



Volume 27, Number 2

Mercury Contamination in Waterbirds Breeding in San Francisco Bay

by Dr. Josh Ackerman
and Dr. Collin Eagles-Smith

References to the neurological effects of mercury exposure date back several centuries. In the 1800s, when mercury was a common ingredient used in the production of felt hats, the term “mad as a hatter” entered the vernacular as a reference to the slurred speech, irritability, tremors, and other odd behavior that mercury exposure could cause. These neurological and behavioral effects were made famous by the delirious Mad Hatter character in Lewis Carroll’s 1865 masterpiece *Alice in Wonderland*.

However, environmental concerns regarding mercury contamination were not widespread until the tragedy in Minamata Bay, Japan in the late 1950s when an estimated 27 tons of mercury-containing compounds were released into the Bay from a plastics factory. The mercury accumulated up the food chain into fish, which comprised a major portion of the fishing town’s diet. The outcome was drastic – the fishery collapsed, several hundred people died, and more than 3,000 others had contracted “Minamata disease” which caused devastating neurological impacts from methyl mercury exposure. Since this and other tragic mercury-related events, extensive research has been undertaken to understand the distribution, cycling, and accumulation of mercury in the environment. These past studies have indicated that mercury is a potent neurotoxin and a common contaminant in aquatic ecosystems throughout the world, and is a significant health threat to both humans and wildlife.

San Francisco Bay has a legacy of mercury contamination from historical mercury mining in the Coast Range and gold extraction in the Sierra Nevadas. An estimated 220 million pounds of mercury were mined in the coastal

mountains from the mid-1800s to the mid-1900s. Additionally, over 26 million pounds of mercury were used for gold recovery in the Sierras. During these mining activities, roughly 10% to 30% of all the mercury used was lost to the surrounding watersheds and has since been making its way, attached to sediment particles, into the San Francisco Bay-Delta. This pollution has resulted in San Francisco Bay being listed as an impaired water body under the Clean Water Act, and a Bay-wide fish consumption advisory has been enacted by the State of California’s Office of Environmental Health Hazard Assessment (for more information visit <http://www.oehha.ca.gov/fish/general/sfbaydelta.html>).

The most sensitive endpoint of mercury toxicity in wildlife is reproductive impairment, thus mercury contamination in San Francisco Bay may reduce the reproductive success of waterbirds breeding within the estuary. Although these effects have been little studied in the estuary, the risk is a concern because San Francisco Bay is a site of hemispheric importance to shorebirds, annually supporting over half a million wintering and



A radio-marked avocet is readied for release. Subsequently, it is tracked to determine movements and habitat use.
Photo by Scott Demers, USGS.

Continued page 2



A remotely triggered net is set ready to capture a group of roosting black-necked stilts in a San Francisco Bay marsh. Photo by Brooke Hill, USGS.

migrating shorebirds and more than a quarter million ducks. Current restoration plans to enhance existing wetlands and to convert salt evaporation ponds into tidal marsh could result in accelerated microbial conversion of legacy inorganic mercury to methyl mercury, the form of mercury which is highly toxic and most bioavailable to wildlife and humans.

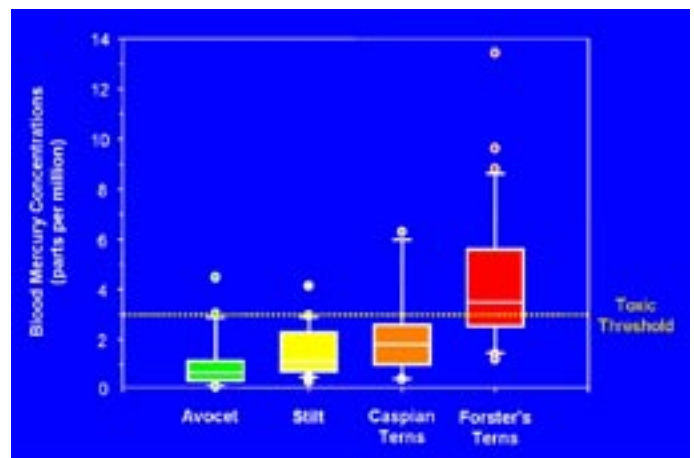
In a large collaborative project funded by the CalFed Ecosystem Restoration Program, biologists of the U.S. Geological Survey, U.S. Fish and Wildlife Service, San Francisco Bay Bird Observatory, and PRBO Conservation Science are investigating the risks of mercury to waterbirds breeding within the estuary. This unprecedented project seeks to assess mercury burden and dietary exposure in waterbirds and, ultimately, the effects that mercury has on avian reproduction within the estuary.

This study is examining several aspects of the biology of five waterbird species that are common residents of San Francisco Bay and associated wetlands. The species being studied include two shorebirds (American avocet and black-necked stilt), two terns (Forster's tern and Caspian tern), and one diving duck (surf scoter). This is a multi-faceted project that includes capturing and radio-marking birds to track their movements and habitat use, sampling bird blood and feathers for mercury concentrations and chemical signatures of diet, monitoring nesting success, and examining chick movements and survival. Although the study was initiated only recently, in 2005, it has already produced several inter-

esting results. For example, it has been determined that mercury concentrations are generally higher in fish-eating birds (terns) than in birds that eat mainly aquatic invertebrates (shorebirds). This is likely due to the fact that methyl mercury bioaccumulates within the environment, such that fish that are eaten by birds already will have accumulated high levels of mercury from consuming large amounts of invertebrate prey.

Furthermore, mercury concentrations are high enough to be a cause for concern, especially in the most southern and northern portions of the Bay. For example, 5% of stilts, 6% of avocets, 10% of Caspian terns, and 58% of Forster's terns breeding in South Bay sites south of the

Dumbarton Bridge (Alviso salt pond complex) were at or above the high-risk category for mercury contamination. The higher mercury levels in the South Bay are likely a consequence of highly contaminated sediments that have been transported through Alviso Slough, the discharge point for the Guadalupe River. This watershed drains from the historic New Almaden quicksilver mine – one of the largest mercury mines in the western U. S. – and residual mercury remains within the environment. High levels of mercury in the North Bay are likely from the Sacramento-San Joaquin Delta, and ultimately from upstream historic gold mining activities in the Sierras. Although it is difficult to detect how mercury toxicity might actually manifest itself in wild birds, mercury usually has its greatest effect on reproduction. These effects can include reduced



