

SPRING 2007

# Tideline

San Francisco Bay National  
Wildlife Refuge Complex



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## Fluttering to extinction?

By Jim Nickles

The Lange's metalmark butterfly, whose only home is a few stunted sand mounds in the Contra Costa County town of Antioch, is fluttering dangerously close to extinction.

But conservationists are working to bring it back from the brink.

The U.S. Fish and Wildlife Service has launched an aggressive new effort to restore habitat at Antioch Dunes National Wildlife Refuge, its only known home, and breed the species in captivity until its wild population can be stabilized and, eventually, recovered to full health.

The new effort is a joint project of the refuge and the Fish and Wildlife Service's Ecological Services program in Sacramento, with the help of a lot of partners and volunteers. The Service is working with the San Diego Zoo and others to establish the captive-breeding program and with Pacific Gas & Electric Co. to improve habitat on PG&E-owned land that is part of the refuge.

"We have been very concerned about the butterfly population at Antioch Dunes National Wildlife Refuge and are taking some positive actions that we hope will be successful in helping the population to recover," said Mendel Stewart, project leader for the San Francisco Bay National Wildlife Refuge Complex, which includes Antioch Dunes.

"The Service and its partners are undertaking a renewed effort to protect the habitat and ensure the survival of the species, through habitat restoration and enhancement, and captive propagation of the butterfly," said Craig Aubrey, leader of the endangered species recovery team at the Service's Sacramento field office.

The two-pronged approach – habitat improvements and captive-breeding – has worked to stabilize the population of the endangered Palos Verdes blue butterfly, a Southern California species once thought to be extinct. Conservationists hope to show equal success with the Lange's metalmark butterfly.

One of the first insects to be protected by the

Endangered Species Act, the Lange's metalmark has been federally listed as endangered since 1976. It is a fragile, brightly colored butterfly in the Riodinidae (metalmark) family, with an adult wingspan that varies from 1 to 1 ½ inches.

Metalmark butterflies are named for their grey, or metallic-colored, spots on their wings. Three other species of metalmark butterflies are found throughout California, but this particular subspecies is named for the late William H. Lange Jr., the young UC Berkeley entomology student – and future UC Davis professor – who first described it in the 1930's.

Unlike some butterflies that can travel for hundreds of miles, the Lange's metalmark is not known to have ever ventured beyond the sand dunes along the southern bank of the San Joaquin River, on the far western edge of the Sacramento-San Joaquin Delta. Now, with most of those dunes long gone, the butterfly's only remaining habitat is at the Antioch Dunes National Wildlife Refuge.

Also unlike some other butterflies that can produce more than one generation in a year, the Lange's metalmark produces only one crop of young per year. Each summer's count of adult butterflies is considered a critical indicator of the species' health.

Unfortunately, those counts have been on decline for the last several years. While the falling numbers prompted growing concern among refuge managers and endangered species biologists, the most recent results set off alarm bells.

Last fall, biologists recorded a peak count of only 45 adult Lange's metalmark butterflies, down from 232 in 2005 and a high of 2,342 in 1999.

"That of course is of great concern," said

## Preventing the Lange's metalmark butterfly from floating away



*A Lange's metalmark butterfly on naked-stem buckwheat.*

Photo: ©Alan Wight

Continued page 2

# Fluttering to extinction? Preventing the Lange's



*Michael Krieg and other members of a volunteer crew plant a young crop of Contra Costa wallflowers at the refuge.*

*Photos: Jim Nickles*



*The endangered Lange's metalmark butterfly depends on the naked-stem buckwheat in its early life stages. Adult butterflies deposit eggs on buckwheat leaves during August and September. Larvae, which hatch during the rainy months, are known to feed only on buckwheat.*

consulting biologist Dr. Travis Longcore, who proposed the captive-breeding program as a way to ensure the butterfly's survival. "You have a species declining, but we don't know why."

Longcore is science director of the Urban Wildlands Group, a non-profit conservation organization based in Los Angeles that has overseen the captive-propagation of the Palos Verdes blue butterfly.

He and others say several factors are likely to blame for the Lange's metalmark's rapid decline. They include a continuing invasion of exotic weeds at the refuge that are choking out the butterfly's host plant, the naked-stem buckwheat. Several large arson fires in recent years killed both buckwheat and butterflies.

"Fires killed a lot of the host plants and they killed a lot of the butterflies," Aubrey said. "That, combined with the threat of invasives, has hit the species pretty hard."

Despite its name, few actual dunes remain at the refuge, and they are pale reminders of what was once there. In the 19<sup>th</sup> Century, shifting dunes up to 100 feet high dominated the south bank of the river for more than two miles. Over the course of many decades, the dunes disappeared, their sand mined to build California's highways and houses, including many buildings in San Francisco.

These days, the refuge's rolling swales and flatlands are carpeted with a host of non-native plants, including yellow star thistle, Russian thistle, vetch and non-native grasses like ripgut brome.

The 67-acre refuge -- divided into two units owned by the Service and 12 acres of adjacent land owned by PG&E -- is a "biological island" of rare and exotic plants and insects that are found nowhere else in the world. The refuge was established in 1980 as a haven for two federally listed endangered plants -- the Contra Costa wallflower and the Antioch Dunes evening primrose -- as well as the Lange's metalmark butterfly.

"That is literally the last remaining habitat anywhere (for Lange's)," Aubrey said. "That is what makes this refuge so special."

The task facing the refuge is how to save dune-dependent native plants -- and the butterfly that depends on them -- when functioning sand dunes no longer exist. The native plants need the shifting sand, steep banks and clear ground of real dunes. But the increasingly thick weed base stabilizes the soil, which in turn leads to the growth of more weeds.

The refuge has tried several tactics to control the weeds, prevent fires and encourage the growth of endangered plants. Those tactics have probably not been aggressive enough, as the explosion of vetch has demonstrated, refuge manager Christy Smith said.

