



Volume 24, Number 4

# In the Trenches with Invasive Spartina

## Coastal Conservancy Program Launches Bay-wide Assault on Hearty Marsh Invader

By Peggy Olofson

Beleaguered marsh managers and concerned environmentalists found reason for renewed optimism, and even some celebration, this fall. After years of disheartening delays and frustration, a coordinated regional attack on non-native *Spartina*, an invasive cordgrass that has established in the San Francisco Bay, finally got underway. On September 2, 2004 with the signing of the last environmental authorizations by the U.S. Fish and Wildlife Service (USFWS), the San Francisco Estuary Invasive *Spartina* Project (ISP), a program of the State Coastal Conservancy, launched an attack on 450 acres of tenacious weeds present in the Bay.

“If we had done this work two years ago,” laments ISP Field Operations Manager Erik Grijalva, “we’d have knocked out most of the non-native *Spartina* population in the Bay!” As it is, Grijalva and the ISP partners are well aware that they have a tough battle ahead of them for the next several years. Although 450 acres may seem like a monumental battlefield, it is only 23% of what is actually out there. Even if this year’s treatment were 100% successful, at the current rate of spread, the plant may cover as many as 3,000 acres of the Bay’s tidal marshes and mudflats by treatment time next year – 1,000 acres more than was estimated at the beginning of this year.

“But at least now we have a program,”

says Alameda County Flood Control District’s Saul Ferdan. “At least now there’s a little less probability that the areas we cleared this year will be completely reinfested by seed from a neighbor’s untreated marsh.”

### Origin of the invasion

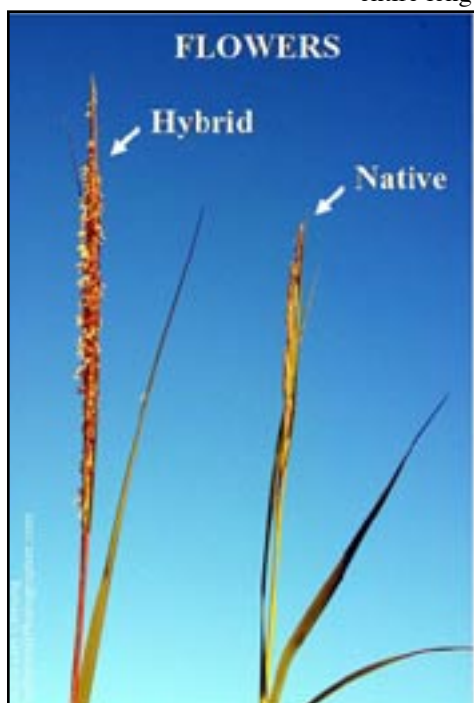
Four species of non-native *Spartina* were introduced to the San Francisco Estuary in the  
*Continued on page 2*

Map of 2004 *Spartina* Treatment Sites  
 ISP chart



# Coastal Conservancy Program Launches

1960's and 70's – at least three intentionally by well-meaning landscapers and restorationists (see “Good Intentions Gone Awry,” by Phyllis Faber, in the Conservancy’s California Coast and Ocean, Summer 2000 issue). Two of the species, English cordgrass (*S. anglica*) and dense-flowered cordgrass (*S. densiflora*), were planted as part of a landscaping project at Creekside Park in Marin County. Both these species have remained relatively localized along Corte Madera Creek and the Marin shoreline, but dense-flowered cordgrass, a native to Chile, has spread along the entire length of the Creek and begun migrating to



*Superior pollen production and fertility enable hybrid *Spartina* to “swamp” native flowers with pollen, causing native plants to produce entirely hybrid offspring.*

*ISP illustration*

other areas in the northern Central Bay. Salt-meadow cordgrass (*S. patens*), a native of Atlantic salt marshes, is of unknown origin in the Bay, and is found only at Southampton Marsh near Benicia.

The fourth species, Atlantic smooth cordgrass (*S. alterniflora*), also from the Atlantic coast, was introduced as part of a marsh restoration experiment at a salt pond on the Alameda County shoreline. This species eventually cross-pollinated with native Pacific cordgrass (*S. foliosa*), and the hybrids created soon evolved into an aggressively expanding “hybrid swarm”. Researchers at University of California found that the hybrid cordgrass produces pollen in much greater abundance (21 times greater) and with higher fertility

than native cordgrass. It would overwhelm or “swamp” native cordgrass flowers, thus producing huge volumes of hybrid seed. The hybrid seeds are able to establish not only in areas suitable to Pacific cordgrass, but also in extreme areas, such as wave-washed open mudflats, high marsh, and freshwater creek channels.

“I’ve got one growing in my backyard in Oakland,” confides Grijalva, “and it’s doing great!”

It is because of this very high productivity and ability to grow just about anywhere in the tidal spectrum that the *Spartina* hybrid swarm may be the most significant threat to San Francisco Bay’s marsh ecosystem since human development.

## Beautiful blight

A characteristic of hybrid *Spartina* that sometimes makes garnering public support for its control more difficult is that it’s quite an attrac-

tive, lush green grass. In some areas, hybrid *Spartina* meadows have been established for 10-15 years. Nearby residents consider them a lovely part of their afternoon walk, little suspecting the underlying havoc being wreaked on the ecosystem. The potential long-term ecological effects of non-native *Spartina* are significant, including the following:

- Extensive regional loss of tidal flats – Almost half of the 19,000 acres of existing tidal flat in the South and Central bays may become dominated by hybrid *Spartina* in less than 10 years if it is not successfully controlled.

- Elimination of critical foraging habitat for resident and migratory birds – With the loss of tidal flats comes the loss of critical foraging areas for all sorts of birds. The mudflats would become dense monoculture meadows, with no foraging value for many important species.

- Failure of planned South Bay salt pond restorations to restore native tidal marsh that supports target species – Every one of the 33 tidal marsh restoration projects implemented in the Central and South bays in the last 20 years has become dominated by *Spartina* hybrids that are fast becoming monoculture meadows. Until nearby hybrid populations have been removed and hybrid pollen sources eliminated, the *Spartina* Project estimates that new tidal marsh restoration efforts will achieve the same end.