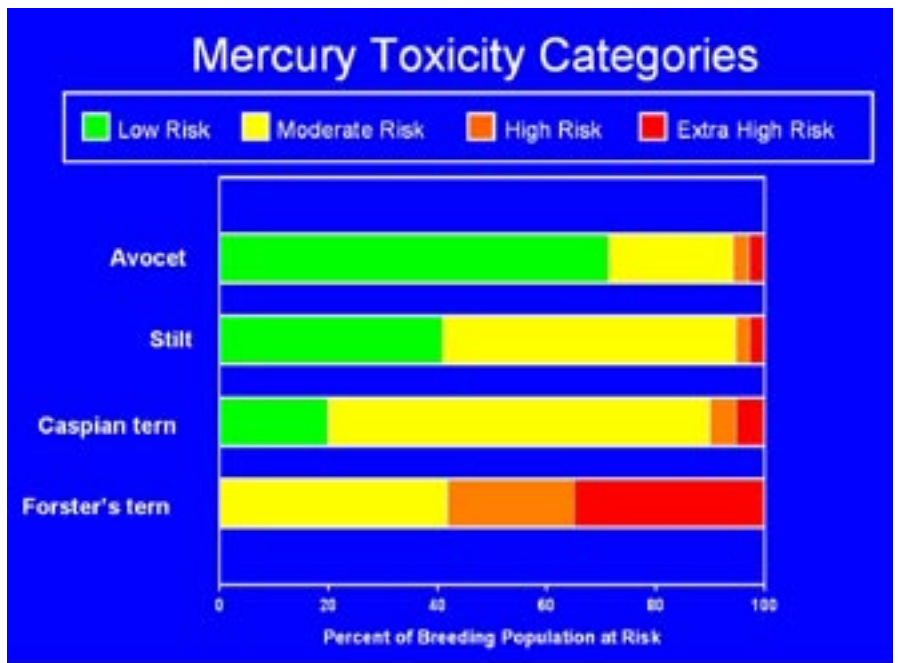
The percentage of the breeding populations of several waterbird species that are at risk to reduced reproductive success and declining populations due to mercury contamination in the South San Francisco Bay. USGS and USFWS graphic.

breeding effort, altered breeding behavior, impaired vision, hearing, and motor skills, embryo death and deformities, reduced egg hatchability, and reduced chick survival.

Although mercury will continue to be a problem in San Francisco Bay for the foreseeable future, the benefits of wetland creation for wildlife will likely outweigh many concerns about the potential for increased methyl mercury production. Scientists will continue to conduct research within the San Francisco Bay National Wildlife Refuge Complex to understand mercury's availability to wildlife and its effects on breeding waterbirds.

Dr. Josh Ackerman is a Research Wildlife Biologist at the U. S. Geological Survey's Davis Field Station and studies waterbird ecology and the ecotoxicological effects of mercury on avian reproduction.

Dr. Collin Eagles-Smith is a biologist with the U. S. Fish and Wildlife Service, Environmental Contaminants Division and studies aquatic foodwebs and the bioaccumulation and ecological effects of mercury contamination.



Mercury concentrations in the blood of breeding waterbirds approached and surpassed toxic threshold levels in the South San Francisco Bay, especially for fish-eating terns. Bird samples were analyzed for mercury at the USGS Davis Field Station Mercury Lab.

Working towards a greener tomorrow

Refuge Reflections
By Mendel Stewart

In this edition of *Tideline*, Visitor Services Chief Karla Tanner conveys the need for appropriate facilities for our visitors and employees here at our Refuge Complex Headquarters in Fremont. Like most Federal, State, and local natural resource agencies, funding is not adequate to do all of the conservation work necessary. In the National Wildlife Refuge System, for example, we currently have an estimated \$2-billion funding backlog that hampers our efforts to achieve our mission of wildlife conservation.

Nonetheless, our employees go out of their way to make good things happen for wildlife conservation. Whether it is by seeking additional funds through grants, finding innovative partnerships with other organizations, or coming

up with cost-effective solutions, our employees find ways to succeed. But when meeting conservation needs takes all the available funds and more, making improvements to infrastructure is postponed again and again. This is the case for our visitor contact station and our staff offices here at the Complex Headquarters. The improvements to the visitor contact station, office expansion and remodel, and improvements in energy efficiency that we are planning will not be inexpensive. These are just the first steps to meet the demands of the future.

To learn about efforts to support the National Wildlife Refuge System please visit the National Wildlife Refuge Association website at: <http://www.refugenet.org/>



Discovering nature in an urban setting

by *Cristy McKernan*
Visitor Services Intern

“I’d like to speak a word for nature,” the opening line from Henry David Thoreau’s *Walking*, could be a catch phrase for almost all thoughts concerning nature and the environment. And I too would like to speak a word for nature, but more of a word for nature and civilization, or rather, the unity of the two.

When I arrived at Don Edwards San Francisco Bay National Wildlife Refuge as the new Visitor Services Intern it did not take long for me to understand that my idea of a wildlife refuge did not fit here. I imagined a wildlife

disconcerting: how can you provide a sanctuary for wildlife in the midst of urban sprawl? A wildlife refuge should be an escape from all of the hustle and bustle of ‘big city’ life. I’m pretty sure my initial theories about wildlife refuges would have made Henry David Thoreau quite proud (in *Walking* he writes about often leaving the city and withdrawing into the wilderness in order to experience what he felt was truly wild) and fit quite nicely in the green hills of my past.

I’ve since realized that this is a very romantic idea and the more time I spent on the refuge, the more my idealizations proved to be futile. My feelings about how a wildlife refuge should be quickly changed when I opened my bedroom window in Trailerville – the refuge housing area and heard the landing gear drop from airplanes and the hum from the never-ending-river-of-cars passing over the Dumbarton Bridge. I knew instantly that I needed to retreat into the natural world. I needed to escape the frenzy coming from the city. So, I decided to take a walk through the refuge.

With the freeway as a boundary line, I first thought this place was not wild by any means. Thoreau writes in *Walking* that “in wildness is the preservation of the world,” and the more I experience wildness in an urban setting, the more I believe him.

Don Edwards San Francisco Bay National Wildlife Refuge was the United States’ first urban National Wildlife Refuge, which, in my opinion, is where one is needed most. Sometimes we can lose our sense of place and our relationship to nature when our lives are entangled in a technologically based society. We need a retreat from our laptops, cell phones and on-star devices, almost as much as animals need it.

Amongst the urban sprawl I see snowy egrets probing the mudflats, great blue herons expanding their wings as they take flight, and red-tailed hawks hovering directly above me. I am exhilarated and overwhelmed with a sense of wonder and awe thinking that you don’t need to leave the city and move into the “wilderness” like Thoreau to feel connected to nature; all you have to do is take a walk on the refuge trails. Enjoying wildlife should be available to everyone and here, it is. Watching birds and other animals in their natural habitats and observing their instinctual behaviors puts me at ease. I lose myself and frequently forget that I am in and among one of the largest urban areas in the nation. Nature is all around us, waiting and wanting



Red-tailed hawk
Photo: Larry Wade

refuge as a complete escape and separation from any type of city life. Maybe that’s because I’m from Pennsylvania, and not even ‘big city’ Pennsylvania, like Pittsburgh or Philadelphia. I’m from a small city – if you can even call it that – tucked away along the West Branch of the Susquehanna River Valley where the whole place is rather green and dominated by eroded, tree-covered mountains. To have a wildlife refuge in the middle of one of the largest urban areas in North America seemed somehow contradictory. I was focused on an idea of what a wildlife refuge should be. An urban wildlife refuge, like Don Edwards Refuge, directly opposed my concept. The juxtaposition of the words “wildlife” and “urban” were in complete disagreement, in my way of thinking, especially when “wildlife” is followed by “refuge.” My initial thoughts were

Trails Of The Don Edwards San Francisco Bay Nat'l Wildlife Refuge

Don Edwards San Francisco Bay National Wildlife spans nine cities and three counties, and contains over 30 miles of hiking trails. Refuge Manager and birding enthusiast Clyde Morris continues to highlight trails found on America's first urban National Wildlife Refuge. For descriptions of other trails, contact Carmen Minch at carmen_leong-minch@fws.gov.

