

Tideline



Antioch Dunes / Don Edwards / Ellicott Slough / Farallon Island / Marin Islands / Salinas River / San Pablo Bay

The Marvels of Monarch Migration: Bringing Back the Monarch Butterfly

By Carmen Minch

Few insects in this world are more recognizable than the monarch butterfly (*Danaus plexippus*). Its distinctive orange wings with thick black veins are reminiscent of lead came in stained glass windows. These wings, bordered by black edges with white markings often stir a sense of wonder and joy to those who witness them in flight.

The monarch butterfly is one of the most studied insects in North America, and what we have learned has inspired awe in many of its admirers. The monarch seems ubiquitous, for the number of individuals that congregate at the overwintering sites can run in the tens of millions. Despite these staggering numbers, there is evidence that their population has been declining for the past 15 years. This information provided by the World Wildlife Fund prompted several organizations to petition the US Fish and Wildlife Service (USFWS) to review the monarch butterfly's status to determine if the species warrants protection under the Endangered Species Act. In December 2014, the USFWS announced that it will review data submitted.

Monarchs live in temperate climates during warm seasons. However, no life stage of the monarch can tolerate the winters in these temperate zones. In order to survive, monarchs need to search for habitat with warmer temperatures before the onslaught of winter. In the spring, the butterflies return to their breeding grounds. This behavioral pattern is very similar to migrating birds. No other butterflies make such

a journey, or one as long. The distance can be up to 3,000 miles! That can seem pretty extreme for an insect that has the same weight as a paper clip and a wingspan of 3.5 to 4 inches. Unlike birds, one migration cycle takes place over several generations.

In North America, there are two

Canada and eastern and central United States to central Mexico. Some individuals from the eastern population may end up in southern Florida, where there is a much smaller non-migratory population.

The most spectacular migration is witnessed in the eastern population. Their



Monarch butterfly on New England Aster at Great Bay National Wildlife Refuge, Newington, NH. Greg Thompson/USFWS

distinct populations. The western population lies west of the Rocky Mountains and monarchs from throughout the western states migrate to the coastline of California. The eastern population, which is the most studied and largest, lies east of the Rocky Mountains and migrates from southern

story begins in the spring in northern Mexico and southern United States where the females will search for milkweed to lay its eggs on. Milkweed (*Asclepias sp.*) is the host plant for the monarch butterfly. There

continued next page

are several different species of milkweed and combined, makes up the bulk of the habitat for monarchs. The availability of milkweed in the United States was one of the factors



Monarch Larva.

Steven Munafò/Courtesy of Monarch Joint Venture

that monarch butterfly populations were once so abundant. Females lay their eggs only on milkweed and their larvae, also known as caterpillars, feed exclusively on milkweed leaves.

The relationship between milkweed and monarchs is an important one. The plant contains chemical compounds that are toxic to vertebrates, called cardenolides. Its Spanish name, *venenillo*, means small poison. These compounds protect the plant from being eaten by herbivores but it has no detrimental effects on the monarch larva. Instead, the larva absorbs the toxins, thereby becoming distasteful to their natural, vertebrate predators. The orange and black coloring of the adult butterfly serves as a warning to those predators that have considered ingesting them.

After about two weeks, the larva leaves its host plant and searches for a well-hidden site to transform into a pupa (chrysalis). After eight to 15 days, the pupa transforms into a beautiful adult butterfly. Males can be distinguished from females by one black spot on each hind wing.

As the year progresses, the monarchs migrate northward toward Texas and the southern states, following the blooms of milkweed and other nectar plants. As butterflies, the monarchs are no longer specialists and will feed on the nectar of several different species of flowering plants, pollinating them along the way. The first few monarch generations typically live no

longer than six weeks. Females begin laying eggs three to four days after emerging as butterflies and continue until they die.

When the adults emerge after about a month, they continue the path started by their predecessors through the middle states

and toward the northernly range towards southern Canada and eastern United States, all the while breeding and creating new generations to carry on the northern migration. This migration northward is carried out by two to three generations of monarchs, concluding in the fall. But the story does not end there.

