



Black Skimmers Invade the Bay

by Cheryl M. Strong and Sharon Miyako,
San Francisco Bay Bird Observatory

Mystery Bird 2000

Reports of a strange, black, and white bird among the nesting Forster's terns began trickling in during the summer of 2000 at the Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center (EEC) in Alviso. Visitors to the Refuge described a striking, mystery bird that stood out from the smaller terns. It looked anything but ordinary with its large, odd-shaped, bright, orange and black bill. It was visible from a trail not far from the EEC, and was sometimes discernible from the back deck of the Center. A spotting scope was brought to the deck for a closer look at the Forster's tern colony. After some exploration, a pair of black skimmers was sighted.

The unusual bill distinguishes the skimmer from any other bird in the world. In fact, anyone seeing a black skimmer for the first time may well wonder how the bird flies with such an enormous bill. To get a better idea of the enormity of the bill, imagine it the length of an open magazine (50-60 cm) and slightly wider than the length of the key on your keychain (40-50 mm). Males have a slightly larger bill than females.

The bill is bright orange towards the head, black towards the tip, and unique in shape and function. It is narrow and knife-like, with the lower beak (mandible) extending past the upper beak; an avian under-bite of sorts. This shape allows the birds to "skim" the upper surface of the water. Skimmers fly very close to the water's surface with their bill open, the mandible dropping down into the water and the upper beak held above the water. When the mandible touches a fish, the upper bill snaps closed in-

stantly and dinner is served. A reflex mechanism, similar to our knee reflex, triggers the closing of the bill. This feeding method allows them to be successful foragers even in the dark. Black skimmers in the San Francisco Bay Area are rarely seen swimming in the water. They spend most of their time gliding along the surface of



South Bay sloughs at high tide. The combination of the massive orange and black bill, the webbed, bright orange feet and short, squared tail, make for a striking bird. Add to the skimmer's whiny "bark" of a call, and you have a comedic species to watch.

Photo by W. Walther, SFBBO

These were not the first black skimmers in the Bay Area. They were part of the Bay Area black skimmer invasion!

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Black Skimmers Invade the Bay

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Where Are the Skimmers Coming From, and What Are They Doing?

Simply put, the black skimmers are looking for new homes. The first reported occurrence of black skimmers in California was in 1962 on the Orange County coast in southern California. They began breeding at the Salton Sea in 1972, San Diego in 1976, and Orange Co. in 1985.



SFBBO photo

The first report of black skimmers breeding in south San Francisco Bay was in 1994. Since that time, there have been consistent breeding attempts throughout various sites in the South Bay with no more than a few nests recorded at any given site.

Skimmers throughout their range choose colony sites based on the presence of other species. In the Bay Area, colony mates on the salt ponds include Forster's terns, Caspian terns, and American avocets. The presence of these more aggressive species may help give the skimmers some protection from predators. Terns especially provide early warning and defense against intruders. Skimmers themselves are less aggressive. When San Francisco Bay Bird Observatory (SFBBO) biologists approach the colonies the skimmers fly over a few times, call loudly, and often land at a distance until the biologists leave. Terns will continue to circle overhead, calling very loudly, and have been known to hit biolo-

gists on the head with their feet or bills. There are exceptions, of course. One particularly habituated skimmer pair near the Environmental Education Center in Alviso came awfully close to taking out an SFBBO intern last summer.

Success.... Sort Of...

Although present for nearly a decade, skimmers have not been very successful at nesting on the Bay. In the 2002 nesting season, black skimmer pairs occupied three sites in the South Bay; in 2003 there were four sites. Only one area was used during both years. Because the skimmer population is not individually marked with bands, we do not know if the same skimmers are attempting to breed in the same place each year. Skimmers abandon unsuccessful sites and continue to nest in successful sites, especially when predation is the cause of failure. Important predators on egg and chicks include gulls, ravens, rats, foxes, and feral cats and dogs.

Another problem for skimmers nesting on the Bay could be their methods of cooling off their eggs. Like most species that live in warmer climates, skimmers have a variety of ways of cooling themselves. Skimmers lie down with their neck and bill extended forward, thus reducing heat uptake while resting. Skimmers also cool themselves and their eggs by foot-wetting and belly-soaking. Both of these methods involve flying low over the water and dragging feet and/or belly to get them wet. Foot-wetting and belly-soaking are adaptations for beach-nesting birds; sand transferred from the belly to the eggs falls easily off the eggs as they dry. Salt pond islands are made of dredge materials and consist mainly of thick, heavy Bay mud. Anyone who has walked on levee trails after a rain knows that it sticks to your shoes like glue. It also sticks to eggs. SFBBO biologists have found many skimmer nests buried in the mud. This causes the eggs to suffocate as they cannot be turned over by the adults.

A few chicks appear to have successfully fledged in the past few years. These chicks may return to breed in the place where they were born, as many birds do. This would increase our Bay population of black skimmers, albeit slowly.

Invading, Expanding? What Are the Skimmers Doing Here?

Are they really “invading?” By definition, an invasive species is an introduced species that out-competes native species for space, food, or other resources. Species can be introduced into new areas either naturally or by human actions.

One example of natural introduction is range expansion. The geographic range of a species changes over time, as birds cross into new areas of suitable habitat, or leave areas that have become unsuitable. For example, cattle egrets are an Old World species (from Eurasia) that have successfully made it to North America where they are now firmly established and thriving among the cattle herds in many parts of the United States and Mexico. The expansion of the skimmer into the Bay Area may well be due to the existence of our salt pond islands and levees. These provide nesting habitat that is isolated from humans and from mammalian predators. The black skimmers need new habitat - new homes since gull colonies, beach recreation and development have taken over much of the formerly suitable beach habitat available along the Gulf and East coasts. Both the cattle egret and the black skimmer have come on their own, yet both have taken advantage of human induced changes to the landscape.

Species range expansions often indicate changes in habitats and may have interesting consequences for the communities that are invaded. One of the factors in defining an invasive species is its ability to out-compete native species for some part of the habitat. So far, there is no evidence that the few black skimmers

currently residing in the Bay have any sort of detrimental impact on the other species here. So for now, it seems the black skimmer is expanding its horizons, rather than taking over and conquering.