Name: Ravenswood Trail

Miles One Way: 3.2 miles. A shuttle vehicle is necessary at one of the two trailheads. Trail can be done as a loop if you walk 0.6 miles along Highway 84 between the east and west trailhead.

Trail Use: Walking & bicycling; dogs are prohibited. During waterfowl hunting season (mid October – late January), trail is closed to all use except waterfowl hunters and their retrieval dogs.

Trail Conditions: Flat, compacted dirt levee. Trail turns into mud after rain. Strong winds are common in the summer.

Highlights: This little used trail traverses the greatest variety of habitat types for the distance hiked: tidal slough, tidal marsh, Bay shoreline, seasonal salt ponds and muted tidal pond. During the winter when birding is best, the seasonal former salt ponds support thousands to tens of thousands of birds depending on the amount of water they hold. The Mosely Tract, owned by the City of San Jose, provides some of the best birding of the hike. Midway along the Bay shoreline, you will find yourself far from the urban clamor. This is a good time to enjoy distant views of the East Bay Hills and the San Mateo Mountains across the San Francisco Bay. It is also an excellent bike ride and connects with the Bay Trail – ride west to continue into Menlo Park or ride east across the Dumbarton Bridge into Fremont and the headquarters of the refuge.

Directions to Trailhead: The two trailheads, marked with brown metal gates and signs, are in the Ravenswood of the Don Edwards San Francisco Bay NWR just east of the Dumbarton Bridge on the north side of Highway 84. From the East Bay, cross the Dumbarton Bridge and exit at the Ravenswood Unit sign. Drive east 0.3 miles on the frontage road to the eastern trailhead. To access the western trailhead, drive west on the dirt path between Highway 84 and the PG&E substation for 0.3 miles. From the west (Menlo Park) drive Highway 84 toward the Dumbarton Bridge, exit at the Ravenswood Unit sign and drive east on the frontage road. Cross under the bridge and back west to the eastern trailhead (0.6 miles).

Trail Details from the Eastern Trailhead: Starting at the metal gate, hike the levee trail between the seasonal salt ponds on the left and a tidal pond on the right. The tidal pond called

the Mosely Tract can hold large flocks of ducks, up to 12 species, during the winter at high tide. Caspian and Forster's terns, along with fewer ducks, can be seen in the summer. Gulls, double-crested cormorants and both American white and California brown pelicans can be seen in the proper season feeding on fish. At lower tides, shorebirds take over feeding along the muddy shoreline.

During wet winters, the salt ponds on the left provide habitat for waterfowl such as northern shoveler, bufflehead, scaup, and ruddy ducks. Lower water levels during the spring and fall migrations bring large flocks of shorebirds including phalaropes, plovers, dowitchers, western and least sandpipers, dunlin, willet, marbled godwits and long-billed curlews. In the summer, the ponds can contain nesting snowy plovers and American avocets.

As you continue on the trail, the Mosley Tract is replaced with the Bay shoreline. Bay ducks such as scaup, canvasback, and scoters dive with cormorants and grebes. The peacefulness of this little used section of the bay surrounded by views of the East Bay and northern reaches of the Santa Cruz Mountain is a treat. Civilization seems far away, providing a bit of solitude we can all use in this urban environment.

At 1.8 miles, the Bay shoreline gives way at the mouth of the tidal Ravenswood Slough. The tidal slough and marsh are good places to look for northern harriers, egrets, and herons. The tidal marsh is home to two endangered species, the California clapper rail and salt marsh harvest mouse that are found only in San Francisco Bay. The Alameda song sparrow and common yellowthroat, species of concern in California, can also be found here. The vegetation is predominately pickleweed, Pacific cordgrass, and gumplant - which blooms bright yellow flowers late into summer. Along this section of trail, evidence of the salt making process lingers in the form of old tide gates, siphons, pumps and power lines. Some of these structures date back to the 1940s when many of these ponds were built.

To the left continues to be the seasonal salt ponds. You can see the former tidal slough channels containing water when the rest of the pond is dry. Nesting avocets and plovers tend to be found here in greater numbers than along other sections of the trail.

At 3.2 miles you reach the metal gate at the west trailhead.



A dowitcher probes in the mud for invertebrates.

For more information on trails, contact the Don Edwards San Francisco Bay National Wildlife Refuge Visitor Center Tuesday through Sunday 10:00 a.m. – 5:00 p.m. or call 510-792-0222 ext. 43.

Ten things I hate about the Farallons

By Marjorie Siegel, Refuge Volunteer

Like a lot of people, my imagination conjured up the Farallons long before I ever saw them---desolate rocks above the waves, offering both refuge and mystery. Recently, I had the good fortune to go out as an invasive-plant puller. From the moment I stepped onto the



Marjorie fits in sunset watching around dinner preparation at Southeast Farallon Island.

Farallons, I could see that the islands I've been dreaming about for so long actually do provide refuge---to breeding seabirds and elephant seals, migrating birds, sea lions, indigenous salamanders, intertidal life, and a host of other living things. What I most enjoyed was experiencing how their rhythms shaped the human activities. But, there are some down sides, too of which I made a list. Here are the

10 things I hate about the Farallons

1. Being distracted from plant pulling by the frequent sight of gray whales offshore.
2. Being eyed with cautious curiosity by vociferous ranks of Western gulls every time I walked outside.
3. Having to walk up the steep trail to the lighthouse to see if common murrens had landed on Shubrick Point.
4. Having to close the curtains at night to prevent the Cassin's auklets from crashing into the windows on their way from the sea to their burrows.
5. No Pizza Delivery!! Therefore, having to time dinner preparations around the ritual of watching the sunset from the front steps.
6. Staying up after dinner to hear and be questioned about the day's events and sightings for the Farallon Log. I was grilled by the biologists about not only what I saw, but how many and where I saw first blooms, salamanders, ladybugs, landbirds, dead birds, etc. The interrogation would continue for even more details, like the number of spots on the ladybugs, the direction the whales were heading, and whether a peregrine falcon or a burrowing owl killed the bird.
7. Having to tread ever so carefully while hanging laundry so as not to step on the nest-boxes and burrows under the clothesline.
8. Encountering a slumbering elephant seal bull right where I had intended to pull plants & having to alter my plans on where to work. Should I work where there are views of waves breaking over Saddle Rock, or swells rolling in from Indian Head?
9. Trying to sleep amid the cacophony of waves crashing, wind moaning, elephant seal pups squawking, Western gulls calling, Cassin's auklets singing, burrowing owls hooting, and California sea lions barking.
10. Seeing the islands at the horizon as I cross the Golden Gate Bridge, instead of seeing the coastline and San Francisco skyline from the lighthouse.NOT!!!!!!

Editor's Note: Marjorie has contributed over 150 volunteer hours during the past two winters to restoring seabird habitat on the Farallon National Wildlife Refuge. Opportunities for several volunteers each month – January, February, and March – are available. A minimum 2-week commitment is required due to the logistics of boat availability. Contact the Farallon Refuge Operations Specialist or Refuge Manager at 510-792-0222 if you are interested.

Congratulations to the 25th Annual Endangered Species Poster Contest Winner!