Vetch, the refuge's new worst culprit, covers the ground with a thick carpet, choking out such plants as the naked-stem buckwheat, which the butterfly uses. Pulling the vetch out is difficult, because it intertwines with other plants.

"Vetch is just horrible because as it grows it covers and encapsulates other plants, such as the host plant for the butterfly, and creates an unsuitable micro-climate for the life cycle of the butterfly," Smith said. "Vetch attaches to other plants with tendrils that make it difficult to pull or remove without damaging buckwheat or stripping larvae or eggs from the buckwheat."

The refuge is preparing an updated Endangered Species Act report known as a Biological Opinion that outlines a new plan of action -- for more fire breaks, more land cleared of weeds, more plantings of nursery-raised native plants, and more monitoring and evaluation of various tactics. The plan calls for clearing and improving 10 acres of habitat each year -- twice as many acres as in the past.

In December, refuge biologists Susan Euing and Louis Terrazas led a group of volunteers that planted hundreds of young Contra Costa wallflowers on some steep sand hills that had been recently cleared of weeds.

"It really likes these slopes," said volunteer Michael Krieg as stooped to put the fragile young plants in their new home. "It doesn't do well in the flats."

As they work the habitat and battle vetch, Smith and her team will assess what works and what does not. Among other things, they will be testing different methods of controlling the weeds by hand, heavy equipment or chemicals. They might even try grazing on a limited basis.

Just as important as habitat improvements will be the effort to breed Lange's metalmark butterflies in captivity. To fund the work, Aubrey's endangered-species recovery program recently applied for a \$250,000 federal grant from the Central Valley Project Conservation Program. Those grants will be awarded later this spring.

Not everyone is convinced that the Lange's

# metalmark butterfly from floating away

metalmark butterfly can be bred in captivity. Jerry Powell, a retired UC Berkeley entomology professor who has studied the Lange's metalmark for more than 20 years, said the butterfly presents unique challenges because of its restricted habitat requirements and long breeding season – and the fact that it produces only one generation per year.

Adult Lange's metalmarks lay their eggs at the base of buckwheat stems in the late summer, and the eggs remain dormant until the rainy season begins in late fall or early winter. The larvae that emerge begin feeding on the new growth of the buckwheat plant, but they don't transform from caterpillars into butterflies until mid- to late summer.

Others say that, while captive-breeding success is not guaranteed, it is one option they need to try to prevent the species from going extinct.

Captive breeding of Lange's has worked on a limited basis, said Longcore, whose Urban Wildlands Group has agreed to develop procedures for the breeding program. If funding is approved, the breeding would be conducted at the San Diego Zoo's Beckman Center for Conservation Research in Escondido.

"I just think this is the one right choice we can make right

now that puts us on the path to be successful," Longcore said.

For now, biologists are crossing their fingers that a new generation of Lange's metalmark butterflies emerges this summer. They hope to capture at least five adult females, and then transfer them to the Beckman Center in potted buckwheat plants. In netted enclosures at the center, hatched larvae will be raised to the pupae stage, then transported back to the refuge and placed at the base of buckwheat plants.

Eventually, as the habitat for the butterfly improves, the natural population will grow and become self-sustaining.

Or at least that is the plan.

"We hope that this comprehensive approach, which involves restoration and captive breeding and developing public-private partnerships, leads to the recovery of Lange's and the two plants," Aubrey said. "We want those species to be here for future generations."

*Until early this year, Jim Nickles was the deputy chief of external affairs for the Sacramento Fish and Wildlife Office. He is now with the U.S. Geological Survey's California Water Science Center in Sacramento.*

## A Whole Lot to Feel Good About

Managing National Wildlife Refuges is one of the greatest jobs in the world but one frustrating part of the job is the overwhelming notion that I do not accomplish anything. I feel if I'm not personally producing a product or a widget, if you will, then I am just spinning my wheels. I occasionally need to remind myself that this staff is among the finest in the nation and that by leading them (or just staying out of the way), I am accomplishing a lot. With this in mind, I'd like to highlight some of our accomplishments for 2006.

Our maintenance team led the way in completing several major projects. To paraphrase maintenance supervisor Larry Wade, the six-member team will fix it, paint it, move it, nail it, sand it, build it, mow it, dump it, or sign it. The maintenance staff keeps all seven refuges plus the least tern colony in Alameda in working order, and assists biological, visitor services and administrative programs. Projects in 2006 include: building and installing information kiosks at the headquarters in Fremont, at the Environmental Education Center (EEC) in Alviso, and at Salinas River NWR; installing solar lighting and security cameras at the EEC; and constructing a parking lot at the EEC for visitors so they can enjoy the trails when the refuge gate is closed during daylight hours.

Visitor Services staff piloted a new "Service learning" volunteer program designed to combine environmental education and community service. The Volunteer Coordinator and Wildlife Stewards, a Refuge Friends group that supports the volunteer program, initiated an enrichment series of lectures, field trips and special events expressly for refuge volunteers. One highlight was a cruise to the waters surrounding Farallon NWR. Refuge biologists were on board as natural history interpreters and volunteers spent the day learning about our most remote refuge. The EEC Director was awarded a Challenge Cost Share grant to revegetate 10 acres of upland adjacent to the EEC and build an accessible, interpretive trail. Restoration activities have already been started.

There are too many other accomplishments to go into detail

but here are a few just to give you a taste:

- Completed the Environmental Impact Statement for Bair Island (Don Edwards SF Bay NWR) restoration and began implementation
- Successfully reintroduced the endangered salt marsh harvest mouse into a restored area of the Don Edwards SF Bay NWR.
- Repaired a major levee that resulted in habitat protection for the Santa Cruz long-toed salamander at Ellicott Slough NWR.
- Completed the Comprehensive Conservation Plan for Marin Islands NWR.
- Constructed an all weather access road for fire engines to protect homes at Mayhew's Landing (Don Edwards SF Bay NWR)
- Increase number of breeding murrelets by 90% on Devil's Slide Rock even without the use of social attraction. The murrelets seem ready to colonize on their own without human assistance.
- Remodeled an old farm house into offices for San Pablo Bay NWR staff
- Constructed a greenhouse for propagating plants for habitat restoration at San Pablo Bay NWR.