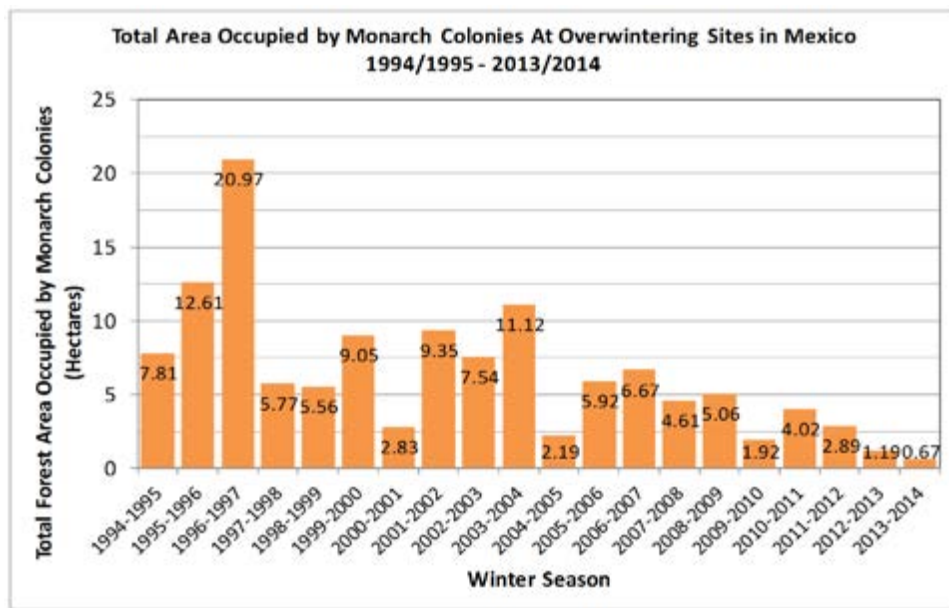
Something remarkable happens after the northward migration. The generation following the northward-bound butterflies can live up to nine months. This group, triggered by dropping temperatures, shorter day length and fewer food sources, begins its migration toward central Mexico without stopping to breed. They travel up to 3,000 miles to reach their overwintering sites, which they return to year after year.

At the overwintering sites, the butterflies would cluster into dense colonies on tree branches and trunks. Their numbers are so dense that rather than counting individuals, scientists estimate population numbers by the number of hectares the butterflies occupy. Previous studies have indicated that one hectare can house 50 million butterflies.

After spending a few months in the wintering sites where the climate is more tolerable, this generation would migrate back toward northern Mexico and southern United States. Here they would breed and allow the next generation to begin another life cycle once again.

Although not as plentiful in population numbers as the eastern population or a migratory route quite as long, the western population of monarchs follows a similar pattern with the overwintering sites in coastal California. Numbering into the hundreds of thousands in California, wintering monarchs can be viewed locally at several locations including Ardenwood Historic Farm in Newark, Monarch Bay Golf Course in San Leandro, and the Monarch Grove Sanctuary in Pacific Grove. Historically, the butterflies would winter in native forests but over time, due to deforestation and the introduction of eucalyptus trees, the monarchs now mostly cluster in eucalyptus trees at these sites.

Given the long journey, the numerous habitats they pass through, and their dependence on the overwintering sites to complete their life cycle, the monarch butterflies rely on several variables for their survival. Monitoring by scientists, volunteers, and conservation organizations have indicated that both eastern and western monarch populations have been declining for quite some time. In fact, 2014 had the lowest number of monarchs ever recorded. This prompted the Center for Biological Diversity, the Center for Food Safety, the Xerces Society for Invertebrate Conservation



Graph: Courtesy of Monarch Joint Venture Data provided by World Wildlife Fund - Mexico

and Dr. Lincoln Brower to petition the US Fish and Wildlife Service to list a subspecies of monarch (*Danaus plexippus plexippus*) under the Endangered Species Act. The US Fish and Wildlife Service has agreed to review information submitted to them by March 2, 2015 to see if the species warrants special protection. More information about the process and the type of information they are seeking can be found at www.regulations.gov docket number FWS-R3-ES-2014-0056.

Factors that may be influencing the monarch population include the decline of milkweed plants in vital areas. The decline may be caused by the use of herbicides to protect crops and the invasion of nonnative species. An invasive species called the swallow-wort has found its way into the breeding areas of the eastern population. This species is similar to milkweed and will attract female butterflies to lay its eggs on it. However, the caterpillar cannot develop properly when it eats the leaves.

