



# Life and Death on a Salt Pond: Avocets and Stilts Survive Amidst Mercury Pollution and Invasive Gulls

Volume 25, Number 4

*By Josh Ackerman, Carolyn Marn, and John Takekawa*

Look closely along the edges of the salt ponds at the Don Edwards San Francisco Bay National Wildlife Refuge during the summer, and chances are you will see and hear breeding American avocets and black-necked stilts. Long-legged shorebirds named for their strongly curved beaks, the family of Recurvirostridae or recurves sweep the water column and probe the mud in shallow-water habitats for aquatic invertebrates.

Avocets and stilts were once uncommon visitors to the San Francisco Bay. However, salt evaporation ponds created in the early 1900s provided ample shallow-water foraging habitats, roosting areas, and nesting sites which resulted in increasing winter and breeding populations in the Bay. No other site on the Pacific Coast has avocet or stilt breeding populations approaching the size of those in the South Bay. More than 4000 avocets and 1000 stilts, roughly 20% of the wintering population in the Bay, breed locally in the estuary.

Avocets nest together in loose colonies and often are associated with nesting Forster's terns and sometimes with stilts. Avocet nests are little more than a scrape in the dirt lined with available objects that are found nearby, including gull skeletons and shells. They will nest on exposed salt pond levees, but they prefer nesting on islands that have little to no vegetation. Terrestrial predators, such as skunks and foxes, have difficulties accessing nests located on islands.

In contrast to avocets, stilts prefer to nest in the more vegetated areas of tidal marshes. Stilts nest within tidal marshes on small islands or clumps of vegetation. Both avocets and stilts typically lay three to four eggs and incubate their clutch for 24 days until hatching.

The U. S. Geological Survey, partnering with the contaminants branch of the U. S. Fish and Wildlife Service, San Francisco Bay Bird



Observatory, and PRBO Conservation Science, is studying the breeding biology of avocets and stilts at the Don Edwards San Francisco Bay National Wildlife Refuge and other sites throughout the Bay. This study is supported by the CALFED ecosystem restoration program, a state-federal partnership designed to develop

*Photo: J. Ackerman, USGS*

*Continued page 2*

## Life and Death on a Salt Pond: Avocets and Stilts



*Above: Black-necked stilt nest. Right: Truck mounted with antenna.*

*Photos: R. Wilming, USGS*

and implement a long-term plan to restore the health of the Bay-Delta system and improve water management (<http://calwater.ca.gov>). The purpose of the study is to examine the potential risks of mercury exposure to recurves, terns, and scoters. Mercury is elevated in San Francisco Bay, especially in the South Bay where contamination flowed downstream from the Almaden mercury mine from the upper watershed of the Guadalupe River to the salt ponds and mud flats at the edge of the Bay. The on-going restoration of salt ponds in the South Bay could alter the availability of mercury to birds.

This past summer in the first year of our studies, we surveyed nests in the South Bay and documented that the percentage of avocets successfully hatching eggs in Alviso salt pond A16 (adjacent to the Environmental Education Center) was higher (86%) than for stilts nesting in the adjacent New Chicago Marsh (48%). Avocets nesting on islands in Pond A16 were provided some protection from terrestrial predators, but were still exposed to aerial predators. In contrast, stilt nests were exposed to more terrestrial predators that commonly forage along wetland edges. Although avocets can be very successful in hatching their eggs, post-hatching survival of their chicks can be very low.

To study chick survival, we attached tiny radio transmitters (1 g) to the back of avocet and stilt chicks just after they hatched and tracked them with truck-mounted antenna systems. These transmitters included sensors that changed the signal with the temperature of the radio, allowing biologists to quickly detect whether a chick was alive or dead. When a chick died, biologists would access the salt ponds and marshes with a receiver and handheld antenna to find the chicks and determine the cause of death.

We found that 32% of stilt chicks and only 14% of avocet chicks survived to the age when they could fly. This striking difference in chick survival was largely due to gull predation. Gulls accounted for 39% of all avocet deaths, followed by other avian predators like herons and raptors (34%), mammalian predators (21%), and snakes (5%). In contrast, no stilt chicks were taken by gulls; instead, deaths were caused by other avian

predators (43%) and mammalian predators (57%).

Because the radio transmitters were still emitting signals after death, we were able to follow the chick carcasses wherever the predators took them. We found 15 avocet chick carcasses located miles away from their nest sites at the California gull colony in Alviso salt pond A6, which currently has a population of more than 17,000 gulls. That number has increased from several hundred birds in the past 20 years. We even tracked one chick to a local landfill frequented by gulls, a food source that is likely a major reason for their increased populations.

Unfortunately, the increase in gull numbers may complicate the salt pond restoration effort. If several ponds are to be restored back to salt marsh, recurves may be at greater risk from predators such as gulls as they concentrate onto fewer ponds for breeding.

Overall, avocet chicks were more than twice as likely to die as stilt chicks. Due to their nesting preferences on exposed islands, avocet chicks had little vegetative cover to escape aerial predators after hatching. Stilt chicks, meanwhile, hatched in close proximity to emergent vegetation and were adept at hiding from predators. Avocet chicks that survived the longest would



quickly move into any available adjacent marsh that could provide escape cover from predators.

The striking contrast in high nest success and low chick survival among the recurves has management implications for wetland design in the ongoing restoration program. While avocets achieve higher hatching success than stilts by nesting on man-made islands within salt ponds, once hatched, avocet chicks are exposed to a greater threat of predation. Our early results suggest that avocets could benefit by having salt ponds, with man-made nesting islands, in close proximity to tidal marshes where chicks can find escape cover. Conversely, although stilts might

# Survive Amidst Mercury Pollution and Invasive Gulls

expand their current breeding distribution in the San Francisco Bay as salt ponds are restored to tidal marsh where they nest, managed ponds with abundant invertebrate populations, such as brine flies, will be important to provide foraging areas for adults and chicks.