- Genetic assimilation, and extinction, of native Pacific cordgrass (*S. foliosa*) – As described above, the *Spartina* hybrid swarm easily overwhelms native Pacific cordgrass, swamping the native flower with hybrid pollen and precluding the native plant’s ability to reproduce itself. At the rate this phenomenon occurs, it would be only a few short years before Pacific cordgrass, the keystone species of our estuarine tidal marsh system, becomes locally and perhaps regionally, extinct.

- Loss of flood control capacity – Flood control agencies in the South and Central bays have become increasingly concerned as they watch hybrid *Spartina* become dominant in important flood water conveyance channels, causing highly accelerated sediment accretion and loss of channel capacity.

- Marginalization of endangered species habitat – Although it is not always evident in the short term, the spread and domination by hybrid *Spartina* on mudflats and mid to high tidal marsh is expected to adversely affect many endangered tidal marsh species, including the California clapper rail, salt marsh harvest mouse, California

# Bay-wide Assault on Hearty Marsh Invader

sea-blite, and soft bird's-beak.

For more information on other consequences of the unchecked spread of non-native cordgrass, see the *Spartina* Project's Programmatic Environmental Impact Statement/ Report and "A Review and Assessment of Potential Long-term Ecological Consequences of the Introduced Cordgrass *Spartina alterniflora* in the San Francisco Estuary" (Baye 2004).

## ***Spartina* history on the Don Edwards San Francisco Bay National Wildlife Refuge**

Refuge Wildlife Biologist, Joy Albertson, was among the first marsh managers in the San Francisco Estuary to initiate serious action against non-native *Spartina*. "We first started noticing this grass coming into the newly-restored Ideal Marsh in 1990," recalls Albertson. "We didn't think too much about it until it showed up suddenly south of the Dumbarton Bridge, at La Riviere Marsh, another restoration site. We soon could see that the seeds from northern sites were establishing very rapidly in the newly forming marshes. Once they were established in the new marsh, we began to see seedlings showing up in the surrounding native marshes."

When asked how she knew this plant was a problem, Albertson explains: "There were some reports circulating at that time . . . that warned that non-native *Spartina* was potentially a serious problem, and we just took it seriously."

In 1991-92, Albertson was relying on mowing and tarping to control small, isolated patches of non-native *Spartina*. By the mid-1990s, she was using glyphosate herbicide, and reaching out to marsh managers to the north. "We could see that we were just going to keep being invaded, so we started asking the Alameda County Flood Control Agency to control the *Spartina* in Alameda Creek Flood Control Channel.

Refuge control work has definitely expanded since the days of isolated patches. Partially funded by a \$151,000 grant from the State Coastal Conservancy, the refuge was able to treat the entire San Mateo County shoreline between the two bridges, as well as La Riviere Marsh and Mayhew's Landing. "The big thing," according to Albertson, "is that we continue to get everyone to participate in coordinating control – and we have to keep our priorities straight. There's only so much we [the refuge] can do if other marsh managers don't do anything."

## **The battle plan**

ISP Field Operations Director Grijalva feels optimistic after this year's efforts and has high hopes for the future: "Things went pretty well for our first year; we succeeded in getting a strong program structure in place, including dozens of partnerships, avenues to future funding, and increased public awareness, in addition to treating almost 400 acres of cordgrass."

By next season, Grijalva would like to have control plans and partnerships in place for all of the remaining 2,000-plus acres of non-native cordgrass, treating at least half of it, in addition to re-treating all of the areas that he hit this year. "It's an ambitious plan," admits Grijalva, "but it's possible, and more importantly, I think it's necessary if we are going to be successful."

Like Albertson, Grijalva is adamant that the key to successful *Spartina* control and healthy marsh restoration lies in a unified assault by the marsh managers: "Either you recognize the need for controlling non-native *Spartina* and help deal with it, or else you better reevaluate your definition of a healthy marsh system."

The ISP has thus far been funded primarily by the CalFed Bay-Delta Program and the Coastal Conservancy. The Conservancy is continuing to take the lead in acquiring funding for the ISP. At this point, a potential \$3 million has been identified for operations over the next several years, and other sources are being sought. The Conservancy, CalFed, University of California, and the San Francisco Bay Joint Venture sponsored the Third International Conference on Invasive *Spartina* in November this year in San Francisco. The conference brought together international experts to advise on the San Francisco non-native *Spartina* Invasion. For conference information, abstracts, and proceedings, visit [www.the-conference.com/2004/Spartina/](http://www.the-conference.com/2004/Spartina/).

For more information, contact: Peggy Olofson, Director, San Francisco Estuary Invasive *Spartina* Project, 605 Addison Street, Suite B, Berkeley, CA 94710 Phone: 510-548-2461 Email: [prolofson@Spartina.org](mailto:prolofson@Spartina.org)

*Peggy Olofson is the owner of Olofson Environmental, Inc., and Director of the San Francisco Estuary Invasive Spartina Project. For 10 years prior to accepting the contract as ISP Director, Ms. Olofson was an engineer for the San Francisco Bay Regional Water Quality Control Board, where she served as Manager of the San Francisco Bay Area Wetlands Ecosystem Goals Project and editor of the Baylands Ecosystem Species and Community Profiles. She lives in Oakland with her two teenage children.*

## **Spartina Project Partners**

- Alameda County Flood Control District
- California Department of Fish and Game
- California Department of Parks and Recreation
- California Department of Transportation
- City of Palo Alto
- Don Edwards San Francisco Bay National Wildlife Refuge
- East Bay Regional Parks District
- Friends of Corte Madera Watershed
- Golden Gate Audubon
- Marin Conservation Corps
- Mid-Peninsula Open Space District
- San Mateo County Mosquito Abatement District
- Santa Clara Valley Water District
- Tiburon Audubon Center

# Thank you San Francisco Bay Wildlife Society Donors!

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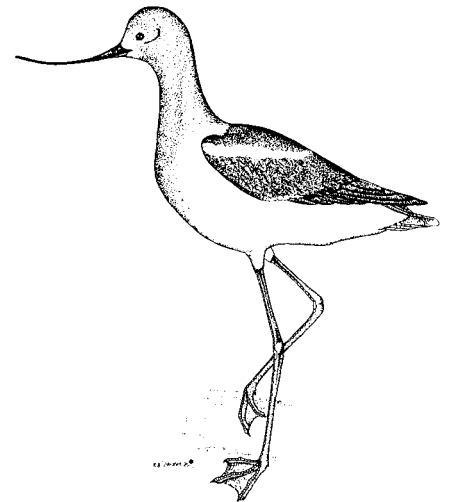
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## Help Us Help the Refuge

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.

