Rangers -Volunteers	-Environmental Volunteers -Save the Bay -Santa Clara Valley Audubon Society -CNPS -Grassroots Ecology	-City of Palo Alto annual budget -The Nature Conservancy -Restoration grants
Second	Flood-proof nonrecreational facilities to prevent damage from temporary flood conditions.	Although it is important to flood-proof facilities to ensure business continuity during storm events, the action may be outside the existing Baylands budget. Nonrecreational assets also are not affected until a 36-inch sea level rise scenario, allowing more time for implementation.	-Palo Alto Airport -RWQCP -Save the Bay nursery -Baylands Ranger Station	10	-City of Palo Alto	-Palo Alto Airport -RWQCP -SFCJPA	-Federal Aviation Administration -Transportation Research Board -City of Palo Alto annual budget -Adaptation grants
Second	Construct tidal marsh transition zones, consistent with USFWS's Tidal Marsh Recovery Plan, to enhance the habitat of threatened species vulnerable to sea level rise.	Will provide enhanced habitat for native species to migrate as sea levels rise.	-Baylands	10	-City of Palo Alto	-SFCJPA -USFWS -SFEI	-USFWS -The Nature Conservancy -Restoration grants -Adaptation grants

Priority	Adaptation Action	Description/Rationale	Location(s)	Timeline (years)	Lead Implementing Party	Potential Partners	Potential Funding Sources
Second	Add backup power with fuel for several days for on-site nonrecreational facilities, to minimize interruptions to critical assets.	Although it is important to provide backup power to ensure business continuity during storm events, the action may be outside the existing Baylands budget. Nonrecreational assets also are not affected until a 36-inch sea level rise scenario, allowing more time for implementation.	-Palo Alto Airport -RWQCP -Save the Bay nursery -Baylands Ranger Station -Lucy Evans Baylands Nature Interpretive Center	10	-City of Palo Alto	-Palo Alto Airport -RWQCP -SFCJPA	-City of Palo Alto annual budget
Second	Explore the feasibility of expanding the flood retention capacity area by connecting with other basins or marshland, such as Emily Renzel Wetlands (as mentioned in *Palo Alto Flood Control Basin Hydrology* [SCVWD 2016]).	Will provide enhanced habitat for native species and increased flood basin capacity.	-Flood Control Basin -Emily Renzel Wetlands	10–20	-SCVWD	-City of Palo Alto -City of Mountain View	-State of California -USFWS -SFBRA -SFCJPA Cities Authority Cities -Private Sector (e.g., Facebook, Inc.) -Caltrans
Third	Elevate low-lying trails to maintain access during high-water events.	Trails are not exposed until a 36-inch sea level rise scenario, allowing more time for implementation. Temporary loss of trail use will not have big impacts on the region.	-Adobe Creek Loop Trail	10–15	-City of Palo Alto	-SFCJPA	-City of Palo Alto annual budget
Third	Relocate, elevate, or adapt interpretive signage and public art, as necessary.	Although it is important to adapt local artwork and signage, exposure to flooding will not cause big impacts on the region.	-Baylands region	20	-City of Palo Alto	-Palo Alto Public Art Program	-Palo Alto Public Art Program
Third	Relocate low-lying trails that experience frequent flooding.	Although it is important to coordinate retreat strategies, trail exposure to frequent flooding will not cause big impacts on the region.	-Adobe Creek Loop Trail	20–30	-City of Palo Alto	N/A	-City of Palo Alto annual budget -Adaptation grants



8.2.2.2 Actions with Co-Benefits

Many of the proposed actions have other positive effects, or co-benefits, on other aspects of management of the Baylands and implementation of the BCCP. Taking co-benefits into account demonstrates that actions can not only pay off in the long term, but can also have immediate effects. By serving multiple purposes, co-benefits can also offset the cost of climate change and sea level rise adaptation. Table 9 shows several examples of co-benefits for proposed actions.

Table 9 Adaptation Actions with Co-benefits

Action	Co-Benefit
Short-Term Actions	
Conduct study for sea level rise influence on groundwater levels and the associated impact of increased liquefaction potential during earthquakes.	Understanding sea level rise influence on groundwater levels will also inform the vulnerability of underground infrastructure such as utilities. Understanding groundwater will also inform appropriate species selection for long-term restoration planting success.
Develop and maintain an asset management plan that includes asset-specific information such as location, age, elevation, condition, and replacement cost to inform long-term planning or prioritization.	More thorough understanding and record of existing assets and component conditions.
Take a community approach to habitat and wildlife restoration and persistence at the Baylands,	Community involvement will foster a sense of ownership and support for adaptation actions within the Baylands.
Replace tide gate structure to improve functionality of flood retention system.	The tide gate can also serve as a barrier between Bay tides and low-lying developed areas upstream during high tide events.
Enhance tree roosting habitat for birds in areas with a freshwater source suitable of supporting riparian species to expand vulnerable habitats.	Enhanced wildlife viewing opportunities.
Action	**Co-Benefit**
Long-Term Action	
Implement climate-smart restoration plantings, consistent with the Silicon Valley 2.0 adaptation strategy, to promote vegetation with a wider climate tolerance zone.	Enhanced wildlife viewing opportunities.
Construct tidal marsh transition zones consistent with USFWS's Tidal Marsh Recovery Plan to enhance the habitat of threatened species vulnerable to sea level rise.	Enhanced wildlife viewing opportunities.
Horizontal levees and tidal marshes to provide regional flood control that expands marsh habitat.	Preservation of existing marsh ecosystems and recreation opportunities at the Baylands.
Expand flood retention capacity area by connecting with other basins.	Expansion of existing marsh ecosystem habitat and recreational opportunities.
Introduce pumps to efficiently discharge floodwaters.	Preservation of existing marsh ecosystems and recreation opportunities inside Flood Control Basin area.
Modify elevation of levee walls.	Preservation of existing marsh ecosystems and recreation opportunities at the Baylands.
Elevate critical roadways to maintain public and staff access to and within the Baylands.	Elevation of Embarcadero Road could be tied in with regional flood control strategy.
Relocate low-lying trails that experience frequent flooding.	Former trail alignments can be converted to transitional marsh habitat.

8.2.2.3 Partners

Regional partnerships are necessary for the long-term resilience of the Baylands to impacts from climate change and sea level rise. Regional partnerships allow

information sharing, planning, and advocacy between groups and stakeholders. Coordinating flood control efforts also can lead to larger regional resiliency options and provide a more effective advocacy voice than that of an individual city or department. Partners may include federal, state, and local governmental agencies that have a large-scale perspective of standards and resources for flood control and how it is applicable to the local area; local universities and research organizations that have the capabilities to complete additional studies or fill data gaps; nonprofit organizations that have interest of habitat and species; or the private sector (e.g., Facebook and Google), which also may be exposed to flooding during the same planning time frame as Baylands and may be able to offer additional information, support, and/or funding potential.

8.2.2.4 Funding

To maintain safety and operations of the Baylands during future climate conditions, the City will be challenged to identify and have access to capital for project development, such as the actions identified in this plan.

Funding for climate adaptation actions can come from a variety of sources, including federal grants, annual city maintenance budgets, the City special projects budget, direct in-kind donations, and other grants. Grants available for climate adaptation include those from SFBRA, Santa Clara County (mini grants), National Oceanic and Atmospheric Administration (coastal resilience grants), FEMA (flood mitigation assistance grants), the State of California (sea grant), California Coastal Conservancy, USACE, and The Nature Conservancy. Private businesses (e.g., Facebook and Google) will be vulnerable to flooding at the same time as the Baylands and may provide an additional source of funding to complete a regional approach to flood control. Direct and in-kind donations from private organizations can be leveraged to achieve adaptation goals or protect vulnerable public art.

8.2.2.5 Timing

Climate adaptation actions (as detailed above) will require implementation in the long term and short term. Short-term actions (1–5 years) will include incorporating sea level rise language into planning and design documents, addressing data gaps, acquiring funding for future action implementation, replacing tide gate structures, expanding suitable habitat areas, and collaborating with neighboring stakeholders. Long-term actions will include flood-proofing and elevating vulnerable assets, constructing tidal marsh zones, placing large-scale flood control components (e.g., horizontal levees, expanding flood retention capacity, and elevating existing levees), elevating roadways, and introducing pumps to efficiently discharge water from the Flood Control Basin.

As future conditions and Baylands activities evolve, they may affect climate action priorities. Therefore, the prioritization methodology should be applied periodically for appropriate allocation of funds. Recommended timing for assessing climate adaptation action plans is as follows:

- **Annually:** Assess the prioritized list when planning for maintenance and capital improvement budgets.
- **Mid-term (3–5 years):** Set larger goals and assess successes and challenges; recalibrate the priority list.
- **Long term (lifetime of BCCP):** Assess the success of overall actions in light of local and regional trends

8.3 Public Access and Facilities

8.3.1 Best Management Practices

BMPs are practices, guidelines, methods, or techniques that are effective and practical means of achieving goals and objectives. BMPs were developed for each Public Access and Facilities planning goal listed below. The BMPs were developed from a range of sources: prior plans, stakeholder input, research, and review of BMPs applied by leaders in the field of integrated resource planning.

Recreation/Access

PAF Goal 1: Provide opportunities for recreation/access via a habitat-compatible trail network to enable wildlife observation and ensure that future generations develop an appreciation for wildlife, natural habitats, wildlife-compatible recreational activities, and connections to the greater Palo Alto area.

- **PAF BMP 1.1**. Locate visitor-serving facilities in previously disturbed areas or areas of relatively low resource value to minimize disturbance to higher value habitat areas. Avoid fragmentation of higher value habitat areas when planning access.
- **PAF BMP 1.2.** Coordinate with partners and adjoining landowners to create a consistent network of recreational options. Ensure that recreation opportunities support the San Francisco Bay Trail and San Francisco Bay Area Water Trail Plan goals of providing access around the entire bay.
- **PAF BMP 1.3.** Allow uses such as hiking and picnicking in areas that are attractive for such uses and where such activities would not conflict with wildlife habitat.

PAF Goal 2: Provide appropriate facilities for visitors to the Baylands.

- **PAF BMP 2.1.** Maintain existing facilities and trails.
- **PAF BMP 2.2.** Assess facilities and trail use on an annual basis, and develop additional management and monitoring guidelines as needed to maintain or enhance visitor-serving facilities.
- **PAF BMP 2.3.** Locate facilities to allow for safe, effective, and efficient visitor use.
- **PAF BMP 2.4**. Incorporate universal access standards.
- **PAF BMP 2.5**. When planning to develop new facilities, consider the need for maintenance and public safety personnel, equipment, communications, and emergency vehicle access.
- **PAB BMP 2.6.** Improve recreation waste management to limit access of food waste by wildlife.

Former Los Altos Treatment Plant

PAF Goal 3: Identify alternatives for land uses at the former Los Altos Treatment Plant site.

- **PAF BMP 3.1.** Obtain funding for the development of alternatives use concepts as part of a comprehensive planning process.
- **PAF BMP 3.2.** Assess the feasibility of potential land use alternatives.
- **PAF BMP 3.3.** Conduct outreach with City staff, the public, and stakeholders to gather input and buy-in for potential land uses for the site.

Palo Alto Airport

PAF Goal 4: Promote ecologically sensitive policies for areas at and near the Palo Alto Airport.

- **PAF BMP 4.1.** Explore the feasibility of low-impact wildlife control actions, including determining the timing of vegetation management.
- **PAF BMP 4.2.** Explore mutually beneficial opportunities with the airport.
- **PAF BMP 4.3.** Coordinate with partners to identify funding sources for infrastructure protection from climate change and sea level rise.
- **PAF BMP 4.4.** Trails and public access near the airport should be maintained.

