

U.S. Fish & Wildlife Service

Don Edwards San Francisco Bay

*National Wildlife
Refuge*



In the heart of California's Silicon Valley lies a twenty three thousand-acre oasis providing habitat for millions of migratory birds and endangered species like the California clapper rail.



Welcome!

Don Edwards San Francisco Bay National Wildlife Refuge, the first urban National Wildlife Refuge established in the United States, is

dedicated to preserving and enhancing wildlife habitat, protecting migratory birds, protecting threatened and endangered species, and providing opportunities for wildlife-oriented recreation and nature study for the surrounding communities.



As of 2002, the Refuge spanned nearly 23,000 acres of open bay, salt pond, salt marsh, mudflat, upland and vernal pool habitats located throughout south San Francisco Bay. Located along the Pacific Flyway, the Refuge hosts

over 280 species of birds each year. Millions of shorebirds and waterfowl stop to refuel at the Refuge during the spring and fall migration. In addition to its seasonal visitors, the Refuge provides critical habitat to resident species like the endangered California clapper rail and salt marsh harvest mouse.

Today, hundreds of thousands of people visit the Refuge each year to enjoy its diverse wildlife and habitats, and to participate in the Refuge's many environmental education and interpretive programs.

The Don Edwards San Francisco Bay National Wildlife Refuge is located on the south end of the San Francisco Bay and along the Pacific Flyway, one of the major migratory routes for North American birds.

Wildlife Island in an Urban Sea

The San Francisco Bay area has had a significant human presence stretching back thousands of years. The earliest residents of the South Bay were the Ohlone, indigenous peoples who lived in ecological balance with their surroundings. The Ohlone were the region's only human inhabitants for thousands of years, until Spanish settlers emigrated to the area in the late 1700s.



Newark slough at high tide in the salt marsh.

©Alvin Dockter

Major changes occurred in the San Francisco Bay environment following the

California gold rush in 1849. Explosive growth and development placed greater demands on the sensitive lands surrounding the Bay. The newly introduced salt industry, for example, converted tens of thousands of acres of salt marsh into commercial salt ponds.

Conversion of wetlands to support development continued well into the 20th century, and today, nearly 85% of the Bay's original marshes and shorelines have been altered. Congressman Don Edwards, responding to concerned local citizens, worked with Congress to approve the purchase of lands for the San Francisco Bay National Wildlife Refuge, which was officially established in 1974. The Refuge was later renamed "Don Edwards San Francisco Bay National Wildlife Refuge" in 1995 to honor Congressman Edwards' dedication to the Refuge and its mission.

The urban areas surrounding the Don Edwards San Francisco Bay National Wildlife Refuge continue to expand. As a "wildlife island in an urban sea," the Refuge faces unique challenges. Nearby developments

Housing developments border Refuge salt marsh.

©Alvin Dockter

affect the Refuge in many ways. Power lines and levees criss-cross Refuge grounds. The high cost of land in the Bay area makes acquiring additional property difficult. Most importantly, Refuge managers are entrusted to protect habitat and wildlife while providing for other land uses, such as public recreation and commercial salt production, which benefit both the community and the Refuge.

Despite the difficulties of an urban setting, the Refuge also benefits from and provides unique opportunities for the surrounding community. Local partner organizations aid the Refuge in acquiring sensitive habitats for migratory birds and for threatened and endangered species. An extensive network of community volunteers provide invaluable support to Refuge staff. School groups participate in environmental Refuge educational programs and people of all ages come to enjoy a wide variety of weekend interpretive programs which provide further opportunities for wildlife-oriented recreation.



The Don Edwards San Francisco Bay National Wildlife Refuge is one of over 530 refuges in the National Wildlife Refuge System—a network of lands set aside specifically for wildlife conservation. Managed by the U.S. Fish and Wildlife Service, the System is a living heritage, conserving wildlife and habitat for people today and for generations to come.

A Year of Wildlife

Visiting the refuge is rewarding year-round. Each season brings different wildlife viewing opportunities.