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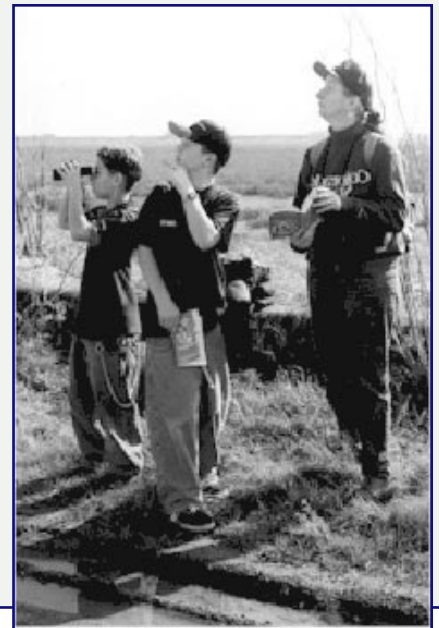
Friday, January 21      3 pm - 9 pm  
Saturday, January 22      9 am - 4 pm  
Sunday, January 23      9 am - 3 pm

Join us for Guided Tours to San Pablo Bay National Wildlife Refuge at Tolay Creek on Saturday and Sunday.

Sign up for these tours for excellent shorebird viewing at Tubbs Island.

Visit the San Pablo Bay National Wildlife Refuge booth at the Festival Headquarters at building 897.

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



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Find out more about events and activities at the San Francisco Bay National Wildlife Refuge Complex at <http://desfbay.fws.gov>

Sponsored by: US Fish & Wildlife Service Coastal Program, San Pablo Bay National Wildlife Refuge, other Bay area environmental organizations, natural resources agencies and businesses.

The San Francisco Bay National Wildlife Refuge Complex has had another busy year from providing environmental education opportunities to preparing long-term management plans. Below is just a sample of what your seven, Bay Area national wildlife refuges have been up to:

## Antioch Dunes National Wildlife Refuge

A wildfire set by vandals in 2002 caused severe population setbacks for the endangered Lange's metalmark butterfly in 2003. The number of butterflies is slowly recovering as their host plant, the naked-stemmed buckwheat, continues to make a comeback. To help the butterflies return to their natural breeding ground, Antioch Dunes NWR will plant more than 1,000 buckwheat plants over the next two years. A portion of those plants will be propagated in the San Francisco Bay NWR Complex's Native Plant Nursery.

The refuge and Friends of Antioch Dunes National Wildlife Refuge teamed up this year to provide docent-led tours to this refuge. Normally closed to protect sensitive endangered species habitat, Antioch Dunes NWR is now open for tours every second Saturday of the month. Check the activity schedule for dates and times. Special group tours are available upon request. Friends member Michael Krieg has been active in advertising the tours, recruiting volunteers, and meeting with local politicians about the refuge.

Antioch Dunes NWR also partnered up with EarthTeam, a nonprofit organization that educates students about the environment. EarthTeam will introduce advanced placement environmental science students at Deer Valley High School in Antioch to the refuge. This project will integrate habitat restoration projects at the Antioch Dunes NWR with classroom based inquiry, classroom speakers and follow-up monitoring of restoration success.

## Don Edwards San Francisco Bay National Wildlife Refuge

Visitors to this refuge in Fremont can't help but notice dirt roads, heavy equipment and a plethora of orange cones this fall. The Don Edwards San Francisco Bay NWR is striving to make the refuge headquarters more visitor-friendly. During phase one of this long-term project, Marshlands Road will be realigned, the main parking lot will accommodate buses, the Quarry Trail to Coyote Hills East Bay Regional Park will be paved and accessible to



*A volunteer assists with planting native plants at Antioch Dunes NWR. FWS photo*

persons with disabilities, and the shortcut road down to the Newark Slough Learning Center will be less steep and paved. In phase 2, when funding becomes available, the bridge crossing the slough on Marshlands Road will be seismically safe, and be widened for safer passage for pedestrians and bicyclists. A welcome kiosk and restrooms with running water are also planned for Marshlands Road in phase 2. Visit the Visitor Center in Fremont for a schematic drawing of the changes to take place.

Refuge Biologists conducted small mammal trapping on a unit of the refuge in South Fremont known as the "Mouse Pasture". This 25-acre parcel, located between Fremont Blvd. and Coyote Creek was acquired by the refuge in the 1980s as a preserve for endangered salt marsh harvest mice (SMHM). No native rodents of any species were captured during the July trapping effort, prompting refuge staff to review habitat quality and past management efforts. Lack of flooding and reduced vigor of the pickleweed is thought to be a problem. A water management plan has been prepared and the Mouse Pasture was flooded in late summer to mimic natural tidal conditions. Pickleweed response was immediate and dramatic. The pickleweed now looks healthy and green, and will hopefully entice mice from nearby habitat.

## Ellicott Slough National Wildlife Refuge

In an effort to reduce fire hazards and to restore native habitat for the endangered Santa Cruz long-toed salamander, one acre of eucalyptus trees have been removed. Eucalyptus trees are invasive and degrade the habitat of the salamander. Native oak trees will be planted in its place this winter.

The first round of Santa Cruz long-toed



surveys began in October during the first storms of the fall season. Juvenile salamanders were witnessed trekking from breeding ponds to the surrounding upland areas, indicating breeding success from earlier this year. Surveys will take place again in December to count the adults returning to the ponds to breed.

## Farallon National Wildlife Refuge

Seabirds on the Farallon Island had another banner breeding season this year. 2004 marks the fifth year in a row that most seabird populations have increased. Common murres are now living up to their name .....they are the most numerous seabird on the refuge. Over 200,000 murres were counted this year on the South and North Farallon Islands, doubling their population in barely ten years. Cooler ocean temperatures, and consequent increases in food prey items, as well as restrictions on gill netting, are factors contributing to this seabird good news story. Non-native invasive plants are also on a downward trend thanks to increased weed control efforts by refuge and PRBO Conservation Science staff and volunteers. Fewer invasive species translates to more habitat for burrow nesting seabirds like Cassin's and rhinoceros auklets.

