TENNESSEE HOLLOW WATERSHED PROJECT
GLOSSARY OF POSSIBLE HABITAT TYPES

The following describes habitat types that may be expanded or created as part of the Tennessee Hollow Watershed Project, as referenced in the November 20, 2002 public scoping workshop. Information on the plant and wildlife communities associated with each habitat is provided, as well as a description of where you can find these habitats at the Presidio. A list of the sources used and/or referenced below is provided at the end of the document**.**

Introduction

Presidio habitats provide a refuge within the highly developed San Francisco peninsula for a variety of plants and animals, including 13 plant species which are afforded special recognition or protection. The Presidio is also a link of vital importance for resident and migratory birds in a severely threatened but poorly understood portion of the Pacific Flyway (one of the main routes for migratory birds).

Where animal species are found depends on the amount and distribution of food, shelter, and water in relation to the mobility of the animal. For many animals, "edges" between different habitat areas are active places. For example, a red-shouldered hawk may rely on an area bordering a forest and a grassland so that it can use trees for shelter and observation, and can find food (such as gophers) in the grassland.

The amount of surface water available is also an important component of the inter-relationship among various habitat types. The more surface water that an area has, the more wildlife species diversity and abundance can be supported. Within the Presidio, habitats that have large blocks of multistoried (of varied heights) vegetation and an herbaceous (not woody) or shrub understory together with nearby water have the highest diversity and abundance of wildlife.

Riparian Forest (also known as Riparian Woodland)

Riparian habitats border the edges of rivers and streams and are considered to be among the most valuable wildlife habitats due to the microhabitats that are created by the layering of trees, shrubs and herbaceous and aquatic vegetation. This environment promotes very high wildlife species diversity. (Goals Project 1999) Of all the riparian habitats in the Bay Area, riparian forests are considered the most complex and support the greatest number of plant and animal species. Riparian forests also enhance the functions of adjacent habitats, and are considered most valuable when occurring in an unbroken corridor throughout the length of the watershed (Goals Project 1999).

In the Presidio, riparian forest and scrub vegetation is represented by three native plant communities: *Central Coast Live Oak Riparian Forest (Oak Riparian Woodland), Central Coast Arroyo Willow Riparian Forest (Willow Riparian Woodland), and Central Coast Riparian Scrub (Riparian Scrub*). A description of each of these habitats is listed below.

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Willow Riparian Woodland often occurs in dense stands of arroyo willow trees and develops in the wettest zones of perennial (i.e., year-round) and intermittent creeks. Willow riparian forest occurs along the central reach of Lobos Creek and the northern margin of Mountain Lake, and in a few scattered locations along the El Polin Spring/Tennessee Hollow drainage. Willow riparian woodland is relatively uncommon at the Presidio and in San Francisco. Plant species found within this community would include blue elderberry, red elderberry, creek dogwood, California wax myrtle, and potentially red alder. The dense, multistoried vegetation together with water provides essential habitat for species such as flycatchers, vireos, warblers, grosbeaks and sparrows. (Jones and Stokes 1997.)

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Riparian Scrub is found along the edges of lakes and streams with sandy soils. It is characterized by large native shrubs adapted to high moisture levels and frequent flooding including California blackberry and small trees such as willows. Riparian scrub occurs in association with willow riparian woodland habitat at Mountain Lake and in a small section of the eastern tributary of the Tennessee Hollow corridor near Morton Street Field. An isolated stand of riparian scrub occurs east of Battery Caulfield Road, north of the Public Health Service Hospital. Common riparian scrub species include California wax myrtle, coyote brush, and arroyo willow. Riparian Scrub offers similar wildlife habitat to the other scrubs. However, certain species may be restricted by the more dense foliage or may benefit from the greater availability of water.

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Oak Riparian Woodland is a hardwood forest dominated by coast live oak trees. It occurs between moist, willow-dominated areas and drier upland shrublands. The oak riparian woodland adjacent to Lobos Creek in the southwest corner of the Presidio is the last stand associated with a riparian area within the northern San Francisco Peninsula. An oak riparian woodland in the Tennessee Hollow corridor could also support a mixed woodland that includes coast live oak, California bay, holly-leafed cherry, and California buckeye. This woodland would vary from the one currently present at Lobos Creek because of differences in the soil of these two locations. The forest floor could support a diversity of plant species including ferns, iris, flowering currant, toyon, and coffeeberry. Coast live oak receives heavy use by migratory and nesting birds. These native trees attract a host of insects that, in turn, attract insect-eating birds. Species such as solitary vireos, Hutton's vireos, black-throated gray warblers, lazuli buntings, Rufus-sided towhees, California towhees, and chipping sparrows are often associated with live oaks at the Presidio. (Jones & Stokes 1997)

Freshwater Wetland Habitats

The Presidio also supports a diversity of **wetland habitats**, many of which are found within the Tennessee Hollow Watershed. When water is present in these areas, diverse wildlife use it as a source of drinking water. Aquatic insect larvae are often found in freshwater areas and, when they have become adults, can attract bats that feed on them.

