

Tideline



Don Edwards / Antioch Dunes / Ellicott Slough / Farallon Island / Marin Islands / Salinas River / San Pablo Bay

If You Build It, Will They Come?

Response of Waterbirds to Salt Pond Enhancements in Pond SF2

By Stacy Moskal

The sight of spherical and saw-toothed islands that are clearly man-made in a former salt pond can be a bit disconcerting as you head westbound on the Dumbarton Bridge in South San Francisco Bay. Large billboard signs that publicize that wetland restoration is in progress greet commuters and visitors alike as they approach the site. Unbeknownst to the casual observer, these strange-looking islands are part of an on-going experiment to determine how best to provide habitat for migratory and wintering shorebirds.

The San Francisco Bay-Delta is the largest estuary on the west coast of the Americas and it is surrounded by a large urban center with a population of 7.5 million people. Healthy estuaries provide important ecosystem services such as water purification and flood protection. All living organisms also benefit from estuaries because of the food, open space, recreation, transportation of people and goods, and diversity of wildlife they offer.

There are multiple habitat types within the estuary: tidal marshes, mud flats, salt ponds, dry salt flats, and subtidal zones. These habitat types are home to several federally-listed endangered species like the California Clapper Rail, California Least Tern, Salt Marsh Harvest Mouse and Soft

Bird's-Beak. Federally-listed threatened species like the Western Snowy Plover and California Red-Legged Frog depend on the estuary for their survival. Several "species of special concern" that have been designated by the State of California also reside in the San Francisco Bay Estuary and include the Salt Marsh Common Yellowthroat and the Salt Marsh Song Sparrow.

and Central Bays and for salt production in the South Bay. Today, roughly 95% of the historical wetlands have been lost to development and conversion. Since wetlands provide critical habitat for endangered species and have important ecosystem functions, which have become relevant as a result of climate change and sea level rise, the San Francisco Bay ecosystem is currently



Round and saw-toothed islands in Pond SF2 Photo by Cris Benton

Historically, 200,000 acres of tidal marshes and shallow pans were used by the indigenous people for waterfowl hunting and salt production. By 1930, much of the wetlands were filled to support population booms due to the gold rush and urbanization, and for salt evaporation ponds. The area was diked and drained to allow for more grazing and agriculture in the North

undergoing the largest wetland restoration project on the Pacific Coast.

In 2003, Cargill, Inc. sold 15,100 acres of salt ponds in South San Francisco Bay to federal and state governments. The South Bay Salt Pond Restoration Project (Restoration Project) was formed to oversee

continued next page

the large scale restoration. The Restoration Project's goals are to: "restore and enhance a mix of wetland habitats; provide wildlife-oriented public access and recreation; and provide for flood management in the South Bay." For further information on the project, visit <http://www.southbayrestoration.org>.

Salt ponds and dry salt flats have become extremely important habitat for one million migratory and wintering shorebirds. The California Least Tern and Western Snowy Plover have also come to depend on these types of habitat for their survival. The San Francisco Bay is such an important location for shorebirds it has been designated as a Western Hemisphere Shorebird Reserve Network Site of Hemispheric Importance. These habitats are used as roosting and breeding sites as well as foraging areas at high tide.

The current management plan of the Restoration Project is to convert 50-90% of the existing 30,000 acres of former salt ponds to tidal salt marsh. Because migratory birds have come to rely on these ponds for food and roosting sites, the South Bay Salt Pond Restoration Project has agreed that there should be no net loss of waterbirds in the bay when the ponds are restored back to tidal salt marsh.

So how do we maintain the abundance of migratory and wintering shorebirds in a smaller footprint of managed ponds? The most logical way is to increase the number of shorebirds using the remaining managed ponds. To increase the number of shorebirds using a pond, we need to know and understand what characteristics these birds are looking for as their ideal habitat and how to maximize them. The South Bay Salt Pond Restoration Project is conducting adaptive management using sound science: 1) design an experiment; 2) test the hypothesis; 3) change management or restoration design based on experimental results. An experiment designed with adaptive management in mind was created at a former salt pond on the Don Edwards San Francisco Bay National Wildlife Refuge named SF2.

Pond SF2 is on the west side of bay, just south of the Dumbarton Bridge (Hwy 84). Prior to the pond's enhancements, SF2 was a gypsum-covered dry pond, home to a couple thousand roosting sandpipers, a handful of nesting snowy plovers, and a few dozen foraging bufflehead and common



USGS Biologist Stacy Moskal survey bird use on the man-made islands. Photo by USGS

goldeneye. In 2009-2010, the Restoration Project enhanced SF2 by constructing 30 nesting and roosting islands and installing water control structures to allow tidal flow into the 155-acre pond.

These islands were designed with the purpose of conducting an experiment. All of the islands have a north facing slope that provides protection from winds that come from the northwest which is the Bay Area's typical wind pattern. Half of the islands are round in shape, therefore having a low shoreline edge to area ratio. The other islands are longer and linear with a saw-tooth south edge, thus having a high shoreline edge to area ratio. The round versus linear islands were designed to test whether birds prefer to be clumped in distribution (thereby choosing the round islands) or more spread out (thereby choosing the linear islands). These islands are also spatially distributed strategically throughout the pond. Some islands were constructed closer to exposed mud flat when water levels are low, and some were placed closer to the trail or road to see if human disturbance is a factor.

To allow for the ebb and flow of bay waters into the pond, The Restoration Project placed two sets of tide gates in the bay-front levee. By opening or closing various screw gates, water levels within the pond can be manipulated up or down.

In order to determine whether salt pond enhancements are an effective way to increase migratory shorebird abundance in ponds, the Restoration Project, the Resources Legacy Fund, Council on Ocean

Affairs, Science and Technology, and U.S. Geological Survey (USGS) funded a graduate research project to conduct the study. We surveyed the pond weekly at three locations from October to May for two seasons (2010-2011 and 2011-2012). Using a map with a 50 m grid superimposed on an aerial photo of the pond, we recorded all birds observed within the pond, noting grid location, bird behavior (foraging or roosting), and habitat type (island #, levee, water, pond bottom, or man-made structure). All avian predators observed were also recorded. We defined a survey as two counts: the daily high and the daily low tide within one 24-hour period.

Enough data have been collected over the last two seasons to begin our data analysis. Some of our preliminary results are presented here. Of the 265,546 non-breeding waterbirds that were observed on the pond over the two seasons, 36,884 (14%) were using islands. Since it is common for waterbirds to forage at adjacent mud flats at low tide and roost in ponds at high tide, more birds were observed using the pond at high tide (212,369) than low tide (53,177) but the proportion of birds using islands remained similar.

To help see general trends and simplify analysis, data is often examined at guild level. In this case, a guild is a group of bird species that forage similarly. Of the observed fish eaters (like cormorants and pelicans), 50% were seen on islands. Other guilds like dabbling ducks (like Mallard, Northern Shoveler, Northern Pintail, and American Wigeon) and gulls were seen on islands 30%



Dunlin and Western Sandpipers on one of the islands. Photo by USGS.

of the time. All other foraging guilds were observed on islands 25% of the time or less.

Regardless of the guild, birds observed on islands were typically roosting, not foraging. With the exception of small shorebirds (Western Sandpiper, Least Sandpiper, and Dunlin), all guilds had a higher number of birds observed on linear islands as opposed to the round type. It is still uncertain as to why this is. In general, waterbirds have a tendency to choose roost sites that are extremely close or slightly in the water. The linear islands provide more interface

between land and water which may be preferred. A second reason may be the linear islands offer multiple sections of shelter from the wind due to the saw-tooth edge as opposed to the round ones that only offer one section thereby forcing all the birds into one section. Further analysis may be able to help explain the island use discrepancy. It also appears that shorebirds are choosing to use the islands closest to the bay, perhaps awaiting the next low tide when their foraging habitat would once again become available.

From this experiment, we hope to better understand how waterbirds use islands. Not only does shape and proximity to mud flats likely impact island use, but other characteristics may also be important such as island morphology (height, size, slope, texture, vegetation), distance to disturbance (trails, power lines, roads), and water quality (temperature, pH, dissolved oxygen, salinity). Most of these features were measured at SF2; the goal is to combine the measured characteristics with the bird observations to determine which island and water attributes

are most influential in waterbird use.

Since the SF2 enhancements, The Restoration Project has begun two other island projects: pond A16 in the Alviso Unit of the Don Edwards San Francisco Bay National Wildlife Refuge and ponds E12/13 in California Department of Fish and Game's Eden Landing Ecological Reserve. Construction of the islands in pond A16 will most likely be completed by the end of 2012 while ponds E12/13 is still in the design phase. As part of the adaptive management process, the USGS will continue to analyze the data to help land managers improve island designs in future enhancement efforts. For further information on the USGS San Francisco Bay Estuary Field Station and their research, visit <http://www.werc.usgs.gov>.