Last fall, lights from squid fishing boats were causing problems for Ashy storm-petrels and auklets. These nocturnal seabirds are disrupted and disoriented by the bright lights



that were shining on the breeding colonies when fishermen fished too close to the shore. Also attracted to the fishing boat lights were western gulls, predators of the Ashy storm-petrels. Half of the world's ashy storm-petrels nest on the Farallons. Refuge biologists worked with the California Department of Fish and Game and squid fishermen to close the Gulf of the Farallones Marine Sanctuary to night squid fishing.

## Marin Islands National Wildlife Refuge

Development of a 15-year management plan is underway for these islands just north of the Richmond Bridge. A public scoping meeting was held in October to gather public comments about how the public would like to see Marin Islands NWR be managed. For more information about this process see the accompanying article in this issue.

The 481st Transportation Company, Mare Island, completed a training mission a few months ago at the Marin Islands NWR where they removed large amounts of non-native tree and shrub debris. These partnerships are beneficial to the US Fish and Wildlife Service and to the critical mission of training military troops. Save the Bay Association and Friends of San Pablo Bay are also assisting the refuge in habitat restoration. Non-native vegetation is currently being removed, which will soon be followed by the planting of natives.

## Salinas River National Wildlife Refuge

The threatened western snowy plover experienced its second most successful breeding season in the Salinas River region in 2004. This species, whose loss of breeding habitat had threatened its survival, produced 42 juveniles on the Salinas River NWR. This is six shy of the number of fledglings in 2003.

## San Pablo Bay National Wildlife Refuge

A draft Environmental Impact Statement/ Environmental Impact Report on tidal restoration of Cullinan Ranch Unit of the San Pablo Bay NWR will soon be available for public review in early 2005. This 1,500 acre unit was formerly tidal salt marsh habitat integral to the endangered salt marsh harvest mouse and the California clapper rail. It had been drained in the late 1800s for the purpose of growing hay. Once the plan has been approved, Cullinan Ranch could be fully restored in the next three to four years.

As part of the restoration effort, the US Army Reserves, Mare Island, 801st Engineer Company assisted the refuge in removing the last remaining structure at the Cullinan Ranch Unit. A large metal pole barn consisting of steel beams and a roof, was part of the 801st Engineer Company's training exercise on November 6, 2004. The Company has agreed to de-construct the pole barn and remove all debris associated with the structure.



*A western snowy plover and its chick at Salinas NWR  
FWS photo*

*The Don Edwards San Francisco Bay National Wildlife Refuge would like to thank BFI for their contribution to this year's Coastal Cleanup. The cleanup was a huge success!*

# A Farewell Message from Refuge Manager Marge Kolar

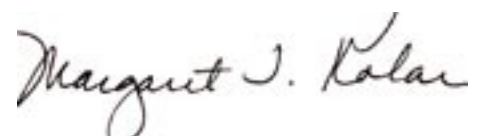
Many of you are aware that I'll be leaving the San Francisco Bay National Wildlife Refuge (NWR) Complex in January for another job with the national wildlife refuge system in Sacramento. After ten years in the Bay Area, I know I will miss the many people with whom I've worked on so many projects throughout San Francisco and Monterey Bays. Working together we've been

individual volunteers who devote their precious time for the benefit of the area's resources. I particularly appreciated the partnerships with our sister agency, the California Department of Fish and Game, at every one of the seven refuges throughout San Francisco and Monterey Bays.

The last ten years have brought many changes to northern California: the population increased by 800,000 people in the San Francisco Bay area alone. But more amazingly, the size of our national wildlife refuges and other open space lands in the area also increased. Common murre populations on the Farallon Islands and on Devils Slide Rock increased, as did populations of threatened snowy plovers and endangered California clapper rails. This is remarkable and can only be attributed to the strong will of the Bay Area community to protect and enhance wildlife even in the face of increasing human development.

As I near my departure date, I know I'll remember the many sights, sounds, and smells of the refuges in the Complex. I'll miss the sight of tens of thousands of shorebirds landing at the mudflats off Tolay Creek in San Pablo Bay NWR, the soft blooms of evening primrose at Antioch Dunes NWR, the startling contrast of white egrets on dark green vegetation at Marin Islands NWR, and the spectacular sunsets out the back door of our offices at Don Edwards SF Bay NWR. I'll recall the loud raucous calling of gulls and other seabirds at the Farallon NWR, the crashing surf at Salinas River NWR, and the quiet salamander pools at Ellicott Slough NWR. I'll even miss the pungent odor of decaying algae in the salt ponds and the sweet smell of crushed fennel and wet eucalyptus.

But most of all, I'll fondly remember each of you. Thank you so much for your support during the last ten years.



able to expand the size of our refuges, restore tidal and seasonal marshes, enhance upland habitats, increase seabird populations and improve public access to our lands. We've worked so closely that I feel we've become more than just professional associates, but friends as well.

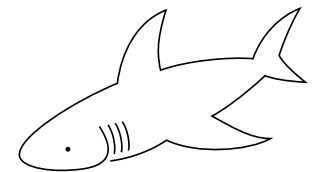
We are so blessed in the Bay Area for having such a large base of community support for our refuges and for having such a large number of organizations willing to partner with us. I've been so impressed by the number of individuals who have committed their time and energy for so many years to conserve the natural resources of the area. These hard working folks come from community-based organizations, national environmental groups, local, State and Federal agencies, non-profit research organizations, private foundations and companies, and in-



# Shark Day October 2004



*Thanks to our numerous volunteers, interns and refuge staff for making Shark Day a huge success! This popular October event, held annually during National Wildlife Refuge Week at the Environmental Education Center, Alviso, focuses on sharks that live in the San Francisco Bay. Visitors saw and pet live sharks under the care of Marine Science Institute, and participated in games, arts and crafts, and presentations. If you missed this year's event, join us next October when we do it again!*



## Planning for the Birds: A Roadmap to Conservation at San Francisco Bay National Wildlife Refuges

by Winnie Chan

Birds need to fly, fish need to swim and refuges need to plan. Refuge staff not only have the duty of implementing day-to-day activities and objectives to promote wildlife conservation, they must plan all these activities to coordinate with one another. While not an exciting aspect of refuge management, planning is an integral part of how refuges achieve wildlife conservation objectives.