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*American avocets and black-necked stilts.  
Photo: J. Ackerman, USGS*

## TIDELINE

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

# Silo Renovation Designed to Improve Wildlife Habitat at Mayhew's Landing

By Karla Tanner

“For us, as writer, artist and art critic Suzie Gablik has written, art has a job to do. Our work aspires to be both aesthetically powerful and practical.” Such is the philosophy behind

Meadowsweet Dairy, a small collaborative group of environmental artists from Corte Madera, California, who make objects of sculpture from objects in nature. “Our site-specific constructions call attention to interesting natural features or processes and help address environmental concerns. We make

habitat pieces in consultation with biologists to get the design right for the creatures expected to use the site.”

In collaboration with the U.S. Fish and Wildlife Service and Dr. Dave Johnston, wildlife ecologist and bat biologist from Santa Clara University, Meadowsweet Dairy is currently retrofitting the existing concrete silo in Mayhew's Landing to provide habitat for native swifts, swallows, and bats. The old grain silo is the only remaining building left from a short-lived period of farming on this small tract of land at the edge of Don Edwards San Francisco Bay NWR.

The first phase of the silo conversion is complete. A locking steel door has been installed and the lowest two oval filling apertures are closed, making the interior secure from unauthorized entry. The second phase, design of habitat, is underway as Meadowsweet Dairy seeks funding for construction.

Mayhew's Landing, a 123-acre tract of land across Thornton Avenue from Refuge Headquarters, has a varied history. Originally a tidal marsh, it was diked off from tides in 1917 to create farmland. After farmers stopped working the land, weeds took over for a while, then golfers. When the golf course was abandoned, native wetland vegetation gradually reclaimed portions of Mayhew's Landing, creating salt and freshwater marsh.

The U.S. Fish and Wildlife Service acquired the Mayhew's Landing tract in 1995 because it provided important habitat for migratory birds and the endangered salt marsh harvest mouse. Since that time, the California clapper rail, another endangered species found only in San Francisco Bay marshlands, has colonized the site.

Mayhew's Landing is small – essentially an island of wildlife in an urban sea. Human activity has a much greater impact here than on areas of greater expanse. Keeping the area closed to public use, as refuge managers are doing, encourages endangered species to come back and helps provide an environment where native birds and bats can thrive.

More information on the silo renovation project can be found on the Meadowsweet Dairy website: [www.meadowsweet-dairy.com](http://www.meadowsweet-dairy.com)



*Silo in Mayhew's Landing.  
Photo: Katie Fotta, USFWS*

*Meadowsweet Dairy is currently retrofitting the existing concrete silo in Mayhew's Landing to provide habitat for native swifts, swallows, and bats.*



*Bat house in the near future? Photo: USFWS*

# Architecture for the Birds

The creation of functional, imaginative structures that fuses with the natural and suburban landscape was one of the goals of the spring 2005 architecture class at the University of California in Berkeley. Working with the Don Edwards San Francisco Bay National Wildlife Refuge, Professor Jill Stoner wanted her graduate students to “explore an architecture that serves nature as its primary client, while at the same time working within the conventions of the architectural profession.”

Stoner chose the refuge as the location because of her “long-standing fascination with the salt ponds, and with the complex nature the refuge, with its surroundings of freeways and intensive development.” She wrote, “I wanted the students to be inspired by this level of environmental contrast.”

Her students’ works can be seen at various locations of the Don Edwards Refuge including the Newark Slough Trail, the Fremont Visitor Center, Bair Island, and the Warm Springs Unit.

Along the Newark Slough Trail, Marie Sorensen developed interpretive structures named “A Bird’s Eye View.” These wooden

structures emulate the body shape of various birds, and their anticipated view of the landscape. By peering through the circle, or the “eye” of the structure, you can “see” what challenges the birds face. Interpretive brochures of these structures are available at the Visitor Center.

Also in the Visitor Center is a “Spartina Screen” constructed by Molly McGrath. This hanging screen is made entirely of dried *Spartina alterniflora*, an invasive plant species that is quickly taking over mud flat and native salt marshes.

And, if you haven’t been out on the Warm Springs Unit Trail lately, swing by and take a look at the “Fence Book” by Matt Burton. These etched acrylic plates provide information about vernal pool species protected in that unit, such as the tiger salamander, Contra Costa goldfield, and vernal pool tadpole shrimp.

For more information and directions to see these pieces and others found on the refuge, contact the refuge Visitor Center Tuesday – Sunday from 10:00 a.m. – 5:00 p.m. at 510-792-0222 ext. 43.



*A Bird's Eye View  
Sculpture on the Newark  
Slough Trail*

## Special Thanks

*The Don Edwards San Francisco Bay National Wildlife Refuge would like to thank all the volunteers, Wildlife Stewards, Starbucks, and the City of Fremont for contributing to the success of our annual Coastal Cleanup!*

*And, a huge thank you to all the volunteers at Shark Day. It was a huge success!*

## Letter to the Editor:

A colleague just e-mailed me a pdf of the Autumn 2005 *Tideline*. As someone born and raised in San Francisco, I always enjoy seeing the latest issues, and this one was no exception. I did want to comment, however, on the cover article about the phalaropes. These are species of great concern to us here on the Yukon Delta as well. On page 2, in the section, Threats to phalarope populations, the authors state, “For many years, up to 20,000 red-necked phalaropes also stopped to feed and rest in the western Bay of Fundy in New Brunswick.” They then go on to talk about the disappearance of phalaropes from this site. Unfortunately, the authors have dramatically understated the potential calamity. Based on the BNA account for red-necked phalaropes, the figure of 20,000 actually represents the maximum density (i.e., numbers/sq-km) detected in that area. Estimates of the total number of phalaropes passing through the site ranged up to 3,000,000. To date, scientists are still trying to figure out if birds died or simply moved elsewhere, but the mystery probably involves millions of birds, not just a couple tens of thousands.