Where Can I Find a Black Skimmer?

The EEC’s Mystery Bird 2000 has stuck around. The number of black skimmer pairs fluctuates every nesting season. For the last four summers, most visitors venturing up the levee from the Environmental Education Center’s boardwalk have seen at least one black skimmer, aggressively, and adamantly defending its nest. Or possibly, with a pair of binoculars, visitors have glimpsed the birds resting with their neck and bill extended to reduce heat loss. Walking a little further to the floating dock at high tide, lucky visitors witnessed a skimmer elegantly slicing the slough water like a knife, searching for a meal. Now is the chance to see an acclimating species trying to make its way in the San Francisco Bay Area.

If you haven’t seen a black skimmer, take a walk in the late spring and summer at the Don Edwards SF Bay NWR’s Environmental Education Center in Alviso, or visit Charleston Slough in the Mountain View area. Though black skimmers can be sighted year-round foraging in the South Bay, these two sites listed above during the breeding season are the best bets. As you continue exploring the edge of the Bay, keep an eye out for one of these explorers looking for new homes. You never know where a new pair could appear.

A picture of a Black Skimmer chick being banded can be found on the following website: <http://www.sfbbo.org/intern.htm>

Cheryl Strong is a biologist and Waterbird program director at SFBBO. She holds an MS in biology from Southeastern Louisiana University where her research focused on the wintering diet of hermit thrush. Other past research projects include studying the effects of deforestation on birds in the Brazilian Amazon. She is currently the project leader for the colonial waterbird program, the Western Snowy Plover survey program, and the contaminants and reproductive success of terns project.

Sharon Miyako is the education and outreach intern at SFBBO. Without her SFBBO cannot look up anything on the internet quickly, nor write grants. She holds a B.S. from UCLA in Ecology and Behavior as well as a double major in English.

For more information about the San Francisco Bay Bird Observatory, its activities for the public, and how you can be involved, check out www.sfbbo.org

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San Francisco Bay National Wildlife Refuge Complex

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

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

Thank you San Francisco Bay Wildlife Society Donors!

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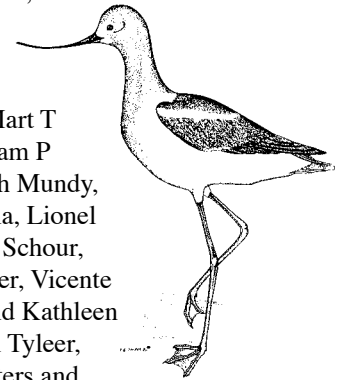
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Mail your donation to: San Francisco Bay Wildlife Society, P.O. Box 234, Newark, CA 94560. You may also fax your membership donation using a Visa or MasterCard number to (510) 792-5828.

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:

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Don Edwards San Francisco Bay National Wildlife Refuge Presents

International Migratory Bird Day

Environmental Education Center • 1751 Grand Blvd, Alviso

**Saturday, May 8, 2004 • 10:00 a.m. – 4:00 p.m.
Free!**

Join us in celebrating the amazing spectacle of the spring migration! Learn about colonial nesting migratory birds of the San Francisco Bay region.

**Naturalist-led Bird Walks • Live Animal Presentations • Magic Shows • Arts and Crafts
Hands-on Salinity Testing • Mud Studies • Binocular Lessons • Poster Contest!**

**Preview evening – Friday, May 7, 2004
7:00 p.m. – 9:15 p.m.
A special evening for adults only.
Twilight Bird Walk & Colonial Bird Presentation**

**Check our website for specific programs, activities and times. <http://desfbay.fws.gov/Tideline/IMBD.htm>
For more information call (408) 262-5513 • E-mail: sfbay_urbanrunoff@yahoo.com**

Event Partners: San Francisco Bay Wildlife Society, US Fish & Wildlife Service, Santa Clara Valley Urban Runoff Pollution Prevention Program, City of San Jose, San Francisco Bay Bird Observatory (SFBBO), Santa Clara Valley Audubon Society (SCVAS)

Other IMBD internet sites: <http://birds.fws.gov/imbd> <http://birdday.org/>



FWS photo

The *Tideline* and the Invisible Volunteer

A story about Hal Brown

by *Eileen McLaughlin*

It was 1983. The San Francisco Bay National Wildlife Refuge was hosting a Junior Ranger program in the auditorium of the Fremont Visitor Center, a facility that had been built just a few years earlier. Sierra Brown was one of the young people participating. Watching the proceedings, parent Hal Brown was quickly delighted and impressed by the brown-clad program leaders and their teaching methods, demonstrating just how birds' bills were adaptations that enabled different types of feeding.

Hal immediately knew that these were lessons that the community needed and that he wanted to help them continue. What could he do?

As the program ended Hal heard the staff invite everyone to subscribe to the refuge newsletter, *The Tideline*. He did so. That action triggered an idea of how he might help. He sought out a staff member and asked how *The Tideline's* subscription list was being maintained. The answer was that it was managed manually.

Hal asked: "Would it be helpful to convert the list to a computer-based format? Would you be interested in letting me help the Refuge by providing that service for you?" The response was "Yes, Yes!"

Hal already had a solution in a data program that he had recently created for a client. He knew the program could be used for a subscription list and could produce mailing labels. That is exactly what he made it do for *The Tideline* and has done so, continuously, ever since. Daughter Sierra grew up and left home. Still, Hal continued

his voluntary contribution...steadily, dependably and for more than 20 years.

Four times a year, *The Tideline* arrives in mailboxes around the Bay, the country and the globe. For each edition, a roomful of volunteers and refuge staff apply mailing labels during "Peel 'n Stick" sessions, handling an excess of 16,000 labels per edition in recent years. At the same time, small stacks of *The Tideline* are packaged, destined for libraries and similar organizations. One such stack goes to Hal Brown. Each quarter, he distributes copies to his clients. He always makes a special effort to bring its contents to the attention of parents, hoping that they too will bring their children to the refuge.