Spring

The song of the marsh wren announces the arrival of spring at the Refuge. Barn swallows, salt marsh song sparrows, and common yellowthroats dot the marsh with color, while tiny, sand-colored western snowy plovers begin nesting on the salt flats. March through May is the best time to see spectacular wildflower displays, and to view the millions of birds that pause at the Refuge during their northerly migration.



©Jim Cruce

*Above:
Marsh wren
lets out a
warning
cry*



Summer

In warmer months, the Refuge acts as a nursery to many different animals raising their young. More than 80 species of birds, including the endangered California clapper rail, nest on sites throughout the Refuge. Harbor seals haul out in protected sloughs to give birth to pups and nurse their young. Native gray fox pups are often seen scampering across the upland near dusk.

*Harbor seals
on a haul out*



Fall

The migratory frenzy begins in August with the arrival of hundreds of thousands of shorebirds making their way south from the Arctic, Alaska, and western Canada. Twenty-five species of waterfowl follow in October, which is also one of the best times to see migratory golden-crowned sparrows and yellow-rumped warblers.

*Yellow rumped
warblers peak
in the fall.*

©Peter LaTourrette



Winter

Winter at the Refuge is a prime time to view both waterfowl and shorebirds along the Bay, sloughs and marshes. Great “rafts” of surf scoters, lesser scaups, ruddy ducks and bufflehead float along the Bay, while flocks of eared grebes drift in nearby salt ponds. With luck, you may see a golden eagle soaring overhead, scanning for rabbits and other prey.

*Above left:
Western snowy
plovers return
to successful
nesting sites
year after
year.*

©Peter Knapp



*Look for the ruddy duck's
white cheek and upturned tail*

©Clair Kofoed

Highlight on Habitat

*A handful of
San Francisco Bay
mud may contain
40,000 tiny living
creatures!*



*The heron's foot
has evolved
to evenly distribute
its weight, to
prevent sinking
in the mud.*

Mudflats



Mudflats, seemingly barren, are actually teeming with life. A handful of Bay mud may contain 40,000 tiny living creatures! The secret of the mudflat abundance is the two tidal

cycles that occur each day. Tidal water flowing in and out of the Bay creates strong currents that distribute enormous quantities of nutrients throughout the Bay, sloughs and marshes. Fish



*Avocets feed by
whipping their
curved beak
through the
mud exposed
at low tide.*

feast on the abundant creatures brought in by the tide, which include zooplankton – animals that drift in the current – such as copepods. At low tide, dowitchers, American avocets, and willets can be seen probing and sweeping the mud for tasty worms, insects and shellfish.



*Copepods, a type of zooplankton
found in tidal slough waters.*

*Mussels and snails are tasty
treats for the endangered
California clapper rail.*

©Alvin Dockett



*Look for dowitchers,
heads bobbing like
sewing machine
needles, as they
probe for food.*



Highlight on Habitat

*So intensive
is plant growth,
that acre for acre
many salt marshes
out-produce our
best farms!*



*Black-necked
stilts nest on
salt pond
levees.*

Salt Marsh



Salt Ponds

Salt marshes are one of the most productive habitats on Earth. Food produced in salt marshes creates the foundation of many food webs. Nutrients produced in the marsh are carried out via sloughs to the plants, invertebrates and fish of the open Bay. The endangered California clapper rail, the endangered salt marsh harvest mouse, and the salt marsh song sparrow all make their homes in the salt marshes.

Salt production in the Bay area involves the use of a series of salt ponds. As the water moves from one pond to the next, evaporation causes successive ponds to become saltier. Plant and animal species found in a given salt pond are determined by the concentration of salt. Fish such as topsmelt, goby, killifish and perch thrive in low to moderately salty waters. Endangered California least terns take advantage of these fish populations, while phalaropes and black-necked stilts feed on the abundant brine shrimp of saltier ponds. Salt marsh plants, such as pickleweed and cord grass, have adapted to the Bay's salty water.