Sincerely,

*Brian J. McCaffery*

*U. S. Fish & Wildlife Service*

*Yukon Delta National Wildlife Refuge*

*The Year 2005 has been a busy one for the San Francisco Bay National Wildlife Refuge Complex. Here are just a few highlights of each refuge's accomplishments.*

*Lange's metalmark butterfly.  
Photo: USFWS*

### Antioch Dunes National Wildlife Refuge

Visitor opportunities expanded at the Antioch Dunes NWR. Over 400 visitors participated in guided tours, surveys, and environmental education at the 55-acre refuge, which is home to three endangered species. For the second year and to the delight of local residents, docents led tours on the second Saturday of each month. Deer Valley High School and Earth Team conducted restoration experiments and documented evidence of wildlife on the refuge using Nature Mapping software. Volunteers helped plant 2000 buckwheat seedlings to benefit Lange's metalmark butterflies and other insects.



Trapping was conducted to compare small mammal populations in 2005 with those captured in 1985. Results showed that captures of endangered salt marsh harvest mice were slightly lower than in 1985. The salt marsh harvest mice may be underrepresented in the captures because voles and house mice, which are more numerous, may have encountered the traps first.

### Don Edwards San Francisco Bay National Wildlife Refuge

One of the biggest developments at Don Edwards SF Bay NWR this year was the progression of the South Bay Salt Pond Restoration Project's Initial Stewardship Plan to Phase 2. Since the acquisition of salt ponds from Cargill in 2003, the South Bay Salt Pond Restoration Project has been the largest tidal wetland restoration project on the West Coast. Since installing water control structures in the levees of several ponds, allowing for tidal movement, there has been a 100% increase of use by both waterfowl and seabirds. Some of the new salt ponds are being used for hunting, thus increasing the hunting area by over 2,000 acres. Salt Pond Docents continue to lead tours that inform the public of the restoration.

This summer, refuge biologists conducted small mammal trapping on Mayhew's Landing, an 123-acre tidal marsh and grassland area across from Refuge Headquarters.

Don Edwards SF Bay NWR continues to benefit from the overwhelming contributions of volunteers. Service hours from special events, such as Earth Day, Coastal Clean-Up, Save the Bay's Bair Island Education and Restoration Program, Shark Day, and National Wildlife Refuge Week total over 1,500 hours. This number does not include the hundreds upon hundreds of hours worked by our dedicated volunteers, who staff the visitor center and lead interpretative programs.

### Ellicott Slough National Wildlife Refuge

Ellicott Slough NWR received funding allotted to repair the damage to Calabasas Pond Levee caused by the El Niño winter of 1997-1998. Refuge staff teamed with engineers to design a structure that could withstand 100-year flood events, and provide optimal habitat for endangered Santa Cruz long-toed salamanders. Construction is scheduled to start in the summer of 2006.



*By Katie Fotta, intern*

*Shark Day.  
Photo: Norton Bell*

Refuge staff continued work with students from Renaissance High School. Environmental Education Specialist Ken Clarkson accompanied seniors from Renaissance High School to Russia in October to attend a Young Peoples Ecological Conference. This opportunity provided the chance to meet international students involved with protected lands and restoration.

## Farallon National Wildlife Refuge

This was an unusual year for breeding seabirds on the Farallon islands. Common murre and Brandt's cormorants bred in low numbers, while pelagic cormorants did not breed at all. Few Cassin's auklets nested on the Farallon islands this season. Krill, the Cassin's auklet's main food source, appeared to be in short supply.

For the first time in its history, Farallons NWR hosted a media day and welcomed 11 journalists from Bay Area newspapers, TV stations, and Associated Press for a tour of Southeast Farallon Island. Media coverage of the islands allows the public to further connect with the refuge they have heard so much about but are unable to visit due to the sensitivity of the habitat. Oceanic Society Naturalists, including director Birgit Wining, assisted with the tour to enhance the media's understanding of refuge management, resource sensitivity and biological monitoring.

The refuge partnered with Point Reyes Bird Observatory, Farallon National Marine Sanctuary, Common Murre Restoration Project, and the San Francisco Bay Wildlife Society to develop a new environmental education program which will be taken into schools in the Pacifica and Half Moon Bay area. If any educators are interested in the program, contact Ken Clarkson at 510-792-0222 ext. 36.

Another important development for the refuge was the installation of a new waste treatment system. All sewage and gray water will be treated and disposed of on-site with a special bio-remediation process, eliminating all discharge into the ocean. A

loud cheer was heard from the island as the old composting toilet was carried away by helicopter.

## Marin Islands National Wildlife Refuge

Marin Islands NWR is working on its Comprehensive Conservation Plan, which is a guide for managing the refuge for the next 15 years. The final draft of the plan will be available for public comment in early 2006. Management alternatives can be viewed on the web site <http://pacific.fws.gov/planning/>. The chosen alternative will be based on the refuge's purpose and mission in addition to comments received from the public during the comment period. The refuge continues work with Save the Bay's Discover the Bay Program. Volunteers kayak to the islands once a month to help with native plant restoration, weeding, and cleanup efforts.

## Salinas River National Wildlife Refuge

The snowy plover season winds to a close in Salinas. After a mid-season lull when harriers and ravens were suspected of taking many nests along the beaches, the plovers rebounded with some successful nests and late fledges.

## San Pablo Bay National Wildlife Refuge

We've moved! The main office of the San Pablo Bay NWR is a renovated farm building on an old dairy farm. We are located south of Highway 37, near Infineon Raceway in Sonoma County. The address is 7715 Lakeville Highway, Petaluma, CA 94954. Our new phone number is 707-769-4200. Visit us at the new site!

Plans are formulating for a green house of native plants, which will be used for tidal marsh restoration. With the help of volunteers and a new mapping program, the staff is starting to map invasive plant species. For more information contact the refuge.