Talking with Hal today is to sense the same excitement that he must have had in 1983. What keeps him excited and committed? Hal does his *Tideline* work in the office of his Hayward business, Payroll Partner, yet has never charged his time as a tax write-off. His name is not in the Refuge's volunteer database, the hours he's worked have never been reported and he has not been acknowledged at any volunteer banquet.

Hal says he doesn't need any of that attention. He describes the source of his satisfaction by quoting President John F. Kennedy. "Ask not what your country can do for you. Ask what you can do for your country." Hal took those words to heart as his own. The Refuge and many thousands of *Tideline* readers are his beneficiaries. Thank you, Hal Brown!

Eileen McLaughlin is a Refuge volunteer and Project Director of Wildlife Stewards, a Refuge support group.



Annual Marshlands Road Closure to Take Place April 1

Nesting season is once again at hand, and western snowy plovers will arrive soon to begin nesting along Marshlands Road. Marshlands Road provides access to the Dumbarton Fishing Pier at the edge of San Francisco Bay. The road closure to motorized vehicles creates a difficulty for anglers who wish to drive out or operate a motorized scooter to the fishing pier. However, the road is still open to bicycles and pedestrians. The road closure is expected to last from April 1 until August 31.

The Refuge will provide shuttles to the pier on Saturday and Sunday and will leave from the Visitor Center parking lot at 9:00 am and 12:30 pm. The shuttle will pick up anglers at the fishing pier parking lot to return to the Visitor parking lot at 12:45 pm and 5:15 pm. Reservations are required and can be made at 510-792-0222.

Snowy plovers and other shorebirds like American avocets and black-necked stilts nest in flat, open areas, and use the levees and dried salt ponds along the road to build their nests. The chicks wander onto the road surface, where their gray and white feathers blend into the asphalt, making it very difficult to spot them from a car.

Snowy plovers, listed as "threatened" in 1993 due to a severe decline in numbers, have in the past nested on beaches along the coast of central California. Plovers at most of those nesting sites, however, have long since disappeared due to spring and summer disturbance each year by humans. Unfortunately for the plovers, the nesting season coincides with the greatest human use of beaches. Fortunately, nesting has begun on other areas, such as dried salt ponds and levees along Marshlands Road.

IMBD 2004 Poster Contest

Celebrate the 12th annual International Migratory Bird Day by entering the IMBD 2004 Poster Contest! Show your appreciation of migratory birds by capturing their spirit on paper. Here are a few simple rules to follow:

- Who:** Grade K-Adults
Theme: Colonial Nesting Migratory Birds in the San Francisco Bay Area
Size: No larger than 16" X 24"
Medium: Drawing, paints, collages, anything goes!
Entry Form: Fill out entry form and affix it on the back of the poster
Deadline: April 26, 2004

Entries may be dropped off at the Refuge at 1751 Grand Blvd, Alviso or 1 Marshlands Road, Fremont. Or, mail entries to Laurie McEwen, Don Edwards SF Bay NWR, PO Box 524, Newark, CA 94560.

Winners will be notified by April 30th, 2004 and awards will be presented on May 8, 2004 at the Don Edwards SF Bay National Wildlife Refuge IMBD Celebration in Alviso at 12:00 p.m. All winning posters will be displayed during the IMBD Celebration on May 7-8, and the Best in Show will be framed. Prizes will be donated from local wildlife-oriented businesses and organizations. Winners must be present to receive the award. Questions? Call Laurie McEwen at 408-262-5513 ext. 102

Full Name _____

Grade (circle one) K 1 2-3 4-5 6-8 9-12 adult

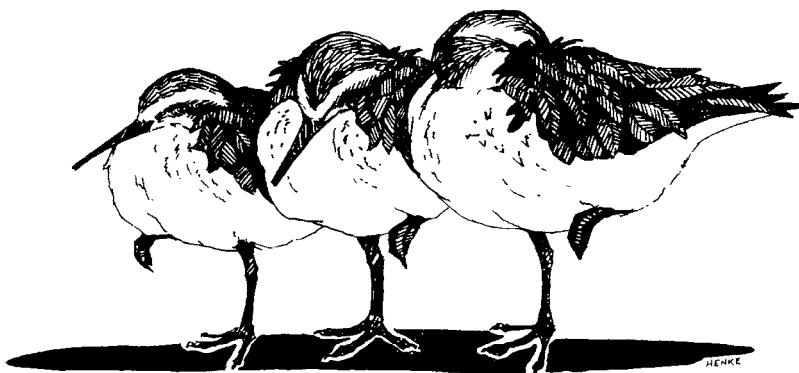
Phone Number _____

School (if applicable) _____

Bird _____

For migratory bird ideas, check out a bird field guide at your local library or on-line at www.birdday.org.

Posters may be picked up at the EEC after May 8. Include a self-addressed stamped envelope if you want the poster mailed to you.



Spring Activity Schedule

March

Watershed Diorama Demonstrations

Sundays in March 1:00- 4:00 p.m.

Environmental Education Center, Alviso

Been thinking about stopping by the Center for an activity but the scheduling never works out? Well, drop in any Sunday afternoon this spring for a hands-on demonstration of our 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! All ages are welcome.

Saturday, March 6

Botanical Wanderings

Visitor Center, Fremont

2:00 p.m. – 3:30 p.m.

Discover the diverse spring 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.

Wild Lands!

Environmental Education Center, Alviso

3:30 p.m. - 5:00 p.m.

Enjoy an Informative slide presentation tracing the history of our National Wildlife Refuge System, from Pelican Island to the San Francisco Bay. Follow the slide show with a short walk around the Refuge (weather permitting). Ages 12 and up welcome. Led by Ed Kantack. RESERVATIONS REQUIRED. Call 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Sunday, March 7

Sunday Afternoon at the Movies

Environmental Education Center, Alviso

2:30 p.m. – 4:00 p.m.

WINGED MIGRATION -- the amazing documentary celebrating the spectacle of migration. FREE. Rated G. Suitable for the whole family but we ask you consider other guests and leave squirmy kids at home. Our auditorium is currently under construction. Please call ahead to make sure the movie will be playing, 408-262-5513. Seating is on the floor. Bring your own pillows, blankets, and refreshments.