*Refuge Reflections*

By Mendel Stewart



A lot has been done to meet our mission of protecting wildlife, conserving habitat, and providing wildlife-oriented recreation in 2006. Reviewing this list confirms that it was a busy and productive year and we all have a lot to feel good about.

# Gardening for Wildlife? Try California Native Plants!

by June Smith

Seeing butterflies and birds in backyard gardens brings pleasure and excitement to people of all ages. Many of you may have already discovered that it can be thrilling to view wildlife so close to home.

If you are one of those people who enjoys backyard viewing, and you want to attract birds, butterflies, and even bees to your yard, does it really matter what is planted in your garden?



*Redbud in bloom*  
Photo: June Smith

After all, aren't the flowers and leaves produced by one plant as good as the flowers and leaves produced by any other, no matter where the plant originated? The answers to those questions are yes and no, respectively.

Native plants are adapted to the climates where they grow naturally. The unique microclimates of California can leave us (and the plants!) freezing in June or sweltering in October. California native plants are adapted to these local rhythms. For example, during a long hot summer, when most other plants have shut down in the heat, native California fuchsias are still sporting showy, red tubular flowers for thirsty nectar seekers. In the fall when other plants are becoming dormant, native gumplant, with its bright yellow daisy-like flowers, is still going strong. By the middle of December when there is little food to be found, toyon is loaded with bright red berries for wintering birds and gray fox. Later still as winter ebbs, redbuds busting with beautiful purple blossoms signal to humans

and wildlife that spring has arrived.

Timing of bloom and fruiting is important to many wildlife species. Migrating butterflies and birds have been coming through our backyards for centuries. Some species stay for the season; others are just passing through. All rely on food sources being available when they fly through so they can rest and eat before continuing their journey. As we replace native plants with plants from other places, migrating species may not find flowers, fruit, seeds or shelter at the right time. That mulberry tree in the backyard offers great shelter in the summer, but where will birds ride out a rainstorm in the winter when the mulberry has dropped its leaves?

Our native wildlife also depends on finding fruit, flowers, seeds, and leaves in the specific shapes and structures produced by native plants. For example, those lovely English roses smell wonderful but native bees can't find the nectar-ies under all those layered petals! The native California rose, on the other hand, has just five open petals, making it easy for nectar seekers to find the food they need. Not only does the California rose serve nectar seekers well, it provides food in the winter for seed eaters when the blooms mature into bright red rose hips which are loaded with seeds.

So make space in your garden for a few native plants! To get started, visit a local botanic garden to see what is native to your particular area. Check the *Tideline* schedule for tours of the Environmental Education Center's native plant garden in Alviso. Our friendly Refuge Native Plant Nursery volunteers would love to talk about plants with you. Participate in the Going Native Garden Tour on April 29 (see page 9), featuring Environmental Education Center's gardens. Other gardens worth visiting are UC Berkeley Botanic Garden, the Friends of Regional Parks Botanic Garden in Tilden Park, the Strybing Arboretum in Golden Gate Park and the Coyote Hills Regional Park butterfly garden. Finally, the California Native Plant Society website (<http://www.cnps.org>) is also an excellent source for more information.

*June Smith is a long-time volunteer at the San Francisco Bay National Wildlife Refuge Complex. She runs the Complex's Native Plant Nursery and leads native plant workshops at the Environmental Education Center at the Don Edwards San Francisco Bay National Wildlife Refuge.*

# Trails Of The Don Edwards San Francisco Bay National Wildlife Refuge

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

**Name:** Warm Springs Trail

**Miles One Way:** 1.3 miles

**Trail Use:** Walking & bicycling; dogs not permitted

**Trail Surface/elevation:** Flat, compacted gravel road

**Highlights:** This trail overlooks the last remaining vernal pools in South San Francisco Bay and the largest area of seasonal grasslands in the Don Edwards San Francisco Bay NWR. Wildflower viewing can be spectacular in spring. It is also the best location to see certain wildlife not easily found in other parts of the refuge.

**Directions to Trailhead:** From I-880, take the Fremont/Cushing Pkwy Exit and turn right onto Cushing Parkway. Drive 0.5 miles until you see a blue metal gate on the left, immediately after the last building. Park in the dirt area next to the gate. Do not block the gate.

**Introduction:** The Warm Springs Vernal Pool Complex was purchased by the refuge in 1991 to protect and enhance habitat for three threatened and endangered species: endangered vernal pool tadpole shrimp, endangered Contra Costa goldfields and threatened California tiger salamanders. Although they are not always visible from the trail, this grassland also supports a large population of burrowing owls, a species of concern in California. The refuge is expected to receive ownership of the adjacent Pacific Commons Preserve in 2007. This grassland, which extends to Interstate 880, was a mitigation project for the Pacific Commons shopping complex and contains artificial vernal pools inhabited by endangered species. The large commercial development south of the Pacific Commons shopping complex is slated to be the new home for the Major League Baseball team the "Oakland" Athletics.

**Trail Details:** Walk 0.1 mile past the blue gate to the refuge's sign at the edge of the salt pond. The eucalyptus trees to your left shielding the business parking lot once housed nesting western kingbirds in 2002, a flycatcher that is rarely found so close to the Bay.