8.4 Public Engagement

8.4.1 Interpretive Messaging Plan

Multiple designs for interpretive messaging currently exist in the Baylands. Regional trails, such as the Bay Trail, require their own sets of signage and messaging. This plan is intended to be used as a reference guide when planning or proposing future interpretive messaging and signage. This plan compiles and presents guidance that was developed as part of the Interim Byxbee Park Master Plan (City of Palo Alto 2015), the *Lucy Evans Baylands Nature Interpretive Center Signage Plan* (City of Palo Alto 2017b), and the concepts for the former ITT Property/Emily Renzel Wetlands and the Byxbee Design Plan in this BCCP. This plan includes guidelines developed through the BCCP stakeholder engagement process and identified in the opportunities and challenges analysis conducted during development of the BCCP.

8.4.1.1 Existing Interpretive Messaging

Interpretive messaging in the Baylands includes messaging about management activities and natural, cultural, and historical features of the preserve. The *Design Guidelines for the Palo Alto Baylands Nature Preserve* (City of Palo Alto 2005) were aimed to create a unifying theme of style and messaging within the Baylands; however, multiple designs exist for signage and panels (Figure 15).

Figure 15. Examples of Existing Interpretive Panels at the Baylands.

8.4.1.2 Proposed Interpretive Messaging

8.4.1.2.1 Lucy Evans Baylands Nature Interpretive Center Signage Plan

The *Lucy Evans Baylands Nature Interpretive Center Signage Plan* (City of Palo Alto 2017b) presents guidance for signage and messaging over a 2-mile trail, from the Sailing Station to Cooley Landing, including the Lucy Evans Baylands Nature Interpretive Center deck and boardwalk, and two public art interpretive elements. Proposed interpretive messages include historic, cultural, infrastructure, natural history, conservation, and land-use information to appeal to different user groups including children, adults, casual users, and daily visitors. The plan includes conceptual examples of messaging themes and signs, guided by the *Site Assessment and Design Guidelines for the Palo Alto Baylands Nature Preserve* (City of Palo Alto 2005) and the *Smithsonian Guidelines for Accessible Exhibition Design* (Smithsonian 2019). Figure 16 shows the locations of existing and proposed interpretive messaging throughout the Baylands.

8.4.1.2.2 Interim Byxbee Park Master Plan

The Interim Byxbee Park Master Plan (City of Palo Alto 2015) includes concepts for park entry signage, park interpretive signs, trail marker signs, and park regulation signs. The interpretive signs are intended to be used as a tool to educate visitors about historic features, management activities, and unique natural, cultural, and historic features of the park. Instructional signage is recommended to denote sensitive wildlife areas, along the edge of pathways near nesting habitat.

8.4.1.2.3 Former ITT Property/Emily Renzel Wetlands

Four interpretive signs are proposed for the former ITT Property/Emily Renzel Wetlands at the junctions of proposed and existing trails. Proposed signage would focus in wetland ecology and restoration and could include information regarding the former use of the site as a ship-to-shore communications hub.

8.4.1.3 Recommendations and Best Management Practices

The following sections present recommendations and BMPs for interpretive messaging at the Baylands. The intended audience for messaging as the Baylands includes casual and daily visitors, children, and adults.

8.4.1.3.1 Messaging

- Messaging should fit with current relevant science, and themes should focus on the Baylands' natural processes, cultural history, and its future, including climate change and sea level rise.
- Potential future messaging could include information related to proposed actions and projects at the Baylands, including restoration at the former ITT Property, closing of the landfill and clay cap at Byxbee Park, or protection of the RWQCP from sea level rise.
- Messaging should be consistent, identifiable, understandable, and current, using cutting-edge education and information methods.
- Messaging opportunities should be discussed across multiple City departments and with all partners.
- Future messaging should build on existing resources and use new tools to appeal to a broader audience, such as alternatives to signage, including online messaging, educational apps, or a mobile interpretive trail guide.
- Messaging regarding natural resources could be reinforced through encouraging bio blitzes and naturalist apps.

Graphic design of interpretive panels should follow the *Design Guidelines for the Palo Alto Baylands Nature Preserve* (City of Palo Alto 2005).

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CITY OF PALO ALTO

AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 16

Existing and Proposed Interpretive Signage

8.4.1.3.2 Best Management Practices

- Signage should be appropriately spaced to avoid a "sign forest."
- Signage and art in previously disturbed areas or in areas of relatively low resource value should be located to minimize disturbance to higher value habitat areas.
- Signage that that can attract pest species or be hazardous or harmful to wildlife should be avoided.
- Installation of signage near sensitive habitats during the bird breeding season should be avoided.
- Existing signage throughout the Baylands should be replaced as the signs reach the end of their useful lives.
- Coordination should be conducted with USFWS for signage at the Faber-Laumeister Tract.
- Technical guidance for potential future signage should follow National Park Service standards for signage (NPS 2009). Multilingual, accessible signage should be developed to reflect visitor diversity while explaining and describing the Baylands' natural and cultural history and its future.

8.4.1.3.3 Panel Materials

The *Design Guidelines for the Palo Alto Baylands Nature Preserve* (City of Palo Alto 2005) include a recommended style for interpretive panel frames and bases, made from redwood and plywood. Since 2005, such panels have been used throughout the Baylands and their maintenance has been difficult. The wood components require a new coat of paint nearly every year, are easily vandalized, and are difficult to repair or replace. Replacement materials are difficult to source, thus leading to different styles of panel bases throughout the Baylands (Figure 15).

New or replacement panels, bases, and frames should follow National Park Service standards (NPS 2009), which are consistent with panels located in other parks in Palo Alto. This style of panel generally is made of commercial-grade aluminum, is graffiti resistant, has low maintenance and repair needs, and is easy to replace (Figure 15). This type of panel can be used for wayfinding, information, orientation, and interpretive signage throughout the Baylands.

8.4.1.4 Partners

Potential partners for developing interpretive and educational messaging include the Lucy Evans Baylands Nature Interpretive Center, Cooley Landing, Don Edwards Wildlife Refuge, RWQCP, BCDC, the Bay Trail, Santa Clara Valley Audubon Society, Grassroots Ecology, Palo Alto Airport, Palo Alto History Museum, Palo Alto Historical Society, Palo Alto Amateur Radio Club, local universities, and Environmental Volunteers. Partners could provide technical expertise and historical and ecological information. Partners could also develop online messaging, educational apps, or mobile interpretive trail guides.

8.4.1.5 Funding

Funding for interpretive messaging can come from City budgets or from private or in-kind donations, particularly for online and mobile messaging. In addition, funding can come from stand-alone grants from the California Department of Parks and Recreation, BCDC, and others. Funding also can be secured as part of larger restoration or adaptation projects in the Baylands.

8.5 Public Art

8.5.1 Public Art Master Plan

The public art plan builds on the *City of Palo Alto Public Art Master Plan* (City of Palo Alto 2016a) and advances BCCP Public Art Goal 1 (Include appropriate environmental art in the Baylands that builds on Palo Alto's Public Art Master Plan) by identifying potential themes and locations for temporary and permanent public art in the Baylands. The plan is intended to be used as a guide when planning future public art opportunities and includes guidance and BMPs for art in the Baylands.

Locations and themes for potential future art were identified through the BCCP stakeholder engagement process; areas identified in the Opportunities Analysis report of the BCCP; *Public Art at the Baylands: An Overlay to the Palo Alto Baylands Comprehensive Conservation Plan, 2019* (Art Overlay; Appendix B); the *City of Palo Alto Public Art Master Plan*; and the *Lucy Evans Baylands Nature Interpretive Center Signage Plan* (City of Palo Alto 2017b).

The Public Art Master Plan (City of Palo Alto 2016a) called for the Embarcadero Road corridor to have its own art plan. Funding for public art along this corridor would likely come from a public art requirement as part of commercial redevelopment. Instead of commissioning the installation of individual works of public art on their property, developers may choose to pay the equivalent amount to the Public Art Fund. These in-lieu funds may be pooled from several projects to fund public artworks managed by Palo Alto Public Art. These funds are separate from Open Space, Parks & Golf Division budgets. This public art plan and the Art Overlay seek to incentivize developers to contribute to projects that seek to promote the natural characteristics of the Baylands, emphasize ecological and environmental themes, and minimize disturbances to natural areas of the Baylands.

8.5.1.1 Existing Art in the Baylands

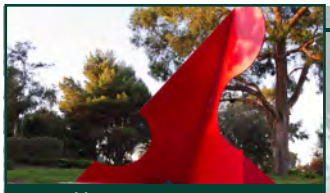
Art is an important part of the Baylands, and 10 pieces currently are installed (Figure 17). Table 10 describes the types and locations of existing art in the Baylands, at Byxbee Park, the Palo Alto Municipal Golf Course, and along Embarcadero Road, which is generally are considered to be a "gateway" to the Baylands.

Table 10. Existing Art Installations in the Baylands

Piece Name (year)	Artist(s) Name	Location	Art Type
Birdie (2017)	Joyce Hsu	Municipal Golf Course	-Sculpture -Permanent
Bliss in the Moment (2010)	James Moore	Flood Control Basin Trailhead (3633 E. Bayshore Road)	-Sculpture -Permanent
Chevrons (1991)	Peter Richards Michael Oppenheimer	Byxbee Park	-Sculpture -Permanent
Currents (2014)	Martin Webb	RWQCP	-Mural -Permanent

Piece Name (year)	Artist(s) Name	Location	Art Type
Foraging Island (2018)	Mary O'Brien Daniel McCormick	Byxbee Park	-Remedial Sculpture -Temporary
Kaikoo V (1990)	Betty Gold	Municipal Golf Course (1875 Embarcadero Road)	-Sculpture -Permanent
Pole Field (1991)	Peter Richards Michael Oppenheimer	Byxbee Park	-Sculpture -Permanent
Riding the Current (2014)	Martin Webb	Palo Alto Water Quality Control Plant	-Sculpture -Permanent
Streaming (2009)	Ceevah Sobel	2027 E. Bayshore Road Pump Station	-Sculpture -Permanent
Windwave (1991)	Peter Richards Michael Oppenheimer	Byxbee Park	-Sculpture -Permanent

Source: City of Palo Alto 2016a; data compiled by AECOM in 2018



Betty Gold
Kaikoo V, 1990

Joyce Hsu
Birdie, 2017

Martin Web
Riding the Currents, 2014

Ceevah Sobel
Streaming, 1991

Daniel McCormick and Mary O'Brien
Foraging Island, 2018

Peter Richards and Michael Oppenheimer
Windwave, 1991

James Moore
Bliss in the Moment, 2010

Martin Webb
Currents, 2014

Peter Richards and Michael Oppenheimer
Chervons, 1991

Peter Richards and Michael Oppenheimer
Pole Field, 1991

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Bliss in the Moment, Kaikoo V, Pole Field, and *Streaming* images: Camera Club
Aerial Imagery: Esri, 2018

AECOM

FIGURE 17

Existing Art Installations

8.5.2.1 Baylands Art Overlay

The Art Overlay, developed by Mary O'Brien and Daniel McCormick, provides recommendations for themes and identifies appropriate sites for public art that are ecologically and/or educationally beneficial, and that minimize disturbance to natural areas in the Baylands. The Art Overlay identifies opportunities for ecological, environmental, and social practice art and provides guidance on how the Baylands can become an area for artworks, performances, and events that complement conservation efforts at the Baylands. Recommendations from the Art Overlay are presented in the following sections. Appendix B provides the full Art Overlay.