The loss of overwintering habitat is also a threat with forests being cut down for agriculture. Climate change is an issue. Extreme winter storms and record high temperatures can have a major impact on

monarch numbers. And, vehicle collisions and diseases may also play a role in declining populations.

It may seem unrealistic to bring monarch population numbers to the levels seen in 1997, but there are several things we, as individuals, can do to help stabilize and increase monarch numbers. Not only do monarchs bring pleasure to many people, they also play a role in maintaining a healthy ecosystem by providing their pollination services.

To help the monarchs, use care when utilizing pesticides that can harm native plants and insects. Be mindful of the type of plants you grow in your garden by avoiding nonnative or invasive species. Better yet, create a butterfly garden in your yard or community by planting milkweed native to your area and other native flowering plants. Don Edwards National Wildlife Refuge will be distributing free narrow leaf milkweed seeds, while supplies last, provided by the Pacific Grove Natural Museum at two of its programs: Bring Back the Monarchs on March 21 and Plants for Wildlife talks on April 26 as part of the Bringing Back the Natives tour. See activity section for details.

You can also become a citizen scientist and volunteer and help monitor monarchs in your neighborhood. The Monarch Joint Venture web site and Monarch Watch have a great deal of information about the butterfly and several tips on how to protect the species. See the list of resources for web site addresses.

References and Resources:

Monarch Joint Venture:

<http://monarchjointventure.org>

Monarch Watch: <http://monarchwatch.org/>

North American Monarch

Conservation Plan

US Fish and Wildlife Service:

[http://www.fws.gov/refuges/news/](http://www.fws.gov/refuges/news/MonarchButterfliesTrouble.html)

[MonarchButterfliesTrouble.html](http://www.fws.gov/refuges/news/MonarchButterfliesTrouble.html)

US Forest Service: http://www.fs.fed.us/wildflowers/pollinators/Monarch_Butterfly/index.shtml

The Wild Center: <http://bit.ly/1x6w9UL>

Carmen Minch is the Outdoor Recreation Planner for San Francisco Bay National Wildlife Refuge Complex and Editor of Tideline. A special thank you to Wendy Caldwell from Monarch Joint Venture for providing additional information about monarchs.

Make Your Voice Heard

Recently I joined more than a hundred of our partners and advocates to watch the bay waters rush into the Cullinan Ranch Unit of the San Pablo Bay National Wildlife Refuge for the first time in over a hundred years. The levee that had diked off the area from adjacent slough channels since the late 1880s was breached to allow Nature to reclaim 1,200 acres and restore it back to tidal marsh habitat. This was the culmination of two decades of hard work and determination by many of those watching with me. Standing there, I reflected on how simple it seemed for the excavator to just scoop out several buckets of dirt and mud and let the waters in, quipping “Can’t we just sneak out under the cover of night and do this elsewhere?!” But in all seriousness, there are many good reasons why it takes us so long to reach this milestone in all our restoration projects.

One of the most important is complying with the National Environmental Policy Act (NEPA). NEPA was signed into law on January 1, 1970 and was the first major environmental law in the United States. Its

purpose is to “encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and ... to enrich the understanding of the ecological systems and natural resources important to the Nation...”

Even though habitat restoration is inherently good for the environment, NEPA directs us to conduct a deliberate decision-making process that ensures consideration of best available information, development of alternative actions, and a thorough evaluation of impacts in order to avoid unintended consequences that might harm the environment.

At the core of NEPA is public participation. Citizens have an essential role in the NEPA process in helping identify what issues should be addressed, providing pertinent information to decision makers, and commenting on the findings in an agency’s Environmental Assessments (EA)

or Impact Statements (EIS). I encourage you to participate in the NEPA process, either individually or as a member of one of the many conservation organizations that actively support habitat restoration efforts in the Bay Area. Your participation has several



potential benefits, such as increasing your understanding of proposed management actions, and helping us identify the best alternatives for achieving restoration goals. You will have an opportunity to review and comment on the forthcoming South Bay Salt Pond Restoration Project’s Phase 2 Draft EIS/EIR. Check the project website at www.southbayrestoration.org for updates. Make your voice be heard!

Come and join us!
Celebrate Earth Day!
 at
 Don Edwards San Francisco Bay
 National Wildlife Refuge
April 18, 2015
9:00 a.m-12:00 p.m

Join us at Ravenswood Point in Menlo Park for our annual Earth Day Cleanup. Help protect the wildlife and environment while enjoying the beautiful Bay view. Gloves and trashbags provided. Children welcome, and must be accompanied by an adult.