Stacy Moskal is a South Bay native and a wildlife biologist with the U.S. Geological Survey. Stacy has worked in the San Francisco Bay Estuary since 2005. She is currently working on her master's degree at San Jose State University.

Innovative Deal on Dirt Saves Taxpayers Money

By Doug Cordell, Public Affairs Officer

An innovative arrangement to acquire uncontaminated dirt for an ongoing wetland restoration project on Bair Island, a part of the Don Edwards San Francisco Bay National Wildlife Refuge near Redwood City, Calif., is saving taxpayers more than \$5 million.

When the project broke ground in 2006, the total cost was expected to be \$12 million. Close to half that amount was the projected cost of acquiring 1.5 million cubic yards of dirt to reverse decades of erosion and subsidence of the land – a result of its historical use for agriculture. It turns out though, that area construction firms have limited options for disposing of dirt from their own projects, and they're willing to pay the contractor on the Bair Island project, Pacific States, of Dublin, Calif., to take it.

While securing a supply of free dirt has lengthened the project's timeline somewhat, it is ultimately lowering the cost of the total project to \$6.9 million.

Currently, up to 500 dump trucks of dirt are being carted to Bair Island each day from various construction sites in the Bay Area. The goal is to raise the elevation of the



Each day, up to 500 dump trucks of dirt are hauled to the wetland restoration site on Bair Island. Photo by Aric Crabb, Bay Area News Group

restoration area by two feet.

It's not simply a matter of trucking in the surplus dirt, however. First, the soil must be inspected by trained professionals hired by Pacific States to ensure it does not exceed required standards for levels of contaminants.

The six-year, 1500-acre restoration of Bair Island is now nearing completion. The

restored site will bring back thriving wetland habitat for a wide range of birds, fish and marine mammals. It will also feature a number of public access amenities. A pedestrian foot bridge is scheduled to be installed in December 2012, and by April 2013, the site will feature viewing platforms, interpretive displays and an ADA-compatible public trail.

Meet Anne Morkill: New Project Leader at San Francisco Bay National Wildlife Refuge Complex

By Michael D'Agostino, *Environmental Education Intern*

On October 1, 2012, the San Francisco Bay National Wildlife Refuge Complex staff welcomed their new Project Leader Anne Morkill. As Project Leader, Morkill oversees and supervises all management activities of the seven national wildlife refuges within the complex.

Morkill is no stranger to the USFWS. She has been a permanent employee for 16 years, working at an impressive array of National Wildlife Refuges across America: from Colorado to Alaska to Florida. She began her career as a wildlife biologist for several state and federal agencies, studying everything from migratory waterfowl to caribou to black-footed ferrets and white-tailed prairie dogs.

More recently, Morkill served as Project Leader for the past six years at the Florida Keys NWR Complex. This diverse Floridian landscape consists of 500 square miles of marine, coastal and upland areas protecting subtropical habitats (such as mangrove forests); it is also home to over 20 federally protected plants and animals. Nevertheless, the mesmerizing marshlands and distinctive urban challenges of the San Francisco Bay NWR Complex compelled Morkill to lend her talents here.

Upon first arriving in San Francisco Bay, Morkill was immediately struck by the region's "stark wildland-urban interface": the close proximity of commercial salt



pond industries, residential neighborhoods and federally-protected salt marshes with endangered species.

Morkill is already eager to ignite renewed environmental appreciation in the Bay Area's diverse local communities, envisioning an "outstanding opportunity to provide wildlife-dependent recreation and to educate the public, who will hopefully become future stewards of our wild places."

Additionally, Morkill enthusiastically declares, "I am really excited about working on a world-class habitat restoration program that has multiple partners from the local to the federal level, and involves a diversity of public and private interests."

A champion of community collaboration and interagency cooperation, Morkill is apt to note, "the only way that we can truly accomplish our conservation mission is through effective partnerships across the

landscape." Such joint efforts are key to the success of ongoing and future conservation efforts in San Francisco Bay and across America.

"What I love the most about the US Fish & Wildlife Service," professes Morkill, "is its people: the staff and volunteers." Together, all are unified by the passion and dedication put towards "our mission of conserving and restoring wildlife and their habitats," she adds.

Indeed, Morkill takes great pride working with others to manage and facilitate NWR lands for the enjoyment of future Americans, with the caveat that wildlife comes first, making these federal nature sanctuaries "unlike any other conservation system in the world."

Ever adaptive to the changing needs of different ecological, cultural and local environments, Morkill is dedicated to continually "fostering partnerships with the research and conservation communities to restore and conserve imperiled wildlife and their habitats in the face of multiple challenges, ranging from habitat fragmentation, development, invasive exotic species, and climate change."

Overseeing the ecological health and management of sensitive endangered species is clearly no walk in the park.

Yet Morkill is up to the challenge. She remains focused, enthusiastic, and hopeful about her new home's future legacy. "I am honored and humbled to be here," she says, "and look forward to meeting everyone!"

Extra High Winter Tides at the Refuge

By Gregg Aronson

One of the most spectacular phenomena at the Don Edwards San Francisco Bay National Wildlife Refuge is the extreme high tidal action of winter. This year the highest tide in the San Francisco Bay takes place on Thursday, December 13. It will be at its maximum height at 11:45 am at the Fremont location. During this time you will see the pickleweed (the succulent plant that blankets the salt marsh) almost completely submerged. Levee trails that have always seemed sufficiently high enough in elevation to hold back the tides suddenly look vulnerable. This is truly a time to come and see the refuge as you have never seen it before. If you miss it, you will have to wait until next year for this amazing view again.

During the winter months, many migratory birds can be easily observed. Along the wetland areas, you will likely see Great Egrets, Snowy Egrets, and Great Blue Herons wading in the sloughs looking for fish, and up on higher ground hunting for small animals. Overhead, you may see White-tailed Kites and Northern Harriers hovering over the marshes. If luck is on your side, you may witness a hovering kite or harrier abruptly drop down from the sky and into the marsh to snatch its prey.

If you are unable to make it out to the refuge on December 13, there are still some other winter high tide dates and times that should be pretty spectacular. The table below shows the remaining highest tide times and dates for this year at Fremont.



Photo by Gregg Aronson

Dig that Cullinan Restoration Project

By Don Brubaker

For more than a year, commuters along State Route 37 have been witnessing dozers and excavators tearing up the land and piling up huge amounts of dirt in long stretches, obscuring the view that was once there. Cullinan Ranch, the receiver of all the activity is a unit of the San Pablo Bay National Wildlife Refuge and is undergoing Phase II of a wetland restoration project.

Flood Protection

Cullinan Ranch was one of the first large portions of a vast estuarine habitat to be leveed-off and drained to farm oat hay to feed livestock in the late 1800s. It is the reason some old maps refer to the site as Island Number 1. San Pablo Bay National Wildlife Refuge obtained the former ranch in 1991 with the intent to restore the 1,500 acres back to tidal salt marsh to benefit endangered species and ecosystem functions. Tidal marsh restoration requires the levees to be breached to allow the tides to flow into the property. Because the area has been diked off for nearly 150 years, the land has subsided substantially. Flooding of Cullinan Ranch could seriously impact SR37 which is a major transportation corridor for up to 62,000 vehicles a day (<http://www.cahighways.org/033-040.html>).

The length of dirt you see piled along SR37 near Mare Island is a protection levee. This 3,900-foot levee will protect the route from being submerged when Cullinan Ranch is flooded on or about January 2014. Last year, the levee material excavated on site and formed into a long pile is now dry enough to be folded and compacted this year. Think of this as a 40-foot wide, 3,900-foot length of pizza dough being kneaded by dozers and excavators. The finished product will be 13 feet high and may block the viewshed until settling to 11 feet high in a few years. Placement of rip-rap along the portion of SR37 not protected by the



Photo by Don Brubaker/USFWS

levee will take place in the final phase of the restoration project.

Restoration includes Plans for Wildlife-Oriented Recreation

In addition to prepping the land for tidal inundation, public use facilities and kiosks with interpretive signage will be installed along a 1.3-mile trail between the west side of Cullinan Ranch and California Department of Fish and Game's Napa-Sonoma Marshes Pond 1. A canoe/kayak universal access launch and retrieval facilities, wildlife observation and fishing platforms, and interpretation kiosks will be established off the existing paved parking lot previously installed by California Department of Fish and Game. These new facilities will no doubt snarl traffic and installation of acceleration and deceleration

lanes to safely access the parking lot will be constructed.