Congratulations to **Annie Cheng** for taking the Best in Show in the Don Edwards San Francisco Bay National Wildlife Refuge 25th Annual Endangered Species Poster Contest! This contest is held annually for schools in Union City, Newark, Fremont, and East Palo Alto. We received almost 400 posters and they were all wonderful! Thank you to all who entered. First, second, and third place finishers in each grade level from Kindergarten to 6th grade along with Honorable Mentions can be viewed on-line at www.fws.gov/desfbay/contest.htm.

A huge thank you to the San Francisco Bay Wildlife Society for sponsoring the event!



Don Edwards San Francisco Bay National Wildlife Refuge

Habitat Heroes

June 19-21, 2007 • 9 a.m. - 3 p.m.

Habitat Heroes is a program for Teens, ages 13-18, who have the desire to develop leadership skills through team-building activities and community service. After the training, participants will be asked to commit to assisting at one of our special events in 2007. The program is FREE, but space is limited. Applicants must attend all three days and be able to fulfill the service component in 2007.

How to apply: Please submit a letter (one page) of interest (with your name, age, address, phone number, parent/guardian's name) indicating why you would like to participate AND a letter of reference from someone who knows you well (teacher, coach, neighbor, etc.). Application deadline is 5:00 pm on Friday, June 1, 2007. Participants will be notified the following week by mail and subject to parent/guardian approval.

Please send your letters to: Habitat Heroes
c/o EE Specialist
9500 Thornton Ave.
Newark, CA 94560

Questions? Please call Tia at 510-792-0222 ext. 36



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 January 13, 2007 and April 13, 2007. These gifts will be used for capital, environmental education, habitat restoration, and interpretive programs at the Don Edwards San Francisco Bay National Wildlife Refuge.

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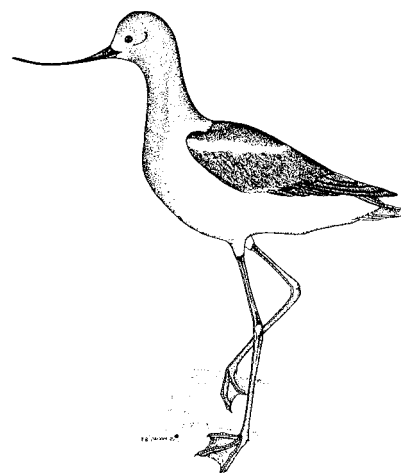
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Help Us Help the Refuge

Mail your donation to: **San Francisco Bay Wildlife Society, P.O. Box 234, Newark, CA 94560.** You may also fax your membership donation using a Visa or MasterCard number to 510-792-5828.

For a gift membership, call 510-792-0222 ext. 40.

San Francisco Bay Wildlife Society is a nonprofit 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:

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2007 and Beyond...

By Karla Tanner

People interested in architecture often rave about our headquarters / visitor center building when they see it for the first time – the pilings give it a strong sense of place and the design beautifully maintains the visual line of the hill. It was built long before the idea of “standard” designs for administrative offices and visitor centers on national wildlife refuges. Although we can celebrate its unique character, we must also acknowledge that the facility has neither kept pace with the needs of our public nor with the needs of our staff.

We are already working toward providing the public with a visitor facility to be located on Marshlands Road adjacent to the lower parking lot. It would be the first building people would see as they enter the refuge – a welcoming building with universal access. Kek-kek-kek-kek-kek. People will likely be able to hear the clattering call of the California clapper rail from the deck overlooking LaRiviere Marsh. Or they can follow the trail from there through the marsh for a closer look at ducks and wading birds, migrants and residents. Inside, exhibits will tell the story of habitat restoration activities on the seven refuges of the Complex, introduce some of the “Habitat Heroes” of the San Francisco Bay wetlands, and offer ways to get involved.

Meanwhile, the exhibit area in the former visitor center on the hill will be converted to office space. The conference room will be retained and expanded. Over the years, the refuge staff has grown beyond the current available space, and modern methods for conserving energy have passed us by. We need to upgrade. In addition, we expect up to two staff from the Sacramento Ecological Services office to co-locate here in the near future.

Such is the long-range vision – a univer-



California clapper rail

Photo: Bill Purcell

sally accessible visitor contact facility along Marshlands Road and expanded, more energy- and-space-efficient offices in the headquarters building.

The first step to reaching this dual goal is to set-up a temporary, modular visitor contact facility on Marshlands Road near the location where we plan to build the permanent facility later. We hope to have the temporary building in place by this time next year. Discussions are also underway with San Francisco Bay Wildlife Society to initiate a capital campaign to help fund some of the needed construction. Look for project updates in future editions of *Tideline*.

New federal lands park pass now available

The new National Parks & Federal Recreational Lands Pass for seniors and people with disabilities are now available at the San Francisco Bay National Wildlife Refuge Headquarters. These passes cover the entrance and standard amenity fees charged for using federal recreational lands – including national wildlife refuges.

The new “America the Beautiful – The National Parks and Federal Recreational Lands Pass” series includes Interagency Senior Passes, \$10, for U.S. citizens 62 and older; and Interagency Access Passes, free for U.S. citizens who are permanently disabled. The new program also introduces an interagency admissions pass for volunteers who donate 500 hours during a year, for hours accrued after January 1, 2007.

Paper versions of the Golden Age or Golden

Access Passports should be exchanged for the new Senior or Access passes. However, plastic Golden Age or Access passes are valid for the pass holder’s lifetime and do not need to be exchanged.

The Senior and Access passes are good for the lifetime of the holder and make available (to the pass holder only) 50 percent discounts on some expanded amenity fees.

For the first time, hangtags are available. Hangtags are for those who anticipate parking vehicles at unmanned facilities.

For more information about these passes, call Refuge Headquarters at 510-792-0222 or log on at www.recreation.gov.



Summer Activity Schedule

June

Sunday, June 2

Bye-Bye Spring

Environmental Education Center, Alviso
10:00 a.m. – 12:00 p.m.

Say goodbye to spring and hello to summer. Many of our inhabitants have finished with mating and are now busy raising their young. Join Paul Bridges on two-mile hike around the refuge to see if we can discover any little ones. Spotting scopes are helpful but not required. Not recommended for younger children. Bring water, a hat and sunscreen. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Salt Pond Restoration Talk & Walk

Environmental Education Center, Alviso
2:00 p.m. - 4:00 p.m.

Where does the task of restoring 15,100 acres of tidal wetlands begin? Learn the answer during a restoration project overview and tour the site where some of the first actions of the project have already begun. Led by Docent Steve Dill. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.

Saturday, June 9

Exploring the Dunes

Antioch Dunes NWR, Antioch
10:00 a.m. – 11:00 a.m.

Did you know there's a National Wildlife Refuge in Antioch? Here's your chance to explore this refuge that is usually closed to the public. This guided tour (1-1.5 mile) will focus on the wonders of Antioch Dunes National Wildlife Refuge. Wear sturdy shoes for the sandy hike along the dunes. All ages welcome. No reservations required. No facilities. Contact 510-521-9624 for additional information and directions.

Cloud Dancers

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

Eagles, hawks, and owls, oh my! Come meet some amazing dancers of the sky. Raptors are some of the most majestic and noble animals on earth. Come ready to fly high in this live animal show, put on by Zoo2You. This is a great opportunity for kids of all ages to learn something new. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102. Limited space is available.