Saturday, March 13

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 Trail (1 1/3 miles). 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. x43. Led by Mary and Gene Bobik.

Night Skies

Visitor Center Parking Lot, Fremont

7:00 p.m. - 9:30 p.m.

Observe the stars from the San Francisco Bay Refuge. Learn a couple of constellations and star names and view a star cluster through a telescope. Great fun for the whole family. Subject to cancellation due to cloudy skies. RESERVATIONS REQUIRED! Call 510-792-0222 x43. Led by Ralph Libby.

Sunday, March 14

Avian Antics

Environmental Education Center, Alviso

12:00 p.m. – 1:00 p.m.

Join us at the Refuge as we explore the trails and attend a low-tide feast. Learn a little bird trivia along the way, like why some birds eat their own feathers or which Refuge bird finds a mate for life? Bring your own binoculars, or borrow a pair of ours! Reservations required. Call Carrie at 408-262-5513 x104. Subject to cancellation due to inclement weather.

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 Carrie at 408-262-5513 x104.

Saturday, March 20

Community Service Day

Environmental Education Center, Alviso

9:45 a.m. – 12:00 p.m.

Calling all high school students looking to fulfill community service requirements, Scout groups looking to earn a service badge, and anyone else who just wants to pitch in at a one-time Refuge project. Come out to fight non-native plants 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. Call Laurie McEwen at 408-262-5513 x 102 or e-mail sfbay_urbanrunoff@yahoo.com.

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 bird watching 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. Led by Eileen McLaughlin.

Nature Walk

Visitor Center, Fremont

11:00 a.m. - 12:30 p.m.

Join a Refuge naturalist for an easy hike while exploring an aspect of the Refuge. No reservations required. Meet at the observation deck outside the Visitor Center entrance. Led by Matthew Greuel.

Vernal Equinox Walk

Environmental Education Center, Alviso

3:00 p.m. – 4:30 p.m.

Spring is truly upon us. Come find out what's happening in the marsh at this time of year. Take a short stroll through Refuge habitats looking for signs of spring. Suitable for all ages. RESERVATIONS REQUIRED. Please call Laurie at 408-262-5513 x 102 to make a reservation or e-mail sfbay_urbanrunoff@yahoo.com.



Don Edwards San Francisco Bay National Wildlife Refuge Complex

1 Marshlands Road, Fremont – (510) 792-0222 • 1751 Grand Blvd, Alviso – (408) 262-5513

Spring Activity Schedule

Sunday, March 21

Beginning Birdwatching for Kids

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

Learn about the feathered flyers found in the habitats of the San Francisco Bay. Join us and create a personalized bird identification booklet to use along the salt marsh trails. Dress warmly, bring binoculars or borrow ours and wear sturdy walking shoes. Great for ages 5 and up. Led by Peg Bernucci. RESERVATIONS REQUIRED, 408-262-5513 x 102 or e-mail sfbay_urbanrunoff@yahoo.com.

Saturday, March 27

Bike the Bay

Meet at the Visitor Center Flagpole, Fremont

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

A slow and easy bicycle tour of the marshes and salt ponds along dirt levees and trails. Learn about the ecology and history of the salt marshes of San Francisco Bay. Bring helmets (mandatory), bikes with knobby tires (seriously recommended) and a lunch if you wish to eat with the group at the end of the tour, overlooking the marsh. RESERVATIONS REQUIRED. Call 510-792-0222 ext 43. Led by Norton Bell and Martin Celusnak.

Twilight Marsh Walk

Environmental Education Center, Alviso
6:00 p.m. - 7:30 p.m.

Join our interpreter for a twilight walk around our trails. Experience a completely different environment as the sun goes down and the night creatures come out. Warm up inside with a cup of hot chocolate and then join us at 8:30 for a look at the night sky. Suitable for all ages, children welcome. RESERVATIONS REQUIRED, call Laurie at 408-262-5513 x 102 or e-mail sfbay_urbanrunoff@yahoo.com.

Night Skies

Environmental Education Center, Alviso
7:30 p.m. - 8:30 p.m.

Learn about what stars and planets are up, as well as their interesting histories. Then venture outside to look at 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. Led by Ralph Libby. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Sunday, March 28

Slough Who?

Environmental Education Center, Alviso
10:00 a.m. - 11:30 a.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 hike the habitats, search for owl clues, and get a chance to dissect owl pellets, discovering exactly whom that owl ate! Reservations required. Call Carrie at 408-262-5513 x104.

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 talk and a slide show about how the San Jose/Santa Clara Water Pollution Control Plant cleans our wastewater. Then take a hike to see the Refuge habitats and how this cleaned wastewater affects them. Appropriate for ages 10 and up. Reservations required. Call Carrie at 408-262-5513 x104.

A Ghost Town in SF 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. Led by Pat Anthony.

April

Watershed Diorama Demonstrations

Sundays in April 1:00- 4:00 p.m.
Environmental Education Center, Alviso

Been thinking about stopping by the Center for an activity but the scheduling never works out? Well, drop in any Sunday afternoon this spring for a hands-on demonstration of our 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! All ages are welcome.

Saturday, April 3

Nature Walk

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

Join a Refuge naturalist for an easy hike while exploring an aspect of the Refuge. No reservations required. Meet at the observation deck outside the Visitor Center entrance. Led by Matthew Greuel.

Fantastic Farallons

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

Enjoy a fascinating slide show about the "Seasons and Shorebirds" of the Farallon National Wildlife Refuge. Joelle Buffa, the Farallon Refuge Manager and Supervisory Biologist of the San Francisco Bay Refuge Complex, will share sights and stories of these intriguing islands off our coast. The program will be followed by a short walk around the boardwalk trail. Adult program. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Botanical Wanderings

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

Discover the diverse spring habitats from the hill-tops 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.