*Brandt's cormorant.*  
Photo: ©Tom and Pat Leeson

# 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 16, 2005 and October 21, 2005. 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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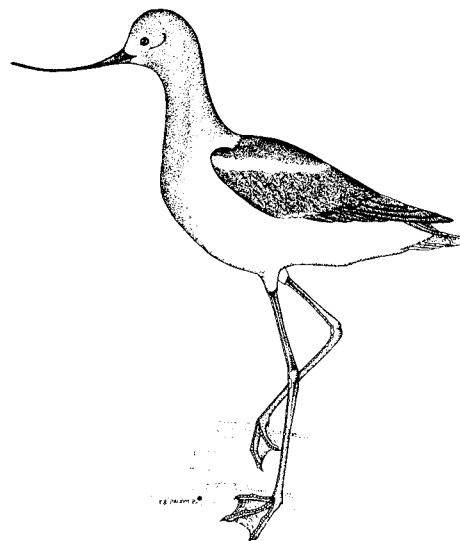
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## Help Us Help the Refuge

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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 Hwy 37 after Lakeville Hwy  
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10<sup>th</sup> Annual

# San Francisco Bay Flyway Festival

Friday, January 27 5pm – 9pm • Saturday, January 28 9am – 4pm • Sunday, January 29 9am – 3pm



Visit the San Pablo Bay National Wildlife Refuge booth at the Festival headquarters in Building 897 on Mare Island.



Meet the National Wildlife Refuge System's famous Blue Goose! Saturday and Sunday, 12 noon to 1:00 p.m.



Enjoy Mucky Marsh Music Saturday 1:30 p.m.



Plus, visit the New Office of the San Pablo Bay National Wildlife Refuge in Petaluma.

Christy Smith, San Pablo Bay Refuge Manager & John Brosnan, Project Director of Sonoma Land Trust will discuss restoration of the North Point property.

Saturday 1:00 p.m. to 2:00 p.m.

Directions to refuge office: going west on 37, pass 121 light, make a U-turn at the next light, Lakeville Hwy., office ½ mile on right. Going east on 37, office ½ mile on right after Lakeville Hwy light.



## Refuge and Partnership Walks!

**Skaggs Island's Hawk Walks** • Reservations required, call 707-649-9464  
 Friday 1pm - 4:30pm; Saturday 8am - 12 noon & 1pm - 4:30pm; Sunday 8am - 12 noon

**Sonoma Baylands Tidal Wetland Walk** • Saturday 2:30pm-3:30pm  
 Come early and visit with Christy and John before the walk.  
 off of Hwy 37 at Port Sonoma Marina, follow the signs

**Guadacanal Village Wetland Restoration Marsh** • Saturday 2:00pm -4:00pm  
 Meet refuge volunteer for shorebird viewing. Get directions to the site at the refuge booth in Building 897 or from the Festival brochure.

**Cullinan Ranch, San Pablo Bay National Wildlife Refuge** • Sunday 1:00pm - 2:00pm  
 Bird viewing and discussion on wetland restoration. Get directions to the site at the refuge booth in Building 897 or from the Festival brochure.

For a Flyway Festival brochure, call (707) 649-9464 or [www.SFBayFlywayFestival.com](http://www.SFBayFlywayFestival.com)  
 For events and activities at SF Bay National Wildlife Refuge Complex visit <http://www.fws.gov/desfbay>

# Winter Activity Schedule

## December

*Saturday, December 3*

### 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. Led by Katie Fotta.

### Holiday for the Birds!

Environmental Education Center, Alviso  
2:30 p.m. - 4:00 p.m.

Make some new feathered friends at our holiday season **live bird** program. Sulphur Creek Nature Center will bring an interesting assortment of live birds to the refuge. Discover how you can help wild birds and other wildlife in your watershed. Make a bird treat to take home. Please note: Peanut butter is used for the bird treat. Suitable for all ages. RESERVATIONS REQUIRED. Space is limited. Call Laurie at 408-262-5513 ext. 102.

*Sunday, December 4*

### Salt Pond Tour

Meet at Bayfront Park, Menlo Park  
1:00 p.m. - 3:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions.

*Saturday, December 10*

### 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.

### South Bay Salt Pond Restoration Presentation

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

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, hear about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext. 43 for reservations.

### 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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222. Led by Mary and Gene Bobik.

*Sunday, December 11*

### Marsh Walk

Environmental Education Center, Alviso  
1:00 p.m. - 2:30 p.m.

Take a break from your busy week and join Jen Stankiewicz for a relaxing stroll through New Chicago Marsh. Check for new arrivals in the salt ponds. Look for seals in Artesian Slough. Suitable for all ages. Dress warmly. Trail is mostly level, and is wheelchair and stroller accessible. Distance covered is less than 1 mile. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

### 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. Bring your creativity because we will design a drain pipe system and learn where all of our water goes. Design and decorate your own, unique household water-saver pail from recycled materials. While you wait for your newly crafted pail to dry, test your agility and luck in our water pipes obstacle course. Recommended for ages 7 and up. Reservations required. Call Tina at 408-262-5513 ext 104.

### Botanical Wanderings

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

Discover the diverse winter habitats from the hilltops to the marsh. Use our free plant list to help identify the great variety of plants that thrive in this unique urban refuge. Bring binoculars to get a better look at birds and animals we may encounter on the trail, or borrow a pair of ours. Led by Alvin Dockter.

### Adult Beginning Birdwatching

Environmental Education Center, Alviso  
3:00 p.m. - 4:30 p.m.

Can you tell an avocet from a black-necked stilt? If not, join birding enthusiast, Ceal Craig, for a beginning birdwatching program and get to know the most common refuge visitors. Start with a slide show inside to learn how to recognize the regulars, and then try your new skills on the trail. Program intended for adults. RESERVATIONS REQUIRED. Call Laurie McEwen at 408-262-5513 ext. 102.

*Saturday, December 17*

### Slough Who?

Environmental Education Center, Alviso  
1:00 p.m. - 2:30 p.m.

Who... whoo... whoo did that owl eat? Bet you can find out! Come solve the mystery of who ate whom and learn a bit about these nocturnal predators with Ed Kantak. We will watch a slide show on owls, hike the habitats and search for owl clues, and get a chance to dissect owl pellets to discover exactly who that owl ate! Reservations required. Call Tina at 408-262-5513 x104.