8.5.2.2 Potential Future Art in the Baylands

8.5.2.2.1 Locations and Types of Potential Future Art in the Baylands

Table 11 shows locations for and types of potential future art in the Baylands. This includes locations and types of art identified in the Art Overlay, the Public Art Master Plan, the *Lucy Evans Baylands Nature Interpretive Center Plan*, and the Opportunities Analysis section of the BCCP, and developed through the stakeholder engagement process. Figure 18 shows locations for potential future art and artworks in the Baylands. The entire Embarcadero Road corridor has been identified previously in the Public Art Master Plan as a potential location for public art integration and art-related activities. Art and art-related activities east of Embarcadero Way should blend with or enhance the natural landscape, be sensitive to existing wildlife habitats and corridors, and consider the environment and ecology of the Baylands.

8.5.2.2.2 Guidelines and BMPs for Potential Future Art in the Baylands

- Public art in the Baylands should enhance and blend with the natural landscape and environmental messaging of parks and open space, and should promote environmental stewardship and sustainability.
- Artwork and art-related activities should minimize disturbance to higher value habitat areas.
- Artwork and art-related activities that may attract pest species or be hazardous or harmful to wildlife should be avoided and should not include materials that can potentially be hazardous, or that can create roosting (perching) habitat for predator species. Upward lighting and performing arts that amplify sound should be avoided.
- Community members are engaged and volunteerism is high in the Baylands, and they should be leveraged to participate in creating and viewing artistic displays, and participating in art-related activities.
- Coordination with USFWS should occur for artwork and art-related activities at the Faber-Laumeister Tract.
- Art-related activities and installation of artworks should be avoided during the bird breeding season, near sensitive habitats, or near critical wildlife corridors.

Table 11. Locations for and Types of Potential Future Public Art in the Baylands

Location	Type									
	Permanent	Temporary	Performing Art	3D (i.e., sculpture)	2D (i.e., mural)	Educational	Experiential/ Interactive	Environmental	Ecological	Social Practice
Adobe Creek Bridge	X	X		X		X	X	X		X
Friendship Bridge Project	X	X		X		X	X	X		X
Byxbee Park	X	X	X	X		X	X	X	X	
Embarcadero Road Corridor (U.S. Highway 101 to Embarcadero Way)	X	X	X	X		X	X	X		
Regional Water Quality Control Plant	X	X	X	X	X	X	X	X	X	
Developed Areas (i.e., trails, benches)	X	X	X	X	X	X	X	X	X	X
Ranger Station Picnic Area	X	X	X	X	X	X	X	X	X	X
Roads and Road Shoulders	X	X	X	X	X	X	X	X	X	X
Observation Decks	X	X	X	X	X	X	X	X	X	X
Parking Lots	X	X	X	X	X	X	X	X	X	X
Entrances to the Baylands (vehicle, bike, pedestrian)	X	X	X	X	X	X	X	X		X
Palo Alto Baylands Sailing Station and Parking Lot	X	X	X	X	X	X	X	X		X
Lucy Evans Baylands Nature Interpretive Center and Boardwalk	X	X		X		X	X	X	X	
Cooley Landing	X	X	X	X		X	X	X	X	
Environmental Volunteers EcoCenter		X	X			X		X	X	X

Sources: City of Palo Alto 2016a, 2017b; data compiled by AECOM in 2018

Bliss in the Moment, Kaikoo V, Pole Field, and *Streaming* images: Camera Club
Aerial Imagery: Esri, 2018

AECOM Oakland CA 3/7/2019 USER:Ryan.Haines PATH:L:\Projects\GIS\Projects\Baylands_Comprehensive_Conservation_Plan\02_Maps\02_Map_Production_and_Reports\ActionPlan\Fig18_Potential_Art_Installations.mxd

AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 18

Locations for Potential Future Public Art

8.6 Operations and Management

8.6.1 Weed Management Plan

Habitat conversion and nonnative invasive plant species are among the leading causes of native biodiversity loss (Vitousek et al. 1996). Nonnative invasive plant species spread quickly, displace native plants, prevent native plant growth, and create monocultures. The change in native biodiversity affects the structure, quality, and quantity of wildlife habitat, and sometimes hydrology. The weed management plan achieves BCCP NRM Goals 1, 2, and 3, and Operations and Management Goal 3 (Reduce the extent of invasive species in the Baylands) by identifying and prioritizing weeds for management to protect existing habitats, enhancing degraded habitats, and promoting native species biodiversity.

The plan includes a list of weed species, including native and nonnative invasive species, known to be present in the Baylands, prioritized for management based on their threats to habitat and wildlife. The plan includes a prioritization methodology based on based the ecological threat of the species. The prioritization methodology should be applied periodically as conditions change and new weeds are discovered in the Baylands. This weed management plan provides descriptions of actions, timing, implementing parties, potential partners, and potential funding sources for weed management. The plan also provides technical guidance and recommendations for weed management and pest prevention.

8.6.1.1 Weed Management Goals

- Reduce existing weed infestations that degrade habitat and habitat functions that support wildlife.
- Prevent new weed infestations.
- Treat incipient weed infestations.
- Monitor weed infestations to track long-term effectiveness and adapt management actions.

8.6.1.2 Existing Weed Species

Table 12 lists weed species known to occur, and requiring management in the Baylands, organized by vegetation communities/habitat types and location. Weed species in the Baylands include nonnative invasive species, and species that are native in origin but grow in a way that is of concern to the specific site. Such species include a monotypic stand of *Phragmites australis* in the Flood Control Basin, and coyote brush in Byxbee Park, where concern exists that the deep taproot can compromise the safety of the clay landfill cap. Coyote brush is not considered a species of concern in other parts of the Baylands.

8.6.1.3 Management Priorities

This section describes a methodology for prioritizing species for management that should be applied periodically to reevaluate management priorities. Table 12 shows the results of applying the methodology for known nonnative invasive species and nuisance species that are native in the Baylands, to produce a prioritized management list.

8.6.1.3.1 Prioritization Methodology

Key considerations for weed management priorities are based on the ecological threat of the species, the combined impact of multiple species in an area, and the management priority given to the management area in the conservation and restoration plan. The ecological threat of the species is evaluated using California Invasive Plant Council

(Cal-IPC) inventory rankings, local and regional knowledge, and severity of the population (Cal-IPC 2016). Thus, a species may not have the same priority in all management areas.

Priority should be given to new weed species that arrive at the Baylands, because new small populations, or incipient populations, are easier to eradicate to prevent a larger problem. Priority also may be warranted for any weed population that is, or becomes, a large monotypic stand that excludes native species or alters the hydrology of the system.

First-Priority Key Considerations:

- Species that pose the greatest ecological threat to the habitat they inhabit, including those with a high Cal-IPC ranking.
- Species that are located near vector conduits, such as trails.
- Species for which management is feasible without large-scale habitat alterations, or large-scale use of herbicide.

Second-Priority Key Considerations:

- Species that pose a lower ecological threat to the habitat, including those with a lower Cal-IPC ranking, those having a smaller population with a higher ranking, or species in a habitat that naturally limits the spread through resource or microsite limitation (e.g., a species that thrives in wetland conditions, growing in an upland habitat).

Third-Priority Key Considerations:

- Species with a low severity ranking from Cal-IPC and located in areas that also have a lower priority for conservation actions.
- Species that are very difficult to manage because of the complexity of their growth habitats.

The weed management prioritization methodology is in alignment with the conservation and restoration plan area priorities, meaning that the priority levels of the conservation and restoration areas have been taken into consideration when assigning the weed management priority.

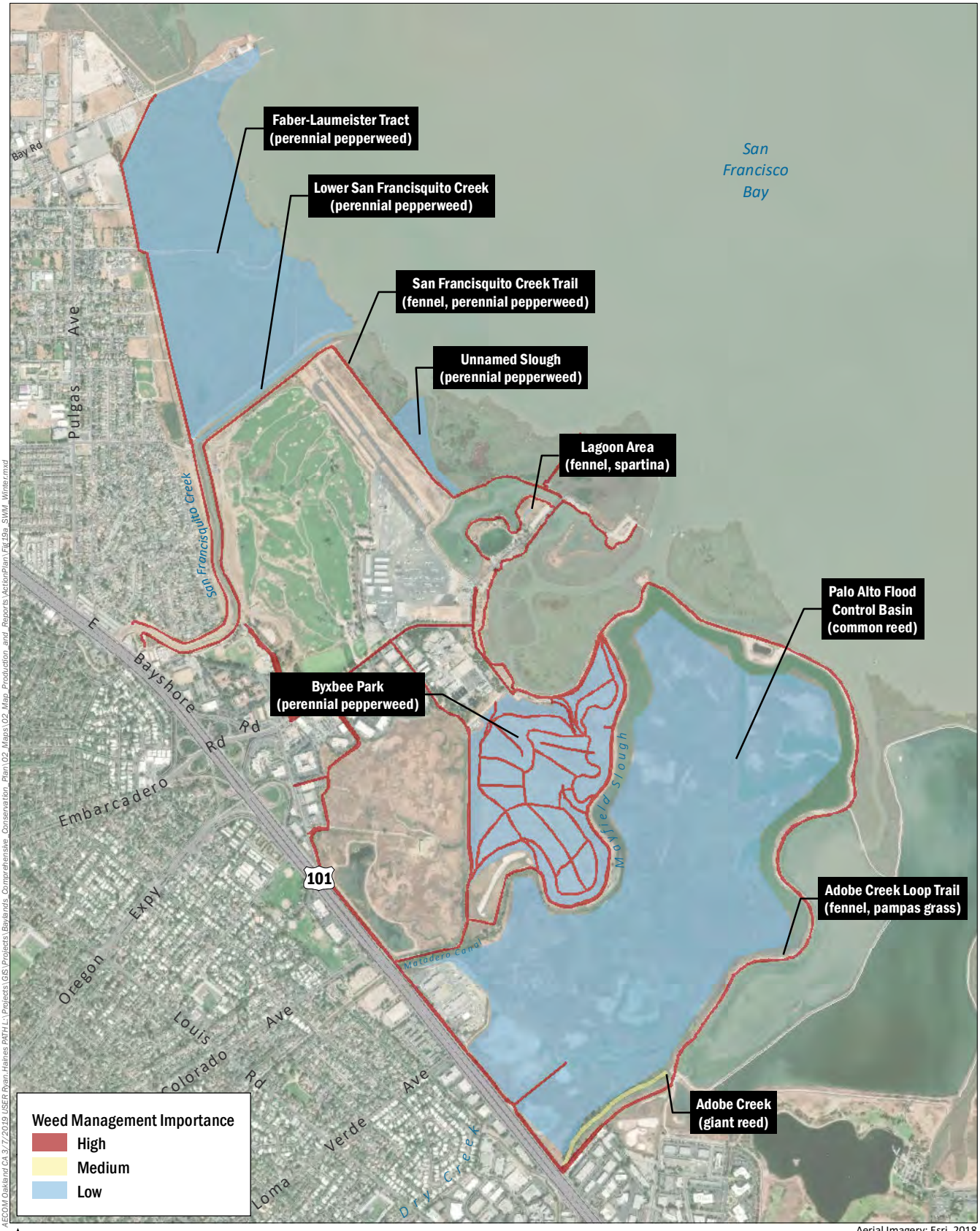
8.6.1.3.2 Management Priority List

Table 12 shows the results of applying the methodology described in the previous section, based on current Baylands data compiled from field visits and City and stakeholder input. Table 12 shows the priority of each species per management area, and Figures 19a, 19b, and 19c show the weed management priorities by season and management area, to provide a usable tool for weed management staff. This priority list is a baseline assessment and should be reevaluated regularly.