Walk past the refuge sign and follow the road. The adjacent salt pond was purchased from Cargill Salt in 2003. Restoration of this pond and the others purchased in 2003 is in the planning stages as part of the South Bay Salt

Pond Restoration Project ([www.southbayrestoration.org](http://www.southbayrestoration.org)). Large flocks of gulls use this pond for roosting. The PG&E towers in the pond have been used by a prairie falcon for the past five winters. This is the only site in the refuge known to be used by this rare species. In the summer, when this pond dries, it becomes nesting habitat for threatened snowy plovers. Plovers are best seen using a spotting scope.

Approximately 0.5 miles from the trailhead, take a moment to read the wonderful interpretive display about vernal pools. The display was built by a UC Berkeley landscape architecture student as a class project.

The next 0.8 miles leads you past vernal pool habitat. In the summer and fall this area looks more like grassland than wetlands. In the winter, rain floods the shallow depressions, forming pools that attract waterfowl and shorebirds. As many as 1,900 ducks and 3,300 shorebirds use this small area, depending on the amount of rainfall. In the spring, wildflowers follow the receding waterline as the pools evaporate.

The drier habitats attract raptors such as golden eagle, white-tailed kite, American kestrel, and red-tailed hawk. A barn owl lives in the palm tree to the north. This is one of the only areas on the refuge that hosts eagles. The wooden power poles to the north provide them with roosting sites. Grassland species include savannah sparrows, western meadowlarks, loggerhead shrikes, and black and Say's phoebes.

The trail ends at the brown metal gate. At this gate, you have unobstructed but distant views of the old massive hangers at Moffett Airfield to the west. To the southwest are the skyscrapers of Silicon Valley and to the southeast is Mount Hamilton with the Lick Observatory on top. To the east is Mission Peak.

**Historical Interests:** The trail holds a glimpse of the east bay's ranching and duck club history. The group of trees to the north was a ranch homestead in the early 1900s. Remnants of another ranching home can be seen toward the end of the trail including a small tractor. The area to the north was used as a duck hunting club in the mid 1900s. Though cattle were removed from the land when it was purchased, we now realize that grazing is an important part of protecting the vernal pools from being overcome by invasive European grasses. We have reintroduced cattle grazing to much of this unit and are comparing the results with the non-grazed area.

For refuge-lead tours of the Warm Springs Vernal Pool Unit, contact Refuge Operations Specialist Ivette Loredo at 510-792-0222 ext. 34. Tours are scheduled during the height of the wildflower bloom in the spring.



*Rings of wildflowers dot the landscape in the spring as vernal pools evaporate.*

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

# Myths of Migration

by Carmen Minch

*Oh dear me!* The melancholy song of the golden-crowned sparrow follows me as I trek up the hill to the San Francisco Bay National Wildlife Refuge Complex headquarters in Fremont. *Oh dear me!* The sparrows cry again. It's hearing these three glum notes and recalling

the birdwatchers' mnemonic, rather than noting any particular calendar date or any dip in temperature, that reminds me fall has arrived and the fall bird migration has started. Similarly, it is seeing hundreds of red-necked phalaropes spinning in salt ponds along Marshlands Road that signals to me the beginning of the spring migration.

The annual bird migrations of spring and fall are some of the most amazing spectacles in nature. Twice a year, millions of birds around the globe take flight. As temperatures warm up, food and nesting sites becomes available to the north, prompting birds of most species to travel thousands of miles to higher latitudes where they will find more suitable summer habitat. Conversely as temperatures drop in the northern hemisphere, these same birds will migrate to more southerly latitudes, occasionally stopping along the way to rest and eat before continuing south.

The San Francisco Bay estuary lies at the heart of the Pacific Flyway, one of four north-south American flyway corridors. Being the largest estuary on the west coast of North and South America, it attracts millions of birds and acts as a pit stop along the flyway for many species. We residents of the San Francisco

Bay Area live in a prime location to witness the semi-annual migration phenomenon.

Had the Bay Area been home to more naturalists and thinkers of the past, perhaps the world would have missed some of the more fanciful theories proposed to explain bird migration.

Before modern tracking and observation techniques were developed, the appearances and

disappearances of birds were mysteries. Because several species migrate at night, some species seem to disappear without a trace. In 1703, one scientific pamphlet explained birds flew to the moon and spent the winter there.

Swallows in particular seemed to have stumped many naturalists. Although Greek philosopher and naturalist Aristotle and Roman naturalist Pliny the Elder correctly theorized cranes, geese, rails and other birds migrate to warmer climates in the fall, swallows were thought to be in a different category. Aristotle believed swallows spent the winter hibernating in hollow trees or in the mud of marshes. Other "observers" claimed they saw these birds flock together in such large numbers that they would bend the reeds they were roosting on, submerging them into the water where they would sleep until spring arrived.

Transmutation was also another popular theory instigated by Aristotle. He thought one bird species would turn into another species when the season cools. It would turn back to its original form in the spring. For example, he believed a European robin would turn into a redstart in the fall. These two species are similar in size. The redstart was visible in the winter while the European robin was seen only in the spring. Pliny the Elder echoed this theory but claimed that certain marsh birds turned into frogs. These theories spilled over into wildlife folklore, including ones about frogs mutating into sora rails.

Despite some of these fantastic theories, naturalists for the most part did believe birds migrated to different climates in the spring and fall. However, it was more difficult to fathom small birds or birds that are poor flyers traveling such long distances. This was explained by claiming these birds travel on the backs of their larger feathered companions. Hummingbirds, particularly, have long been thought of "hitching" rides on geese.

We have come a long way in knowing how these amazing species migrate. Through direct observation, use of technology, and bird banding, we now know birds can travel, depending on the species, up to 50 miles an hour, 3,000 miles in a two-day period, and as high as 20,000 feet. The record for distance traveled belongs to the arctic tern, which travels 11,000 miles one way.

As the spring migration begins, (which can start as early as February and end as late as June, depending on the species) grab your binoculars, head out to the bay, marshes, and salt ponds, and observe this amazing event. You can learn more about birds at the annual South Bay Bird Fests at the Environmental Education Center in Alviso on April 22.