Partners

Restoration of the Cullinan Ranch Unit has been a long time coming and is the result of great partnerships with Ducks Unlimited, California Department of Fish and Game, Wildlife Conservation Board, North American Wetlands Conservation Act, Castro Cove Trustee Council, National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, and people like yourselves who enjoy the opportunities of viewing wildlife in their native habitats.

For more information about the project, visit <http://www.restorecullinan.info>. You may also contact Don Brubaker, Manager, Antioch Dunes, Marin Islands, and San Pablo Bay NWR's at don_brubaker@fws.gov.

The 15-year adaptive management plan for the Don Edwards San Francisco Bay National Wildlife Refuge will be available to view in January 2013. It can be downloaded at <http://www.fws.gov/cno/refuges/DonEdwards/DonEdwards.cfm>.

Please contact Winnie Chan at Winnie_chan@fws.gov if you would like more information.

By Ashley Mertz, Visitor Services Intern

The 2012 year has yet again been a busy one for the San Francisco Bay National Wildlife Refuge Complex. Here are just a few highlights of some of the refuges' accomplishments.

Antioch Dunes National Wildlife Refuge

Docents at Antioch Dunes continue to offer monthly tours on the second Saturday of every month. Anyone interested in these programs can meet the docents at 10:00 am at 501 Fulton Shipyard Road in Antioch.



Dr. Jana Johnson of Urban Wildlands Group releases a Lange's metalmark butterfly onto naked-stemmed buckwheat. Photo by Louis Terrazas/USFWS

The refuge partnered with PG&E to control invasive plant species on bordering properties, and with Verco Decking, INC. on Coastal Cleanup Day held on September 15, 2012. Other groups having participated in refuge community service days include Antioch Alive, Cub Scouts, Antioch High School, and the Youth Conservation Corp.

Antioch Dunes' partner organization, The Urban Wildlands Group, continues to breed Lange's metalmark butterflies (LMB) in captivity. Nearly 80 pupae and

23 adults were released this year. There was an increase in total population from 2011 to 2012. In 2011, 74 LMB were counted in surveys and 84 were counted in 2012. However, the 2012 peak count of 23 butterflies was lower than last year's count of 32.

The refuge is continuing its management strategies concerning the endangered Contra Costa wallflower (CCW) and Antioch Dunes evening primrose (ADEP). Invasive plant species are mowed and sprayed with herbicide to reduce competition with the native endangered species.

Refuge managers are hoping to bring cattle grazing to the Stamm Unit of the refuge in order to control the invasive winter vetch and nonnative grasses. In response to the lack of rain, the refuge has planned to expand its greenhouse nursery with the hopes of bringing CCW and ADEP populations back to pre-drought numbers. Managers continue to work towards the large-scale dune restoration project where sand from the Port of Stockton will be used to supplement the disappearing dunes at Antioch. Workers have started clearing a 10 acre area on the Stamm Unit in preparation

of receiving the new sand. Refuge staff is looking forward to seeing the effects of this long term restoration project and its contribution to the LMB population.

Marin Islands and San Pablo Bay National Wildlife Refuge

On San Pablo Bay National Wildlife Refuge—heron, egret, raptor, and owl nesting surveys continue at the Skaggs Island Unit. Additionally, salt marsh harvest mouse, clapper rail, and shorebird surveys were carried out.

Research during this past year at the Marin Islands NWR was fundamentally focused on monitoring egret and heron rookeries. This year, refuge managers implemented a new survey of black oystercatchers. This species has been known to nest on the islands for years, but this was the first official survey. Five pairs of oystercatchers were monitored throughout the nesting season but there was no reproductive success. The refuge continues its work with Audubon Canyon Ranch who conduct egret and heron rookery surveys each year.

When managers are not busy conducting population surveys, they have their hands full removing invasive weeds. Marin Islands NWR worked with Bay Area Sea Kayakers (BASK) to control invasive weeds by hand, and San Pablo Bay NWR work with Students and Teachers Restoring a Watershed (STRAW) to implement a grassland re-vegetation project. Refuge staff has continued to use an Integrated Weed Management approach to control invasive plants. This strategy uses a combination of pulling, chopping, lopping, weed wrenching, and herbicide application. Staff is optimistic about a new method of herbicide



Black Oystercatchers on Marin Island NWR. Photo by Kerry Wilcox.

application called basal bark treatment. This method is being used to control French broom and minimizes non-target species' mortality while allowing for treatment of large areas during a narrow time frame. This is of particular importance as the time to treat French broom coincides with the breeding season for sensitive birds. The refuge has another very busy year ahead and is hoping to garner additional volunteer help on the islands to control invasive weeds.

Don Edwards SF Bay National Wildlife Refuge

Don Edwards San Francisco Bay National Wildlife Refuge has had an incredibly busy year filled with surveys, docent programs, environmental education events, and new management strategies. A few noteworthy outreach events include the Endangered Species Poster Contest, South Bay Bird Fest, Summer Camp, BioBlitz, and the Amazing Refuge Race. Docent programs continue to be offered on the weekends at Ravenswood, Alviso, and



Salt harvest mouse is released back into the wild. Photo by Bryan White.

Fremont locations.

Salt marsh harvest mouse trapping at New Chicago Marsh in Alviso and the "Mouse Pasture" in Fremont generated small numbers. However, the endangered mice were found at both sites. Clapper rail call counts were conducted this year as part of a Secretive Marsh Bird Survey being conducted across the bay. New protocols on the refuge were implemented this year so data can be compared with data collected

from across the bay. Protocols for salt marsh harvest mouse trapping were also standardized. Don Edwards Refuge developed a partnership with UC Davis, who conducts monthly fish surveys in restored sites, sloughs, and creeks.

Refuge staff has much to be optimistic about. A levee breach at pond A6 in 2010 is filling in with sedimentation and native marsh plants. Pond A21 continues to accumulate sediment for the establishment of native plants, and provide fish nursery habitat. Refuge staff is working with the San Francisco Bay Bird Observatory (SFBBO) on a three-prong approach to control weeds and propagate native plants in LaRiviere Marsh. This strategy uses a combination of seeding, mulching, and salinization to get rid of nonnatives. Managers are looking forward to the upcoming annual midwinter waterfowl surveys. This is an aerial duck survey that is part of a nationwide survey effort and provides the refuge with crucial information about the wintering habits of ducks in the Bay Area.

Scout and Youth Group Programs

The Don Edwards San Francisco Bay National Wildlife Refuge offers free hands-on, programs for youths. During the programs participants learn about endangered species, migratory birds, wetland habitats, and the relationship between personal habits and their effects on the San Francisco Bay. These programs are designed to meet badge/patch requirements of Scout Groups, but anyone can participate. Because of the popularity of such programs, reservations are required. Badges are not provided. Below are the names, dates, and descriptions of the programs. Programs at the Environmental Education Center are sponsored by the Santa Clara Valley Urban Runoff Pollution Prevention Program and the San Francisco Bay Wildlife Society.

Programs at the Environmental Education Center in Alviso

Note: Ratio of 1 adult per 5 children maximum. Space is limited to 20 people,

including siblings. Once the program is full there will be a waiting list. Call Debra at 408-262-5513 ext. 102 for reservations.

Saturday, December 1

*Brownie Eco-Explorer Try-It Patch 10:00 a.m. – 12:00 p.m.

Come and learn about habitats, food chains, and how you can help wildlife. Then take a walk to explore the habitats at the South Bay. We'll have a special craft to round out the day. Space is limited to 20 people and program fills quickly.

Saturday, December 15

* Junior Girl Scout Wildlife Badge 10:00 a.m. – 12:00 p.m.

Calling all Junior Girl Scouts of Santa Clara County! Anyone out there need to earn a Wildlife badge? We've got the program just for you! Come to the wildlife refuge and learn about features of different creatures, observe animal behavior, see how you can help wildlife, and so much more. Take a walk to explore the habitats at the south end of the bay.

Saturday, February 2

Webelos Naturalist Badge 10:00 a.m. – 12:00 p.m.

Anyone out there need to earn a Naturalist badge? We've got the program that's right for Webelos! Learn about birds, migration, flyways, food chains, human impact, and the importance of wetlands. Then take a walk and use our binoculars to spot birds in the wild.

Programs at the Refuge Headquarters in Fremont

The Refuge Headquarters offer Webelos programs for up to 15 Webelos. Call 792-0222 ext. 363 for reservations. All programs are led by June Smith.

Sunday, December 2 Saturday, February 9

Webelos Naturalist Program 10:00 a.m. – 12:30 p.m.