### Salt Pond Tour

Meet at Bayfront Park, Menlo Park  
1:00 p.m. - 3:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions. Led by Loren Almeida and Steve Dill.

*Sunday, December 18*

### Wicked Weeds: Noxious Plants on the Refuge

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

Discover which silent invaders are skulking in the marsh and in the upland habitats. Which plants have the capability of wreaking havoc and destruction to

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# Winter Activity Schedule

all those that live near them? During this walk, see which plants are the culprits, and hear how these invasive non-native weeds can alter the environment. Led by Carmen Minch.

## South Bay Salt Pond Restoration Presentation

Environmental Education Center, Alviso  
3:00 p.m. – 4:00 p.m.

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, hear about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext. 43 for reservations. Presented by Samantha McLEmore.

## January

Saturday, January 7

## South Bay Salt Pond Restoration Presentation

Visitor Center Auditorium, Fremont  
1:00 p.m. – 2:00 p.m.

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, hear about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext. 43 for reservations. Presented by Pradeep Sudame.

## Botanical Wanderings

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

Discover the diverse winter habitats from the hilltops to the marsh. Use our free plant list to help identify the great variety of plants that thrive in this unique urban refuge. Bring binoculars to get a better look at birds and animals we may encounter on the trail, or borrow a pair of ours. Led by Alvin Dockter.

## Focus On New Year

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

Kick off 2006 with a visit to the Education Center. Create a fish print calendar to decorate your home or office. Play a game, then make a few resolutions that will help our local wildlife. Program suitable for

ages 5 and up. Visitors under age 5 welcome with a crafty adult supervisor. Note: we will be using washable paint for the craft. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

Sunday, January 8

## Marsh Walk

Environmental Education Center, Alviso  
1:00 p.m. – 2:30 p.m.

Take a break from your busy week and join Jen Stankiewicz for a relaxing stroll through New Chicago Marsh. Check for new arrivals in the salt ponds. Look for seals in Artesian Slough. Suitable for all ages. Dress warmly. Trail is mostly level, and is wheelchair and stroller accessible. Distance covered is less than 1 mile. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

Saturday, January 14

## 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 Tour

Meet at Bayfront Park, Menlo Park  
1:00 p.m. – 3:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions. Led by Lynn Mortensen and Loren Almeida.

## Winter Discovery Walk

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

Join Ed Kantack for an enlightening walk around the Education Center. Look for signs of wildlife activity in the uplands. Geared for ages 8 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

Sunday, January 15

## Marsh Mud Mania

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

What's that wiggling and squiggling? Think that brown stuff is just mud? Think again!!! Come take a slough hike, collect some ooey, gooey mud, and discover which critters the birds find during a low-tide feast. We'll also compare mud creatures from two different habitats to see what they can tell us about the health of these muddy homes. Reservations required. Call Tina at 408-262-5513 x104.

## Family Bird Walk

Visitor Center, Fremont  
2:30 p.m. - 4:30 p.m.

Let family walks become a shared time of nature learning. We'll begin by helping kids create their personal birdwatching field guides. 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. Led by Eileen McLaughlin.

## Adult Beginning Birdwatching

Environmental Education Center, Alviso  
3:00 p.m. – 4:30 p.m.

Can you tell an avocet from a black-necked stilt? If not, join birding enthusiast, Ceal Craig, for a beginning birdwatching program and get to know the most common refuge visitors. Start with a slide show inside to learn how to recognize the regulars, and then try your new skills on the trail. Program intended for adults. RESERVATIONS REQUIRED. Call Laurie McEwen at 408-262-5513 ext. 102.

Saturday, January 21

## Community Service Day

Environmental Education Center, Alviso  
1:45 p.m. – 4:00 p.m.

Calling all high school students looking to fulfill community service requirements, Scout groups looking to earn a service badge, and anyone else who just wants to pitch in at a one-time Refuge project. Come help us remove non-native invasive species from the Education Center's habitats. Gloves and tools provided. Expect to get dirty. Long pants and long sleeve shirts are recommended. Recommended for ages 9 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

Don Edwards San Francisco Bay National Wildlife Refuge

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# Winter Activity Schedule

## February

### Saturday, February 4

#### **A Ghost Town in San Francisco Bay?**

Visitor Center, Fremont

3:00 p.m. - 4:00 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. Presented by Pat Anthony.

#### **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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222. Led by Mary and Gene Bobik.

### *Sunday, January 22*

#### **Salt Pond Tour**

Meet at Bayfront Park, Menlo Park

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

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions. Led by John Snyder and John Hemingway.

#### **Avian Antics**

Environmental Education Center, Alviso

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

Join us at the refuge as we explore the trails and attend a low tide feast. Learn a little bird trivia along the way, like why some birds eat their own feathers or which refuge bird finds a mate for life? Bring your own binoculars, or borrow a pair of ours! This is a quiet walk so the birds don't fly away. Reservations required. Call Tina at 408-262-5513 x104. Subject to cancellation due to weather.

### *Saturday, January 28*

#### **10th Annual San Francisco Bay Flyway Festival**

Mare Island, building 897

9:00 a.m. to 4:00 p.m.

This annual event has it all! Come join the bird migration frenzy through games, activities for young and old, wetland and bird walks, presentations, videos, music and much, much more. See

the Festival advertisement in this newsletter for Refuge-related events and go to <http://www.SFBayFlywayFestival.com> for details. Saturday only! Special performance by the "Mucky Marsh Music Makers" 1:30 p.m. - 2:30 p.m. in Building 897.

#### **Duck, Duck, Goose**

Environmental Education Center, Alviso

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

Who's honking overhead? Why are they quacking in the marsh? It's that time of year again, ducks and geese from far away are hanging out around San Francisco Bay. Why? Come find out, and make your very own bird book. Weather permitting we'll take a bird spotting walk. Otherwise we'll play a game and make a duck call to take home. Dress warmly and bring binoculars or borrow ours. Great for ages 5 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

#### **Twilight Games**

Environmental Education Center, Alviso

4:00 p.m. - 5:30 p.m.