Saturday, April 10

Bike the Bay

Meet at the Visitor Center Flagpole, Fremont

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

A slow and easy bicycle tour of the marshes and salt ponds along dirt levees and trails. Learn about the ecology and history of the salt marshes of San Francisco Bay. Bring helmets (mandatory), bikes with knobby tires (seriously recommended) and a lunch if you wish to eat with the group at the end of the tour, overlooking the marsh. RESERVATIONS REQUIRED. Call 510-792-0222 ext 43. Led by Norton Bell and Martin Celusnak.



Spring Activity Schedule

Saturday, April 10

Spring in Bloom

Antioch Dunes NWR, Antioch
10:00 a.m. - 12:00 p.m.

Did you know there's a National Wildlife Refuge in Antioch? Well, 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 native wildflowers in bloom, highlighting the endangered Contra Costa wallflower. Wear sturdy shoes for the sandy hike along the dunes. All ages welcome. No reservations required. Call 510-521-9624 for additional information and directions.

Gardening for the Birds

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

Take a tour of the habitat gardens surrounding the EEC. Take a look at some good plants for Bay Area gardens that not only attract birds and add beauty to your garden, but do not require much watering. Learn what small things you can add to your garden to attract more wildlife. Geared for adults. Led by Laurie McEwen.

Sunday, April 11

Avian Antics

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

Join us at the Refuge as we explore the trails and attend a low-tide feast. Learn a little bird trivia along the way, like why some birds eat their own feathers or which Refuge bird finds a mate for life? Bring your own binoculars, or borrow a pair of ours! Reservations required, call Carrie at 408-262-5513 x104. Subject to cancellation due to inclement weather.

Puzzling Pipes

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

Care to climb down your drain pipes? Well . . . maybe not! Instead, come out to the Refuge and jump into our fun maze of puzzling pipes. Bring your creativity and design your own drain pipe system, learning where all of our water goes in the process. Design and decorate your own, unique household water-saver pail from recycled materials. While you wait for your newly-crafted pail to dry, test your agility and luck in our water pipes obstacle course. Reservations required. Call 408-262-5513 x104 to make a reservation.

Saturday, April 17

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 bird watching 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 x43. Led by Eileen McLaughlin.

Nature Walk

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

Join a Refuge naturalist for an easy hike while exploring an aspect of the Refuge. No reservations required. Meet at the observation deck outside the Visitor Center entrance. Led by Matthew Greul.

Refuge Ramble

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

Take a short hike around the Refuge exploring the different habitats. Find out what makes a habitat and how to tell them apart. Learn which animals thrive in each habitat. Geared for kids age 7 and up. Led by Ed Kantack. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

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 Trail (1 1/3 miles). 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 x43. Led by Mary and Gene Bobik.

Sunday, April 18

Watershed Watchers Clean-Up

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

Earth Day is coming! Find out what you can do at home to take care of our planet. Help keep pollution out of our waterways by working in our chemical-free gardens. Wage war on invasive exotic plants and make the Refuge a better place for migratory birds as well as our resident animals. Bring garden

gloves and water. Garden tools provided. Great service project for Scout groups, high school community service, or home-school groups. Suitable for everyone age 10 and up. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Saturday, April 24

Earth Day Cleanup!

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

Join us for our annual Earth Day Cleanup and help protect wildlife! We'll supply laytex gloves and trash bags. Wear sturdy shoes, a hat, and clothes you don't mind getting dirty in. Water is also recommended. No reservations needed. All groups welcome. For more information, call Carmen Minch at 510-792-0222 ext. 38.

Salt Marsh Histories

Environmental Education Center, Alviso
6:30 p.m. - 8:00 p.m.

Take a leisurely stroll through New Chicago Marsh and learn about human activity from the late 1800's to the present. "Meet" three unique friends from salt marsh history during the walk, and gain a different perspective on the lands of the Refuge. Why not stay for the Night Skies program that follows? Geared for adults. Led by Laurie McEwen. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Night Skies

Environmental Education Center, Alviso
8:00 p.m. - 9:00 p.m.

Learn about what stars and planets are up, as well as their interesting histories. Then venture outside to look at 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. Led by Ralph Libby. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Sunday, April 25

The Refuge Rocks!

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

That's right, the Refuge is pretty cool. We have great birds, plants, and even rocks! Come see a presentation on the geologic history of the Bay Area, take a hike around the Refuge, and answer those burning questions in your mind: What is

Don Edwards San Francisco Bay National Wildlife Refuge Complex

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Spring Activity Schedule

chert? Where did serpentinite come from and why is it the state rock of CA? How did the San Francisco Bay form and when? Appropriate for ages 10 and up. Reservations required. Call Carrie at 408-262-5513 x104.

Salinity Sleuths

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

Step into the shoes of a scientist and strap on our field detective packs for a hands-on investigation where we will collect water samples, use plant clues, and do some sleuthing to answer the question "How salty is it?" You will need to bring along keen senses of taste, smell and sight to determine which plants and animals live in the Refuge's salty habitats! Reservations required. Call Carrie at 408-262-5513 x104.

May

Watershed Diorama Demonstrations

Sundays in May 1:00- 4:00 p.m.

Environmental Education Center, Alviso

Been thinking about stopping by the Center for an activity but the scheduling never works out? Well, drop in any Sunday afternoon this spring for a hands-on demonstration of our 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! All ages are welcome.

Saturday, May 1

Refuge Clean-Up

Environmental Education Center, Alviso
9:30 a.m. - 11:30 a.m.

Calling all Refuge fans and volunteers! April showers will bring May flowers. This is good news for native plants and bad news when it comes to invasive non-natives. Help us keep the pepperweed, mustard, and other non-natives down. A weed-free EEC means better field trips and visitor experiences. We recommend long pants and long-sleeved shirts when working in the garden. Bring water and garden gloves or borrow a pair of ours. Call Laurie to let her know you're coming at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Nature Walk

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

Join a Refuge naturalist for an easy hike while exploring an aspect of the Refuge. No reservations required. Meet at the observation deck outside the Visitor Center entrance. Led by Matthew Greuel.

Botanical Wanderings

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

Discover the diverse spring habitats from the hill-tops 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, May 2

Gardening for the Birds

Environmental Education Center, Alviso
9:30 a.m. - 10:30 a.m.