Coastal Freshwater Marsh (*Freshwater Marsh*) is dominated by emergent wetland plants such as tules or bulrushes, rushes, and sedges. It occurs in areas with perennial (i.e., year-round) inundation or soil saturation in the roots. Much of the freshwater marsh vegetation growing along the edges of Mountain Lake represents freshwater marsh habitat. Similar to wet meadows (see below), this plant community supports a wide diversity of plants, insects, and animals. The existing freshwater marsh habitats and the habitat in the El Polin Spring area currently support some of the most abundant and diverse bird populations at the Presidio. Enhancement of freshwater marsh habitat as part of the Tennessee Hollow project could perhaps support the highest diversity of birds and insects of any other restored habitat.

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A **W*et Meadow*** is different from a freshwater wetland in the depth and duration of inundation. It can be defined as an area adjacent to a perennial or a seasonal creek where the ground water is close to the surface and the soil is seasonally saturated. Although this type of habitat is not officially classified as a vegetation community, it is a habitat type that is referred to in local floras. Wet meadows support specific plant species and are extremely diverse. Locally, species may include cow clover, buttercups, Pacific reed grass, rushes, carexes, horse tails, cinquefoils, and species of grasses that are adapted to moist environments. Small scattered fragments of wet meadow habitat can be found on the Presidio, including one just above El Polin Spring.

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Freshwater Seeps are composed of vegetation similar to that of freshwater marsh. Freshwater seeps occur at sites with seasonal or perennial soil saturation resulting from groundwater seepage. On the Presidio, small seeps and springs occur in both serpentine and dune soils along the western coastal bluffs, the west Crissy bluffs, the area north of the Public Health Service Hospital tennis courts, and within all three tributaries feeding the Tennessee Hollow Watershed. Although they are not large in size, these small wetlands provide a rich source of species diversity (Vasey 1996), and include many species found in wet meadows, as well as larger shrubs such as wax myrtle, willows, and twinberry.

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Serpentine Seeps occur at sites underlain with serpentine soil where seasonal or perennial soil saturation results from groundwater seepage. Serpentine (a soil derived from serpentinite rock) contains low levels of nutrients, such as nitrogen, that are essential to plant growth, and high levels of minerals such as nickel that are toxic to most plants. Dominant plant species include rushes and sedges.

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Upland Habitat

Upland habitat is located at higher elevations directly above the riparian vegetation communities and in some cases directly above wetland habitats. In the Presidio these vegetation communities consist of grasslands, scrub and woodlands. The following are descriptions of specific upland vegetation communities that either exist in the Tennessee Hollow Watershed or that could be restored.

Coastal Scrub community is dominated by California blackberry, coyote bush, golden yarrow, toyon, and arroyo willow. It is found on gentler slopes and in inland areas. The largest patches of coastal scrub at the Presidio today are found on the west side of Lincoln Boulevard between Battery Crosby and Fort Point and on the north-facing slopes below Battery East Road. Scrub habitats (both Coastal and Dune) are valuable for wildlife species such as Anna's and Allen's hummingbirds, western fence lizard, California slender salamanders, alligator lizards, western kingbird, Bewick's wren, warblers and towhees. They also house some of the Presidio's locally rare wildlife such as California Quail and Nuttall's White-crowned sparrow.

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***Central Dune Scrub* (*Dune Scrub*) -** The largest remaining patches of dune scrub occur on the bluffs below Lincoln Boulevard south of Battery Crosby, between Lincoln Boulevard and Washington Boulevard, on the restored Lobos Creek Dunes north of Lobos Creek, and on sites east of the Public Health Service Hospital's north parking lot. Dune scrub occurs on the sand terrace slopes above Baker Beach and extends up sandy inland dunes east toward and beyond Mountain Lake. This inland sand dune community of shrubs and annual and perennial wildflowers is characterized by densely packed shrubs interspersed with scattered grassy openings. It is dominated by mock heather, lizard tail, bush monkey flower, coyote brush, bush lupine, Chamisso's lupine, poison oak, California coffeeberry, and California blackberry. Several of these species are still found today in the dune habitat north of the Julius Kahn tennis courts.