Under the National Wildlife Refuge System, all refuges are charged with developing a Comprehensive Conservation Plan (CCP) to guide refuge activities for the next 15 years. A CCP is a living management document that assesses past, present and future conditions and needs unique to each refuge. CCPs are important because they dictate refuge objectives and strategies needed to achieve the "Wildlife First" goal of all refuges, including, when appropriate, restoring the ecological integrity of a refuge. CCPs also take into account how other activities such as wildlife-dependent recreation and environmen-

tal education can be compatible with wildlife conservation objectives. Lastly, CCPs are needed to prioritize budget allocations for achieving specific refuge objectives.

The CCP process is not new to the San Francisco Bay NWR Complex, CCPs have been completed for Salinas River NWR (May 2003) and Antioch Dunes NWR (August 2002). Five refuges remain to be completed for the Complex and the schedule is provided below. Currently, the Complex has initiated planning and completed a public scoping meeting for the Marin Islands NWR. Pre-planning has begun for the Farallon NWR.

Planning for all refuges is a multi-year process which requires coordination with and feedback from state and local agencies, tribal governments, local residents, conservation organizations and other interested parties to ensure that local concerns are addressed within the CCP. This open process will identify common interests that will result in a win-win situation for the refuge, those who enjoy wildlife opportunities at refuges, and most importantly, the wildlife.

Refuge	Pre-Planning Start Date	Final CCP Available
Marin Islands NWR	May, 2004	April, 2006
Farallon NWR	September, 2004	September, 2007
San Pablo Bay NWR	October, 2005	March, 2009
Ellicott NWR	February, 2007	April, 2010
Don Edwards San Francisco Bay NWR	October, 2008	July, 2013

# Winter Activity Schedule

## December

*Saturday, December 4*

### 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, 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



*Sunday, December 5*

### South Bay Salt Pond Restoration Presentation

Environmental Education Center, Alviso  
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 to let us know you're coming.

*Saturday, December 11*

### Bird 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 identify birds wintering 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, 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.

### Botanical Wanderings

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

Discover the diverse winter habitats from the hill-tops to the marsh. Use our free plant list to help identify the great variety of plants that strive 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.

### Slow the Flow Presents: 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.

### Twilight Marsh Walk

Visitor Center, Fremont  
4:00 p.m. - 5:30 p.m.

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



*Sunday, December 12*

### It's Not My Fault!

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

The San Francisco Bay region is a complex maze of faults, mountains, and other geologic formations. We will explore the formation of the San Francisco Bay and the hill upon which the Visitor Center sits. Geared toward adults. Led by Carmen Minch.



*Saturday, December 18*

### Slow the Flow Presents: Avian Antics

Environmental Education Center, Alviso  
11:00 p.m. - 12:30 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.

### 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 recently 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.

### Twilight Solstice Walk

Environmental Education Center, Alviso  
4:00 p.m. - 5:30 p.m.

Come celebrate the longest night of the year and find out what comes out in the marsh as the sun goes down. Do you know why these creatures come out at night? Come find out on this leisurely evening stroll. We'll act out our own Solstice. Plus, discover Solstice celebrations from around the world. Suitable for all ages. Reservations required. Please call Laurie McEwen at 408-262-5513 x 102 to make a reservation.

**Don Edwards San Francisco Bay National Wildlife Refuge**

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# Winter Activity Schedule

## Night Skies

**Environmental Education Center, Alviso**  
5:30 p.m. - 6:30 p.m.

Join astronomer Ralph Libby and learn about the winter stars. Then venture outside to view the night sky through a telescope. Bring your own binoculars or spotting scopes if you have them. Dress warmly as the wind can pick up in the evening. Fun for the whole family. Star viewing subject to weather conditions. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

*Sunday, December 19*

## 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 to let us know you're coming.

*January*

*Saturday, January 8*

## 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, 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.

## 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.

## Refuge Explorer Hike

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

Come out for an invigorating walk around the refuge. Dress warmly. Learn about the salt marsh, salt ponds, and sloughs. Find out which plants and animals live in each habitat, and why. Led by Ed Kantack. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102.

## Slow the Flow Presents: Watershed Diorama Rama!

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

Imagine what your city would look like if you were a giant? What might you see? Come explore what a watershed is with a hands-on demonstration of an amazingly detailed and functioning South Bay watershed diorama. It is sure to dazzle and educate visitors of all ages. Learn what a watershed is and see how important our actions are towards maintaining healthy south bay habitats! You also get to create our own 3-D watershed model out of recycled materials to take home! Reservations required, call Tina at 408-262-5513 x104.

## A Ghost Town in San Francisco Bay?

**Visitor Center, 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. Let by Pat Anthony.

*Sunday, January 9*

## 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 to let us know you're coming.

*Saturday, January 15*

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

*Saturday, 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 recently 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.

**Don Edwards San Francisco Bay National Wildlife Refuge**

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# Winter Activity Schedule

## Slow the Flow Presents: Slough Who?

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

Who...who...who 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. We will watch a slide show and see lots of 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.

*Sunday, January 23*

## It's Not My Fault!

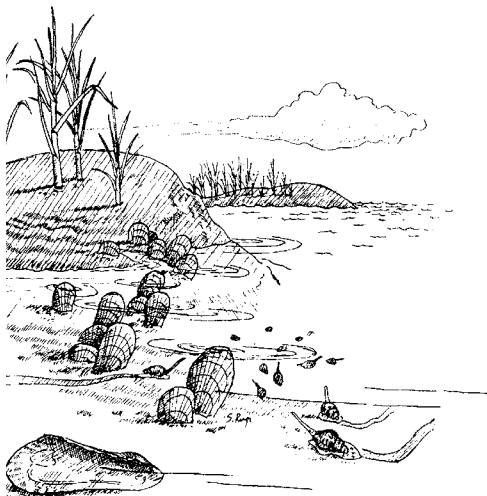
Visitor Center, Fremont  
11:00 a.m. – 12:00 p.m.

The San Francisco Bay region is a complex maze of faults, mountains, and other geologic formations. We will explore the formation of the San Francisco Bay and the hill upon which the Visitor Center sits. Geared toward adults. Led by Carmen Minch.