Take a tour of the habitat gardens surrounding the EEC. Take a look at some good plants for Bay Area gardens that not only attract birds and add beauty to your garden, but do not require much watering. Learn what small things you can add to your garden to attract more wildlife. Geared for adults. Led by Laurie McEwen.

Friday, May 7

International Migratory Bird Day Pre-Event

Environmental Education Center, Alviso
7:00 p.m. - 9:15 p.m.

Help kick off this year's International Migratory Bird Day! See page 7 for more information.

Saturday, May 8

International Migratory Bird Day

Environmental Education Center, Alviso
10:00 a.m. – 4:00 p.m.

(Note: some activities start before 10am.)

Celebrate colonial nesting birds at the 12th annual International Migratory Bird Day at the Environmental Education Center. See page 7 for more information.

Spring in Bloom

Antioch Dunes NWR, Antioch
10:00 a.m. - 12:00 p.m.

Did you know there's a National Wildlife Refuge in Antioch? Well, 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 native wildflowers in bloom, highlighting the endangered Antioch Dunes evening primrose. Wear sturdy shoes for the sandy hike along the dunes. All ages welcome. No reservations required. Call 510-521-9624 for additional information and directions.

Saturday, May 15

Nature Walk

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

Join a Refuge naturalist for an easy hike while exploring an aspect of the Refuge. No reservations required. Meet at the observation deck outside the Visitor Center entrance. Led by Matthew Greuel.

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 Trail (1 1/3 miles). 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 x43. Led by Mary and Gene Bobik.

Saturday, May 22

Twilight Marsh Walk

Environmental Education Center, Alviso
7:00 p.m. - 8:30 p.m.

Join our interpreter for a twilight walk around our trails. Experience a completely different environment as the sun goes down and the night creatures come out. Warm up inside with a cup of hot chocolate and then join us at 8:30 for a look at the night sky. Suitable for all ages, children welcome. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Continued next page

Don Edwards San Francisco Bay National Wildlife Refuge Complex

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Spring Activity Schedule

Saturday, May 22

Night Skies

Environmental Education Center, Alviso

8:30 p.m. - 9:30 p.m.

Learn what stars and planets are up, as well as their interesting histories. Then venture outside to look at 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. Led by Ralph Libby. RESERVATIONS REQUIRED. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Sunday, May 23

Critter Café

Environmental Education Center, Alviso

10:00 a.m. - 11:30 a.m.

Mud and water are pretty boring stuff, right? No way! Come take a closer look at some of the tiny, wiggly, squiggly creatures we'll find in samples of mud and water from marshes at the Don Edwards San Francisco Bay National Wildlife Refuge. Learn

about macroinvertebrates and plankton – the tasty treats that shorebirds are eating at our five-star marsh 'cafes' at the Refuge. Reservations required. Call Carrie at 408-262-5513 x104.

Slough Whoo?

Environmental Education Center, Alviso

2:00 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. 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 Carrie at 408-262-5513 x104.

Saturday, May 29

A Ghost Town In San Francisco Bay?

Environmental Education Center, Alviso

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

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

and presentation. After the presentation, take a short mini-van excursion along our salt pond levee to actually view Drawbridge. Mini-van excursion subject to weather conditions, rain a few days prior to the event will close the levee road. Program is intended for adults. Led by Pat Anthony. Space is very limited, RESERVATIONS ARE ESSENTIAL. Call Laurie at 408-262-5513 ext.102 to reserve your space, or e-mail sfbay_urbanrunoff@yahoo.com.

Sunday, May 30

Nature Detectives

Environmental Education Center, Alviso

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

Do you have what it takes to become a nature detective? Join us for a fun program designed to sharpen your powers of observation and deduction. Learn to tell stories by reading animal tracks. Make your own Backyard Trackers Field Guide to take home. Take a short stroll around the Refuge looking for animal tracks (weather permitting). Great for kids age 8-10. RESERVATIONS REQUIRED, minimum of 5 kids. Call Laurie at 408-262-5513 x102 or e-mail sfbay_urbanrunoff@yahoo.com.

Refuge Trails Received Winter Facelift

Regulars to the Don Edwards San Francisco Bay National Wildlife Refuge Headquarters in Fremont noticed an unusual amount of construction along the Tidelands Trail and LaRiviere Marsh Trail this past winter.

LaRiviere Marsh, which consisted of tilted boardwalks and unstable-looking bridges, drew Secretary of Interior Gale Norton's attention when she visited the Refuge in January 2002. The condition of the trail confirmed the Secretary's decision to announce that \$1 million would be appropriated to the Refuge to aid the

Locally known as the best marsh to see the secretive California clapper rail on the Refuge, an endangered bird that lives only in the San Francisco Bay salt marshes, work crews in LaRiviere Marsh had to work under strict time frames and specific guidelines in order to replace the boardwalks and bridges. Trail construction had to take place in the winter in order to avoid interrupting the rails' breeding season.

Across the road, construction was taking place simultaneously on portions of the Tidelands Trail. New observation decks replaced the old ones, and the upland connector of the trail has been renovated by decreasing the steepness of the grade and by using a trail surface that will accommodate wheelchairs and strollers. Improvements to both trails will allow easier access for all.

"We are thrilled these projects finally took place," said Sandy Spakoff, Chief of Visitor Services. "For too long, many nature lovers have been unable to use our trails because of the surface or the grade. Visitors will now have more choices, and can enjoy more of the Refuge."

If you would like more information about these trail improvements and the accessibility of these trails, please contact Carmen Minch at 510-792-0222 ext. 38.



FWS photo

Refuge in trails and maintenance programs. True to her word, the Don Edwards Refuge received the funds last year and began improving the two most popular trails on the Refuge.

Starbucks Donates \$2000 to Wildlife Society

The San Francisco Bay Wildlife Society is the recipient of a \$2000 donation from the Starbucks *Make Your Mark* Volunteer Program. Bill Crassweller, manager of Starbucks on Thornton Ave. in Newark, and his team volunteered 234 hours to the Don Edwards SF Bay National Wildlife Refuge and stipulated the hours be donated to San Francisco Bay Wildlife Society. Under the Starbucks Volunteer Program, Starbucks matches each hour volunteered with a cash donation to the designated nonprofit.