Table 12. Priority Rating and Locations of Weeds

Species Name	Common Name	Cal-IPC Rating	Mixed	Tidal Salt Marsh	Nonnative Annual Grassland			Muted Salt Marsh	Riparian		Brackish Wetland
			Trail System	Faber-Laumeister Tract	Lagoon Shoreline	Inner Harbor Southwest Shoreline	Byxbee Park	Flood Basin	Adobe Creek	San Francisquito Creek	Unnamed Slough
Acacia spp.	acacia	-							3		
Arundo donax	giant reed	High							1		
*Baccharis pilularis**	coyote brush	-					1				
Brassica spp.	wild mustard	Limited–Moderate	1			3					
Carpobrotus chilensis	sea fig; ice plant	Moderate	1	2							
Centaurea solstitialis	yellow starthistle	High					1				
Cirsium vulgare, Carduus pycnocephalus	thistles	Moderate	1			3					
Cortaderia sellanoa (or *C. jubata*)	pampas grass; jubata grass	High	1								
Dittrichia graveolens	stinkwort	Moderate	1			2	1				
Eucalyptus spp.	eucalyptus	Limited–Moderate							3	3	
Festuca perennis	Italian rye grass	Moderate	2				1				
Foeniculum vulgare	fennel	High	1		2						
Genista monspessulana	French broom	High					1				
Lepidium latifolium	perennial pepperweed	High	1	2			2			2	2
Malva spp.	mallow	-	3								
*Phragmites australis**	common reed	-						3			
Salsola tragus	Russian thistle	Limited		2			1	3		3	
Spartina alterniflora	smooth cordgrass	High		2	2						

*Indicates species that are native in origin but growing in a way that is of concern to the specific site.
Sources: Anderson, pers. comm., 2018; Calflora 2016; Cal-IPC 2016; data compiled by AECOM in 2018.



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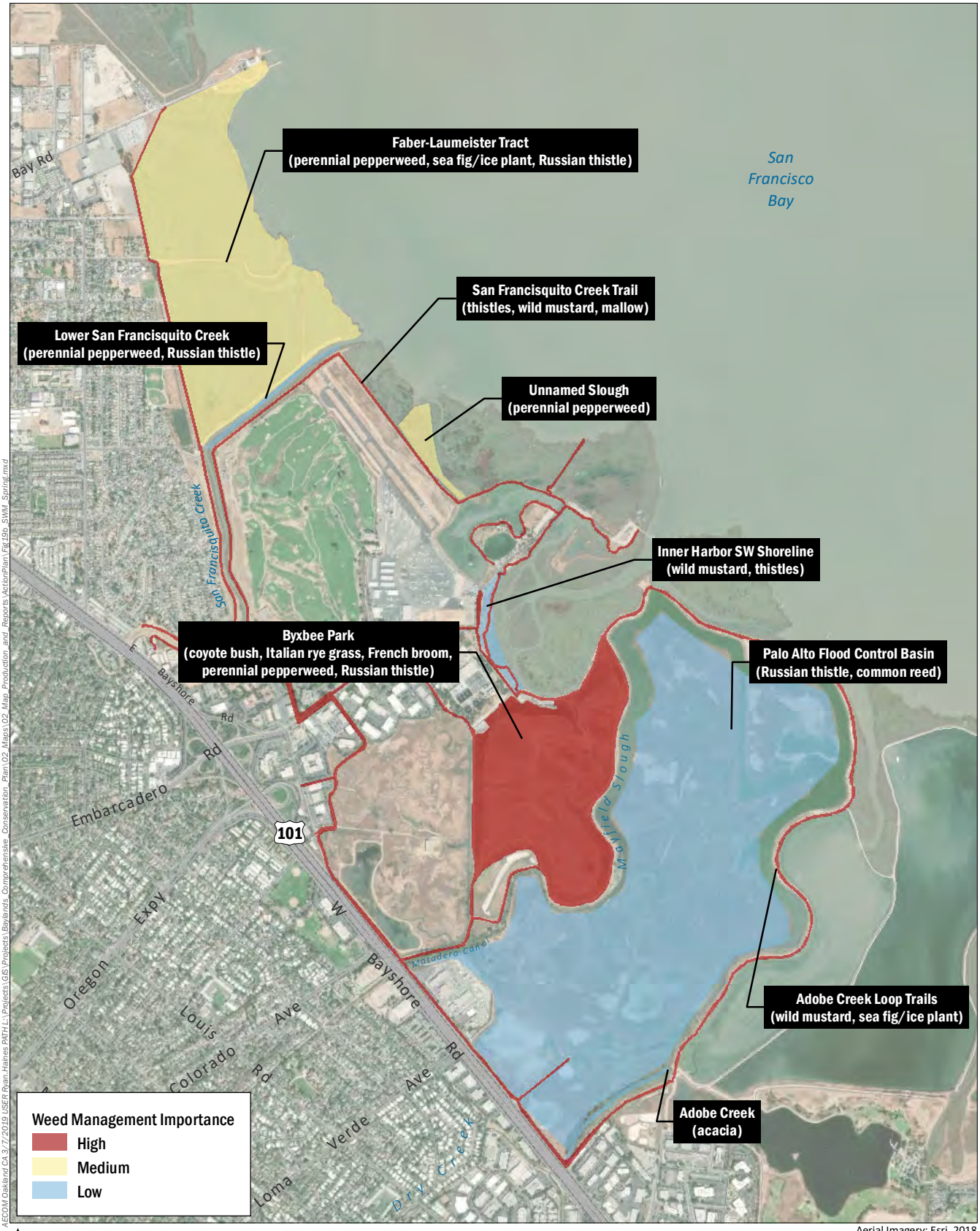
Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 19a

Seasonal Weed Management Map (Winter)



AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 19b

Seasonal Weed Management Map (Spring)

AECOM

Palo Alto Baylands Comprehensive Conservation Plan

FIGURE 19c

Seasonal Weed Management Map (Summer)

8.6.1.4 Management Recommendations

This section includes recommendations for weed management methods and BMPs. Recommendations include methods used to manage these species and the recommended timing of management actions.

8.6.1.4.1 Weed Management Best Management Practices

Weed management BMPs are established to reduce impacts on wildlife, reduce the unintentional spread of propagules and pathogens, and increase management effectiveness in the long term.

- Preconstruction surveying for nesting birds and sensitive species should be conducted before implementing weed management actions.
- Weeds should not be disturbed, pulled, dug up, or managed when they are fruiting or seeding.
- If management occurs when plants are flowering, fruiting, or seeding, the inflorescence should be cut off first and bagged before pulling up, digging up, weed-whacking, or mowing, to prevent seed dispersal.
- Weeds should be treated when they are close to maturity (just before flowering), which will be more efficient, in general.
- Local knowledge of weeds and habitat conditions should be used to maximize weed management efforts.
- Management of large trees should occur until an alternative native tree of equivalent ecological function is planted.
- Locations of removed weeds should be planted with native species, appropriate for the intended habitat type, that provide a similar ecological function, and are chosen by applying climate-smart restoration principles.
- Coordination with USFWS should occur for weed management in the Faber-Laumeister Tract.
- Populations of most plants will need more than one treatment in a season. Each managed population should be retreated to kill re-sprouts and new germinants.
- Perennials should be removed when the soil is wet.
- Equipment should be cleaned thoroughly and disinfected when moving from one area to another, to prevent the spread of weeds and soil pathogens.
- Multiyear plans should be developed for species that may require repeated management actions.

8.6.1.4.2 Methods

Nonchemical methods include mechanical and cultural methodologies. Chemicals/herbicides can be used to control any species if the City of Palo Alto approves their use and they are applied in accordance with application guidelines. In some cases, such as *Spartina alterniflora, Lepidium latifolia,* and *Phragmites australis*, chemical treatment is the only effective method, and thus chemical use should be considered for large populations of those species. Biological management methods are not discussed or presented as a recommendation. Table 13 details recommended timing for management actions and methods for each known weed species.

The cut-and-cover technique is recommended for woody species. The woody stem/trunk should be cut just above of the ground, and then the stump should be covered securely with black plastic, to block light and prevent the stump from sprouting. Solarization and tarping techniques are similar in theory and generally are used on herbaceous species. Clear plastic should be pinned to the ground over the weed, and the clear plastic will

trap the heat, creating temperatures that kill the plant and seeds in the soil. In some parts of the San Francisco Bay Area, temperatures and sunlight are not intense enough to raise temperatures to lethal levels, in which case black plastic should be used, to increase temperatures and block light.

Table 13. Weed Management Methods and Treatment Window

Scientific Name	Common Name	Life Form	Treatment Window	Pulling by Hand or with Hand Tools	Removal with Motorized Equipment	Flooding	Mowing	Tilling	Cut and Cover	Solarization or Black Plastic
Acacia spp.	acacia	perennial	spring						X	
Arundo donax	giant reed	perennial	winter	X	X					
Baccharis pilularis	coyote brush	perennial	spring						X	
Brassica spp.	wild mustard	–	spring	X						
Carpobrotus chilensis	sea fig; ice plant	perennial	spring	X	X					X
Centaurea solstitialis[1]	yellow starthistle	annual	summer	X				X		
Cirsium vulgare, Carduus pycnocephalus	thistles	biennial/ annual	spring	X			X			
Cortaderia sellanoa (or *C. jubata*)	pampas grass; jubata grass	perennial	winter							
Dittrichia graveolens	stinkwort	annual	summer	X			X			
Eucalyptus spp.	eucalyptus	perennial	summer		X				X	
Festuca perennis	Italian rye grass	annual	spring	X			X			
Foeniculum vulgare[2]	fennel	perennial	winter	X	X					
Genista monspessulana	French broom	perennial	spring	X						
Lepidium latifolium[3]	perennial pepperweed	perennial	winter/spring			X				
Malva spp.	mallow	–	spring	X						
Phragmites australis	common reed	perennial	winter/spring	X			X			X
Salsola tragus[1]	Russian thistle	annual	spring	X				X		
Spartina alterniflora[4]	smooth cordgrass	perennial	winter	X					X	

1. Repeat removal multiple times during one season. Leave no stem if pulling.
2. Hand chopping or slashing is more effective than pulling.
3. Mechanical methods should be coupled with chemical use to be effective; using alone may make the infestation worse by spreading root segments.
4. Hand pulling and cut and cover is effective only on small populations. Chemical treatment should be considered for large or satellite populations.

Sources: Consortium of California Herbaria 2016; Anderson, pers. comm., 2018; DiTomaso et al. 2013; data compiled by AECOM in 2018.

8.6.1.4.3 Monitoring Program

Existing habitats should be monitored to detect problems as they arise, and to evaluate habitat conditions and the effectiveness of weed management actions, including any unintended consequences resulting from disturbance from management actions. A repeatable monitoring methodology should be established to provide results that can be compared between years. Monitoring should occur annually and can be conducted by rangers or ranger-trained volunteers, or provided by technical partners such as Save the Bay, Grassroots Ecology, Environmental Volunteers, the Santa Clara Valley Audubon Society, CNPS, and academic institutions. A database of monitoring results should be maintained for use in determining the effectiveness of actions, and the locations and timing of management actions implemented each year. Weed monitoring recommendations include the following:

- Cal-IPC's weed list should be checked annually for revisions.
- Weed species should be mapped annually, documenting approximate population density or size for comparison between years.
- Nonweed species that establish in the areas where weeds were managed should be documented.
- Surveying should be done seasonally for new species establishment in the Baylands.
- The prioritization list should be revised by applying prioritization methodology regularly.