## Beginning Birdwatching for Kids!

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

It's a bird, it's a plane, it's....well, it's a bird. But what kind of bird is it? Come find out, and make your very own bird book so you can always remember. Dress warmly, bring binoculars or borrow ours and wear sturdy walking shoes. Great for ages 5 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 ext. 102. Led by Peg Bernucci.



*Saturday, January 29*

## South Bay Salt Pond Restoration Presentation

Environmental Education Center, Alviso  
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 to let us know you're coming.

*Sunday, January 30*

## Community Service Day

Environmental Education Center, Alviso  
10:00 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. Fight non-native plants in the Education Center's habitats. Bring gardening gloves if possible. A few pairs are available for loan. Long pants and long sleeve shirts are recommended but not required. Recommended for ages 9 and up. RESERVATIONS REQUIRED with Laurie McEwen at 408-262-5513 x 102.

# February

*Saturday, February 5*

## Winter Discovery Hike

Environmental Education Center, Alviso  
12:30 p.m. – 2:00 p.m.

Join naturalist Ed Kantack for an enlightening hike around the Education Center. Find out what critters are enjoying the refuge during this time of year. What does winter look like in a salt pond? In a salt marsh? Look for seasonal changes in our wetland habitats. Geared for ages 7 and up. Reser-



vations required. Call Laurie at 408-262-5513 ext 102 to make a reservation.

## 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 to let us know you're coming.

## Slow the Flow Presents: Bird Adaptation Creations!

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

Ever wonder what it's like to be a bird living on the refuge? Come uncover the mysteries of the bird world! Learn about bird adaptations, explore the skeleton of a bird, and make human sized bird wings, beaks, and feet to take home! A short refuge walk will be included to check out the feathery beasts. All ages welcome! Reservations required. Call Tina at 408-262-5513 x104. In cases of wet weather, the program will carry on without the walk.

## Drawbridge Virtual Tour

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

A ghost town in San Francisco Bay? That's right! On Station Island nestled in the salt marshes of the south bay, the town of Drawbridge once boomed. Was it a quiet, peaceful community of nature lovers, or a rip-roaring town full of two-fisted rowdies? Join Pat Anthony, our Drawbridge historian, for a slide presentation about this intriguing community. Reservations required. Call Laurie at 408-262-5513 ext.102.

*Sunday, February 6*

## Going Native

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

Join our native plant expert, June Smith, to discover the joys and rewards of growing California native plants. June manages the refuge's native plant nursery at the Visitor Center in Fremont. View our demonstration gardens on a guided walk. Find out what to plant to attract butterflies.

**Don Edwards San Francisco Bay National Wildlife Refuge**

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# Winter Activity Schedule

Learn which plants provide good food sources for birds and other animals. Reservations required. Please call Laurie at 408-262-5513 ext.102.

*Friday, February 11*

## Sunset Marsh Walk

**Environmental Education Center, Alviso**  
4:30 p.m. – 6:00 p.m.

Long work week? Come wind down with an evening at the refuge. We'll start at 4:30 p.m. with a twilight walk around our trails. Experience a completely different environment as the sun goes down and the night creatures come out. Join us for coffee and hot chocolate inside while watching the Watershed Diorama after the walk. Dress warmly, and call ahead in the event of rain. All ages welcome. Stay for the music program at 6:00 p.m. Geared for ages 8 and above. Led by Ed Kantack. Reservations required. Call Laurie at 408-262-5513 x 102 to make a reservation.

## Sing Along With Salty!

**Environmental Education Center, Alviso**  
6:00 p.m. – 7:00 p.m.

Prepare yourself for an evening of mucky marsh musical mayhem when Salty's Stinky Slough String Stompers band makes a rare nocturnal appearance. Join us in song and acoustic aerobics as we pay tribute to our favorite habitats, endangered species, and other flora and fauna. All ages welcome. Popcorn, hot chocolate and coffee will be served. Reservations recommended. Call Laurie at 408-262-5513 x 102 to reserve your seats.

*Saturday, February 12*

## 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, February 13*

## 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 resto-

ration 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 recently 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.

## Salt Marsh Hearts

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

What makes a salt marsh tick? What's the heart of the marsh? Come 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 x 102.

*Saturday, February 19*

## Bird 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 identify birds wintering 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. Led by Laurey Hemenway.

## Slow the Flow Presents: Where Does All the Water Go?

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

Ever wonder where all the water that goes down the drain and the toilet ends up? Come see a slide show on how the San Jose/Santa Clara Water Pollution Control Plant cleans our wastewater. Afterwards, we'll take a hike on the refuge and observe how this cleaned wastewater affects habitats. Appropriate for ages 10 and up. Reservations required. Call Tina at 408-262-5513 ext 104.

## Twilight Marsh Walk

**Visitor Center, Fremont**  
5:00 p.m. – 6:30 p.m.

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

*Sunday, February 20*

## South Bay Salt Pond Restoration Presentation

**Environmental Education Center, Alviso**  
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 to let us know you're coming.

*Saturday, February 26*

## 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.

*Sunday, February 27*

## Community Service Day

**Environmental Education Center, Alviso**  
10:00 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. Plant new natives or wage war on invasive exotics in the EEC's habitats. Bring gardening gloves if possible. A few pairs are available for loan. Long pants and long-sleeve shirts are recommended but not required. Recommended for ages 9 and up. RESERVATIONS REQUIRED with Laurie McEwen at 408-262-5513 x 102.

## It's Not My Fault!

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

The San Francisco Bay region is a complex maze of faults, mountains, and other geologic formations. We will explore the formation of the San Francisco Bay and the hill upon which the Visitor Center sits. Geared toward adults. Led by Carmen Minch.

**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. These programs actively involve teachers, adult volunteers, and students in investigating the diverse habitats and wildlife at the refuge. The hands-on, small-group activities are designed to teach basic ecological concepts and to introduce endangered species, migratory birds, and wetland habitats to the students. *All programs have been correlated to the appropriate State of California Education Standards.*

Educators and Youth Group Leaders conduct their own field trips after attending a *Field Trip Orientation Workshop*. The Orientation Workshops provide 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. **Educators must attend an orientation every two years.**



### Field Trips at the Fremont Visitor Center Wetland Roundup

Investigate creatures of the mud flats, plankton 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

Hike the 1-mile Tidelands Trail while learning about the natural history of the refuge! Explore the pickleweed in the salt marsh, the brine shrimp in the salt pond, and the salinity of the slough! Available only at the Visitor Center in Fremont, Trekking the Refuge is designed for grades 3-6, for up to 36 students. Trekking the Refuge is offered Monday - Friday.