Salt Pond Restoration Tour

Meet at Bayfront Park, Menlo Park
2:00 p.m. - 4:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Sunday, June 10

Edible Plants on the Refuge

Visitor Center, Fremont
11:00 a.m. - 12:30 p.m.

Take a guided walk on Tidelands Trail and discover which plants are edible or have medicinal uses. We'll taste some of these plants on the refuge, or in commercially-made products. Led by Carmen Minch.

Habitat Hike

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

Do you enjoy exploring nature? Do you find yourself curious about where mice sleep or how birds stay dry in the rain? If so, then you may be a habitat hominid! What is a habitat hominid? It's a person who loves learning about where local animals and plants live. Come take a walk and explore the habitats at the refuge. Along the way, learn about wetland and upland habitats that have been human altered. We will observe and identify plants, birds, and other animals we see on this short and easy trek. This program is wheelchair and stroller accessible. Recommended for all ages. Reservations required. Call 408-262-5513.

Saturday, June 16

Bike the Levees

Environmental Education Center, Alviso
10:00 a.m. – 12:00 p.m.

Join Ed Kantack for a slow and easy 5.5-mile bike ride around the salt ponds and New Chicago Marsh with several planned stops. We expect good bird viewing and a glimpse of Drawbridge. Learn some history about Drawbridge and the salt ponds. Helmets are a must. Bikes with knobby tires highly recommended along with water and sunscreen. Geared for ages 10 and older. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Webelos Naturalist Program

Environmental Education Center, Alviso
1:00 p.m. – 3:00 p.m.

Calling all Webelos of Santa Clara County! Is there anyone out there who needs to earn a naturalist badge? We've got a program just for you. 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. Led by outdoor educator Jen Stankiewicz. Program will go, rain or shine. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Salt Pond Restoration Presentation

Visitor Center Auditorium, Fremont
3:00 p.m. - 4:00 p.m.

The Salt Pond Restoration Project will transform the Southern San Francisco Bay over the coming decades. See slides and hear a docent-led discussion about this project, a massive expansion of protected Bay wetlands, and the plans involving habitat, flood control and public access. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.



Don Edwards San Francisco Bay National Wildlife Refuge

1 Marshlands Road, Fremont – (510) 792-0222 • 1751 Grand Blvd, Alviso – (408) 262-5513 • <http://www.fws.gov/desfbay>

Summer Activity Schedule

Sunday, June 17

Salt Pond Restoration Tour

**Meet at Bayfront Park, Menlo Park
2:00 p.m. - 4:00 p.m.**

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Father's Day Walk

**Environmental Education Center, Alviso
10:00 a.m. - 12:00 p.m.**

Attention fathers, dads, and pops! Come enjoy a morning out with the family. Learn about bird watching from Ceal Craig with an interactive presentation, then take a walk (easy and level). If you would like to plan a picnic afterwards, (not part of the program) there is a great spot in the pavilion outside! Reservations required. Call 408-262-5513.

Saturday, June 30

Family Bird Walk

**Visitor Center, Fremont
10:00 a.m. - 12:00 p.m.**

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal birdwatching field guides, and then head out onto the trails to find those birds. Learn about the salt marsh habitat along the way. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43.

Twilight Marsh Walk

**Visitor Center, Fremont
7:30 p.m. - 9:00 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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

July

Sunday, July 1

A Ghost Town in San Francisco Bay?

**Visitor Center Auditorium, Fremont
2:00 p.m. - 3:00 p.m.**

That's right! On Station Island nestled in the salt marshes of south San Francisco Bay, the town of Drawbridge once boomed. Was it a quiet, peaceful community of nature lovers, or a rip-roaring gang of two-fisted rowdies? Excellent slide show and presentation. Led by Pat Anthony.

Saturday, July 14

Family Bird Walk

**Visitor Center, Fremont
10:00 a.m. - 12:00 p.m.**

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal birdwatching field guides, and then head out onto the trails to find those birds. Learn about the salt marsh habitat along the way. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43.

A Trip Back in Time

**Visitor Center, Fremont
10:30 a.m. - 12:00 p.m.**

Revive the vanishing knowledge of the history of the Don Edwards San Francisco Bay National Wildlife Refuge grounds by strolling the trails with docent Ray Studer. Ray spent most of 2004 researching the on-site salt production, railroads, and homes that were located on the refuge grounds until the 1950s. Using a collection of old photographs, the last vestiges of a way of life can be traced back to the 1850s that led to the construction of the town of Newark in 1876.

Adult Beginning Bird Watching

**Environmental Education Center, Alviso
10:00 a.m. - 11:30 a.m.**

Can you tell an avocet from a black-necked stilt? If not, join birding enthusiast Ceal Craig for a beginning bird watching program and get to know the most common refuge visitors. Start with a slide show to learn how to recognize the regu-

lars, and then take a walk with Ceal to try your new skills. Binoculars are available to borrow. Program intended for adults. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Exploring the Dunes

**Antioch Dunes NWR, Antioch
10:00 a.m. - 11:00 a.m.**

Did you know there's a National Wildlife Refuge in Antioch? Here's your chance to explore this refuge that is usually closed to the public. This guided tour (1-1.5 mile) will focus on the wonders of Antioch Dunes National Wildlife Refuge. Wear sturdy shoes for the sandy hike along the dunes. All ages welcome. No reservations required. No facilities. Contact 510-521-9624 for additional information and directions.

Salt Pond Restoration Tour

**Meet at Bayfront Park, Menlo Park
2:00 p.m. - 4:00 p.m.**

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Sunday, July 15

Edible Plants on the Refuge

**Visitor Center, Fremont
11:00 a.m. - 12:30 p.m.**

Take a guided walk on Tidelands Trail and discover which plants are edible or have medicinal uses. We'll taste some of these plants on the refuge, or in commercially-made products. Led by Carmen Minch.

Saturday, July 21

All About Owls!

**Environmental Education Center, Alviso
1:00 p.m. - 3:30 p.m.**

Everything you wanted to know about owls and more. Come join owl expert Paul Bridges as he shares his knowledge about owls with a talk and slide show. Want to know what owls eat? Stay for the exciting experience of dissecting an owl pellet. See if you can put together the puzzle of bones and find your own answer. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Don Edwards San Francisco Bay National Wildlife Refuge

1 Marshlands Road, Fremont - (510) 792-0222 • 1751 Grand Blvd, Alviso - (408) 262-5513 • <http://www.fws.gov/desfbay>

Summer Activity Schedule

Saturday, July 21

Salt Pond Restoration Presentation

Visitor Center Auditorium, Fremont

3:00 p.m. - 4:00 p.m.

The Salt Pond Restoration Project will transform the Southern San Francisco Bay over the coming decades. See slides and hear a docent-led discussion about this project, a massive expansion of protected Bay wetlands, and the plans involving habitat, flood control and public access. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.

Twilight Marsh Walk

Visitor Center, Fremont

7:30 p.m. - 9:00 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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

Sunday, July 22

Critter Café

Environmental Education Center, Alviso

2:00 p.m. - 4:00 p.m.

Water is pretty boring stuff, right? No way! Come take a closer look at some of the tiny, wiggly, squiggly creatures living in San Francisco Bay wetlands. Learn about macroinvertebrates and plankton -- the tasty treats that shorebirds are eating at our five-star marsh "cafés" at the refuge. Recommended for ages 3 and up. Reservations required. Call 408-262-5513.