*The Pacific flyway*

# Rachel Carson: A Conservation Legacy

May 27, 2007 marks the 100th anniversary of the birth of Rachel Carson, former biologist with the U.S. Fish and Wildlife Service and one of the world's foremost leaders in conservation. Her work as an educator, scientist and writer revolutionized America's interest in environmental issues. Whether it was her passion for the oceans and coasts, her inspiration as a female scientist and government leader, or her overall footprint on the history of conservation, we can all celebrate her legacy.

There are a variety of ways you can honor Rachel Carson this year:

- Explore a new national wildlife refuge. Even better, invite a child to enjoy it with you!
- Volunteer to help conserve wildlife habitat. Join us for Spring Clean Up on April 28.
- Read one of Carson's five books and pass the conservation message along to a friend or family member.
- Explore a career in natural resources or wildlife conservation.



To learn more go to  
[http://www.fws.gov/  
rachelcarson/](http://www.fws.gov/rachelcarson/)



## SOUTH BAY BIRD FEST!

**SUNDAY, APRIL 22 FROM 1 PM - 4 PM**  
**ALL ACTIVITIES ARE FREE!**



*Photo by Larry Wade*



Celebrate International Migratory Bird Day and Earth Day together! Spend the afternoon exploring birds in their habitats! Your day of exploration includes:

- ▶ Live Bird Shows featuring avian antics
- ▶ Hands-on Activities
- ▶ Bird Habitat Hikes
- ▶ And more!

**Rain or Shine**

**Call 408-262-5513 for reservations.**

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For directions, log on to <http://www.fws.gov/desfbay/directions.htm>

For more information, call 408-262-5513 or check our website  
<http://www.fws.gov/desfbay/birdfest.htm>

*South Bay Bird Fest is sponsored by: City of San Jose, San Francisco Bay Wildlife Society, Santa Clara Valley Urban Runoff Pollution Prevention Program, and U.S. Fish & Wildlife Service*

# 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 October 21, 2006 and January 12, 2007. These gifts will be used for capital, environmental education, habitat restoration, and interpretive programs at the Don Edwards San Francisco Bay National Wildlife Refuge.

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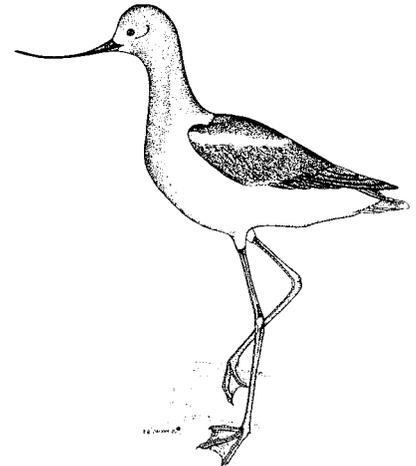
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Mail your donation to: **San Francisco Bay Wildlife Society, P.O. Box 234, Newark, CA 94560.** You may also fax your membership donation using a Visa or MasterCard number to 510-792-5828.

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:

- \$20 Student/Senior     \$50 Family     \$100 Participant     \$250 Sponsor     \$1,000 Leader
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**Don Edwards San Francisco Bay National Wildlife Refuge  
1 Marshlands Rd, Fremont**

# Earth Day Clean-Up

**Saturday, April 28, 2007**

**8:30 a.m. – 12:00 p.m.**

**Protect wildlife and the environment! Join us on our Annual Earth Day Cleanup. We'll supply latex gloves and trash bags. Wear sturdy shoes, a hat, and clothes you don't mind getting dirty.**

**All groups are welcome. No reservations needed!**

**Children under age 18 must have parental approval. Forms may be downloaded from our web site at <http://www.fws.gov/desfbay>**

**For more information, contact Carmen Minch at 510-792-0222 ext. 38**



Photos: Arvind Kumar, Agri Kechaw

**• SAVE WATER • SAVE ENERGY • GROW NATIVE PLANTS • SAVE MONEY •**

Visit the Environmental Education Center, Alviso, and over 40 other native gardens as part of the

## *Fifth Annual* **Going Native Garden Tour**

**Sunday, April 29, 2007, 10 am-4 pm**

A free, self-guided tour of gardens landscaped with California native plants • Locations throughout the Santa Clara Valley and Peninsula • Many private home gardens, some public native gardens • Visit as many as you like — for ideas, for photos, for inspiration.

**Free admission • Registration required  
at [www.GoingNativeGardenTour.org](http://www.GoingNativeGardenTour.org)**

**S P O N S O R S :**

Bay Area Water Supply & Conservation Agency • Mediterranean Garden Society • Santa Clara Valley Water District • Watershed Watch

**S U P P O R T E R S :**

Bay Nature Magazine • California Native Plant Society (Horticulture Program) • California Native Plant Society (Santa Clara Valley Chapter) • Friends of Guadalupe River Park & Gardens • Gardening With Natives • National Wildlife Federation • Native Habitats • Sierra Club (Loma Prieta Chapter) • UCCE Master Gardeners • Western Horticultural Society



**• REDUCE CHEMICAL USE • PROTECT THE ENVIRONMENT •**

**• PROTECT THE ENVIRONMENT • GROW NATIVE PLANTS • CREATE HABITAT •**

# Spring Activity Schedule

## March

*Saturday, March 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.

### Family Bird Walk

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

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

### Salt Pond Tour

**Meet at Bayfront Park, Menlo Park**  
10:00 a.m. – 12:00 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.

### Twilight Marsh Walk

**Visitor Center, Fremont**  
5:30 p.m. – 7:00 p.m.

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

*Saturday, March 17*

### Let's Explore the Uplands

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

Take a leisurely walk off the beaten path to discover what lives in the dry lands above the salt marsh. This walk is suitable for ages 7 and up. Due to the sensitive habitat it will be limited to 15 people. Led by Ed Kantack. RESERVATIONS REQUIRED. Call 408-262-5513 ext.102.