Chores? Homework? Nah, join Jen for a twilight stroll. Many marsh creatures are just waking up to start their "day". Find out why. Become hunters of the night while playing Bat & Moth. Test your eyesight and hearing when you become a hungry owl searching for dinner. Dress warmly and wear comfortable walking shoes. Good fun for the whole family. All ages welcome. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

### *Sunday, January 29*

#### **10th annual SF Bay Flyway Festival**

Mare Island, building 897

9:00 a.m. to 3:00 p.m.

See description of Festival under Saturday, January 28.

#### **South Bay Salt Pond Restoration Presentation**

Environmental Education Center, Alviso

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

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, hear about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext 43 for reservations. Presented by Susan Nickels.

#### **Community Service Day**

Environmental Education Center, Alviso

9:45 a.m. - 12:00 p.m.

Calling all high school students looking to fulfill community service requirements, Scout groups looking to earn a service badge, and anyone else who just wants to pitch in at a one-time refuge project. Come help us remove non-native invasive species from the Education Center's habitats. Gloves and tools provided. Expect to get dirty. Long pants and long sleeve shirts are recommended. Recommended for ages 9 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

#### **Owls Among Us (Live Birds)**

Environmental Education Center, Alviso

3:00 p.m. - 4:30 p.m.

Live owls will be visiting the Education Center today, courtesy of Sulphur Creek Nature Center. What owls live in your neighborhood? How can they hunt in the dark? Enjoy this rare opportunity to view hunters of the night. Take a short guided walk looking for owls as they get ready to go out for dinner. All ages welcome. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

### *Sunday, February 5*

#### **South Bay Salt Pond Restoration Presentation**

Visitor Center Auditorium, Fremont

1:00 p.m. - 2:00 p.m.

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, learn about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext. 43 for reservations. Presented by George Trevino.

#### **Critter Café**

Environmental Education Center, Alviso

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

Mud and water are pretty boring stuff, right? No way! Come take a closer look at some of the tiny, wiggly, squiggly creatures we'll find in samples of mud and water from marshes at the Don Edwards San Francisco Bay National Wildlife Refuge. Learn about macroinvertebrates and plankton - the tasty treats that shorebirds are eating at our five-star marsh 'cafes' at the refuge. Recommended for ages 6 and up. Reservations required. Call Tina at 408-262-5513 ext 104.

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# Winter Activity Schedule

*Saturday, February 11*

## **Gardening for the Birds**

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

Winter is in full swing! That means birds are searching high and low for food and safe havens around the Bay Area. How can you play a role in providing habitat for migrating and wintering birds? View plants in our gardens that not only attract birds and add beauty to your garden, but do not require much watering. Led by Laurie McEwen. RESERVATIONS REQUIRED. Call Laurie at 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 Marsh Hearts**

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

What makes a salt marsh tick? What's the heart of the marsh? Find out on this introductory marsh walk. Then return to the building to make a marsh valentine. Geared for ages 6 and up. Led by Laurie McEwen. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

## **Botanical Wanderings**

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

Discover the diverse winter habitats from the hilltops to the marsh. Use our free plant list to help identify the great variety of plants that thrive in this unique urban refuge. Bring binoculars to get a better look at birds and animals we may encounter on the trail, or borrow a pair of ours. Led by Alvin Dockter.

## **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. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222. Led by Mary and Gene Bobik.

*Sunday, February 12*

## **Introduction to Ducks**

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

Thousands of ducks winter in the San Francisco Bay every year. View a short slide show 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. Led by Carmen Minch.

*Saturday, February 18*

## **Salt Pond Tour**

**Meet at Bayfront Park, Menlo Park**  
1:00 p.m. – 3:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions. Led by Pradeep Sudame and Sam McLemore.

## **Wetlands Around US**

**Environmental Education Center, Alviso**  
1:30 p.m. – 2:30 p.m.

Wetlands! What are they and why are they important to us. Ed Kantack has a new slide show depicting types of wetland throughout the USA. Geared for ages 12 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102 to make a reservation.

*Sunday, February 19*

## **Hawk Walk**

**Meet at the Visitor Center Entrance, Fremont**  
9:00 a.m. - 11:00 a.m.

Join Laurey Hemenway on a leisurely walk through the refuge and learn to differentiate between the various raptors. Identify other migratory birds in the upland and salt marsh habitats. Wear comfortable shoes and bring a bird book and binoculars. Recommended for ages 8 and up. RESERVATIONS REQUIRED. Call 510-792-0222.

## **Habitat Hike**

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

Ever wonder how many habitats are here at the Refuge? Take a walk and see them all! See the salt marsh, sloughs, salt ponds and more on our short and easy trek. We will identify plants, birds, and whatever other animals we see and learn how people

have affected their habitat. Recommended for ages 7 and up. Reservations required. Call Tina at 408-262-5513 ext 104.

*Saturday, February 25*

## **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. Led by Eileen McLaughlin.

## **South Bay Salt Pond Restoration Presentation**

**Environmental Education Center, Alviso**  
3:00 p.m. – 4:00 p.m.

The South Bay Restoration Project will transform South San Francisco Bay in the next few decades. How will this affect habitat, wildlife, and wildlife-oriented recreation? In this slide presentation, hear about the project, the role of the Don Edwards San Francisco Bay National Wildlife Refuge, and how you can become involved with the largest tidal wetland restoration project on the West Coast. Geared for ages 12 and older. Call 510-792-0222 ext. 43 for reservations. Presented by John Snyder.

*Sunday, February 26*

## **Salt Pond Tour**

**Meet at Bayfront Park, Menlo Park**  
1:00 p.m. – 3:00 p.m.

Did you know that the largest tidal wetland restoration project on the West Coast is happening right here in San Francisco Bay? Hear more about this project and view some of the salt ponds acquired by the Don Edwards San Francisco Bay National Wildlife Refuge. Geared toward adults. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43 for reservations and directions. Led by Steve Dill and Susan Nickels.