*Salt pond
brine shrimp
have three eyes
and twenty-two
legs!* ©John Cang

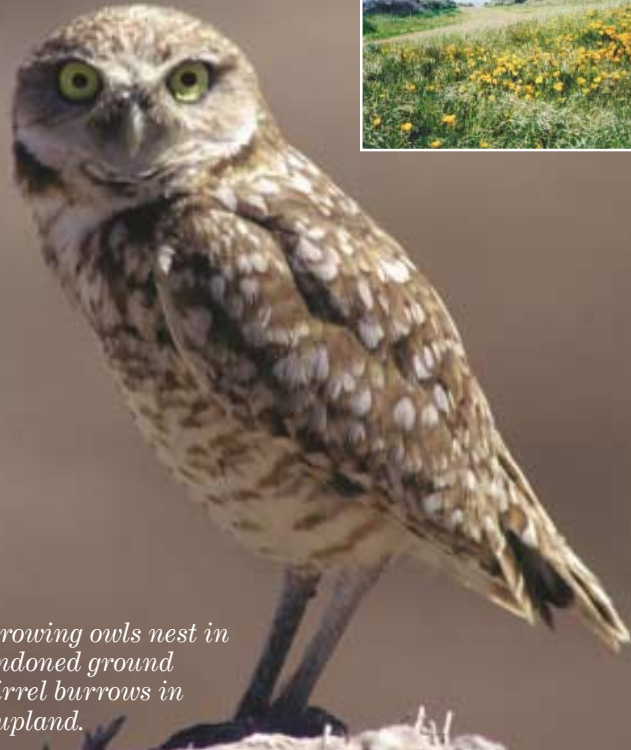


*Making its home
among the pickleweed,
some unwary salt marsh
harvest mice become
stranded during
high tide.*

©Moose Peterson

Highlight on Habitat

A single vernal pool can be home to over one-hundred species of plants and animals!



Burrowing owls nest in abandoned ground squirrel burrows in the upland.

Vernal Pools



CA tiger salamanders leave the vernal pools in summer.

©Joyce Gross

Vernal pools are short-lived, seasonal wetlands. Several species, such as endangered vernal pool tadpole shrimp and Contra Costa goldfields, are found only in this type of wetland. Resident wildlife are well adapted to the alternating wet and dry periods, with most animals and plants taking advantage of winter and spring rains to reproduce. As the seasonal wetlands recede in the spring, yellow goldfields and purple downingia rim vernal pools with brilliant color. Some animals, such as fairy shrimp and other invertebrates remain as dormant eggs throughout the long, dry summers, while adult amphibians leave the vernal pools altogether.

The native California gray fox is the only canine that can climb trees.

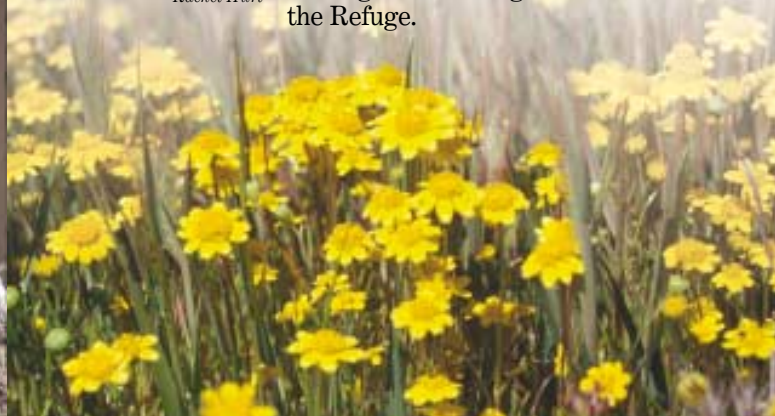


Alden M. Johnson©California Academy of Science

Uplands

Contra Costa goldfields
Rachel Hurt

Rising above the salt marsh is the drier upland habitat, where jackrabbits, fence lizards, and California towhees are found. Coyote brush, oaks and a variety of grasses provide plenty of cover for these animals. Native gray foxes can find enough rodents, rabbits, insects and fruits to satisfy their hunger, while rabbits will feast upon the vegetation and grains found on the Refuge.



Wildlife Viewing Tips

Be Prepared

The climate in the San Francisco Bay area varies throughout the year. Prepare for unexpected weather conditions. Wet, windy and cold weather



conditions are expected in the winter but can also occur in the summer. Temperatures can drop to 30° F in the winter, and can rise to over 90° F in the summer. Check the local weather forecast before your visit. Bring

drinking water, a hat, sunblock, and a sturdy pair of shoes when hiking the trails. Rain gear is recommended during the winter months.