Salt Pond Restoration Tour

Meet at Bayfront Park, Menlo Park

2:00 p.m. - 4:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Saturday, July 28

Snake Stories

Visitor Center Auditorium, Fremont

11:00 a.m. - 12:00 p.m.

Meet one of the few reptilian inhabitants of the salt marsh, the gopher snake. Learn the myths and truths about these beautiful animals. Take a hike along the trail and make a snake-y craft to take home. Geared toward ages 4 to 7. Led by Adrienne DePonte. Reservations required. Call 510-792-0222 ext. 43.

Salt Pond Restoration Talk & Walk

Environmental Education Center, Alviso

2:00 p.m. - 4:00 p.m.

Where does the task of restoring 15,100 acres of tidal wetlands begin? Learn the answer during a restoration project overview and tour the site where some of the first actions of the project have already begun. Led by Docent Steve Dill. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.

Sunday, July 29

Salinity Sleuths

Environmental Education Center, Alviso

2:30 p.m. - 4:00 p.m.

Step into the shoes of a scientist and strap on a field detective pack for a hands-on investigation where we will collect water samples, use plant clues, and do some sleuthing around to uncover how salty the water is. You will need to bring along keen senses of taste, smell and sight to determine which plants and animals live in the refuge's salty habitats! Recommended for ages 6 and up. Reservations required. Call 408-262-5513.

August

Saturday, August 4

A Trip Back in Time

Visitor Center, Fremont

10:30 a.m. - 12:00 p.m.

Revive the vanishing knowledge of the history of the Don Edwards San Francisco Bay National Wildlife Refuge grounds by strolling the trails

with docent Ray Studer. Ray spent most of 2004 researching the on-site salt production, railroads, and homes that were located on the refuge grounds until the 1950s. Using a collection of old photographs, the last vestiges of a way of life can be traced back to the 1850s that led to the construction of the town of Newark in 1876.

Survival Tactics of Native Plants

Environmental Education Center, Alviso

10:30 a.m. - 12:00 p.m.

California native plants do some amazing things to survive. Join native plant specialist, June Smith, for an informative walk around the Education Center investigating plant adaptations. Make a leaf rubbing or plant seeds to take home. Suitable for ages 8 and up. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Drawbridge

Environmental Education Center, Alviso

1:30 p.m. - 4:00 p.m.

There's a ghost town in 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 program, led by Pat Anthony. We'll start with a slide show and then take a short minivan excursion to view Drawbridge across Coyote Creek. Program intended for adults. Space is very limited. RESERVATIONS ARE ESSENTIAL. Call 408-262-5513 ext. 102.

Salt Pond Restoration Tour

Meet at Bayfront Park, Menlo Park

2:00 p.m. - 4:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Saturday, August 11

Family Bird Walk

Visitor Center, Fremont

10:00 a.m. - 12:00 p.m.

Let family walks become a shared time of nature learning. We'll begin by helping kids create

Don Edwards San Francisco Bay National Wildlife Refuge

1 Marshlands Road, Fremont - (510) 792-0222 • 1751 Grand Blvd, Alviso - (408) 262-5513 • <http://www.fws.gov/desfbay>

Summer Activity Schedule

their personal birdwatching field guides, and then head out onto the trails to find those birds. Learn about the salt marsh habitat along the way. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43.

Exploring the Dunes

Antioch Dunes NWR, Antioch
10:00 a.m. – 11:00 a.m.

Did you know there's a National Wildlife Refuge in Antioch? Here's your chance to explore this refuge that is usually closed to the public. This guided tour (1-1.5 mile) will focus on the wonders of Antioch Dunes National Wildlife Refuge. Wear sturdy shoes for the sandy hike along the dunes. All ages welcome. No reservations required. No facilities. Contact 510-521-9624 for additional information and directions.

Sunday, August 12

Edible Plants on the Refuge

Visitor Center, Fremont
11:00 a.m. - 12:30 p.m.

Take a guided walk on Tidelands Trail and discover which plants are edible or have medicinal uses. We'll taste some of these plants on the refuge, or in commercially-made products. Led by Carmen Minch.

Life-sized Puzzling Pipes

Environmental Education Center, Alviso
2:00 p.m. – 4:00 p.m.

Care to climb down your drain pipes? Well, maybe not! Instead, come out to the refuge and jump into our fun maze of puzzling pipes. We will learn where all of our wastewater goes by designing our very own life-sized wastewater pathways. Then, decorate your own, unique water-saving tool to take home. Finally, we will go on a mini exploration to find a secret place where 120 million gallons of cleaned wastewater are released every day. Recommended for ages 6 and up. Reservations required. Call 408-262-5513.

Saturday, August 18

Lazy Days of Summer

Environmental Education Center, Alviso
10:00 a.m. – 11:30 a.m.

The hectic days of mating and establishing a nest site are over. Now our wildlife friends are busy raising their families. Join us in a leisurely walk around refuge habitats to observe summer living. Open to all ages. Walk led by wildlife enthusiast Ed Kantack. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

Bird Watching by Van

Environmental Education Center, Alviso
10:30 a.m. – 12:30 p.m.

Whether you are a novice or expert birder, this program is designed for people who enjoy watching birds but are unable to walk far. Bird watching will be done by van with some brief stops. The vans cannot accommodate wheelchairs; birders must be able to maneuver into and out of the van on their own. Join Ceal Craig and Paul Bridges as they drive you on the levees to view birds. This two-hour trip is suitable for children. Space is very limited. RESERVATIONS ARE ESSENTIAL. Call 408-262-5513 ext. 102.

Salt Pond Restoration Presentation

Visitor Center Auditorium, Fremont
3:00 p.m. - 4:00 p.m.

The Salt Pond Restoration Project will transform the Southern San Francisco Bay over the coming decades? See slides and hear a docent-led discussion about this project, a massive expansion of protected Bay wetlands, and the plans involving habitat, flood control and public access. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.

Twilight Marsh Walk

Visitor Center, Fremont
7:00 p.m. – 8:30 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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

Sunday, August 19

Where Does All the Water Go?

Environmental Education Center, Alviso
2:00 pm. – 3:30 p.m.

Are you curious about where wastewater goes after we flush, rinse, wash, and shower? Come enjoy a presentation about how the San Jose/Santa Clara Water Pollution Control Plant cleans wastewater. A short tour that will allow participants to get up close and personal with cleaned wastewater and the refuge habitats involved will follow. Appropriate for ages 10 and up. Reservations required. Call 408-262-5513.

Salt Pond Restoration Tour

Meet at Bayfront Park, Menlo Park
2:00 p.m. - 4:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast lies along the shores of the South Bay? On a docent-led tour, learn a great deal more with close-up views of planned habitat and salt ponds. Geared for adults. A Wildlife Stewards program. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

Saturday, August 25

Exploring Owls

Visitor Center Auditorium, Fremont
1:00 p.m. – 3:00 p.m.

Owls have captivated human imagination for centuries. Curious about how they hunt, how they see and hear, and what they eat? Come listen to a presentation, view owl body parts, listen to their calls, and dissect their pellets to see what they eat. Recommended for ages 7 and up. Led by Paul Bridges. Reservations required. Call 510-792-0222 ext. 43.