The Society is most grateful to Bill Crassweller and Starbucks. This donation enables the San Francisco Bay Wildlife Society to continue to support the Don Edwards SF Bay National Wildlife Refuge's popular free Summer Camp Programs, which were in danger of being

cut due to insufficient funds.

Bill and his team accumulated these hours by picking up trash on the Refuge during the annual Coast Cleanup last September. Not only did Bill's team make its mark at Don Edwards SF Bay National Wildlife Refuge by cleaning the environment and protecting wildlife, their hard work will continue to benefit the Refuge's environmental education programs.

If your company has such a matching program for volunteer hours, please consider donating to San Francisco Bay Wildlife Society. San Francisco Bay Wildlife Society is a 501(c)(3) non-profit organization, established in 1987, to support education, interpretation and research activities of the U.S. Fish & Wildlife Service.

Don Edwards San Francisco Bay National Wildlife Refuge

Annual Earth Day Cleanup

Saturday, April 24

8:00 a.m. – 12:00 p.m.

Protect wildlife and the environment.

Join us on our annual cleanup. We'll supply latex gloves and trash bags. Wear sturdy shoes, a hat, and clothes you don't mind getting dirty in.

No reservations needed. All groups welcome.

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

Field Trips to the Refuge

General Field Trip Program Information

FREE field trip programs are offered at the Don Edwards San Francisco Bay National Wildlife Refuge and at San Pablo 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 the information you need to design and conduct your own field trip. In addition, adult volunteers must be recruited to lead the activities at the different learning stations and to chaperone the rotation groups of students. We provide easy to follow "scripts" for each station, but both "leaders" and "chaperones" are strongly encouraged to attend a Field Trip Orientation Workshop.

Field Trips at the Visitor Center in Fremont

Wetland Roundup - Investigate creatures of the mud flats, the 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 Monday-Friday.

Trekking the Refuge - Trek the 1 mile Tidelands Trail, and learn about the natural history of the Refuge! Then explore the pickleweed in the salt marsh, the brine shrimp in the salt pond, and the plankton in the slough!! **Available only at the Visitor Center in Fremont,** Trekking the Refuge Field Trip is designed for grades 3-6, for up to 36 students. Trekking the Refuge is offered seven days a week.

Call Ken Clarkson, Environmental Education Specialist, at 510-792-0222 ext 36, to reserve a date for your Trekking the Refuge or Wetland Round-Up Field Trip at the Visitor Center this spring! For more information call Ken, or email him at ken_clarkson@fws.gov.

Field Trip Orientation Dates at the Visitor Center in Fremont

Call to reserve a place for yourself and any interested adult volunteers planning to lead activities on your field trip. It is our policy that you must attend every two years. Call the education staff at 510-792-0222.

Wetland Round-Up Field Trip Orientations at the Visitor Center in Fremont

Weekdays, 4:00 p.m. - 8:00 p.m.
Thursday, March 4, 2004
Tuesday, March 23, 2004
Thursday, April 8, 2004
Thursday, April 29, 2004
Thursday, May 13, 2004

Trekking the Refuge Field Trip Orientations at the Visitor Center in Fremont

Weekdays, 4:00 p.m. - 8:00 p.m.
Weekends, 10:00 a.m. - 2:00 p.m.
Saturday, March 13, 2004
Thursday, April 15, 2004
Thursday, May 6, 2004

Field Trips at the Environmental Education Center in Alviso

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

Wetland Round-Up Field Trips are booked for the spring. However, you can call Genie Moore at 408-262-5513

ext 100, to add your name to the wait list for a Wetland Round-Up field trip at the Environmental Education Center in Alviso this spring. For more information call Genie, or email her at genie_moore@fws.gov.

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 cooperat-

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 all of the 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 6 people, ages kindergarten - adults. There are also group packs available for 12 - 24 (only 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 Visitor Center in Fremont or the Environmental Education Center in Alviso! The Visitor Center is open Tuesday - Sunday from 10 - 5, for questions or to reserve a group pack please call 510-792-0222. The Environmental Education Center is open Saturday and Sunday from 10 - 5 for questions please call 408-262-5513.

Field Trips to the Refuge

ing efforts of the City of San Jose, U.S. Fish and Wildlife Service, and the San Francisco Bay Wildlife Society. The program offers classroom presentations and a field trip program.

Programs are geared for 5th - 12th grades, although a modified field trip is available for college groups. Educators are also encouraged to contact us to discuss options for customizing field trip and presentation activities and schedules. *Slow the Flow* programs are available to educators and groups located in San Jose, Alviso, Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell and Cupertino.

Reservations for the *Slow the Flow* program are on a first come, first served basis. Reservations are still available for the spring! To schedule a field trip, a presentation, to sign up for a field trip orientation workshop, or for more information, please call Carrie Wright at (408) 262-5513 ext 104 or email her at sfbay_slowflow@yahoo.com

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

Call to reserve a place for yourself and any interested adult volunteers planning to lead activities on your field trip. It is our policy that you must attend every 2 years. Call the education staff at 408-262-5513.

Wetland Round-Up Field Trip Orientation Workshops

Weekdays, 4:00 p.m. - 8:00 p.m.
Wednesday, March 3, 2004
Thursday, March 25, 2004
Wednesday, April 7, 2004
Tuesday, April 27, 2004
Wednesday, May 12, 2004

Slow the Flow Field Trip Orientation Workshops

Weekdays, 4:00 p.m. - 6:30 p.m.
Field Trip Orientations are scheduled on an as needed basis.

Environmental Education Programs at San Pablo Bay NWR

Marsh on Mare Island - This is a **FREE** educator-led field trip program for grades K-12, for up to 40 students. Students participate in a variety of hands-on activities which teach them about the different habitats and wildlife found in the North Bay.

In order to come on a field trip to the Refuge, teachers must attend one of our teacher orientation workshops. These workshops provide the educator with the information needed to have a successful field trip.