Learn About Wildlife

Wildlife can be seen at any time of day and throughout the year. Generally, birds are best seen early in the morning, along the mudflats and during an outgoing tide, or in the salt ponds and marshes during high tide. Learn the habits of the animals you would like to see and plan your visit accordingly.

Use Binoculars

Binoculars and spotting scopes allow you to get a closer look at animals without scaring them. Binoculars are available for loan at the Visitor Center and the Environmental Education Center.

Be Patient

Move slowly. Quick movements and loud noises will scare away most wildlife. Animals that hide upon your arrival may return after a short while if you are quiet and still. Keep your eyes open and don't get discouraged. Certain animals may be hard to see at first, as some species have excellent camouflage to protect them from predators.

Use Identification Guides

Study wildlife guides to help identify local plants and animals. Stop by the Visitor Center or the Environmental Education Center for additional information.



*Black-crowned
night heron*

©Jim Cruce

Enjoying the Refuge

Trails

The Refuge contains more than 30 miles of hiking trails, some of which accommodate bicycles. All motorized vehicles are prohibited on Refuge trails. Trails are periodically closed for levee maintenance and wildlife protection. Please help us protect the wildlife and habitat by remaining on designated open trails.

Dogs: Dogs must be kept on 6-foot leashes and are only permitted on the Tidelands Trail in Fremont and on Inner Bair Island in Redwood City. All pet waste must be collected for disposal in trailside waste receptacles.

Wildlife Observation

Hundreds of animal species can be found on Refuge grounds. Binoculars are available for loan. Pick up a bird or plant list to help identify species of interest.

Interpretive Programs

Volunteers and staff at the Visitor Center and the Environmental Education Center offer a variety of weekend programs at no charge. Programs are listed in the Refuge's quarterly newsletter, the *Tideline*, available for free at both Centers.

Environmental Education

The Refuge offers numerous opportunities and resources for educational groups, including teacher orientations, field trips, local library presentations, summer camps and a video lending library.

Fishing and Hunting

Fishing is allowed by boat, off the pier at the end of Marshlands Road, and in Coyote Creek Lagoon. Access to waterfowl hunting areas is permitted only by boat, with the exception of the Ravenswood site, where walk-in hunting is allowed. Check state regulations and pick up a free Hunting and Fishing brochure for restrictions and a map of areas open to hunting.

Boating

Boating is permitted on the Bay and its tributaries, but not in salt evaporation ponds or small slough channels. Canoes and kayaks are recommended since motor boats will scare away wildlife. Jet skis are not allowed. Public boat ramps are located 1/4 mile east of the Visitor Center and in Redwood City. Mallard Slough is closed from March 1 through August 31, and Mowry Slough is closed from March 15 to June 15 to protect sensitive wildlife species.

Restrictions

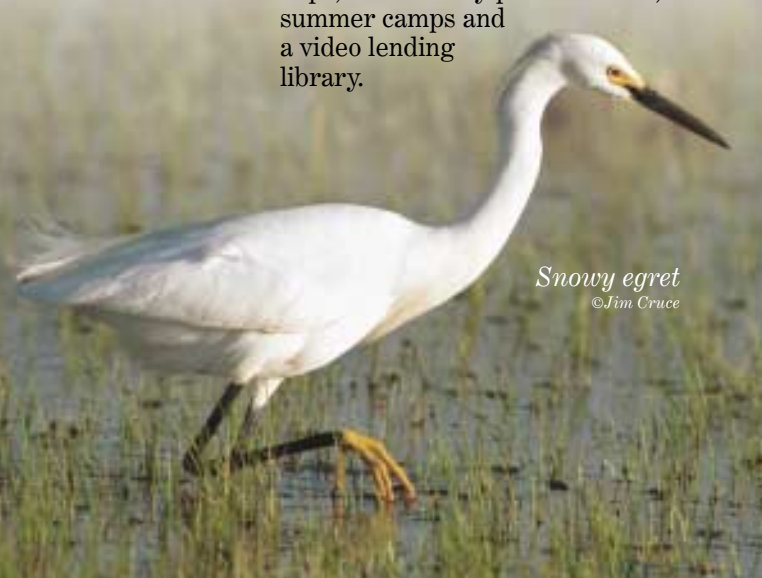
Fire, swimming, camping, skateboarding, kite-flying, off-trail use, and collecting natural objects such as plants, animals and minerals are prohibited.