Attention Webelos! Earn your naturalist badge in just 2.5 hours. During this hike, learn about birds, flyways, food chains, and the importance of wetlands. Bring your binoculars, or borrow one of ours.

Thank you San Francisco Bay Wildlife Society Donors!

We gratefully acknowledge the following donors who have made gifts to the San Francisco Bay Wildlife Society between July 1, 2012 and September 30, 2012. These gifts will be used for publishing Tideline, capital, environmental education, habitat restoration, and interpretive programs at the Don Edwards San Francisco Bay National Wildlife Refuge.

Memorials/Honorariums

In Memory of Lee Lovelady

Tooky Campione, Ries R & Marcia S Lindley, Kimberly Parson, Glenn A Lovelady, and Jay & Mary Jo Lee

Participant

Natalie Forrest, Jane Hicks, Kenneth Himes, Martha A Johnson, and Laurel Przybylski

Supporter

Loring G Dales

Family

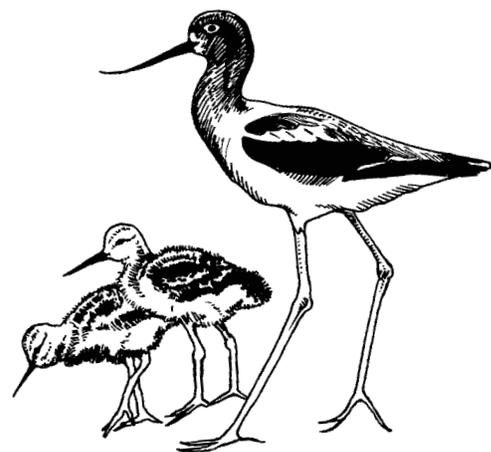
Susan Jane Boddy, Lavonne M Coleman, Thomas & Cathy Crompton, P L & Helen E Fan, Chris & Bob Hunter, David Loeb, John Lukas, Margaret & C J Panton, Stewart & Audrey Perlman, Rita Poppenk, Igor & Shirley Mae Skaredoff, and Sally L & Ken Smyth

Individual

George B & Stephanie Almeida, Thomas M Balock, Sandra H Cooperman, Mary Ann Frankel, Eleanor H Perry, Howard Shellhammer, Haven Thompson, Tri-City Ecology Center, William G Vandenburg, Rose Wright, and Marge E Wood

Senior/Student

Mavis Brown, Erna B Coker, Betsy Dickie, David S Ginsburg, Eugene I Majerowicz, James G Miguelgorry, William Milestone, Nancy Milligan, Dick Nelson, Joan M Nolen, Julia A Paccioretti, Peggy Robinson, Samuel D Sparck, Mary Elizabeth Stone, and Eric D Winch



Help Us Help the Refuge

**Mail your donation to: San Francisco Bay Wildlife Society, P.O. Box 234, Newark, CA 94560.
You may also become a member at www.sfbws.com.**

For a gift membership, call 510-745-8170.

San Francisco Bay Wildlife Society is a not-for-profit 501(c)(3) organization which raises money and awareness for the San Francisco Bay National Wildlife Refuge Complex.

YES! I want to support San Francisco Bay Wildlife Society and its programs with my membership. My dues include a subscription to *Tideline* and 15% discount at the Don Edwards SF Bay National Wildlife Refuge bookstore. Enclosed is my contribution of:

- \$20 Student/Senior \$50 Family \$100 Participant \$200 Corporation \$500 Sustainer
 \$35 Individual \$75 Supporter \$250 Sponsor \$1,000 Leader

Check Visa or MasterCard # _____ Exp. Date _____

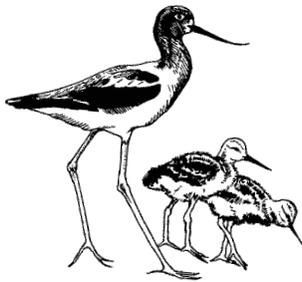
Signature _____

Name _____

Address _____ City _____ State _____ Zip _____

Phone _____ **Thank you for your support!**

Virtual Watershed Flight Campaign: Endow WOWW!



Help raise \$60,000 to create two interactive computer exhibits at the Visitor Center in Fremont and the Environmental Education Center in Alviso. You can contribute first-hand to education programs for local schools and the general public.

To donate, go to our website at www.sfbws.com or call 510-745-8170

Pilot Level

Donate \$5,000 or more

Recognition in Kiosk WOWW application program, shown as Sponsor on www.sfbws.com website and special mention in *Tideline* for 1 year.

Navigator Level

Donate \$1,000 or more

Recognition in Kiosk WOWW application program and special mention in *Tideline* for that quarter.

WOWW Support Level

Donate \$100 or more

Receive a Wildlife Society memento of your choice: mug or mouse pad

What is WOWW?

W.O.W.W. is the acronym for the Watching Our Watersheds & Wildlife Project that brings interactive learning kiosks and educational tools to introduce visitors and students to the concepts of watersheds, wildlife corridors, wildlife and plant identification, historical ecology, climate change, and the effects of pollution on the San Francisco Bay. This project will use the latest technologies to provide visitors the opportunity to “fly” their way through the Google Earth Alameda and Santa Clara County watershed maps when their zip code is typed in. They will see which creeks go by their houses or schools, observe valley historical ecology, or have the option to take an automated fly-through tour of the watershed.

This project will include two permanent touch-screen computers on the refuge, one at the Visitor Center in Fremont and one at the Environmental Education Center in Alviso. In addition, the fun, engaging learning modules can be uploaded from the San Francisco Bay Wildlife Society’s website for in-classroom and public use! The kiosks and the programs available for download are expected to be in place by the end of this year.



The Environmental Education Center now offers free
Wi-Fi courtesy of the San Francisco Bay Wildlife Society

Winter Activity Schedule

December

Saturday, December 1

Beginning Birding Clinic
Environmental Education Center, Alviso
9:00 a.m. – 11:00 a.m.

If you can't tell your egrets from your cormorants this class is for you! We'll learn about binoculars, identification books, and other birding basics through hands-on activities and conversation. Then we'll go out into the field to practice our new skills. Binoculars and books provided during the class. Be prepared to be outdoors in the weather. Reservations Required. 408-262-5513 ext.106.

***Celebrate the History of the Bay!**
Environmental Education Center, Alviso
1:30 p.m. – 3:30 p.m.

Celebrate the history of the San Francisco Bay. Come visit our new exhibit "The Story of a Changing Bay." It highlights how the Bay was formed and the unique relationships over time between humans, plants and animals to the abundant marshes located at the southern edge of San Francisco Bay. We will start off with a short hike to learn about the history of the Bay and then make tule boat replicas that you can take home with you. Reservations Required. Call Genie Moore at 408-262-5513 ext. 100.

Sunday, December 2

Story Hunters - Part 1
Visitor Center, Fremont
2:00 p.m. – 3:30 p.m.

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. After a brief introduction on how to use our GPS units, we'll give you a set of coordinates that will lead you to the landmarks that embody the rich human history that helped shaped refuge lands. GPS units are available for loan. Call 510-792-0222 ext. 363 for reservations.

Saturday, December 8

Animal Drawing for Families and Adults
Environmental Education Center, Alviso
11:00 a.m. – 12:30 p.m.

Learn how to draw animals! Increase your confidence in drawing animals and learn skills to help you draw what you see. We will have a variety of mounted animals and skeletons so you can observe the

anatomy of different types of wildlife. We will practice techniques for converting your careful observations into realistic drawings. Appropriate for ages 8 and up. Children, please bring an adult who would like to participate. Adults without children are welcome as well! Bring a sketch pad and pencil or use ours. All skill levels welcome. Call Debra for reservations at 408-262-5513 ext. 102.

***Family Bird Walk**
2:00 p.m. – 4:00 p.m.
Visitor Center, Fremont

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal bird watching field guides, and then head out onto the trails to find those birds. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 363.

Twilight Marsh Walk
Visitor Center, Fremont
4:00 p.m. – 5:30 p.m.

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext 363. Led by Mary and Gene Bobik.

Saturday, December 15

Intro to Nature Drawing for Teens and Adults
Visitor Center, Fremont
10:30 a.m. – 12:30 p.m.

Learn the basics of sketching nature. We will learn how to draw with negative shapes and shadows, and how to use color and light to add dimension. We will discuss how the changing horizon lines can offer depth. There will be opportunities to practice these techniques on the trail. Paper and pencils will be provided. Dress for the weather. Program begins in the pavilion. Program is for ages 13 and up. Call for reservations at 510-792-0222 ext. 363. Led by Travis Turner.