8.6.1.5 Implementing Parties

Volunteers

Ranger-led volunteer efforts can implement weed management actions, including pulling and digging up weeds and monitoring. Partner organizations that can provide volunteers include Save the Bay, Environmental Volunteers, the Lucy Evans Baylands Nature Interpretive Center, CNPS, and the Santa Clara Valley Audubon Society. Private volunteer groups may come from the Boy Scouts, companies, church groups, community service groups, or artists and artist-in-residence projects.

Rangers

Rangers can implement weed management actions, including pulling, digging up, and mowing weeds, and monitoring habitat. Rangers also should lead volunteers in these actions. Recordkeeping of weed management actions, habitat conditions, and monitoring data should be completed by rangers.

City of Palo Alto

The City of Palo Alto, particularly the Open Space, Parks & Golf Division, should lead planning, securing of funding, and feasibility/technical studies for management of *Spartina alterniflora* and *Phragmites australis*, which will require coordination with other City departments, including the RWQCP, and with agencies including SFCJPA and SCVWD. The City also should lead larger efforts, such as those to control *Arundo donax*, which may require the use of heavy equipment or vegetation management crews.

Partners

Technical expertise and leadership can be provided by partners such as Save the Bay, Grassroots Ecology, Environmental Volunteers, the Santa Clara Valley Audubon Society, CNPS, Point Blue, SFEI, and academic institutions. Volunteer efforts from these organizations should be leveraged to implement weed management and climate-smart native plantings.

8.6.1.6 Funding

Funding for weed management can come from multiple sources, including annual City maintenance budgets, the City's special projects budget, grants, and direct in-kind donations, or as part of larger enhancement or restoration projects. Direct in-kind donations from private organizations also can be leverage to achieve weed management goals.

8.6.2 Operations and Management Best Management Practices

BMPs are practices, guidelines, methods, or techniques that are effective and practical means of achieving goals and objectives. BMPs were developed for each Operations and Management planning goal listed below. The BMPs were developed from a range of sources: prior plans, stakeholder input, research, and review of BMPs applied by leaders in the field of integrated resource planning.

Management, Maintenance, and Staffing

OM Goal 1: Holistically manage the Baylands to strike the appropriate balance between recreation and natural resource protection, and ensure that existing and proposed activities are compatible with the ecological and physical constraints.

- **OM BMP 1.1.** Assess habitat compatibility for proposed plans and projects. Ensure that projects are sited in low-impact areas, and that the project design is sensitive to natural resources.
- **OM BMP 1.2.** Develop an operations and maintenance plan using sustainable maintenance practices, including inspection and monitoring logs. The plan should also address regular and emergency maintenance and associated budgets.
- **OM BMP 1.3.** Ensure that goals, standards, and design intent are understood by staff, volunteers, partners, and contractors/consultants.

Planning/Projects

OM Goal 2: Strategically phase projects within the Baylands to minimize disturbance to wildlife and visitor use.

- **BMP OM 2.1.** Ensure that plans and projects comply with all regulations and that environmental due diligence has been conducted before beginning a project. Obtain necessary permits and implement all permit conditions.
- **BMP OM 2.2.** Identify proposed projects and coordinate project schedules among project proponents.
- **BMP OM 2.3**. Identify opportunities to incorporate green stormwater infrastructure and low impact development principles in plans and projects.

9 Design Plan for Byxbee Park

9.1 Overview

The 137-acre former City landfill was closed, capped, dedicated as parkland, and opened to the public in phases as the landfill's refuse disposal capacity was reached. Final landfill closure and cap construction was completed and Byxbee Park opened to the public in 2015. This Byxbee Park Master Plan provides guidance for improving and managing habitat, and includes park improvements including habitat expansion, trails, benches, signage, and parking.

This master plan builds on the 2015 Byxbee Park Hills Interim Concepts, which were developed for the final closure of the landfill. This plan is intended to be used as a guide when finalizing park features and elements, including a final parking plan. This plan achieves key goal 1 of the BCCP: "Finalize the 2015 Interim Byxbee Park Master Plan, which includes guidance for the completion of interpretive signage, incorporates policies for appropriate management of wildlife and native habitats, contains plans for trail connections to the former ITT Property/Emily Renzel Wetlands, and completes plans for parking at Byxbee Park." Specifically, it plans for trail connections and loops, expanded habitats, and opportunities to include burrowing owl habitat. As part of the landfill closure, the City is required by law to monitor the landfill for potential hazards such as landfill gas, leachate, and settling.

Proposed elements of the master plan were developed from interviews with City staff and stakeholders, research, and site visits.

9.2 Site History

Byxbee Park is located on the site of a former landfill that operated from the 1930s until 2011, when operations ceased. The landfill closure and conversion to parkland began in 1990 and was conducted in four phases—Phases I, IIA, IIB, and IIC—starting from the northwest end of the park and proceeding southeast. Each phase was completed and made available for park use while construction continued in other unfinished segments, which were closed to the public. For 30 years, the City is mandated to monitor hazards associated with former landfills including refuse settlement and release of landfill gas and leachate, using a system of groundwater, leachate, and gas monitoring wells. Postclosure activities are regulated by state agencies including the California Department of Resources Recycling and Recovery (CalRecycle) and its local enforcement agency (Santa Clara

County), the Bay Area Air Quality Management District, and the San Francisco Bay Regional Water Quality Control Board.

The original plan for Byxbee Park was developed by Hargreaves and Associates in 1991, which envisioned a pastoral park after landfill closure (City of Palo Alto 2008). In 2015, the City adopted the Interim Byxbee Plan (City of Palo Alto 2015), which included guidance on habitat management, management of burrowing owl habitat, trails, benches, interpretive signage, and other park amenities. Some parts of the plan, including parking, were not finalized.

9.3 Existing Conditions

Byxbee Park is a hilly part of the Baylands near their outer border with San Francisco Bay. It is vegetated by annual grasslands, and includes many trails that connect the park to other parts of the Baylands, and to Shoreline Park in Mountain View. The park is typically used for walking, hiking, biking, wildlife viewing, and dog-walking.

Byxbee Park has several public art installations, and has been identified as a site for potential future public art (City of Palo Alto 2016a). Both interpretive and wayfinding signage is provided in the park. Benches are present throughout the park, at the tops of hills, and along perimeter trails. Vegetated islands were installed in Byxbee Park in 2016 and are irrigated from a 2,000-gallon water tank, using reclaimed water from the Palo Alto Wastewater Treatment Plant.

The main purpose of management and maintenance activities in Byxbee Park is to guard public safety, enhance recreational opportunities in the area, protect the landfill cap, and minimize impacts on air and water quality from potential landfill gas and leachate. Key management activities include importing soil and regrading areas of excessive settlement to avoid water ponding and seepage that could damage the clay cap. Imported soil is to be added to an approximately 10-acre area each year in portions of the park that have settled and need to be brought back to grade. Other maintenance activities include inspection of monitoring wells, sumps, and monitoring equipment, and upkeep of vegetation and recreational amenities. As a condition of the permits required for landfill closure, ground squirrel abatement is implemented in Byxbee Park to protect the clay cap layer that seals the buried refuse and contains the methane within the sealed area.

Because of the phased closure of the landfill, there are two soil profiles in Byxbee Park: a minimum 4-foot-thick layer of fine-grained soil in Phase IIC, and soils a minimum of 4 feet thick comprising a vegetative soil layer, a compacted clay layer, and a compacted soil foundation layer in Phases I, IIA, and IIB.

9.4 Byxbee Park Hills Interim Park Concepts Narrative

In 2015 the *Palo Alto Baylands Preserve, Byxbee Park Hills Interim Park Concepts Narrative* (City of Palo Alto 2015) was developed to guide management and improvement of park habitats, management of burrowing owls, and development of a trail system that would allow safe public access without affecting wildlife. This Interim Byxbee Plan was developed with measures intended to enable the closed landfill to meet all regulatory requirements. Many components of the plan were implemented and constructed, including vegetated islands, swales, benches, the compass rose, and pedestals for signage.

The *Palo Alto Baylands Preserve, Byxbee Park Hills Interim Park Concepts Narrative* includes a management plan for the western burrowing owl (City of Palo Alto 2015).

This plan identifies three areas that can be designed to enhance burrowing owl nesting habitat. The plan calls for nesting habitat that includes artificial burrows seeded with grasses. However, because this plan requires burrowing into the landfill cap, the City will only be able to construct these burrowing owl areas if it receives permission from all regulatory agencies, including CalRecycle. Such approval has not yet been forthcoming. The City will continue to seek permission from CalRecycle to construct the burrowing owl habitat areas.

9.5 Conceptual Plan Design Elements

The conceptual design for Byxbee Park incorporates feedback from park users, interviews with staff, multiple site tours, and a thorough review of existing conditions reports and previous designs for the park, and from a design charrette with the Stakeholder Advisory Group in December 2017. These planning sessions provided insight into the complexity of the site and the diversity of stakeholder ideas and perspectives. Input was incorporated into conceptual design that was provided to the City and stakeholders for additional review and feedback.

When developing the Byxbee Park conceptual plan, both City staff and stakeholders expressed the necessity for a balance between public use, ecological integrity, and efficient use of park staff time. The following specific objectives guided design decisions during the engagement process:

- Enhance ecological diversity of native habitat.
- Avoid impacts on existing ecological corridors and habitat.
- Improve circulation and wayfinding within the park.
- Limit concepts that increase park maintenance to alleviate unnecessary park staff maintenance tasks.
- Add necessary amenities to improve the park user experience.
- Increase the park's capacity by creating additional parking without affecting natural resources and valuable habitat in the park.
- Capitalize on design elements that have proven successful in the past.
- Incorporate lessons learned.

The conceptual plan (Figure 20) maintains the delicate balance between public access and the park's natural areas with trail loops, additional regular and backless benches, increased parking capacity, and additional interpretive and wayfinding signage. Streamlined irrigation measures and naturalistic management zones are proposed to reduce the number of maintenance tasks and ensure an ecosystem that will work in harmony with existing site conditions. Additionally, areas identified for burrowing owl nesting habitat were retained.

9.5.1 Loop Trails

Navigating the existing 150-acre park is generally a challenge for both returning visitors and newcomers because of the size of the area and the homogeneous nature of the existing vegetation. City staff and stakeholders asked that the number of trails be reduced. Many of the original park trails have been eliminated to simplify the landscape and reduce human impacts on ecological systems. The remaining trails are the minimum number needed for staff to reach key maintenance areas in the park.

Palo Alto Baylands Byxbee Park

Concept

Observation Decks

Pole Field

Mayfield Slough

Wind Wave

Chevron

Group Meeting Area

Byxbee Park Hills

Parking Lot

Hydrological Connection with the San Francisco Bay

Hydrological Connection with Matadero Creek

Embarcadero Rd.

Mayfield Slough Remnant

Regional Water Quality Control Plant

Enhanced Vegetative Cover for Ecological Corridor

Hydrological Connection with Renzel Wetlands

Emily Renzel Wetlands

0 150 300 FEET

SCALE: 1" = 150'

Legend:

- Management Zone - Coastal Prairie
- Management Zone - Tidal Marsh
- Management Zone - Coastal Scrub
- Management Zone - Trail buffer
- Vegetated Island & Expansion
- Potential Borrowing Owl Habitat
- Enhanced Vegetative Cover for Ecological Corridor
- Rock Swale
- Pole Field loop, .75mi
- Vista Loop, 1.5 mi
- Renzel Marsh Loop, 1.4 mi
- Remnant Slough Loop, 0.7 mi
- Existing Adobe Creek Trail
- Proposed & Existing Benches with View Direction
- Proposed Backless Benches
- Proposed & Existing Interpretative Sign
- Proposed & Existing Current Trail Marker
- Existing Drinking Fountain
- Existing Foraging Island
- Existing Bridge Bench Seating
- Existing Defibrillator
- Existing Bike Parking

The four proposed loop trails provide a hiking experience that highlights the various vistas, outdoor artwork, and native ecology. They connect to the larger Baylands Preserve and the Adobe Creek Trail. Additionally, the loop trails pass through high and low elevations of Byxbee Park, thus providing a tour of several distinct management zones for native plant communities, along with diverse views of the park and South Bay landscapes, both close up and far away.