Salt Pond Restoration Talk & Walk

Environmental Education Center, Alviso
2:00 p.m. - 4:00 p.m.

Where does the task of restoring 15,100 acres of tidal wetlands begin? Learn the answer during a restoration project overview and tour the site where some of the first actions of the project have already begun. Led by Docent Steve Dill. Geared for ages 12 and older. A Wildlife Stewards program. Call 510-792-0222 ext. 43 for reservations.



Don Edwards San Francisco Bay National Wildlife Refuge

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Field Trips to the Refuge

General Field Trip Program Information

FREE field trip programs are offered at two sites at the Don Edwards San Francisco Bay National Wildlife Refuge. Wetland Round-Up and Trekking the Refuge field trip programs are offered at the Newark Slough Learning Center in Fremont, and Wetland Round-Up and Slow the Flow programs 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 students. All programs have been correlated to the appropriate State of California Education Standards.

Educators and adult leaders design and conduct their own field trips after attending a Field Trip Orientation Workshop. Adult volunteers must be recruited to lead the activities at the different learning stations and to chaperone the rotation of student groups. We provide easy to follow “scripts” for each station, but both “leaders” and “chaperones” are strongly encouraged to attend a workshop. It is our policy that lead educators must attend a workshop every two years.

Field Trips at the Learning Center in Fremont

Wetland Roundup - Investigate creatures of the mud flats, plankton and other creatures in the slough, and the pickleweed in the salt marsh. This field trip is designed for grades K-6, for up to 65 students. Wetland Roundup is offered Tuesday-Friday from February through May.

Trekking the Refuge - Trek the 1-mile Tidelands Trail, and learn about the natural history of the refuge! Then explore the pickleweed in the salt marsh, the brine shrimp in the salt pond, and the plankton in the slough! Available only in Fremont, Trekking the Refuge Field Trip is designed for grades 3-6, for up to 36 students. It is offered Tuesday through Friday from October through December.

Reservations for fall field trips begin on Wednesday, September 5th between 4:00 p.m. and 5:00 p.m. Call 510-792-0222 to make a reservation in Fremont.

Field Trip Orientation Workshop Dates at the Learning Center in Fremont

Call the Environmental Education Intern at 510-792-0222 ext. 42 to attend an orientation.

Wetland Round-Up
4:00 p.m. - 7:30 p.m.

Dates to be announced in the fall.

Trekking the Refuge
3:30 p.m. - 7:00 p.m.

Dates to be announced in the fall..

Field Trips at the Environmental Education Center in Alviso

Wetland Round-Up

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 program is designed for up to 65 students in grades K-6. Wetland Round-Up is offered Monday - Thursday from October through December.

Reservations for fall field trips begin on Wednesday, September 5th between 4:00 p.m. and 5:00 p.m. Call 408-262-5513 to make a reservation in Alviso.

Field Trip Orientation Workshop Dates at the Environmental Education Center in Alviso

Call the environmental education intern at 408-262-5513 ext. 103 to attend an orientation.

Wetland Round-Up
4:00 p.m. - 7:30 p.m.

Dates to be announced in the fall.

The Slow the Flow Program

Slow the Flow provides an experiential learning environment for students and educators to explore the topics of water use, wastewater treatment, and habitat preservation. Activities and presentations focus on the relationship between personal habits and their effects on local habitats. Slow the Flow is an environmental education program offered at no cost through the cooperating efforts of the City of San Jose, U.S. Fish and Wildlife Service, and the San Francisco Bay Wildlife Society. Slow the Flow programs are available to educators and groups located in San Jose, Alviso, Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino.

5th and 6th Grades: We offer a combined classroom presentation and an all day hands-on field trip at the refuge.

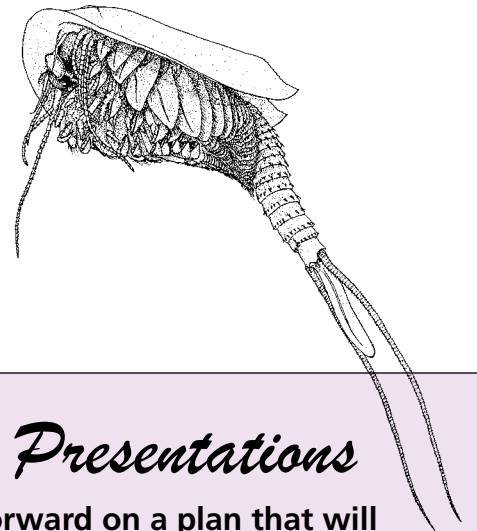
7th - 12th Grades: We offer classroom presentations and/or a field trip at the refuge.

Slow the Flow Programs are available throughout the year in Alviso. Reservations for the **Slow the Flow** program are on a first come basis. Call 408-262-5513 ext. 104 for more information, or to schedule a field trip or presentation.

Free Discovery Packs available at the Visitor Center and Environmental Education Center!

Explore the salt marshes, salt ponds, and the birds of the refuge with your family or small youth group! The Discovery Pack includes an activity booklet and equipment you will need to take a closer look at the salt marsh plants, brine shrimp, and birds! The backpack is suitable for up to six people, ages kindergarten - adults. There are also group packs available for 12 - 24 at the Visitor Center in Fremont. Please call in advance if you would like a group pack. You can check out the Discovery Packs free of charge at

the Visitor Center in Fremont and at the Environmental Education Center in Alviso. The Visitor Center is open Tuesday - Sunday from 10:00 a.m. - 5:00 p.m. For questions or to reserve a group pack please call 510-792-0222. The Environmental Education Center is open Saturday and Sunday from 10 a.m. - 5 p.m. For questions call 408-262-5513.



Salt Pond Restoration Tours & Presentations

The South Bay Salt Pond Restoration Project is moving forward on a plan that will transform 15,100 acres in the South Bay. What kinds of changes are envisioned through its three major goals: wildlife habitat, flood control and public access? Find out more in docent-led programs. See the summer activity schedule for dates and times.

The tours are suitable for adults and youth age 12 and older.

Group tours and presentations are available upon request.

Contact Wildlife Stewards at 408-262-5513 ext. 106 or WildlifeStewards@aol.com

Wildlife Stewards provides these programs as a public service and as a partner to the Don Edwards San Francisco Bay National Wildlife Refuge and the South Bay Salt Pond 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, 9500 Thornton Ave, Newark, CA 94560.

San Francisco Bay National Wildlife Refuge Complex

Founded in 1974 and administered by the U.S. Fish and Wildlife Service, Don Edwards San Francisco Bay National Wildlife Refuge exists to preserve wildlife habitat, protect threatened and endangered species, protect migratory birds, and provide opportunities for nature study. Six additional refuges are managed from the headquarters located in Fremont: San Pablo Bay NWR, Antioch Dunes NWR, Salinas River NWR, Ellicott Slough NWR, Marin Islands NWR, and Farallon NWR.