Seasons & Weather
Environmental Education Center, Alviso
1:30 p.m. – 3:00 p.m.

Why is it summer in San José, California when it's winter in Sydney, Australia? How are clouds made? Why does it rain? What is the difference between a hurricane and a tornado? How does weather affect people and wildlife? Find the answers to all these questions and learn other interesting facts about weather. Suitable for ages 7 and up. Led by Ed Kantack. Call Debra at 262-5513 ext. 102 for reservations.

The Remarkable Gray Fox
Visitor Center, Fremont
2:00 p.m. – 3:30 p.m.

After this walk & talk, you will leave with a handful of tools that will allow you to determine if gray foxes are present wherever you happen to be in the United States. Along with these set of tools, I'll introduce you to what makes gray foxes more unique than all of the foxes in the world. Good walking shoes and a hat recommended. Led by Bill Leikam.

Sunday, December 16

***Duck Walk**
Visitor Center, Fremont
10:00 a.m. – 11:30 a.m.

Thousands of ducks winter in the San Francisco Bay every year. Hear a short lecture on duck identification. Then we'll head out on the trail to try your new skills. A limited number of binoculars are available to borrow. Dress warmly. Led by Carmen Minch.

Animals After Dark
Environmental Education Center, Alviso
2:00 p.m. – 3:30 p.m.

As night falls and we fall into a deep slumber, some creatures are just waking up. Learn how these fascinating animals are specially adapted for the night environment. RESERVATIONS RECOMMENDED – All ages are welcome. Call 408-262-5513 ext. 104

Sunday, December 23

***Salt Marsh Walk**
Visitor Center, Fremont
2:00 p.m. – 3:30 p.m.

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Call 510-792-0222 ext. 363 for reservations.

January

Saturday, January 5

***Marshlands of Dreams**
Visitor Center, Fremont
10:30 a.m. – 11:30 a.m.

Join Paul Mueller on a 1-mile walk of the LaRiviere Marsh Trail to find traces of the past. Prior to marsh restoration, learn how Californians utilized the area for farming, quarrying, salt production, and transportation.



***Trails are generally level. Surface and trail conditions vary. Please call for accessibility information.**

Visitor Center, 2 Marshlands Road, Fremont – (510) 792-0222 ext. 363 • Environmental Education Center, 1751 Grand Blvd, Alviso – (408) 262-5513

***Bird Migration Walk**
Ravenswood Unit (SF2), Menlo Park
2:00 p.m.–3:30 p.m.

Our wetlands are an important stop on the Pacific Flyway, a major bird migration route. Stroll with docent Laurel Stell to learn why the birds migrate, why they stop along the San Francisco Bay, and to spot the birds in action. Trail is easy and level. All ages and abilities welcome. Meet at the SF2 trail parking area on the west side of the Dumbarton Bridge. For information and directions, call 408-262-5513 ext. 106.

Sunday, January 6

Story Hunters - Part 2

Visitor Center, Fremont
2:00 p.m. – 3:30 p.m.

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. New coordinates will lead you to two new landmarks that embody the rich human history that helped shaped refuge lands. We'll begin with a brief introduction on how to use our GPS units. GPS units are available for loan. This program is open to everyone. Call 510-792-0222 ext. 363 for reservations.

***Chompers and Stompers**
Environmental Education Center, Alviso
2:00 p.m. – 3:30 p.m.

Ever wondered why birds come in so many shapes, sizes, and colors? Come and find out why some birds exhibit wacky behaviors. We will examine different bird specimens we have collected over the years to see how birds have adapted some extraordinary features. Come admire the bird kingdom and then take a guided walk around the refuge to see these marvelous creatures in action. RESERVATIONS RECOMMENDED. All Ages are welcome. Call Julie at 408-262-5513 ext. 104.

***Bird Migration Walk**
Environmental Education Center, Alviso
3:00 p.m.– 4:30 p.m.

Our wetlands are an important stop on the Pacific Flyway, a major bird migration route. Stroll with docent Laurel Stell to learn why the birds migrate, why they stop along the San Francisco Bay, and to spot the birds in action. Trail is easy and level. All ages and abilities welcome. Meet at the SF2 trail parking area on the west side of the Dumbarton Bridge. For information and directions, call 408-262-5513 ext. 106.

Saturday, January 12

Community Service
Visitor Center, Fremont
9:30 a.m. – 12:00 p.m.

If you are interested in improving the refuge for visitors and for wildlife alike, join us at the Visitor Center for a community service project. We will do either a trash cleanup or a planting/weeding project. Dress appropriately for the task and for the weather. We will have gloves to lend and will provide the tools. Bring your own water bottle. Meet in the parking lot at the Visitor Center. Driving an additional 2.5 miles may be required since the project may be a different location. For more information, or to make reservations, call 510-792-0222 ext. 363.

Gardening at the EEC -
Community Service
Environmental Education Center, Alviso
10:00 a.m. – 12:00 p.m.

Come help out by planting native plants and improving our native plant gardens. The wildlife will thank you! Bring your own gloves or borrow a pair of ours – tools are provided. Dress in layers and bring water and sunscreen. Be prepared to get dirty! Ages 9 and up. Participants under 18 must be accompanied by a chaperone. Call Debra for reservations at 408-262-5513 ext. 102.

Drawbridge: A History Revealed
Environmental Education Center, Alviso
10:00 a.m. – 11:00 a.m.

There's a ghost town in the San Francisco Bay? That's right! Nestled on an island in the salt marshes of South San Francisco Bay, the town of Drawbridge once boomed. Was it a quiet, peaceful town full of nature lovers, or a rip-roaring town full of two-fisted rowdies? Find out at this slideshow led by Ceal Craig. Program is suitable for adults. Note: this program does not include the Drawbridge Van Tour. Call Debra at 408-262-5513 ext. 102 for reservations.

Nature Drawing for Kids
Visitor Center, Fremont
10:30 a.m. – 12:30 p.m.

Does your child have an interest in the arts? Introduce your child to outdoor sketching in this workshop by Travis Turner and increase their observations skills. We will learn how to draw what we see by incorporating common shapes and learn about color value. We will then head out onto the trail and practice the various techniques. Paper and pencils will be provided. This program takes place outside. Dress warmly. Rain cancels. Kids age 7-12 only! Call for reservations at 510-792-0222 ext. 363. Minors must be accompanied by an adult.

***Hawk Hunt!**
Environmental Education Center, Alviso
1:30 p.m. – 3:00 p.m.

Hey kids! Are you interested in awesome birds of prey? Do you ever see a Red-Tailed Hawk soaring above you and wonder what he may be doing? If so, come on out to this beginning raptor class to see a short presentation about different birds of prey followed by a short hike. This program will conclude with an interactive game which will show how hawks hunt. Led by Jennifer Fraga. Call Debra for reservations at 408-262-5513 ext. 102.

***The Basics of Salt Pond**
Restoration
Environmental Education Center, Alviso
2:00 p.m. – 3:30 p.m.

Join Park Ranger José Garcia to find out how construction in former salt ponds A16 and A17 ties into the South Bay Salt Pond Restoration Project. This ambitious project seeks to convert 15,100 acres of former industrial salt ponds to endangered species and other wildlife habitat using adaptive management. Presentation will be in the auditorium and if weather permits a walk on the 0.25-mile boardwalk to view the progress thus far.



Winter
Activity
Schedule

The Remarkable Gray Fox
Visitor Center, Fremont
2:00 p.m. – 3:30 p.m.

After this walk & talk, you will leave with a handful of tools that will allow you to determine if gray foxes are present wherever you happen to be in the United States. Along with these set of tools, I'll introduce you to what makes gray foxes more unique than all of the foxes in the world. Good walking shoes and a hat recommended. Led by Bill Leikam.

Twilight Marsh Walk
Visitor Center, Fremont
4:00 p.m. – 5:30 p.m.

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext 363. Led by Mary and Gene Bobik.

Sunday, January 13

***Bird Watching for Beginners**
Visitor Center, Fremont
9:30 a.m. - 11:30 a.m.

Thousands of birds winter on the Don Edwards Refuge every year. In this beginner's program, we will go over the use of binoculars, how to use a bird guide, and identify the birds we see on the trail. Recommended for ages 10 and up. Dress warmly and wear comfortable shoes. Heavy rain cancels. Please call 510-792-0222 ext. 363 for reservations. Led by Carmen Minch.

Saturday, January 19

Beginning Bird Drawing
for Families and Adults
Environmental Education Center, Alviso
11:00 a.m. – 12:30 p.m.