9.5.1.1 Pole Field Loop

The Pole Field Loop Trail begins at the expanded main parking lot at Byxbee Park, making a ¾-mile loop at the northeast end of the park. Visitors gain approximately 40 feet in elevation while passing two of the park's original art installations, *Chevrons* and *Pole Field*. The Pole Field Loop passes through the Coastal Prairie and Trail Buffer management zones and connects to the Renzel Marsh Loop and the existing Adobe Creek Trail.

9.5.1.2 Renzel Marsh Loop

The Renzel Marsh Loop also begins at the Byxbee Park parking lot, where visitors can choose to head either east into the Byxbee Park hills or west toward the Emily Renzel Wetlands. The 1.4-mile loop traverses the park's highest and lowest elevations, providing views of both the Byxbee Park hills and the Emily Renzel Wetlands, and connects to all of the proposed loop trails. The Renzel Marsh Loop is located primarily within the proposed Coastal Scrub Management Zone, providing visitors with a unique view of this shrubby plant community that is now rare in the lowlands of the San Francisco Bay Area.

9.5.1.3 Vista Loop

The Vista Loop begins at the art installation *Windwave*, which offers a 360-degree view of the surrounding area including Mayfield Slough, the Flood Control Basin, and the Emily Renzel Wetlands. The 1.5-mile loop traverses the highest point of the park with minimal elevation change, and passes through all vegetation management zones. Directional signs along the trail direct visitors to the group meeting area, where they can gather and rest.

9.5.1.4 Remnant Slough Trail

The Remnant Slough Trail is the shortest loop, at 0.7 mile. It travels along the upland edge of the marsh, maintaining the same elevation throughout. In addition to providing views of the Remnant Slough Basin, this trail provides views of the Flood Control Basin, Matadero Creek, and Mayfield Slough.

9.5.2 Benches

The northeast end of Byxbee Park has several lookout areas where benches and observation decks provide opportunities for rest and reflection. In contrast, the newly completed area at the park's west end lacks observation points despite great views and places of respite along the trails. Eight additional benches are proposed in this area at points with exceptional vistas, with opportunities for wildlife viewing, to provide visitors with a convenient rest area after they complete a steep climb. One additional bench is proposed for the eastern edge of the park to capture views of the park's south end. Bench aesthetics should align with the naturalistic settings. In a number of cases, vegetated islands with berms are placed around benches to protect users against the wind.

Park benches are intentionally absent from areas that the stakeholders have identified as ecological corridors: the Renzel Marsh Loop between Byxbee Park and the former ITT Property/Emily Renzel Wetlands, and between Byxbee Park and the RWQCP. Stakeholders have expressed concern that placing benches in these areas would

promote prolonged human presence, thus potentially distressing wildlife that use these corridors.

The park staff has reported a buildup of guano on existing benches from birds perching on the backs of benches. To alleviate this issue, a small number of backless benches is proposed at various ridge locations to both prevent avian perching and allow for the 360-degree view.

9.5.3 Parking

Figure 21 depicts the proposed expanded parking plan for Byxbee Park. To accommodate current and future traffic needs at the park, the proposed concept expands the total parking area to 68 stalls: three Americans with Disabilities Act–accessible stalls (one of which is van parking), three motorcycle stalls, 10 compact vehicle stalls, one bus stall, and 54 standard stalls. Parking is divided into a large main lot and a smaller overflow lot. In the main parking area, circulation is a one-way loop that accommodates vehicle sizes up to a Type C school bus. The overflow parking lot provides parking spaces for compact and standard vehicles and motorcycles.

Bioretention areas in and adjacent to the parking area provide space for shade trees and vegetation to slow, capture, and filter stormwater runoff, and to reduce the potential for concentrated runoff flows during storms that could cause erosion and gullying. The gentle slope of the parking area allows water to sheet flow into these bioretention areas instead of directly into San Francisco Bay. The downstream edges of the paved parking areas are designed without curbs so that rainwater runoff can sheet flow into the bioretention areas along their entire length without concentrated flows.

9.5.4 Signage

Signs proposed in Byxbee Park consist of interpretive signage and trail markers. All panels, bases, and frames should follow National Park Service standards (NPS 2009).

9.5.4.1 Trail Markers

To enhance wayfinding at Byxbee Park, additional trail markers are proposed at five key locations in the park where multiple trails or paths converge. Each sign indicates the visitor's current location relative to paths, trail loops, and major nodes including the parking lot, the group meeting area, and the Emily Renzel Wetlands.

9.5.4.2 Interpretive Signage

Two new interpretive signs are proposed for Byxbee Park: one at the south end of the park nearest to the Tidal Marsh Management Zone, and the other at the park's highest point, at the border between the Coastal Prairie and Coastal Scrub management zones. Themes for these panels include the development of anthropogenic soil horizons, plant communities growing on them, and the wildlife dependent on the habitats created by the corresponding management zones. Information regarding current seasonal park management activities can also be posted at these locations, providing details about management activities necessary to establish and maintain these natural management zones, and suggestions on how visitors could contribute to their preservation and upkeep.

Palo Alto Baylands Byxbee Park
parking area

Concept

68 Parking stalls
51 standard, 2 standard ADA, 1 van access ADA,
10 compact, 3 motorcycle, 1 bus

Drought tolerant native tree

C Compact Parking

No parking/accessible parking sign

Existing utility pole

Two Way circulation with dead end drive aisle

One way circulation in main parking area

Wheel stop

Relocated pearson and dehlinger benches

Bioretention Areas

Pathway

Parking lot area where stormwater runoff is directed to bioretention and vegetated areas

9.5.4.3 Deferred Amenities

The design process focused heavily on feedback from stakeholders and the City. Because of a lack of consensus and/or feasibility, not every idea is included in the final conceptual plan. However, the unincorporated suggestions are included below so they can provide input for future discussions regarding the park. The City can either note lessons learned or can move forward with these ideas if constraints are eliminated.

Many visitors use Byxbee Park for exercise. Stakeholders expressed interest in expanding opportunities for exercise by adding a staircase to provide a challenging cardiovascular activity. However, several commenters expressed concern that if the staircase were installed, the ongoing and substantial landfill settling may damage it, thus rendering it an inaccessible liability. The park staff is currently determining whether there are areas of the park where future settling will be minimal.

A conceptual shade structure was proposed for the site. Staff members requested that the shade structure be located close to the parking area to provide accessibility and avoid affecting other areas of the park. Conceptual shade structures over benches were also proposed. However, a majority of stakeholders and staff members disapproved of shade structures, either because of general preference or out of concern about potential resting spots for predatory birds. Therefore, shade structures were not included in the plan.

There was a discussion about repurposing one or two of the most interesting antennae that are earmarked for removal from the former ITT Property/Emily Renzel Wetlands. A potential location for the structures was on the northwest hill where the four trails converge. However, this idea was rejected because of concern that the antennae could provide a perching opportunity for raptors in an area where burrowing owl habitat may be present. Repurposing the existing antennae poles as nesting sites on the former ITT Property/Emily Renzel Wetlands was also dismissed, for the same reason.

The current number of trails at Byxbee Park is the minimum needed to maintain the basic functions of the former landfill. However, stakeholders have requested fewer trails in the park to simplify circulation. The City and the Stakeholder Advisory Group discussed closing off two trails and marking them as “maintenance only.” However, they agreed that if the trails are present, they should be publicly accessible.

9.5.5 Vegetated Islands

9.5.5.1 Expansion

The vegetated islands, installed in 2016, are proposed for expansion and irrigation with recycled water that would come directly from a point of connection at the RWQCP. The proposed islands are strategically placed to provide wind protection, a reoccurring theme expressed by stakeholders and park users. Evergreen plant species that provide some height and consistent cover would be added to the proposed vegetated island palette. As the management zones become established, these vegetated islands would blend into the plant community and potentially act as a future seed source.

9.5.5.2 Irrigation

The vegetated islands are currently irrigated using water that is held in multiple water tanks within the park. The water tanks must be filled multiple times every month, which has proven

to substantially increase the workload of park maintenance staff. Recycled water from the adjacent RWQCP would be used to irrigate the expanded islands, allowing maintenance personnel to focus other important activities.

Currently, the recycled water main provides 90 pounds per square inch of pressure at the RWQCP's point of connection. At this pressure, irrigation water would be delivered at approximately 40–50 pounds per square inch at the top of the hills in Byxbee Park, which would be sufficient to operate most sprinklers and drip emitters in the park. Irrigation water would regain pressure where the irrigation lines run downhill.

During review of the RWQCP in the 2017 Annual Recycled Water Report (City of Palo Alto 2018), it was noted that the critical qualities of the recycled/reclaimed water for vegetation (total dissolved solids/salts, sodium adsorption ratio, boron and chloride content, and pH) are within acceptable limits; however, sodium levels are elevated. For this reason, plants selected for Byxbee Park management zones are typically adapted to salt spray and higher soil salinity. Toyon (*Heteromeles arbutifolia*), saltbush (*Atriplex lentiformis*), and Catalina cherry (*Q. durata*) are examples of salt tolerant species that can also provide wind protection. Deeper soils are typically preferred by taller vegetation. Without deep soil, the root system cannot sufficiently stabilize larger plants. At Byxbee Park, taller vegetation is limited to the Coastal Scrub Management Zone because of the deep soils in that area. Additionally, larger plants cannot be planted in areas with a shallowly covered clay cap, because their roots could penetrate through the cap into the landfill.

9.5.6 Management of Vegetation and Wildlife Habitats

9.5.6.1 Burrowing Owl Habitat

No park amenities are proposed for the three areas identified in the Byxbee Park Hills Interim Park Concepts for potential enhancement of burrowing owl nesting habitat, to ensure that these proposed habitat areas are considered in any future proposed design elements to the park.

9.5.6.2 Soils

Before becoming a landfill, the footprint of what is now called Byxbee Park was primarily a low-lying floodplain. Today, Byxbee Park is a highly engineered landscape with biotic conditions that are influenced by anthropogenic design. Despite the underlying complexity, attributes such as the soil, local morphology, aspect, and slope can create conditions that mimic ecological communities and provide a solid base for a regenerating ecological system.

According to the *Final Closure and Postclosure Maintenance Plan* (City of Palo Alto 2013), the phased closure of the landfill created two very different soil profiles, each resulting from the closure cover system used. Phases I, IIA, and IIB have the minimum prescriptive standard cover required. This cover consists of a 1-foot-thick vegetative soil cover atop a 1-foot-thick compacted clay layer with a 2-foot-thick compacted soil foundation layer. Because of shortages of reliable and cost-effective regional borrow sources for clay, the Phase IIC design, which addressed the most recent and last area to be capped in Byxbee Park, uses an evapotranspirative soil cover consisting of a minimum 4-foot-thick layer of fine-grained soil.