### Field Trip Reservations for Fremont

Call 510-792-0222 to reserve a field trip from February to June 2005 starting on the date below.

Date: Tuesday, December 7

Time: 4:00 p.m. – 5:00 p.m.

### Wetland Round-Up Orientation Workshops at the Fremont Visitor Center

All workshops are from 4:00 – 8:00 p.m.

Tuesday, January 18<sup>th</sup>

Tuesday, February 22<sup>nd</sup>

Tuesday, March 15<sup>th</sup>

Thursday, April 28<sup>th</sup>

Call 510-792-0222 ext. 42 to reserve a place for yourself and adult volunteer activity leaders.

### Trekking the Refuge Orientation Workshops at the Fremont Visitor Center

All workshops are from 4:00 to 8:00 p.m.

Tuesday, February 8<sup>th</sup>

Wednesday, March 30<sup>th</sup>

Tuesday, April 26<sup>th</sup>

Call 510-792-0222 ext. 42 to reserve a place for yourself and adult volunteer activity leaders.

For more information about field trips at our Fremont Visitor Center please contact our Environmental Education Staff at 510-792-0222 ext. 36 or email [ken\\_clarkson@fws.gov](mailto:ken_clarkson@fws.gov).

### Field Trips at the Environmental Education Center in Alviso

#### Wetland Round-Up Field Trips

Investigate butterflies in the butterfly garden, taste pickleweed in the salt marsh, or discover creatures that live in the slough on a *Wetland Round-Up Field Trip*. This field trip program is designed for up to 65 students in grades K-6.

#### 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

# Field Trips to the Refuge

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, field trip orientation workshops at the refuge, classroom presentations, and outreach presentations.

Programs are geared for 5<sup>th</sup> - 12<sup>th</sup> grades, although a modified field trip is available for college groups. Educators are also encouraged to contact us to discuss options for customizing field trips, 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.

## Field Trip Reservations for Alviso

**Wetland Round-Up** – Call Genie Moore at 408-262-5513 ext. 100 to reserve a field trip from February to June 2005 starting on the date below.

Date: Monday, December 6

Time: 4:00 p.m. – 5:00 p.m.

**Slow the Flow** - Reservations are on a first come basis. Call Tina, the Slow the Flow Program Coordinator, at 408-262-5513 ext. 104 for more information or to schedule a field trip.

## Field Trip Orientation Workshop Dates in Alviso

All workshops are from 4:00 – 8:00 p.m.

Wednesday, January 19<sup>th</sup>

Thursday, February 10<sup>th</sup>

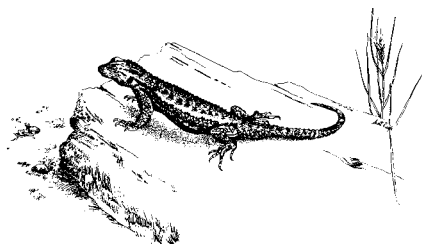
Tuesday, March 22<sup>nd</sup>

Tuesday, April 19<sup>th</sup>

Wednesday, April 27<sup>th</sup>

Call 408-262-5513 to reserve a place for yourself and adult volunteer activity leaders.

For more information about field trips at the Environmental Education Center in Alviso, please contact our Environmental Education Staff at 408-262-5513.



## 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 to adults. There are also group packs available for 12 - 24 at the Visitor Center. (Please call in advance if you would like a group pack.) You can check out the Discovery Packs free of charge at the Fremont Visitor Center or at the Environmental Education Center in Alviso! The Fremont Visitor Center is open Tuesday - Sunday from 10:00 a.m. – 5:00 p.m. For questions or to reserve a group pack, call 510-792-0222 ext. 36. The Environmental Education Center is open Saturday and Sunday from 10:00 a.m. – 5:00 p.m. For questions call 408-262-5513.

## TIDELINE

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Volume 24, Number 4

Editor: ..... Carmen Minch

To receive Tideline, email [carmen\\_leong-minch@fws.gov](mailto:carmen_leong-minch@fws.gov), or write to: Tideline, Don Edwards San Francisco Bay National Wildlife Refuge, P.O. Box 524, Newark, CA 94560-0524.

## 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.

Project Leader: ..... Marge Kolar  
Don Edwards San Francisco Bay

Refuge Manager: ..... Clyde Morris  
Warm Springs Unit Manager: ..... Sally Reynolds  
Farallon Refuge Manager: ..... Joelle Buffa  
Farallon Refuge

Operations Specialist: ..... Jesse Irwin  
San Pablo Bay Manager: ..... Christy Smith

South Bay Refuges Manager: ..... Ivette Loreda  
Antioch Dunes Refuge Manager: ..... Chris Bandy

Refuge Planner: ..... Winnie Chan  
Chief of Visitor Services: ..... Karla Tanner

Outdoor Recreation Planner: ..... Carmen Minch  
Environmental Education Specialists: .....

Fran McTamane, Genie Moore, Ken Clarkson  
Volunteer Coordinator: ..... Tia Glagolev

Law Enforcement Officers: ..... Barry Tarbet  
Biologists: ..... Joelle Buffa, Joy Albertson,

Diane Kodama, Giselle Downard, Rachel Hurt,  
Gerry McChesney

Administrative Staff: ..... Sheila Blackman  
Bahan, Ellen Tong, Tess Dumaop

Maintenance Staff: ..... Juan Flores,  
Larry Wade, Michael Springman, James Griffin,  
Colby Peterson

## 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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Karen Natoli Maxwell

## Staff

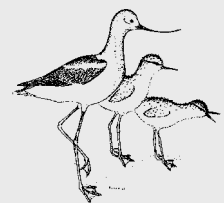
Interpretive Specialist: ..... Laurie McEwen