### South Bay Salt Pond Restoration Presentation

**Visitor Center Auditorium, Fremont**  
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, 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.

*Sunday, March 18*

### Salt Pond Tour

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

Did you know that the largest tidal wetland restoration project on the West Coast 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.

### Bird Adaptation Creations!

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

Ever wondered what it would be like to be a bird living at the refuge? Come uncover the mysteries of the bird world. Learn about bird adaptations, explore a bird skeleton, and make human-sized bird wings, beaks, and feet to take home. A short walk will follow to observe the feathery beasts during the breeding season. All ages are welcome. Reservations required. Call 408-262-5513 ext. 104. The program will continue without the walk in the event of rain.

*Saturday, March 24*

### Signs of Spring Garden Tour

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

Spring comes early to California gardens. Winter rains revive thirsty plants, stimulating new growth everywhere we look. Join June Smith for a leisurely stroll through our native plant gardens and get some great ideas to take home to your garden. Some plants from our native plant nursery will be available for purchase. Money from sales covers nursery expenses. RESERVATIONS REQUIRED. Call 408-262-5513 ext.102.

### Exploring Owls

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

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

*Sunday, March 25*

### Adult Beginning Birdwatching

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

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

### Edible Plants on the Refuge

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

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

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

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

# Spring Activity Schedule

## **Mysteries of Wastewater Treatment**

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

Are you curious about where wastewater goes after we flush, rinse, wash, and shower? Come enjoy a presentation about how the San Jose/Santa Clara Water Pollution Control Plant cleans wastewater. After the presentation we will clean a mock sewer sample and embark on a short hike to get up close and personal with wastewater and the refuge habitats involved. Appropriate for ages 7 and up. Reservations required. Call 408-262-5513 ext. 104.

## *April*

*Sunday, April 1, 2007*

## **Habitat Hike**

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

Ever wonder how many habitats are here at the refuge? Come take a walk and see them all! See the salt marsh, sloughs, salt ponds and more on our short and easy trek led by nature enthusiast Paul Bridges. We will identify plants, birds, and other animals we see. Learn how people affect their habitat. Recommended for ages 6 and up. Reservations required. Call 408-262-5513 ext 104.

*Saturday, April 7*

## **Family Bird Walk**

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

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

## **Gardening for the Air**

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

Want to do something wonderful for planet Earth this month? You've heard of "Spare the Air" days; this is the same idea with a twist. Plant native plants at the Education Center to help reduce carbon dioxide in the air caused by driving to work instead of taking public transportation. Create upland habitat and add new specimens to our demonstration gardens. All hands welcome. This is a great way to fulfill community service hours. Water, gloves and tools provided. Please be prepared to get dirty. Dressing in layers, long sleeved shirts and long pants strongly recommended. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

*Saturday, April 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**  
**10:00 a.m. - 12:00 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.



## **Twilight Marsh Walk**

**Visitor Center, Fremont**  
**7:30 p.m. - 8:30 p.m.**

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

*Sunday, April 15*

## **Edible Plants on the Refuge**

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

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

*Saturday, April 21*

## **A Trip Back in Time**

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

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

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

**Visitor Center Auditorium, Fremont**  
**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, 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.

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

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# Spring Activity Schedule

*Sunday, April 22*

## **South Bay Bird Fest**

**Environmental Education Center, Alviso**  
**1:00 p.m. - 4:00 p.m.**

Join us for a day of exploration celebrating our feathered friends. Hands-on activities, live bird shows, bird habitat hikes, and more! Don't miss this fun, feather-filled, fiesta! Call Tina at 408-262-5513 ext. 104 to make reservations.

*Sunday, April 22*

## **Salt Pond Tour**

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

Did you know that the largest tidal wetland restoration project on the West Coast 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, April 28*

## **Earth Day Cleanup!**

**Visitor Center Parking Lot, Fremont**  
**8:30 a.m. - 12:00 p.m.**

Join us for our annual Earth Day Cleanup and help protect wildlife. Bring a hat, sunscreen, and water. We'll supply gloves and trash bags. All persons under 18 years old must submit Parental Approval Forms. To speed up the registration process, download the forms on our website at <http://www.fws.gov/desfbay>, complete them, and submit them on the day of the cleanup. For more information, call Carmen Minch at 510-792-0222 ext. 38.

## **Life Between the Tides**

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

Join us for a slide show about life in and around New Chicago Marsh followed by an easy stroll along the boardwalk and levee trails. Suitable for ages 7 and up. Led by Ed Kantack. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

## **Marsh Walk**

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

Spring is a wonderful time to explore New Chicago Marsh. Migratory birds are flocking to the place. Join self proclaimed nature geek, Paul Bridges, for a guided tour around the Education Center trails. Discover how you are connected to this thriving wetland and what you can do at home to protect it. RESERVATIONS REQUIRED, please call 408-262-5513 ext. 102.

*Sunday, April 29*

## **Morning Bird Walk With Clyde**

**Environmental Education Center, Alviso**  
**8:00 a.m. - 10:00 a.m.**

Join refuge manager, Clyde Morris, for a morning bird walk along the boardwalk and levee trails. Morning is an especially nice time to visit the marsh; the slant of the sun's rays casts a glowing light over the marsh and there's usually no wind. Discover migratory birds nesting in the salt marsh, on islands in the salt ponds, and along the freshwater slough. Program geared for adults. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

## **Slough Whoo?**

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

Whoo...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 owl enthusiast, Paul Bridges. We will debunk owl myths with an in-depth owl power point presentation, hike the habitats and search for owl clues, and get a chance to dissect owl pellets to discover exactly what that owl ate! Recommended for ages 7 and up. Reservations required. Call 408-262-5513 ext. 104.



*May*

*Saturday, May 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.