The Coastal Prairie community has a similar soil profile to that of the closure cover system used in Phases I, IIA, and IIB of the Byxbee Park landfill. The Coastal Prairie has typically shallow soils with a hard clay layer or bedrock underneath. This is similar to the 1-foot-thick soil cover layer installed over the compacted clay cap of the closure cover system used in that area. If these areas are irrigated, they will rely on recycled water, which is high in sodium. The soils of the Coastal Prairie are typically also high in sodium. The characteristic plants of this plant community can similarly thrive in this saline environment.

Phase IIC has an entirely different soil type and profile and therefore can support a different plant community. The deep, fine-grained, and fairly uniform soil layer of the evapotranspirative cover allows for the preservation of water. The Coastal Scrub community is typically composed of drought tolerant native shrubs that thrive in the mild climate of the San Francisco Bay Area. Unlike the species of the Coastal Prairie, plants in this community typically have deeper rooting systems; however, in fine soils because of lack of aeration, the roots do not penetrate much beyond 2 feet into the soil (Harrison et al. 1971; Bakker 1972). This can be a safeguard against any harm to the closure cover system in this area.

9.5.6.3 Management Zones

Coastal scrub, coastal terrace prairie/coastal foothill grasslands, and tidal marsh are the best herbaceous native plant analogue communities for Byxbee Park's topography, hydrology, and climate. The trail buffer habitat is a mixture of the coastal grassland and scrub habitats. These salt-adapted plant communities provide an excellent blueprint for a successful native landscape that will provide high-quality native habitat for a diversity of wildlife such as burrowing owl, resident and migratory songbirds, raptors, and sensitive species including the endangered salt marsh harvest mouse. Table 14 summarizes typical restoration and management activities required to establish these zones and keep them in a healthy condition. Additional site-specific input regarding soil texture, nutrient availability, compaction, irrigation availability, and other data will be needed to develop a set of detailed landscape construction plans and specifications for each proposed zone.

Table 14. Restoration and Management Activities by Management Zone

Activity	Tidal Marsh	Trail Buffer	Coastal Prairie	Coastal Scrub
Design	-Begin at least 2 years before implementation. -Incorporate native nitrogen fixers in the plant palette, such as Spanish clover and tule pea. -Rely primarily on plugs and diverse seed; minimize use of container plants more than 1 gallon.	-Begin 1–2 years before implementation. -Analyze soils for texture and nutrients. -Incorporate native nitrogen fixers in the plant palette. -Rely primarily on irrigated container plants for quick effect.	-Begin 1–2 years before implementation. -Analyze soils for texture and nutrients. -Incorporate native nitrogen fixers in the plant palette. -Rely primarily on diverse seed; no container plants necessary.	-Begin 1–2 years before implementation. -Analyze soils for texture and nutrients. -Incorporate native nitrogen fixers in the plant palette. -Rely primarily on diverse seed; minimize use of container plants.

Activity	Tidal Marsh	Trail Buffer	Coastal Prairie	Coastal Scrub
Plant Material Procurement	-Contract for plant materials more than 1 growing season ahead. -Collect seed from existing native areas and/or use pest-free, disease-free, and weed-free, deep container plants sourced from the San Francisco Bay Area.	-Contract for plant materials more than 1 growing season ahead. -Collect seed from existing native areas and/or use pest-free, disease-free, and weed-free, deep container plants sourced from the San Francisco Bay Area.	-Contract for plant materials more than 1 growing season ahead. -Collect seed from existing native areas and/or use pest-free, disease-free, and weed-free, deep container plants sourced from the San Francisco Bay Area.	-Contract for plant materials more than 1 growing season ahead. -Collect seed from existing native areas and/or use pest-free, disease-free, and weed-free, deep container plants sourced from the San Francisco Bay Area.
Protection of Existing Native Vegetation	-Identify and avoid areas dominated by natives.	-Identify and avoid areas dominated by natives.	-Identify and avoid areas dominated by natives (if any).	-Identify and avoid areas with native shrubs; avoid ripping/tilling within 5 feet of shrubs or the tree canopy.
Weed Removal	-Limited along vegetated edges.	-Extensive in proposed planting area, by pre-germ/till and/or solarization; weed manually in native-dominated areas.	-Extensive in entire planted area, by pre-germ/till and/or solarization.	-Extensive in entire planted area, by pre-germ/till and/or solarization; manual weeding around natives.
Irrigation Installation	None.	-Extend existing irrigation system, if feasible given existing piping diameter/ controller.	-Irrigate only if summer dormancy is not desirable. -Select dominant grasses accordingly.	-Irrigate temporarily to greatly benefit the establishment of vegetation.
Soil Preparation	-Preserve or restore dendritic channels; grade with close attention to vertical datum.	-Decompact by 6-inch-deep tilling only in areas with more than 80% relative compaction.	-Decompact by 6-inch-deep tilling only in areas with more than 80% relative compaction. -Consider soil imprinting for flat and gently sloping areas.	-Decompact by 12–18 inches in areas with more than 80% relative compaction. -Consider soil imprinting for flat and gently sloping areas.
Amendment of Soil	None.	-Amend soil with slow-release fertilizers only if strongly recommended by soil testing laboratory for "native vegetation"; otherwise avoid. -Use soil mycorrhizal inoculants.	-Amend soil with slow-release fertilizers only if strongly recommended by soil testing laboratory for "native vegetation"; otherwise avoid. -Use soil mycorrhizal inoculants.	-Amend soil with slow-release fertilizers only if strongly recommended by soil testing laboratory for "native vegetation"; otherwise avoid. -Use soil mycorrhizal inoculants.
Seeding	-Disperse with bellygrinders or hydroseeder and prevent loss caused by tidal action using erosion fabric.	-Disperse with bellygrinders or hydroseeder.	-Disperse with bellygrinders or hydroseeder. -Plant 25–100 pure live seeds per square foot with a smaller proportion of large seeded competitive grasses.	-Disperse with bellygrinders or hydroseeder. -After grass establishment, place shrub seeds in a shallow depression created during imprinting.

Activity	Tidal Marsh	Trail Buffer	Coastal Prairie	Coastal Scrub
Planting	-Install plugs through biodegradable erosion fabric.	-Install container plants in areas where a quick effect is desired.	None.	-Install container shrubs and small trees to create a local microclimate/ habitat.
Mulching	None.	-Place 4-inch-deep mulch around shrubs and herbaceous perennials.	None.	-Place 4- to 6-inch-deep mulch around shrubs and small trees. -Place small amounts of soil and litter from undisturbed native areas around roots where mycorrhizae are absent.
Establishment of Irrigation	None.	-Drip irrigate.	-Overhead irrigate daily for 30 days after seeding, then reduce based on evapotranspiration (Et_0) and vegetation type.	-Temporarily overhead irrigate the first year or two to establish grasses, then drip irrigate shrubs.
Establishment Weeding	-Remove invasive exotics as soon as they are recognized. -Prevent weeds from shading native vegetation. -Do not wait for flower or seed.	-Remove invasive exotics as soon as they are recognized. -Prevent weeds from shading native vegetation. -Do not wait for flower or seed.	-Remove invasive exotics as soon as they are recognized. -Prevent weeds from shading native vegetation. -Do not wait for flower or seed. -Mow early and high (late March) to control invasive annual grasses.	-Remove invasive exotics as soon as they are recognized. -Prevent weeds from shading native vegetation. -Do not wait for flower or seed.
Long-Term Maintenance	-Pay primary attention to removal of invasive exotic vegetation and revegetation of areas with poor establishment.	-Remove invasive exotic vegetation, trim dead plant parts, replenish mulch, inspect the irrigation system, and test soil salinity if recycled water is in use.	-Remove invasive exotic vegetation, mow grass depending on species and desired look, maintain the irrigation system, and test soil salinity if recycled water is in use.	-Remove invasive exotic vegetation, mow grass depending on species and desired look, and apply water sufficient to wet the soil profile to a depth below the rooting zone, wetting to progressively greater depths at extending intervals.
Typical Plant Species	-Salt grass, alkali heath, pickleweed, cordgrass, saltbush, and gumplant.	-Species are relative to ecological community surrounding trail.	-California oatgrass, red fescue, seashore bentgrass, tufted hairgrass, California meadow sedge, blue-eyed grass, gumplant, suncups, phacelia, yarrow, pacific aster, bee plant, soap plant.	-Coyote brush, California yerba santa, California sagebrush, black sage, yellow bush lupine, blue-eyed grass, Douglas iris.

Tidal Marsh

Tidal marsh is a wetland community of the diurnally flooded zone between the land and the sea. Tidal marshes are highly dynamic, productive ecosystems that experience many overlapping cycles, including diurnal and semi-diurnal tides, large temperature fluctuations, spring neap tides, seasonal vegetation growth and decay, and runoff from upland areas. Tidal marshes provide habitat for numerous wildlife species, including special-status species such as the salt marsh harvest mouse and Ridgway's rail. Vegetation growing in this zone is fully adapted to saline and anoxic soil conditions, resulting in a very restrictive growing environment and low plant species diversity.

Coastal Prairie

California coastal prairie is a mesic coastal grassland, a mosaic of cool-season, native perennial grasses mixed with a rich assemblage of native perennial wildflowers. Coastal prairie in California supports the highest plant diversity of any grassland in the U.S. It is an appropriate community for the shallow soil areas of the eastern part of Byxbee Park. The coastal foothill grassland plant community intergrades with the coastal terrace prairie throughout central coastal California and is also a cool-season grassland adapted to California's Mediterranean climate. This plant community is more suitable for sloped areas with deeper soils because of improved drainage. At Byxbee Park, this is an area where the shallow soil-covered clay cap transitions into the deep soil cap.

Coastal Scrub

Coastal scrub is typically found near the ocean along Northern California's coastline with the San Francisco Bay as the transition from the northern coastal scrub to the southern sage coastal scrub. This is an assemblage of low-growing, drought and salt tolerant, often aromatic shrubs with a perennial herb/subshrub understory, adapted to the Mediterranean climate of California's coastal lowlands. It is a rich plant community fitting for the conditions at Byxbee Park.

10 Concepts for the Former ITT Property/ Emily Renzel Wetlands

10.1 Overview

The 36.5-acre former ITT Property in the Emily Renzel Wetlands was acquired by the City in 2016 and was dedicated as parkland. Four potential use scenarios were developed for this key area of the BCCP. A preferred concept was developed from a list of common objectives and key design elements, based on interviews with staff and stakeholders, research, and site visits.

Elements of the preferred concept include hydrologic connection, restoration of salt marsh habitat, trails, furnishings, and annual maintenance cost. The objective of the design concepts is to integrate the former ITT Property with the Emily Renzel Wetlands and the rest of the Baylands. This concept seeks to achieve key goal 2 of the BCCP: "Restore, protect, and enhance wetlands, uplands, and hydrologic connectivity to the site; develop a plan for the potentially historic building at the former ITT Property." Specifically, it develops plans for restoring hydrologic connectivity and wetlands and for using the buildings on the former ITT Property.

The concept developed for the BCCP complies with the policies of the Baylands Master Plan (City of Palo Alto 2008) such as maintaining both freshwater and salt marshes that have been created, and removing the antenna field and replacing it with marshland.

10.2 Setting

10.2.1 Site History

An antenna field was originally part of a 200-acre marshland area that was purchased and built into a radio telegraph transmitting station to serve as the hub of Pacific Coast ship-to-shore communications. The 200 acres were bought by ITT in 1930 and were recognized as an integral part of the Baylands rehabilitation plan in the 1970s. The City purchased 154 acres in 1977 and dedicated the property as parkland in 1982, excluding the 36.5-acre easement that remained in use by ITT (City of Palo Alto 2016b).