Come if you want to learn how to draw birds! Increase your confidence in drawing and learn some skills to help you draw what you see. We will have a variety of mounted birds for sketching and for observing bird anatomy. We will practice techniques for life-like drawing and for getting proportions right. Appropriate for ages 8 to adult. Children, please bring an adult with you who would like to participate. Adults without children are also welcome. Bring a sketch pad and pencil or use ours. All skill levels welcome. Call Debra at 408-262-5513 ext. 102 for reservations.

***Trails are generally level. Surface and trail conditions vary. Please call for accessibility information.**

Visitor Center, 2 Marshlands Road, Fremont – (510) 792-0222 ext. 363 • Environmental Education Center, 1751 Grand Blvd, Alviso – (408) 262-5513

Winter Activity Schedule

Intermediate Bird Drawing Environmental Education Center, Alviso

1:30 p.m. – 3:00 p.m.

Learn techniques to help your bird drawings come to life! This class will be a continuation of the morning class. It can also be taken independently. The morning class emphasizes quick sketches and basic shapes, while this class will emphasize the 3-dimensional form and provide more advanced techniques. Appropriate for ages 8 to adult. Children, please bring an adult with you who would like to participate. Adults without children are also welcome. Bring a sketch pad and pencil or use ours. All skill levels welcome. Call Debra at 408-262-5513 ext. 102 for reservations.

Living Wetlands

Environmental Education Center, Alviso

1:30 p.m. – 3:00 p.m.

Our refuge consists of salt marsh, salt ponds, tidal and non-tidal sloughs. How do humans and wildlife depend on our wetlands? How does the marsh affect a nice seafood dinner at your favorite restaurant? The answers can be found by enjoying a slideshow depicting the life and death struggles of our marsh inhabitants. Best suited for ages 7 and up. Led by Ed Kantack. Call Debra at 408-262-5513 ext. 102 for reservations.

Story Hunters - Part 2

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. New coordinates will lead you to two new landmarks that embody the rich human history that helped shaped refuge lands. We'll begin with a brief introduction on how to use our GPS units. GPS units are available for loan. This program is open to everyone. Call 510-792-0222 ext. 363 for reservations.

Sunday, January 20

*Salt Marsh Walk

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Call 510-792-0222 ext. 363 for reservations.

Saturday, January 26

*Family Bird Walk

2:00 p.m. – 4:00 p.m.

Visitor Center, Fremont

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal bird watching field guides, and then head out onto the trails to find those birds. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 363.

Sunday, January 27

*Marsh Mud Mania

Environmental Education Center, Alviso

1:00 p.m. – 2:30 p.m.

Mud – It's what's for dinner! The mud flats of the southern San Francisco Bay are food sources for thousands and thousands of migratory and resident bird species. One spoonful of South Bay mud can contain thousands of organisms! Come see for yourself during this fun, hands-on opportunity – participants will use tools to investigate mud, and go on a guided walking tour of the marshlands. RESERVATIONS REQUIRED. All Ages are welcome. Call Julie at 408-262-5513 ext. 104 for reservations.

February

Saturday, February 2

*Marshlands of Dreams

Visitor Center, Fremont

10:30 a.m. – 11:30 a.m.

Join Paul Mueller on a 1-mile walk of the LaRiviere Marsh Trail to find traces of the past. Prior to marsh restoration, learn how Californians utilized the area for farming, quarrying, salt production, and transportation. There are opportunities for bird watching as well.

Calling all Citizen Scientists! – California Phenology Project

Environmental Education Center, Alviso

1:30 p.m. – 3:00 p.m.

Become a scientist and contribute to a project studying the timing of plant life cycles throughout the seasons. Are plants responding to climate variability? Come learn about projects being set up in the South Bay and how you can participate. We will begin with an indoor presentation followed by practicing plant monitoring outside, weather permitting. For more information about the California Phenology Project, see <http://www.usanpn.org/cpp/about/>. This project is appropriate for adults and families. Call Debra at 408-262-5513 ext. 102 for reservations.

Sunday, February 3

*Duck Walk

Visitor Center, Fremont

10:00 a.m. – 11:30 a.m.

Thousands of ducks winter in the San Francisco Bay every year. Hear a short lecture on duck identification. Then we'll head out on the trail to try your new skills. A limited number of binoculars are available to borrow. Dress warmly. Led by Carmen Minch.

Story Hunters - Part 3

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. New coordinates will lead you to two new landmarks that embody the rich human history that helped shaped refuge lands. We'll begin with a brief introduction on how to use our GPS units. GPS units are available for loan. This program is open to everyone. Call 510-792-0222 ext. 363 for reservations.

Saturday, February 9

Community Service

Visitor Center, Fremont

9:30 a.m. – 12:00 p.m.

If you are interested in improving the refuge for visitors and for wildlife alike, join us at the Visitor Center for a community service project. We will do either a trash cleanup or a planting/weeding project. Dress appropriately for the task and for the weather. We will have gloves to lend and will provide the tools. Bring your own water bottle. Meet in the parking lot at the Visitor Center. Driving an additional 2.5 miles may be required since the project may be a different location. For more information, or to make reservations, call 510-792-0222 ext. 363.

Gardening at the EEC - Community Service

Environmental Education Center, Alviso

10:00 a.m. – 12:00 p.m.

Come help out by planting native plants and improving our native plant gardens. The wildlife will thank you! Bring your own gloves or borrow a pair of ours – tools are provided. Dress in layers and bring water and sunscreen. Be prepared to get dirty! Ages 9 and up. Participants under 18 must be accompanied by a chaperone. Call Debra for reservations at 408-262-5513 ext. 102.

*Beginning Bird Watching

Environmental Education Center, Alviso

1:30 p.m. - 3:00 p.m.

Ever wonder what birds we have in our own community? This will be a great way to learn about many local and migratory birds. Start with a slideshow indoors to learn how to recognize the regulars, then borrow binoculars and join Paul Bridges on a walk to try out your new skills. All ages welcome. Please call Debra at 408-262-5513 ext. 102 for reservations.

*The Basics of Salt Pond Restoration

Environmental Education Center, Alviso

2:00 p.m. – 3:30 p.m.

Join Park Ranger, José Garcia, to find out how construction in former salt ponds A16 and A17 ties into the South Bay Salt Pond Restoration Project. This ambitious project seeks to convert 15,100 acres of former industrial salt ponds to endangered species and other wildlife habitat using adaptive management. Presentation will be in the auditorium and if weather permits a walk on the 0.25-mile boardwalk to view the progress thus far.

***Trails are generally level. Surface and trail conditions vary. Please call for accessibility information.**

Visitor Center, 2 Marshlands Road, Fremont – (510) 792-0222 ext. 363 • Environmental Education Center, 1751 Grand Blvd, Alviso – (408) 262-5513

Twilight Marsh Walk

Visitor Center, Fremont

4:30 p.m. – 6:00 p.m.

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext 363. Led by Mary and Gene Bobik.

Sunday, February 10

Oliver Salt Works Hike

Eden Landing Ecological Reserve, Hayward

9:00 a.m. – 11:00 a.m.

Hidden among the salt ponds is one of the East Bay's most intriguing historical sites. The Don Edwards Refuge and the South Bay Salt Pond Restoration Project are sponsoring this hike to the old Oliver Salt Works within the Eden Landing Ecological Reserve. We'll be walking into an area of the reserve not yet open to the public so please be prepared to walk two miles on unimproved levees. Reservations required. Please call 408-262-5513 ext.106

Intro to Nature Drawing for Teens and Adults

Visitor Center, Fremont

10:30 a.m. – 12:30 p.m.

Learn the basics of sketching nature. We will learn how to draw with negative shapes and shadows, and how to use color and light to add dimension. We will discuss how the changing horizon lines can offer depth. There will be opportunities to practice these techniques on the trail. Paper and pencils will be provided. Dress for the weather. Program begins in the pavilion. Program is for ages 13 and up. Call for reservations at 510-792-0222 ext. 363. Led by Travis Turner.

Mysteries of Wastewater Treatment

Environmental Education Center, Alviso

2:00 p.m. – 3:30 p.m.

The San José-Santa Clara Water Pollution Control Plant treats hundreds of millions of gallons of wastewater from millions of people every day using some of the most advanced treatment technologies available. Come and learn what it takes to make this interesting process happen through a slideshow and an activity where we treat some "wastewater". A tour of the Water Pollution Control Plan is not included as a part of this program. RESERVATIONS RECOMMENDED – All Ages are welcome. Call Julie at 408-262-5513 ext. 104 for reservations.



*Trails are generally level. Surface and trail conditions vary. Please call for accessibility information.