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Deputy Project Leader:..... John Bradley

Don Edwards San Francisco Bay

Refuge Manager:.....Clyde Morris

Don Edwards Warm Springs

Unit Manager: Ivette Loreda

Don Edwards Refuge

Operations Specialist:Eric Mruz

Farallon Refuge Manager:Joelle Buffa

Farallon Refuge Operations Specialist:..... Jesse Irwin

North Bay Refuges Manager:Christy Smith

South Bay Refuges Manager:..... Diane Kodama

Refuge Planner: Winnie Chan

Chief of Visitor Services:..... Karla Tanner

Outdoor Recreation Planner:..... Carmen Minch

Volunteer Coordinator:..... Laurie McEwen

Environmental Education Specialists:

Fran McTamaney, Genie Moore, Tia Glagolev

Law Enforcement Officers:..... Sean Reier,

Walter Duran

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Giselle Downard, Rachel Hurt, Gerry McChesney,

Susan Euing, Louis Terrazas

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Maintenance Staff: Larry Wade, Juan Flores,

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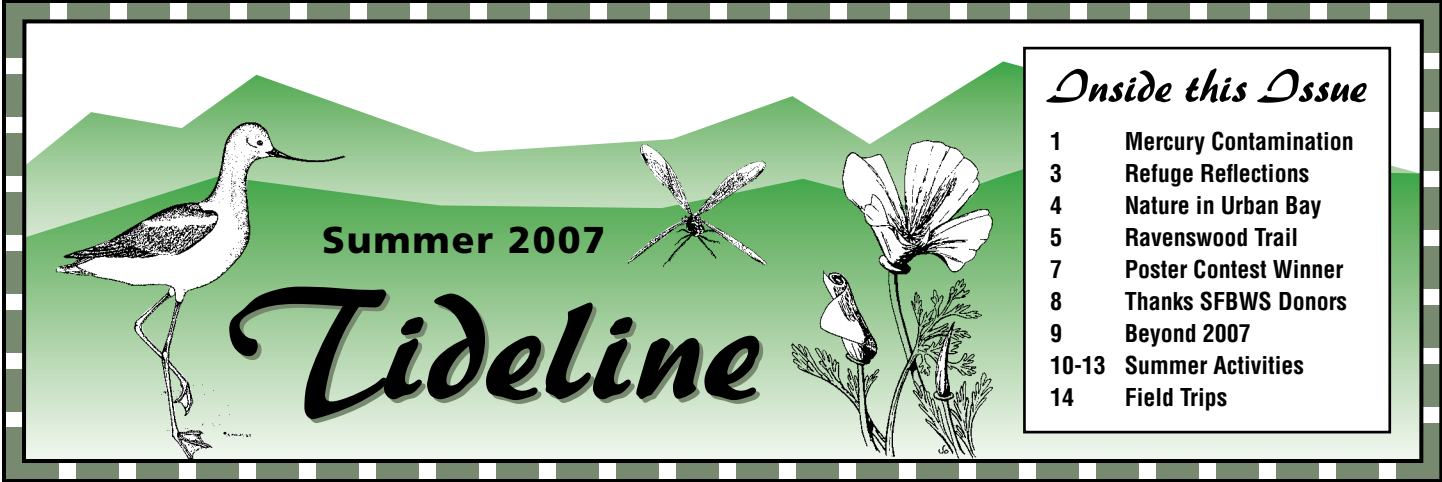
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Visit our web site, which features past issues of *Tideline*, at <http://www.fws.gov/desfbay>

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 DON EDWARDS SAN FRANCISCO BAY
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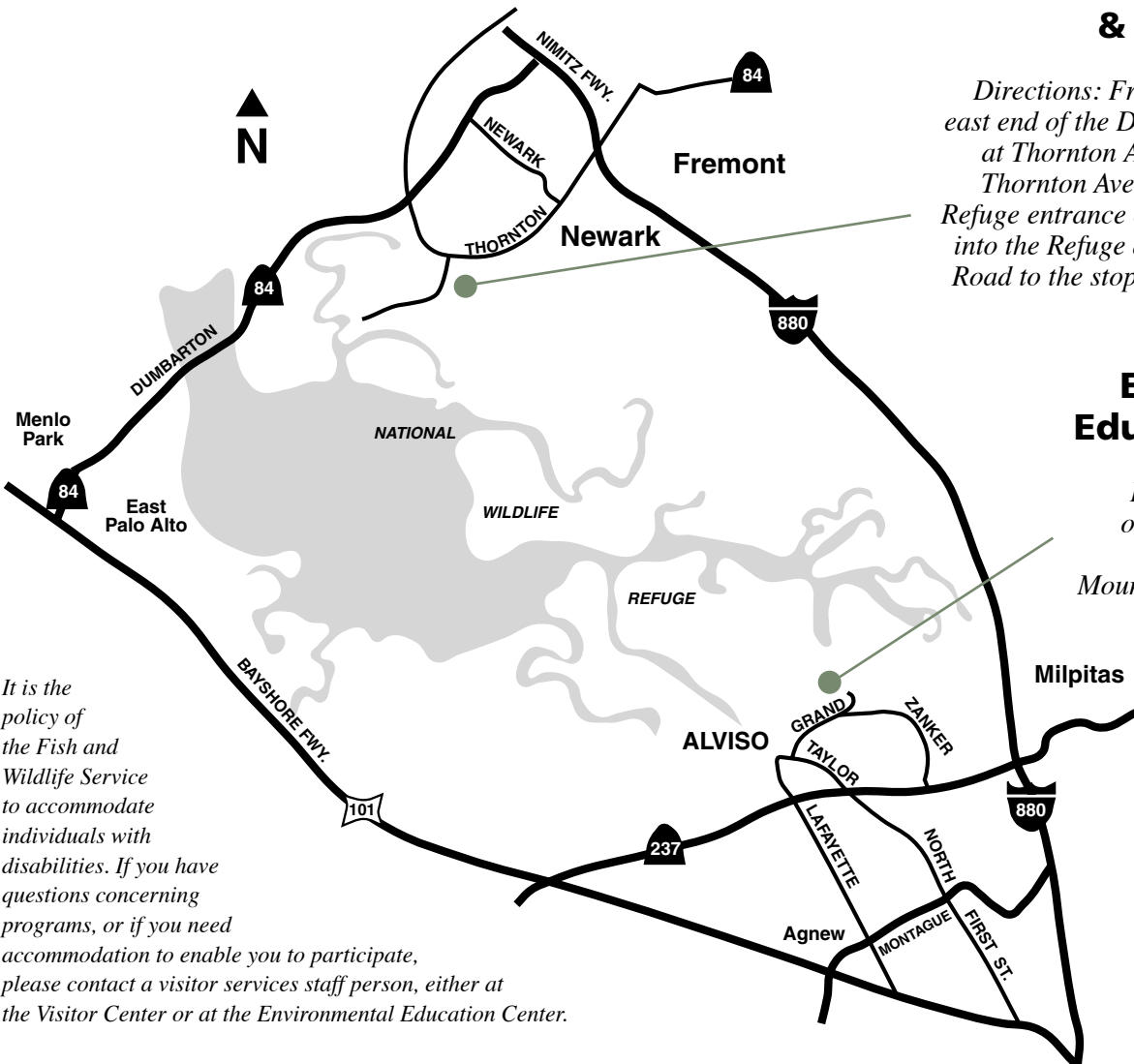
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**Headquarters
 & Visitor Center**

(510) 792-0222
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 Marshlands Road to the stop sign. Turn left into the parking lot.

**Environmental
 Education Center**

(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.