Two buildings, an access road, and antennae are present on the former ITT Property. The *Palo Alto Baylands Master Plan* (City of Palo Alto 2008) recommends removing the antenna field and replacing it with marshland, with the goal of unifying the property

with the rest of the Baylands.

10.2.1.1 Ecological Significance

The area surrounding the former ITT Property is partially restored, muted salt marsh. In 1992, the City constructed and began operating the Emily Renzel Wetlands, a 15-acre freshwater pond and 12-acre restored salt marsh. The Emily Renzel Wetlands currently has muted salt marsh habitat that is hydrologically connected to the inner harbor through pipes, and its freshwater pond is fed by tertiary treated wastewater from the RWQCP. Treated effluent flows through the pond to the marsh outlet, where the flow is discharged into Matadero Creek. Matadero Creek flows to the Flood Control Basin, which is connected hydrologically to south San Francisco Bay. Salt water flows through the marsh and is discharged into Matadero Creek.

10.2.1.2 Historical Significance

In July 2018, an AECOM architectural historian completed a historic survey update, a reevaluation of the property's historical significance, and an assessment of its historic integrity (AECOM 2018). Key findings from the reevaluation state that the former Federal Telegraph Company Marsh Station property (2601 East Bayshore Road) is significant under National Register of Historic Places/California Register of Historical Resources (NRHP/CRHR) criteria A/1, B/2, and C/3, but that it does not retain sufficient historic integrity of design, setting, materials, workmanship, feeling, or association, and the property no longer physically conveys its historic significance. Therefore, the station property is recommended to not be eligible for listing in the NRHP/CRHR. The City's Planning and Community Environment Department and Historic Resources Board may have differing views regarding the historic significance of the station property.

10.3 Potential Future Uses

10.3.1 Development of Design Concept Scenarios

Four design concept scenarios were developed for the potential future uses of the former ITT Property. The concept scenarios were developed from a list of common objectives and key design elements, which were based on interviews with staff and stakeholders, research, and site visits. The key objective of the design concepts was to integrate the former ITT Property with the Emily Renzel Wetlands and the rest of the Baylands. The design concept scenarios were circulated to City staff members, the project's Web site, the Parks and Recreation Commission, and the Stakeholder Advisory Group for review and feedback. The four design concept scenarios remain on file with the City.

All four design concept scenarios for the former ITT Property emphasized the site's historical and ecological significance; however, the essential elements of the scenarios varied, as did the methods used to achieve balance between the site's historical and ecological elements. . Each concept scenario used a different theme to depict a spectrum of ideas and preferences expressed by City staff and stakeholders. For instance, every concept scenario prioritized salt marsh restoration; however, the restoration areas and levels of public site access varied. Similarly, the freshwater pond footprint was presented with options to remain the same or to expand.

Design options for the Radio Station building ranged from repurposing the building into a museum to removing the building and preserving its memory with an interpretive sign at the site. The design concept scenarios that would retain the Radio Station building presented public-access options with and without vehicular access, and with potential pedestrian access to the Radio Station building, or with pedestrian trail continuing through the center of

the site and connecting to Byxbee Park.

Three of the four concept scenarios included a continuous pedestrian trail around the periphery of the site, connecting it to Byxbee Park. Public access to the freshwater pond and its maintenance varied by option. Based on stakeholders' and City staff members' overwhelming preference, and to protect sensitive habitats and wildlife, the concept scenarios excluded dogs from trails in the center of the site, but not from the peripheral trail. The number and placement of site amenities, including overlooks and gathering areas with interpretive signage, also varied by option.

At the time the four design concept scenarios were presented, the Stakeholder Advisory Group had chosen two antennae to potentially remain on-site. The concept scenarios presented options to either retain the two antennae or remove all antennae.

During review of the concept scenarios, the most debated key elements were expanding the footprint of the freshwater pond into the salt marsh, removing or enhancing the Marsh Station building, retaining and placing antennae, and adding trails in the site's center that would have the potential to affect existing habitats and wildlife.

10.3.2 Preferred Concept

A preferred concept was developed based on feedback and input from City staff members, the Stakeholder Advisory Group, and the Parks and Recreation Commission. Elements of the preferred concept are shown in Figure 22 and described below.

10.3.2.1 Hydrologic Connection

Most of the Emily Renzel Wetlands will be enhanced by improved tidal flows. Some parts of the wetlands will be restored as tidal wetlands become established in the locations of existing uplands, such as the site of the Radio Station building. This process would involve decompacting soil in previously developed or otherwise affected areas, such as the site of the Radio Station building, parking area, and access road footprint; removing invasive weeds; excavating the dendritic channels of the historic tidal marsh; and restoring functional hydrologic connections between San Francisco Bay and the marsh. During any earthwork on-site, sensitive areas such as wetlands should be delineated with fencing to restrict access, and impacts should be avoided to the maximum extent feasible. Figure 22 shows key locations for these hydrologic connections. Locations for proposed hydrologic connections include:

- an enhanced tidal flow through the current pipe connection between San Francisco Bay (from a point just north of Embarcadero Road) and the northwest corner of the Emily Renzel Wetlands;
- a connection to the Mayfield Slough remnant, with discharge to Matadero Creek; and
- through a south side levee, providing a direct connection to Matadero Creek.

Further hydrologic modeling and evaluations are needed to determine feasibility, understand potential ecological impacts, determine the feasibility of daylighting piped areas, and understand how projected sea level rise would affect the restored hydrology.

10.3.2.2 Access and Trails

Visitor circulation, amenities, and interpretive signage have been placed carefully on the periphery of the site, to minimize potential impacts on sensitive habitats and wildlife. The proposed ITT Trail, to be accessed from East Bayshore Road, would be in the same

footprint as the access road to the former ITT Property, extending approximately 750 feet and ending at a seating area that would overlook the restored tidal marsh. An interpretive panel at this location would describe the technological achievements made at the Marsh Station.

The freshwater pond and Marsh Trail would be accessed via the freshwater pond maintenance road. Visitors would have a unique vantage point, with the freshwater pond on one side and the tidal marsh on the other. An interpretive panel in this area would describe the engineered freshwater wetland system and the tidal marsh ecosystem. At the south end of the trail, a proposed small bridge would connect the trail to an existing parking area and the Adobe Creek Trail. Dogs and horses would be prohibited from entering the marsh, with signage placed at both ends of the freshwater pond and Marsh Trail.

The proposed North Trail would connect the existing Renzel Trail to Byxbee Park, providing continuous access to the northern end of the site. Impacts on the existing wetlands would be minimized by adding a small retaining wall or earthen berm that would slightly raise the ground in the upland portion of the trail, which would minimize impacts on the marsh. A small segment of the trail might be constructed as a boardwalk as a last resort, should encroachment into the wetlands or on neighboring properties be unavoidable. Directional, informational, and interpretive signage would be placed at the junctions of the proposed and existing trails. The overlook on the western end of the North Trail would provide a vantage point for the entire Emily Renzel Wetlands, and interpretive signage at this location would focus on wetland ecology and restoration.

10.3.2.3 Buildings and Antennae

Based on input from stakeholders and the Parks and Recreation Commission and on recommendations from the historic resources evaluation, the preferred concept would involve removing all buildings, including the Radio Station building and antennae, and restoring the tidal marsh in place. It should be noted that the City's Planning and Community Environment Department and Historic Resources Board may have alternative use concepts for the Radio Station buildings and antennae.

10.3.3 Cost

A cost narrative and estimate have been prepared for the preferred concept, with options for low, medium, and high costs for project amenities, design elements, and activities. This cost narrative includes site furnishings, annual maintenance costs, salt marsh restoration, and accompanying restoration of tidal hydrology connections and other items. Appendix C includes a detailed cost narrative.

Palo Alto Baylands
Renzel Wetlands & former ITT Area

CITY OF PALO ALTO

Prereffed Concept

Legend:

- Proposed north trail/ retain. wall
- Proposed pedestrian trail on existing maintenance road
- Proposed ITT trail on existing maintenance road
- Existing multi-use trail
- Baylands boundary
- Freshwater pond and marsh (current footprint)
- Potential restoration areas
- Restored hydrology areas
- Existing primary and secondary dendritic channels
- Proposed primary and secondary dendritic channels
- ITT building, road and fence removed - area is regraded and restored to tidal marsh
- Hydrological connection
- All antennae removed
- Interpretive sign, existing and proposed
- Overlook and gathering area, existing and proposed
- Proposed Mutt Mitt station
- Proposed bench
- Proposed informational sign
- Proposed directional sign
- Proposed 'dogs prohibited' sign
- Proposed recycling/trash can
- Proposed culvert
- Proposed bridge from levee trail to freshwater pond and marsh trail

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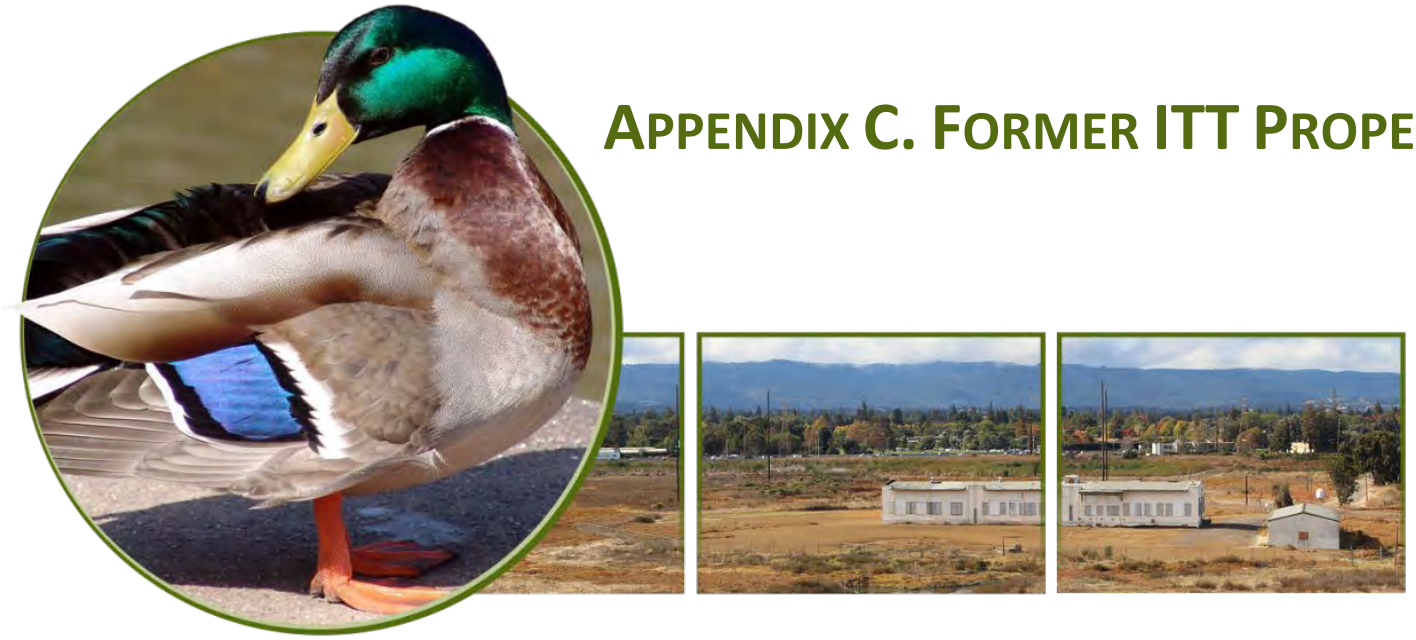
Appendix A. Public and Stakeholder Input Summary

APPENDIX B. ART OVERLAY



APPENDIX C. FORMER ITT PROPERTY