## **Salt Pond Tour**

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## **Twilight Marsh Walk**

**Visitor Center, Fremont**  
**7:00 p.m. - 8:30 p.m.**

Experience the salt marsh at twilight on an easy stroll along Tidelands (1 1/3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Meet at the observation deck. Not suitable for young children. RESERVATIONS REQUIRED. Call 510-792-0222 ext. 43. Led by Mary and Gene Bobik.

*Saturday, May 19*

## **A Trip Back in Time**

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

Revive the vanishing knowledge of the history of the Don Edwards San Francisco Bay National Wildlife Refuge grounds by strolling the trails with docent Ray Studer. Ray spent most of 2004

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

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# Spring Activity Schedule

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

## Bird Watching by Van

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

Whether you are a novice or an expert, this program is designed for people who enjoy birding but are unable to walk far. Bird watching will be done by van with some brief stops. The vans cannot accommodate wheelchairs; birders must be able to maneuver into and out of the van on their own. Join Ceal Craig and Paul Bridges as they drive you on the levees to view spring birds. This two-hour trip is not suitable for children. Heavy rain May 15-19 may cancel program. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

## About Butterflies

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

Learn about the life cycle of butterflies. Find out which plants and butterflies form partnerships. Take a guided walk through our butterfly garden looking for caterpillars, chrysalides, and butterflies. Suitable for ages 7 and up. Limited to 15 participants. Led by Ed Kantack. RESERVATIONS REQUIRED. Call 408-262-5513 ext. 102.

## South Bay Salt Pond Restoration Presentation

**Visitor Center Auditorium, Fremont**  
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, 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.

*Sunday, May 20*

## Adult Beginning Birdwatching

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

Can you tell a baby avocet from a baby stilt? Join birding enthusiast, Ceal Craig, for a beginning bird watching program and get to know the most common refuge visitors. Start with a slide show inside to learn how to recognize the regulars. Then borrow a pair of binoculars and walk with Ceal to try your new skills. By the end of the program you'll be able to tell a baby avocet from a baby barn swallow. Which is cuter? You be the judge! Program intended for adults. RESERVATIONS REQUIRED. Call 408-262-5513 ext.102.

## Salt Pond Tour

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

Did you know that the largest tidal wetland restoration project on the West Coast 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.

## A Ghost Town in San Francisco Bay?

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

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

## Marsh Mud Mania

**Environmental Education Center, Alviso**  
2:00 p.m. – 4:00 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 compare mud creatures from two different habitats to see what they can tell us about the health of these muddy homes. Recommended for ages 5 and up. Reservations required. Call 408-262-5513 ext. 104.

*Saturday, May 26*

## Exploring Owls

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

Owls have captivated human imagination for centuries. Curious about how they hunt, how they see and hear, and what they eat? Come listen to a presentation, view owl body parts, listen to their calls, and dissect their pellets to see what they eat. Recommended for ages 7 and up. Led by Paul Bridges. Reservations required. Call 510-792-0222 ext. 38.

*Sunday, May 27*

## Edible Plants on the Refuge

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

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

## Avian Antics

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

Join us at the refuge as we explore the trails and attend a low tide feast. Learn some 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 408-262-5513 ext. 104.



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

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# Field Trips to the Refuge

## General Field Trip Program Information

FREE field trip programs are offered at two sites at the Don Edwards San Francisco Bay National Wildlife Refuge. Wetland Round-Up and Trekking the Refuge field trip programs are offered at the Newark Slough Learning Center in Fremont, and Wetland Round-Up and Slow the Flow programs are offered at the Environmental Education Center in Alviso. These programs actively involve teachers, adult volunteers, and students in investigating the diverse habitats and wildlife at the refuge. The hands-on, small-group activities are designed to teach basic ecological concepts and to introduce endangered species, migratory birds,

and wetland habitats to students. All programs have been correlated to the appropriate State of California Education Standards.

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

### Field Trips at the Learning Center in Fremont

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

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

*For more information or to schedule a field trip, call the Environmental Education Intern at 510-792-0222 ext. 42.*

### Field Trip Orientation Workshop Dates at the Learning Center in Fremont

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

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

Tuesday, March 6

Wednesday, April 11

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

Dates - Call 510-792-0222 ext. 42 for further information.

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

#### Wetland Round-Up

Investigate the butterflies in the butterfly garden, taste pickleweed in the salt marsh, or discover the creatures that live in the slough water on a Wetland Round-Up Field Trip. This program is designed

for up to 65 students in grades K-6. Wetland Round-Up is offered Monday - Thursday from February to mid-June, 2007.

*For more information or to schedule a field trip, call the Environmental Education Intern at 408-262-5513 ext. 103*