Emergency Phone Numbers

Call 911 for any life-threatening emergencies. All injuries or accidents must also be reported to Refuge Headquarters at 510/792 0222 or to the U.S. Park Police at 415/561 5510.

For More Information

For more information on the recreational activities listed above, please call the Visitor Center in Fremont at 510/792 0222 or the Environmental Education Center in Alviso at 408/262 5513.



Snowy egret
©Jim Cruce





When to Visit

Refuge Hours

Fremont: November 1 through March 31, trails in Fremont are open from 7:00 a.m. to 6:00 p.m. From April 1 through October 31, trails are open from 7:00 a.m. to 8:00 p.m. The portion of Marshlands Road providing access to the fishing pier is closed to motorized vehicles from April 1 through August 31 to protect the threatened snowy plover.

Alviso: The trails at the Environmental Education Center in Alviso are open to visitors from sunrise to sunset. If the gates are closed, you may park outside the gate and walk in.

Redwood City: Trails on Inner Bair Island are open from sunrise to sunset.

Visitor Center Fremont, CA

The Visitor Center is open Tuesday through Sunday, from 10:00 a.m. to 5:00 p.m. It is closed on all national holidays. Call 510/792 0222 for program information and reservations.

Environmental Education Center Alviso, CA









The Environmental Education Center is open to the public Tuesday through Friday from 8:00 a.m. to 4:00 p.m. if it is not reserved by a formal group. The center is open from 10:00 a.m. to 5:00 p.m. on weekends. It is closed on all national holidays. Call 408/262 5513 for program information and reservations, or to see if the building is available to tour.



Mountain Vi


Refuge Map

Don Edwards San Francisco Bay National Wildlife Refuge

| | | | |
|---|--------------------------------|---|-----------------------|
|  | Visitor Center |  | Salt Evaporation Pond |
|  | Environmental Education Center |  | Tidal Mudflat |
|  | Hiking Trail |  | Open Water |
|  | Refuge Boundary |  | Marsh |





1 Visitor Center - Fremont

  **510/792 0222**


The Visitor Center, located at 1 Marshlands Road, is off Thornton Avenue, south of Highway 84 and Gateway Boulevard. Indoor exhibits explore Bay habitats and wildlife. Outdoor interpretive signs outline the natural history of the region and human impacts across the years. Volunteers will be happy to answer questions and distribute free maps and brochures.

2 Environmental Education Center - Alviso

  **408/262 5513**

The Environmental Education Center, located at 1751 Grand Boulevard, is off the Zanker Road exit, north of Highway 237. The Center is available by reservation to school and community groups. Visitors are welcome to use trails during daylight hours. The site consists of a main building with an enclosed observation tower; an open-air pavilion; and demonstration gardens. Interpretive programs are scheduled each weekend.

3 Inner Bair Island - Redwood City

 **510/792 0222**

Inner Bair Island is located off Whipple Avenue, northeast of Highway 101. This undeveloped site offers three miles of hiking trails within one of the largest, easily restorable wetlands in the South San Francisco Bay Area. There are no restroom facilities at this site.

Accessibility

The Refuge is constantly improving its facilities to make them accessible to all visitors. Please call Refuge Headquarters at 510/792 0222 before your visit to discuss accessibility.



**Don Edwards San Francisco Bay
National Wildlife Refuge
P.O. Box 524
Newark, CA 94560
510/792 0222
<http://desfbay.fws.gov>**

**California Relay Service
TTY 1 800/735 2929
Voice 1 800/735 2922**

**U.S. Fish & Wildlife Service
<http://www.fws.gov>**

**For Refuge information
1 800/344 WILD**

March 2003

*California
clapper rail*
©Peter LaTourette