Visitor Center, 2 Marshlands Road, Fremont – (510) 792-0222 ext. 363 • Environmental Education Center, 1751 Grand Blvd, Alviso – (408) 262-5513

Saturday, February 16

Gardening at the EEC - Community Service

Environmental Education Center, Alviso

10:00 a.m. – 12:00 p.m.

Come help out by planting native plants and improving our native plant gardens. The wildlife will thank you! Bring your own gloves or borrow a pair of ours – tools are provided. Dress in layers and bring water and sunscreen. Be prepared to get dirty! Ages 9 and up. Participants under 18 must be accompanied by a chaperone. Call Debra for reservations at 408-262-5513 ext. 102.

Basic Botanical Drawing for Families and Adults

Environmental Education Center, Alviso

10:30 a.m. – 12:00 p.m.

Learn how to draw realistic flowers, fruit and leaves. Increase your confidence in drawing and learn new skills. We will look closely at flowers, even taking some apart, to see how they are put together. Then we will turn our observations into realistic drawings. Appropriate for ages 8 and up. Children, please bring an adult who would like to participate. Adults without children are welcome as well. Bring a sketch pad and pencil or use ours. All skill levels welcome. Led by Kathy Kleinsteinber. For reservations, call Debra at 408-262-5513 ext. 102.

Ravenswood Hike

Bedwell Bayfront Park, Menlo Park

10:30 a.m. – 12:30 p.m.

The 2.3-mile perimeter trail at Bedwell Bayfront Park offers great opportunities to discover winter wildlife and to discuss how future wetlands restoration will shape this piece of the Bay. Offered by the Refuge and the Friends of Bedwell Bayfront Park. Meet at the main parking lot bathrooms at Bedwell Bayfront Park. Call 408-262-5513 ext. 106 for information.

Habitats, Etc.

Environmental Education Center, Alviso

1:30 p.m. – 3:00 p.m.

What is a habitat besides a place to live? Come and explore our wetland habitats and find out what creatures like to call these places home. This outdoor activity may be moved inside if we experience inclement weather. Led by Ed Kantack. Call Debra at 408-262-5513 ext. 102 for reservations.

The Remarkable Gray Fox

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

After this walk & talk, you will leave with a handful of tools that will allow you to determine if gray foxes are present wherever you happen to be in the United States. Along with these set of tools, I'll introduce you to what makes gray foxes more unique than all of the foxes in the world. Good walking shoes and a hat recommended. Led by Bill Leikam.

Winter Activity Schedule

*Family Bird Walk

2:30 p.m. – 4:30 p.m.

Visitor Center, Fremont

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal bird watching field guides, and then head out onto the trails to find those birds. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 363.

Saturday, February 23

Story Hunters - Part 3

Visitor Center, Fremont

2:00 p.m. - 3:30 p.m.

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. New coordinates will lead you to two new landmarks that embody the rich human history that helped shaped refuge lands. We'll begin with a brief introduction on how to use our GPS units. GPS units are available for loan. This program is open to everyone. Call 510-792-0222 ext. 363 for reservations.

Sunday, February 24

Wetlands Water Café

Environmental Education Center, Alviso

1:00 p.m. – 2:30 p.m.

Wetlands can be filled with all sorts of nutrients and organisms that build a diverse web of life. Come visit the wetlands of the South Bay at the Environmental Education Center during this program. Participants will use our lab to observe wetland critters up close and learn about their role in the ecosystem. All Ages are welcome. Call Julie at 408-262-5513 ext. 104 for reservations.

*Salt Marsh Walk

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat, and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Call 510-792-0222 ext. 363 for reservations.

Field Trips to the Refuge

General Education Program Information

We offer FREE field trip programs at two sites at the Don Edwards San Francisco Bay National Wildlife Refuge. Wetland Round-Up field trip programs are offered at our Headquarters in Fremont, and Wetland Round-Up and Living Wetlands are offered at the Environmental Education Center in Alviso. These programs actively involve teachers, adult volunteers, and students in investigating the diverse habitats and wildlife at the refuge. The hands-on, small-group activities are designed to teach basic ecological concepts and to introduce endangered species, migratory birds, and wetland habitats to the students. *All programs have been correlated to the appropriate State of California Education Standards.*

Educators and adult leaders conduct their own field trips after attending a Field Trip Training or Workshop. The Trainings and Workshops allow you to design and conduct your own field trip. In addition, adult volunteers must be recruited to lead the activities at the different learning stations and to chaperone the rotation groups of students. We provide easy to follow "scripts" for each station, but both "leaders" and "chaperones" are strongly encouraged to attend a Field Trip Workshop. New teachers must attend the New Teacher Training. It is our policy that lead educators must attend a workshop every third year. Location of activities and trail conditions may vary. Please call for accessibility information.

Field Trips at the Learning Center in Fremont

The **Wetland Round-Up Field Trip** program in Fremont will resume in Spring 2013. The field trip is designed for grades K-6, for up to 65 students. Mail-in reservations will begin on November 19, 2012. All registration forms received will be opened on December 6, 2012.

Mail-in reservation procedures for Fremont can be found on our website at http://www.fws.gov/desfbay/ee_registration.htm.

Contact the Environmental Education Staff at Fremont:

Office: (510) 792-0222 x 475 Cell: (510) 377-7269

E-mail: ee.hq.intern@gmail.com

Orientation dates will be listed on our website at http://www.fws.gov/desfbay/Field_Trips/Fremont_EE.htm on November 19, 2012.

Field Trips at the Environmental Education Center in Alviso

Wetland Round-Up Field Trips - Investigate the butterflies in the butterfly garden, taste pickleweed in the salt marsh, or discover the creatures that live in the slough water on a Wetland Round-Up Field Trip. This field trip program is designed for up to 65 students in grades K-6. **Wetland Round-Up** will be offered Spring 2013. Mail-in reservations will begin on November 19, 2012. All registration forms received will be opened on December 6, 2012.

NEW! MAIL-IN REGISTRATION for Alviso!!

Mail-in registration for Spring 2013 (March - May) will begin on November 19, 2012. Here's how it works:

- Registration Forms will be available on-line at http://www.fws.gov/desfbay/Reg_form_EEC.pdf
- You will be able to choose from a list of available dates and indicate your 1st, 2nd and 3rd choices on the form. Please make sure ALL these dates are good ones as availability may be more limited this year. If your school is requesting multiple field trip dates, you must submit up to 6 date preferences so that we can accommodate your group.
- PLEASE NOTE! Completed field trip registration forms should be mailed to our office in the following manner:
U.S. Fish and Wildlife Service
P.O. Box 411
Alviso, CA, 95002
WRFT Registration/ EE attn: Michael
- You may also FAX your request to: (408) 262-2867, attention Michael OR, you may drop off your completed form at the Environmental Education Center - 1751 Grand Blvd., Alviso. (Open Saturday and Sunday 10 am - 5 pm, call for weekday hours). We will not be accepting electronic versions of the forms at this time.
- All forms received will be opened on December 6, 2012.
- Every effort will be made to accommodate your requests. However, we may need to offer alternative dates if we cannot assign you your preferred dates.
- Selections will be made in a timely fashion. You will be notified by your preferred method as indicated on your form.
- We will continue to take requests after December 6, 2012 until all available dates for the Spring season (March - May) have been filled.
- Details about Fall 2013 registration will be in the Summer issue of *Tideline* and also posted on our website at http://www.fws.gov/desfbay/Field_Trips/Alviso_EE.htm

New Teacher Field Trip Training

Teachers that have not yet attended a field trip orientation must attend one of the following New Teacher Field Trip Trainings.

Dates will be listed at http://www.fws.gov/desfbay/Field_Trips/Alviso_EE.htm on November 19, 2012

Parent Leader, Chaperone and Returning Teacher Workshop

Parent Leaders, Chaperones, and Returning Teachers will be offered a separate workshop. We highly recommend that Parent Leaders and Chaperones attend one of the following workshops. We strongly encourage returning teachers to attend the workshop with their parent volunteers.

Workshop dates will be listed on our website at http://www.fws.gov/desfbay/Field_Trips/Alviso_EE.htm on November 19, 2012

For more information call the Environmental Education Staff at Alviso: (408) 262-5513 ext. 103 or email: eec.refuge@hotmail.com

Living Wetlands Education Program

The Living Wetlands Program provides first-hand learning environment for students and educators to explore the topics of watershed health, wetlands, and habitat preservation. Activities and presentations focus on the relationship between personal habits and their effects on local wetlands. Living Wetlands is an environmental education program offered at no cost through the cooperative efforts of the City of San Jose, U.S. Fish and Wildlife Service, and the San Francisco Bay Wildlife Society.