## **Adult Beginning Birdwatching**

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

Can you tell an avocet from a black-necked stilt? If not, join birding enthusiast, Ceal Craig, for a beginning birdwatching program and get to know the most common refuge visitors. Start with a slide show inside to learn how to recognize the regulars, and then try your new skills on the trail. Program intended for adults. RESERVATIONS REQUIRED. Call Laurie McEwen at 408-262-5513 ext. 102.

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# Field Trips to the Refuge

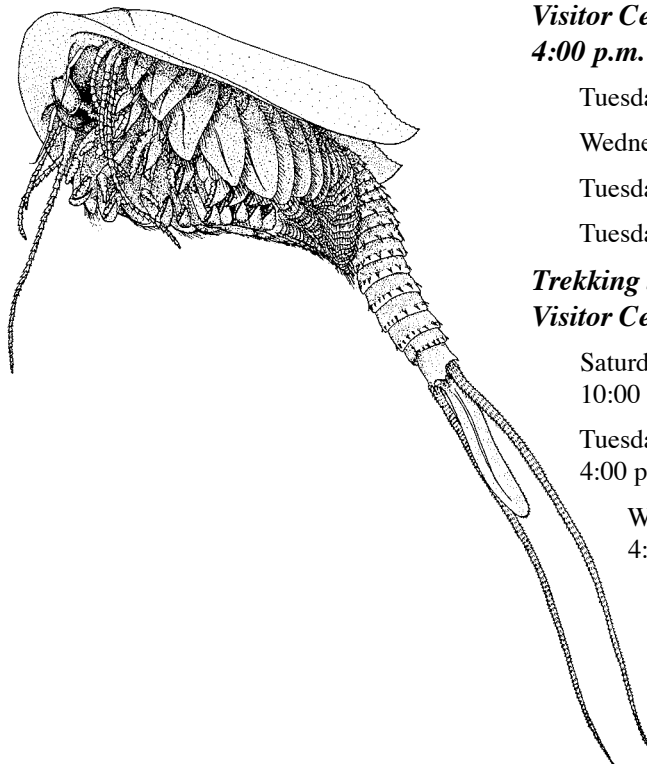
## Don Edwards San Francisco Bay National Wildlife Refuge

*The Refuge offers field trip programs at both our Visitor Center in Fremont and Environmental Education Center in Alviso.*

### General Field Trip Program Information

FREE field trip programs are offered at two sites at the Don Edwards San Francisco Bay National Wildlife Refuge. 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 Youth Group Leaders conduct their own field trips after attending a Field Trip Orientation Workshop. The Orientation Workshops provide the information you need 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 Orientation Workshop.



### Field Trips at the Visitor 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.

**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 at the Visitor Center in Fremont, Trekking the Refuge Field Trip is designed for grades 3-6, for up to 36 students. Trekking the Refuge is offered Tuesday through Friday.

**Reservations begin on Tuesday, December 6, 4:00 p.m. - 5:00 p.m. Call 510-792-0222.**

### Field Trip Orientation Dates at the Visitor Center in Fremont

It is our policy that you must attend every two years. Call Ken Clarkson at 510-792-0222.

#### **Wetland Round-Up Field Trip Orientations Visitor Center in Fremont**

**4:00 p.m. - 8:00 p.m.**

Tuesday, January 24

Wednesday, February 15

Tuesday, March 21

Tuesday, April 18

#### **Trekking the Refuge Field Trip Orientations Visitor Center in Fremont**

Saturday, February 11  
10:00 a.m. - 2:00 p.m.

Tuesday, March 7  
4:00 p.m. - 8:00 p.m.

Wednesday, April 12  
4:00 p.m. - 8:00 p.m.

# Field Trips to the Refuge

## 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.

*December 5, 4:00 p.m. - 5:00 p.m. Call 408-262-5513.*

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

It is our policy that you must attend every two years. Call the education staff at 408-262-5513.

**Wetland Round-Up Field Trip Orientation**  
*4:00 p.m. - 7:30 p.m.*

**\*\* Please note: The cut off date to make a reservation is the Friday before each orientation date.**

Thursday, January 19

Tuesday, February 7

Thursday, March 2

Tuesday, April 4

Wednesday, April 26

### 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. The program offers field trips at the refuge, classroom presentations, and outreach presentations

Programs are geared for 5th - 12th grades. A modified field trip is available for college groups. Educators are also encouraged to contact us to discuss options for customizing field trip and presentation activities and schedules.

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.

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 Tina Simmons, the Slow the Flow Program Coordinator at 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 such as dip nets, magnifying lenses and bug boxes that you will need to take a close look at the salt marsh plants, the brine shrimp, and the birds. The back pack is suitable for up to six people, ages kindergarten - adults. There are also group packs available for 12-24 people (only 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 or 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 in Fremont, please call 510-792-0222. The Environmental Education Center is open Saturday and Sunday from 10:00 a.m. - 5:00 p.m. For questions, please call 408-262-5513.