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

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

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

Thursday, March 15

Tuesday, April 3

Thursday, April 19

#### The Slow the Flow Program

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

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

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

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

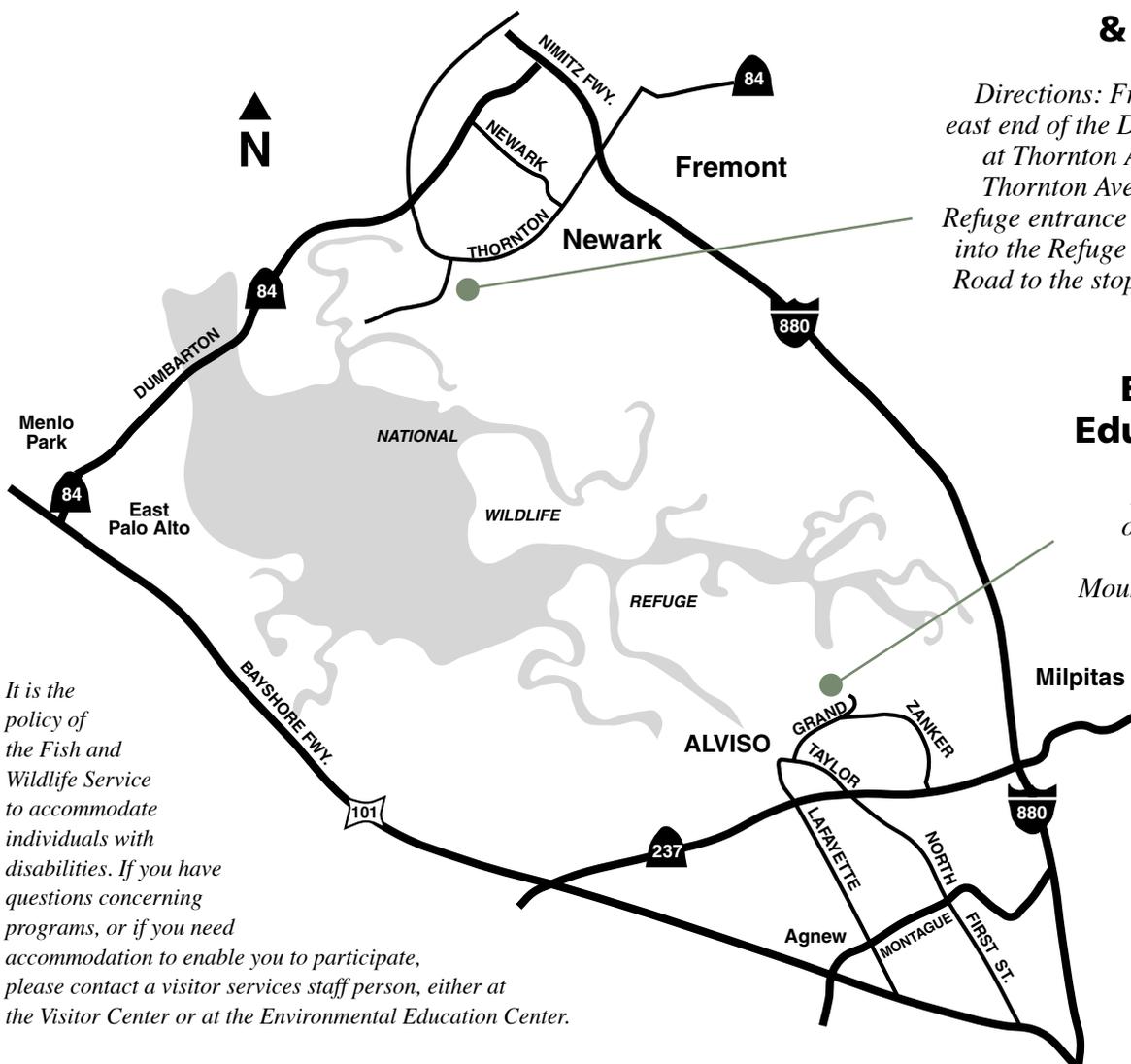
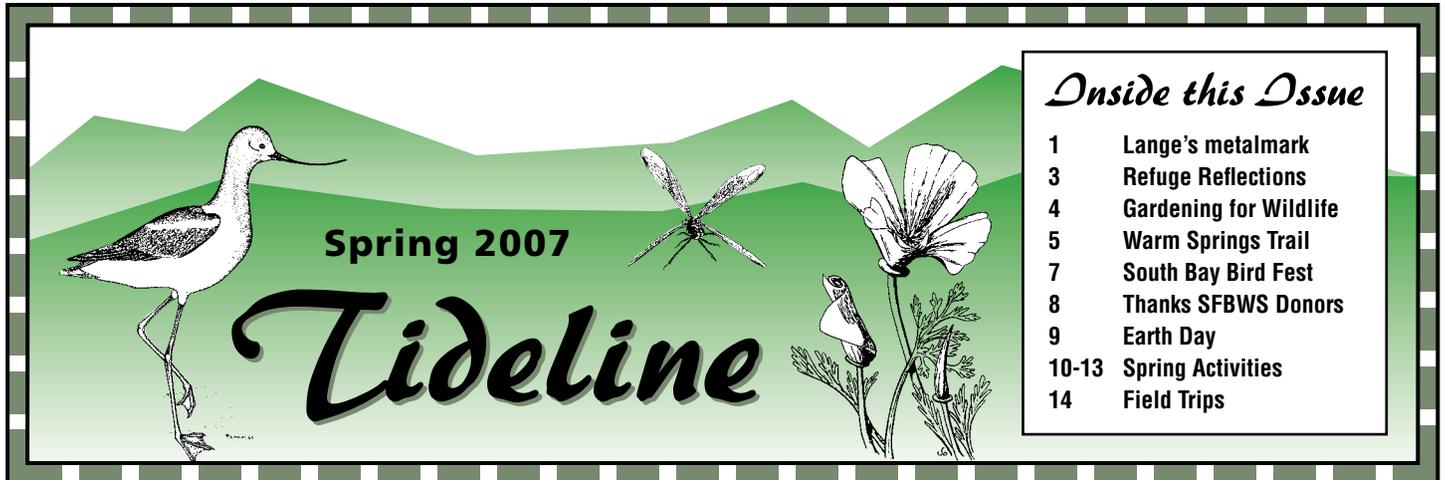


UNITED STATES  
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE  
DON EDWARDS SAN FRANCISCO BAY  
NATIONAL WILDLIFE REFUGE  
9500 Thornton Ave  
Newark, CA 94560

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PENALTY FOR PRIVATE USE, \$300

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Permit No. G-77



### Headquarters & Visitor Center

(510) 792-0222

*Directions: From Highway 84 (at the east end of the Dumbarton Bridge), exit at Thornton Avenue. Travel south on Thornton Avenue for 0.8 miles to the Refuge entrance on the right. Turn right into the Refuge and follow Marshlands Road to the stop sign. Turn left into the parking lot.*

### Environmental Education Center

(408) 262-5513

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

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