In the Marsh on Mare Island Field Trip Orientation Workshops at San Pablo Bay NWR:

Weekdays, 3:45 p.m. - 7:30 p.m.
Tuesday, March 16, 2004

Mud Creatures and the Watershed Connection - This **FREE** program is a one-hour hands-on, in-class activity for 3rd grade students in Solano and Napa counties. Students study crea-

tures that are found in the mudflat habitat while examining marsh mud. Activities also focus on the impact humans have on the Bay waters and how everyday actions can affect all living creatures.

To schedule a teacher orientation date, field trip, or in-class activity please contact the Environmental Education Center Intern at 707-562-2473.

Environmental Education Curriculum Available!

Are you a K-12 educator? Curriculum developer? Scout leader? Are you planning a field trip? Do you want to teach your child more about the environment? Are you looking for some Spanish-English bilingual material?

The EEC Curriculum and Resource Library may have just the thing to help you. Within our 200 resource items available at the EEC, you can find...

On Sandy Shores: Teachers Guide – Five detailed activities for grades 2-4: Beach Bucket Scavenger Hunt; Sand on Stage; The Sights That Sand Has Seen; Build a Sandy Beach; Oil on the Beach. Material provides good background information for teacher. Activities are designed for classroom use with projected times.

Conservation Biology: A Curriculum for High School Students – “Activities that reflect the problems and questions facing conservation biologists.” Seven lessons address biological diversity including species extinction. Each unit has handouts and presentation pages for transparencies. Each lesson is organized including goals, duration, prerequisite knowledge/skills, background data, instructional strategy, and teacher tips.

Spanish-English and English-Spanish dictionaries of specific scientific terms are available in a California Aquatic Science Education Consortium (CASEC) Spanish supplement to a five volume series available in Spanish and English.

How can you gain access to this treasure trove? This resource library can be used by appointment during the week or from 10 am - 5 pm on Saturday and Sunday. Call the education staff, (408) 262-5513, to find out how you can peruse an **Excel database of the resource library**, find a particular item, and then be able to copy and use it!

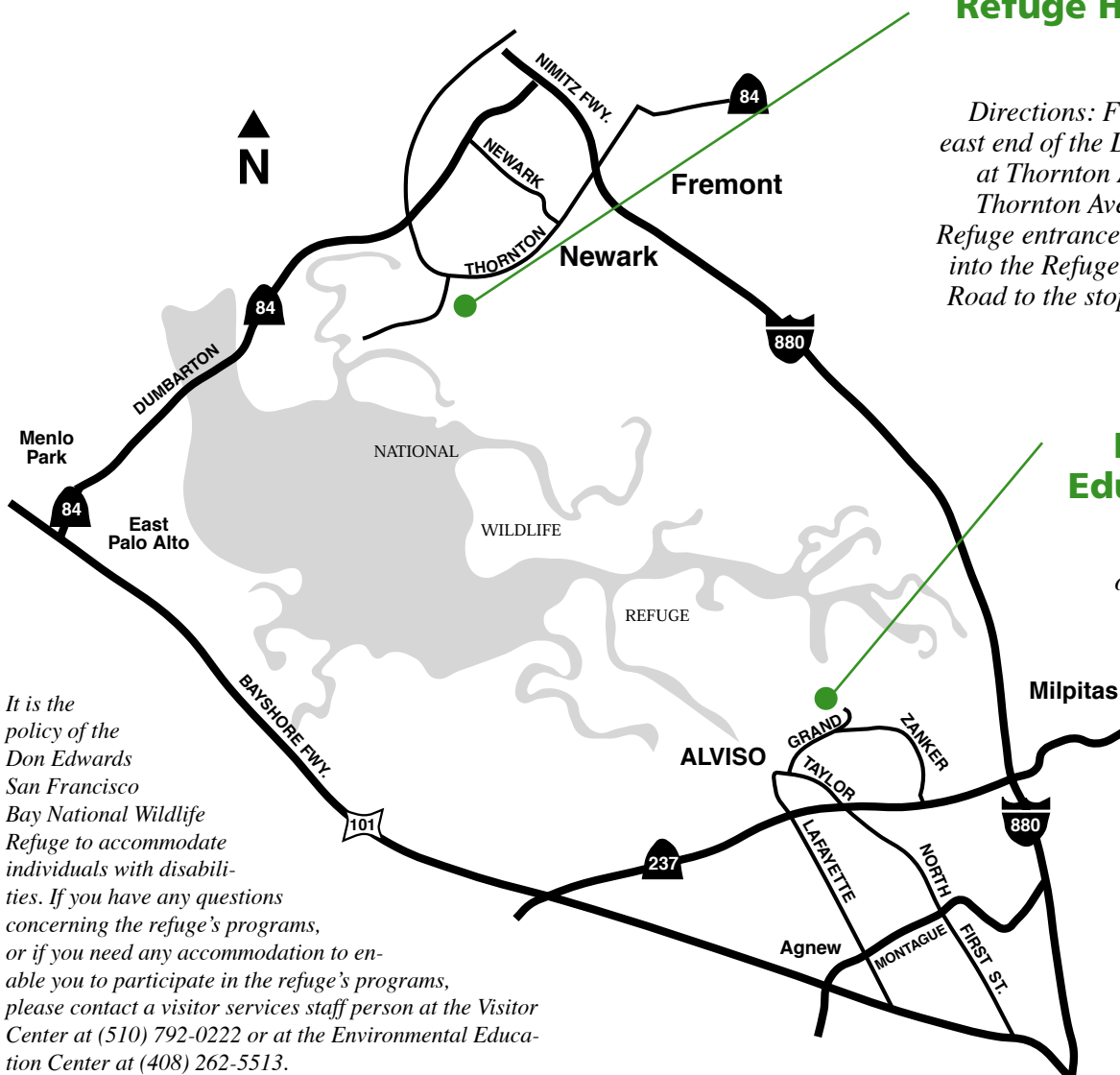
PASS IT ON!! Please help us spread the word about our **FREE**, fun, and educational field trip programs!! If you know a teacher that would be interested in these programs please pass on your copy of Tideline or have them give us a call for more information!! Thank you for your help!

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DEPARTMENT OF THE INTERIOR

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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 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.