Education Specialist: ..... Tina Simmons

Program Administrator: ..... Sue Ten Eyck

## Tideline is On-Line

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

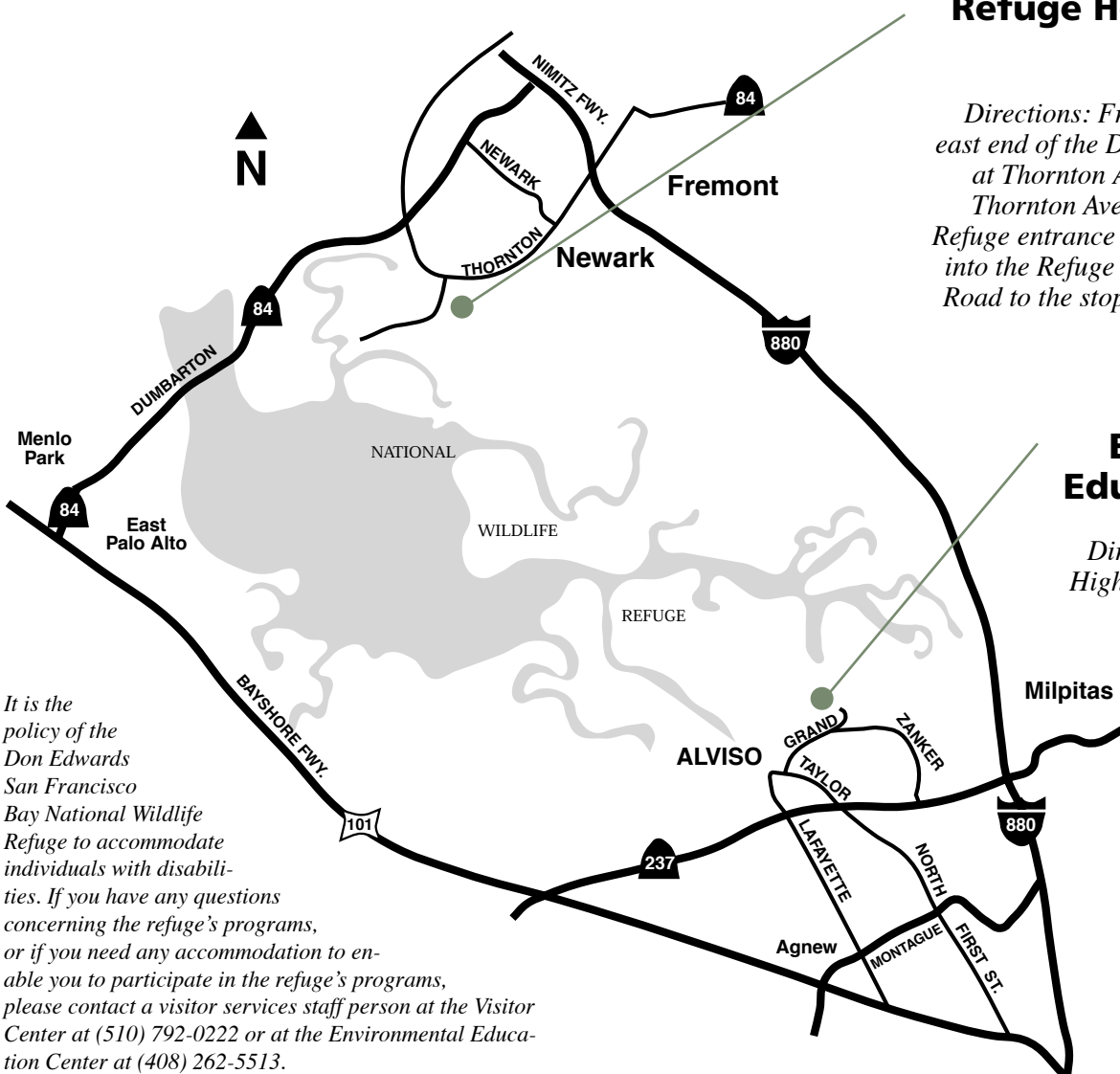
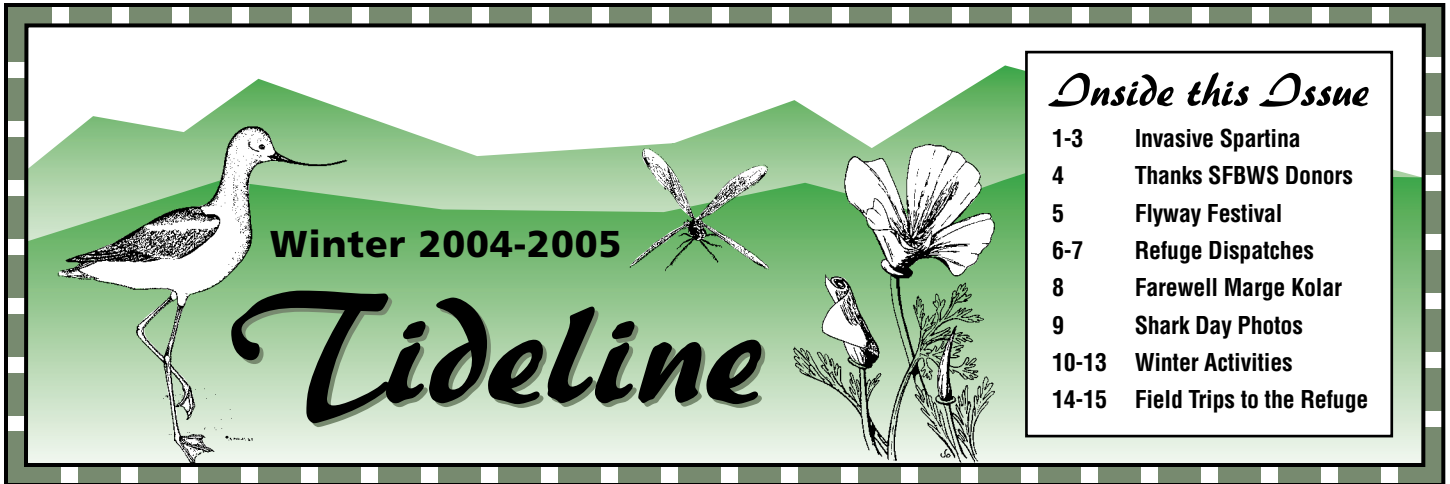


UNITED STATES  
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE  
DON EDWARDS SAN FRANCISCO BAY  
NATIONAL WILDLIFE REFUGE  
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### 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.*