Serpentine Scrub occurs on outcrops (where the rock juts out of the soil) of serpentinite and shallow serpentine soils and is dominated by blue blossom ceanothus, toyon, osoberry, and California blackberry. This community, along with adjacent serpentine communities, provides habitat for several special-status species: Raven's manzanita, Presidio clarkia, Marin dwarf flax, San Francisco owl's clover, San Francisco gumplant, and coast rock cress. Small patches of serpentine scrub occur on serpentine soils southwest of Crissy Field, and southwest and west of the World War II Memorial. The indigenous serpentine communities on the Presidio are more diverse than natural communities on sandy soils and support many rare plant species due to the serpentine soil's unique character. (Vasey 1996).

Serpentine Bunchgrass Grassland (Serpentine Grassland) is a sensitive community restricted to serpentine soils in more protected, drier, less windy, and more sunny uplands than serpentine scrub. On the Presidio, the serpentine grassland community can be found at Inspiration Point, near the World War II Memorial, and north of Fort Scott. The upper portions of the rocky serpentine ridge running south from Fort Point to the southern Presidio entrance at Arguello Boulevard must have once contained large areas of Serpentine Bunchgrass prairie (Vasey 1996). It is dominated by purple needlegrass and foothill needlegrass, an array of wildflowers including footsteps to spring, cream cups, gold fields, California poppies, as well as special-status species found on serpentine soil such as the Presidio clarkia and Marin dwarf flax. Grasslands are often used by foraging birds. They house more small mammals than other habitats, and these mammals can easily be seen by predators because of the open habitat. Therefore you can find many raptors such as northern harrier, sharp-shinned hawk, Cooper's hawk, red-tailed hawk in grasslands.

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Coast Live Oak Woodland (Oak Woodland) develops in moist, sheltered sites away from the immediate coast. Only small, scattered stands of coast live oaks occur on the Presidio including a stand of short, multi-trunked coast live oaks northeast of the Public Health Service Hospital. Historically, other small native trees (such as buckeye, madrone, or California bay) may have occurred within these live oak stands. Despite its relatively small acreage at the Presidio, coast live oak woodlands receive heavy use by migratory and nesting birds. Species such as solitary vireos, Hutton's vireos, black-throated gray warblers, lazuli buntings, rufous-sided towhees, California towhees, and chipping sparrow are often associated with live oaks at the Presidio. (Jones & Stokes, NRI)

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Open-water Associated Habitats

The following are open-water associated habitats. These either exist or would be restored within the lower watershed, adjacent to, and connecting to the Crissy Field marsh.

Brackish Marsh

This community was recently restored to the Presidio as a part of the Crissy Field marsh restoration effort. Tidal brackish marshes occur where the tidal salt water of the bay has been diluted by freshwater runoff. They are seasonally influenced by fluctuations in salt water and fresh water and have a unique set of plants that is uncommon in either salt marshes or freshwater systems. The changing salinity creates diverse plant habitat based on each plant's ability to tolerate salinity, water inundation and competition. In San Francisco Bay, brackish marshes support alkali bulrush which provides high quality waterfowl habitat, hardstem bulrush, California bulrush, low club rush, pickleweed, common reed, and common cattail. In Crissy marsh to date, 12 species of fish (two of which are non-native) have been collected, numerous invertebrates, and over 135 species of birds have been identified.

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Marsh Plain (Tidal Salt Marsh)
A marsh plain (as it was described in the meeting) is the area of the marsh outside of the open water channel. The marsh plain is dominated by California cord grass, Virginia pickleweed and fleshy jaumea, saltgrass, alkali heath, and Virginia pickleweed. In Crissy marsh the land surrounding the open water channel and in the middle of the marsh (the mudflats) makes up Crissy's marsh plain.

Braided Channel
A braided channel forms at the point where a creek enters a marsh plain. In this channel, the fast flowing waters of the creek would slow down and drop out all but the finest sediments to be deposited before reaching the outer Crissy Marsh. Deposited sediments would create a delta area that would likely form a winding shallow creek channel. This area would support many of the same habitat and plant species as detailed in the brackish marsh description above. An example of what this would look like can be found just west of the Bolinas lagoon.

References

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