*PASS IT ON!!*

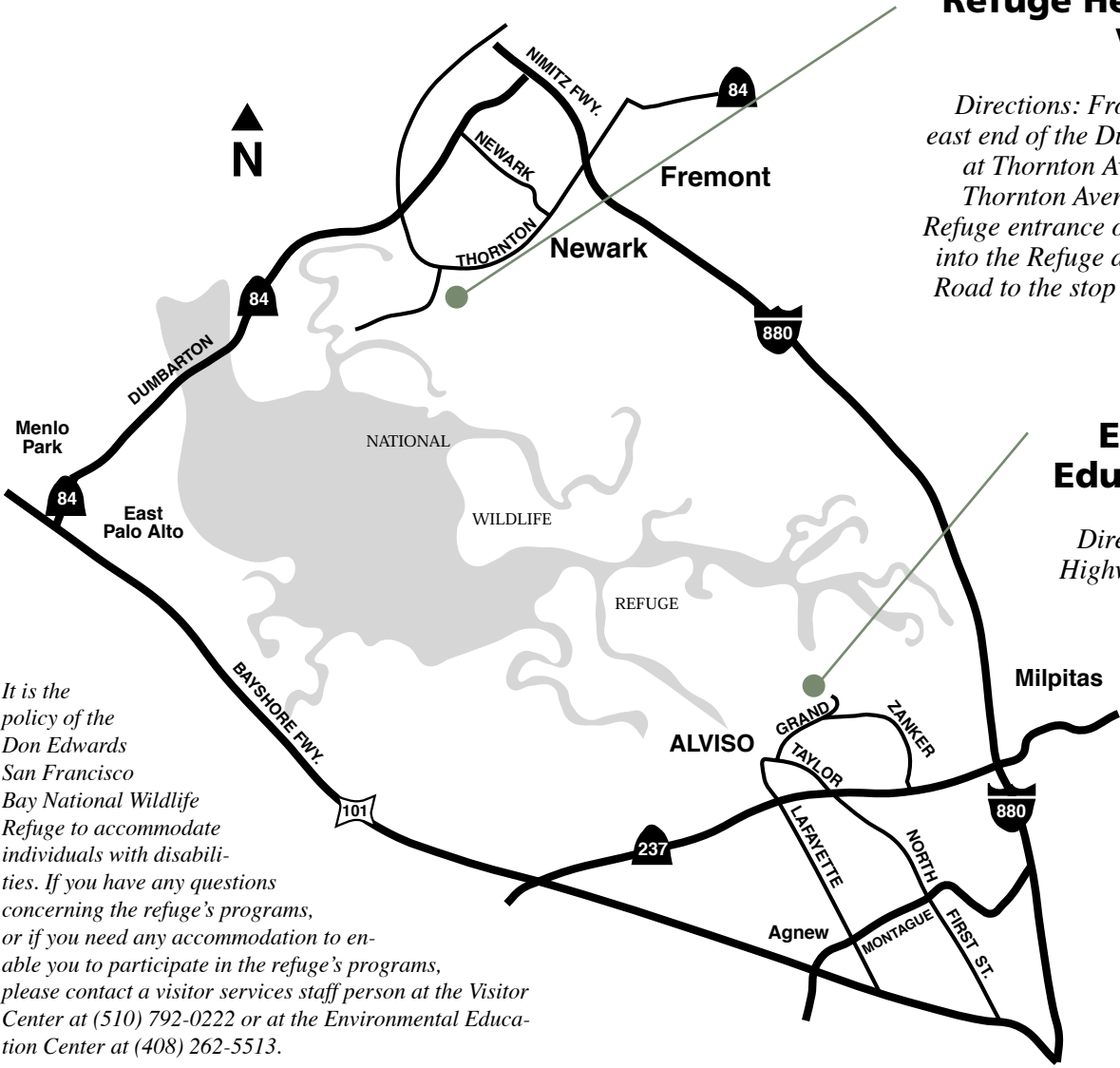
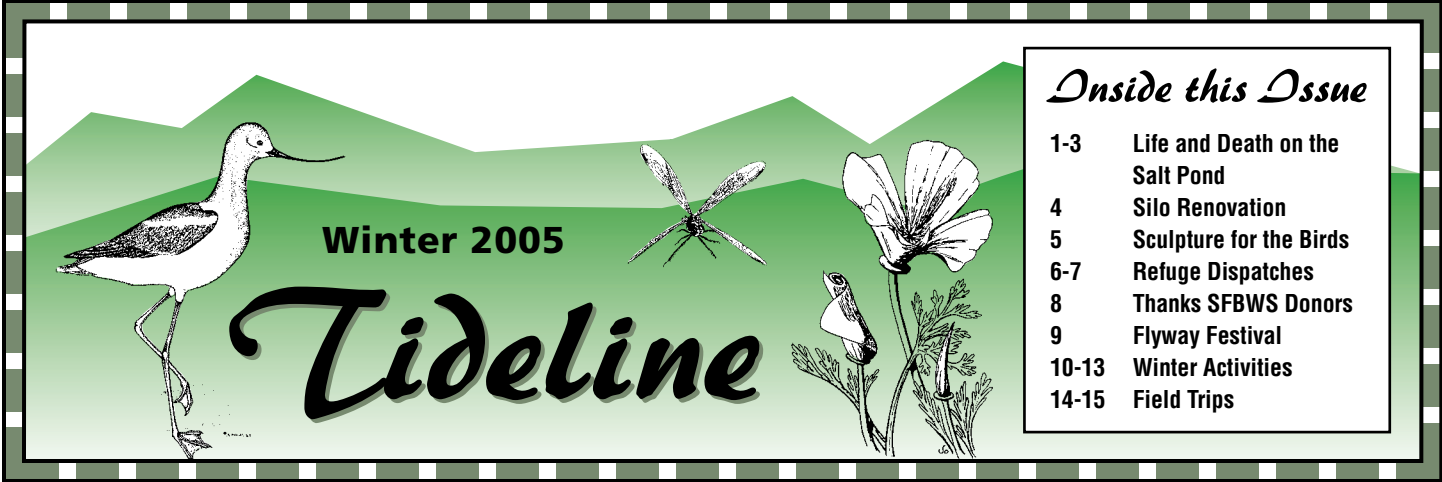
*Please help us spread the word about our FREE, fun, and educational field trip programs!! If you know a teacher that would be interested in these programs please pass on your copy of Tideline or have them give us a call for more information!! Thank you for your help!*

UNITED STATES  
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE  
DON EDWARDS SAN FRANCISCO BAY  
NATIONAL WILDLIFE REFUGE  
P.O. BOX 524  
NEWARK, CALIFORNIA 94560

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

FIRST-CLASS MAIL  
POSTAGE & FEES PAID  
U.S. Fish & Wildlife Service  
Permit No. G-77



**Refuge 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.

**Refuge 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 Don Edwards San Francisco Bay National Wildlife Refuge to accommodate individuals with disabilities. If you have any questions concerning the refuge's programs, or if you need any accommodation to enable you to participate in the refuge's programs, please contact a visitor services staff person at the Visitor Center at (510) 792-0222 or at the Environmental Education Center at (408) 262-5513.