Living Wetlands Program Offerings:

Integrated Field Trip Program (5th – 12th grades): This program incorporates multiple activities related to wetlands and watershed health. Participating classes will receive one pre-classroom presentation from Living Wetlands educators, a field trip to the Don Edwards Refuge, and one post-classroom presentation. All include hands-on activities and demonstrations. For the Integrated Program, participating classes must be from the following cities: San Jose, Alviso, Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino. There is a limitation to 60 students per field trip, and a 1:10 chaperone to student ratio is required.

Classroom Presentations (5th – 12th grades): Currently there are three classroom presentation activities available: Watersheds and Wetlands; Mysteries of Wastewater Treatment; and Marsh Lab Study. Each of these presentations takes approximately one hour. Please contact us for specific classroom presentation needs.

Field Trip and Guided Tours for other Schools, Colleges, Universities, and related organizations: General presentations and guided tours are available and are generally 1.5 hours in length.

Educators are encouraged to contact us to discuss options for customizing field trips and classroom presentations. Reservations



for the Living Wetlands program are on a first-come basis. For more information, or to make a reservation, call Julie Kahrnoff, the Living Wetlands Program Coordinator at 408-262-5513 ext. 104 or email at livingwetlands@sfbws.com.

PLEASE NOTE CONSTRUCTION AT THE ENVIRONMENTAL EDUCATION CENTER:

The salt ponds (A16 and A17) adjacent to the Environmental Education Center will be undergoing construction for the South Bay Salt Pond Restoration Project. Restoring A16 and A17 will create 130 acres of tidal marsh habitat and 240 acres of shallow water foraging habitat for migratory birds, including nesting islands. *Thank you for your patience during this exciting restoration project!*

TIDELINE

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Editor: Carmen Minch

To receive *Tideline*, email carmen_leong-minch@fws.gov, or write to: *Tideline*, San Francisco Bay National Wildlife Refuge Complex, 1 Marshlands Rd, Fremont, CA 94555

San Francisco Bay National Wildlife Refuge Complex

Administered by the U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex exists to preserve wildlife habitat, protect threatened and endangered species, protect migratory birds, and provide opportunities for nature study. Seven refuges are managed from the headquarters in Fremont: Antioch Dunes NWR, Don Edwards San Francisco Bay NWR, Ellicott Slough NWR, Farallon NWR, Marin Islands NWR, Salinas River NWR, and San Pablo Bay NWR.

Project Leader Anne Morkill

Deputy Project Leader:..... John Bradley

Wildlife Refuge Specialist:..... Val Urban

Don Edwards Refuge Manager: Eric Mruz

Don Edwards Wildlife Specialist:..... Melisa Helton

Don Edwards Warm Springs
Unit Manager:.....Ivette Loreda

Farallon Refuge Manager: Gerry McChesney

Farallon Wildlife Specialist:.....Jonathon Shore

North Bay Refuges Manager:.....Don Brubaker

North Bay Wildlife Specialist:Louis Terrazas

South Bay Refuges Manager: Diane Kodama

Public Affairs Officer:.....Doug Cordell

Refuge Planner:.....Winnie Chan

Chief of Visitor Services:Jennifer Heroux

Park Ranger/Outdoor Recreation
Planners:..... Joseph Garcia and Carmen Minch

Environmental Education
Specialists: Tia Glagolev and Genie Moore

Volunteer Coordinator: Paul Mueller

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Chris Wilson

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San Francisco Bay Wildlife Society

A nonprofit 501(c)(3) cooperating association established in 1987 to promote public awareness and appreciation of San Francisco Bay and fund education and outreach programs at San Francisco Bay National Wildlife Refuge Complex.

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Tideline is On-Line

Visit our web site, which features past issues of *Tideline*, at <http://www.fws.gov/desfbay>



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San Francisco Bay NWR Complex

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WINTER 2012
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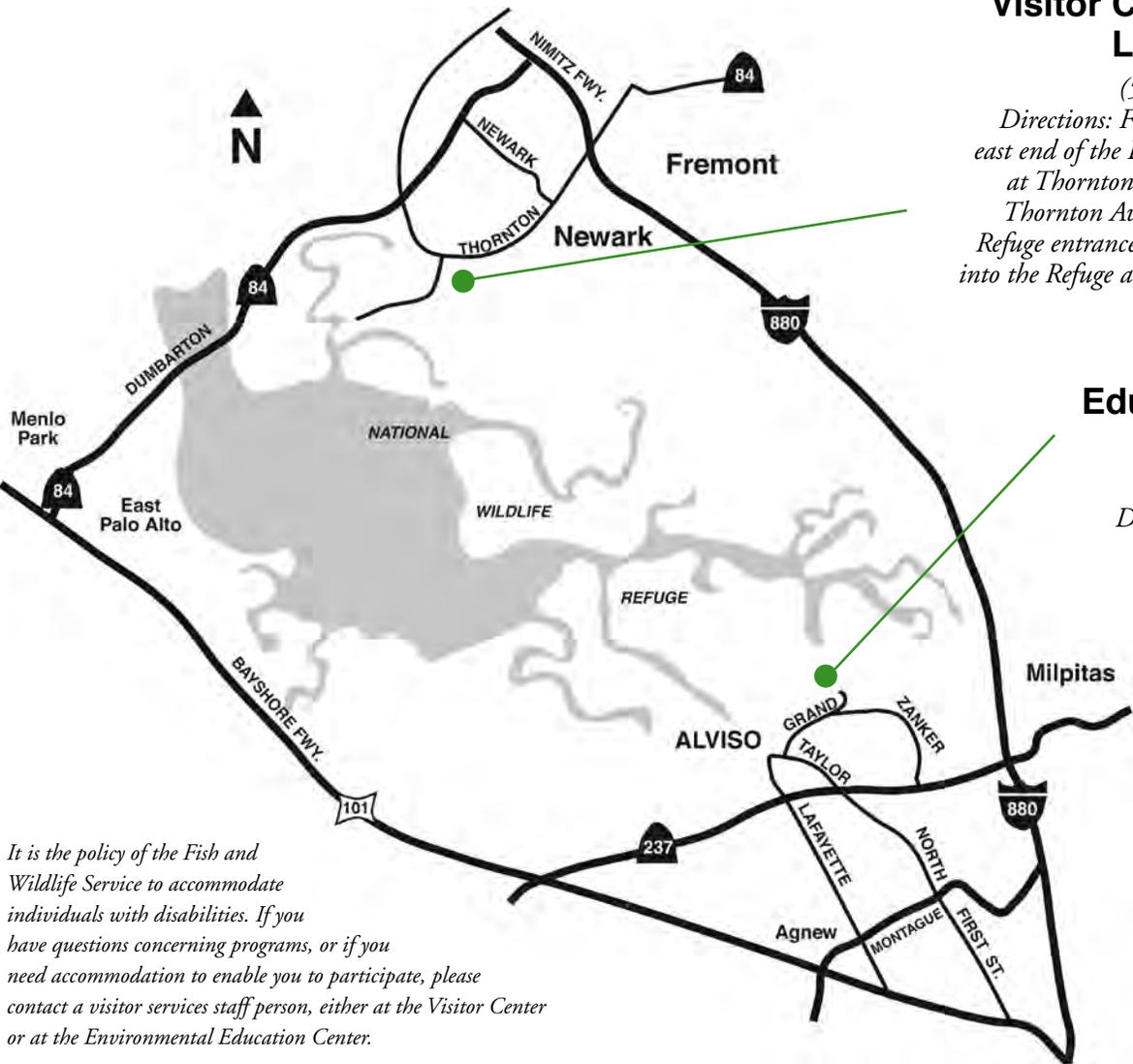
Tideline



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Don Edwards / Antioch Dunes / Ellicott Slough / Farallon Island / Marin Islands / Salinas River / San Pablo Bay



Visitor Center, Fremont Learning Center

(510) 792-0222 ext. 363
 Directions: From Highway 84 (at the east end of the Dumbarton Bridge), exit at Thornton Avenue. Travel south on Thornton Avenue for 0.8 miles to the Refuge entrance on the right. Turn right into the Refuge and follow the signs to the Visitor Center.

Environmental Education Center, Alviso

(408) 262-5513
 Directions: From I-880 or Highway 101, exit on Highway 237 toward Mountain View/Alviso. Turn north onto Zanker Road. Continue on Zanker Road to the Environmental Education Center entrance road (a sharp right turn at Grand Blvd.) The distance from 237 to the entrance road is 2.1 miles.

It is the policy of the Fish and Wildlife Service to accommodate individuals with disabilities. If you have questions concerning programs, or if you need accommodation to enable you to participate, please contact a visitor services staff person, either at the Visitor Center or at the Environmental Education Center.