RSVP at www.safesfbay.org
 Contact joseph_garcia@fws.gov
 or call 510-792-0222 ext 141 for more information

Photo by Gregg Aronson

Litterati Art Exhibit Opening Reception

Rescheduled from February 13, 2015

Environmental Education Center, Alviso

Trash is everywhere. Soda cans, plastic bags, and cigarette butts litter the environment, choke wildlife, and threaten our planet. By combining technology, social awareness and art, the Litterati is tackling this ever-escalating problem one piece of litter at a time.



Tuesday, April 21, 6:30 pm-8:30 pm

FREE Admission with complimentary refreshments

Provided by the San Francisco Bay Wildlife Society

Space is limited, please register at: <http://litteratieec.eventbrite.com>

This planet we call home is a big place to keep clean. We all need to play our part.

Join the Litterati. www.litterati.org

2015 Annual South Bay **BIRD FEST** Saturday May 16, 12-3 PM

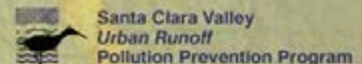
▶▶▶ *Restoring the Habitat for Birds*

Come experience the **LARGEST** Tidal Wetland Restoration Project
on the West Coast!!

Where: The Don Edwards San Francisco Bay
National Wildlife Refuge
Environmental Education Center
1751 Grand Blvd., Alviso (North San Jose)

Live Bird Show ♦ Games ♦ Crafts ♦ Hands-on Activities
Face Painting ♦ Guided Bird Walks
And Much More!!

▶▶▶ **FREE ADMISSION** ◀◀◀



For more information: http://fws.gov/refuge/don_edwards_san_francisco_bay

The Art of Social Attraction

By Cheryl Strong, *Refuge Biologist*

Efforts are currently underway to create habitat for colonially nesting waterbirds in the South San Francisco Bay. In the 1980s, the South SF Bay area was home to a half dozen colonies of nesting Caspian Terns, numbering in the thousands of birds. However, these numbers have declined sharply in the past few decades. Currently, the South Bay hosts only two small colonies of Caspian Terns with approximately 40 nests each.

Possibly hampering the growth of these existing colonies is the fact that tern nesting sites are now located within the much larger California Gull colonies – a species that is much larger and is more aggressive than the terns. California Gulls will eat the chicks of other species, making a Caspian Tern comeback difficult without some assistance. Together with the US Army Corps of Engineers and the US Fish and Wildlife Migratory Bird Office, the Don Edwards Refuge is attempting to bring back Caspian Tern nesting populations closer to levels of the 1980s.

Encouraging colonially nesting waterbirds to use new habitat is not always as simple as the popular quote from *Field of Dreams* “If you build it, they will come.” Colonial waterbirds not only have specific habitat features required to build their nests, they are also, by definition, very social and are attracted to groups of their own or similar species. Creating habitat is only one part of the equation. To lure the birds to use it is the other part.

One method of luring the birds to a site is known as social attraction. It has been successfully used on a number of species and projects including the Common Murre Restoration Project off the California coast near Pacifica. Social attraction has also been used to lure birds away from inappropriate or dangerous nesting sites and into more suitable areas. Because many birds are strongly attracted to the place where they were born, or to where they have had successful nests in the past, it is important to get it right when creating new habitat.

To those who witness social attraction techniques without any context may liken the methods as an odd wildlife experiment. Polyethylene Caspian Tern decoys are strategically placed on islands while a

battery-powered sound system nearby broadcast tern calls to attract the birds to the islands. This method has been proven effective on Devil’s Slide Rock where thousands of Common Murres were once extirpated from their traditional breeding area due to an oil spill. The method was so effective that the number of breeding pairs that returned to the rock was a few years ahead of the management plan’s schedule. We hope the same will happen for the Caspian Terns.

But first, the appropriate habitat must be created. In December of 2014, contractors brought in rock to pond A16, by the Mallard Slough Trail near the Environmental Education Center in Alviso. Small, pea-gravel sized material was spread on top of the islands in order to create a more appealing substrate on which to nest. Caspian Terns nest on the ground and create a “scrape” to lay their eggs in. The ground needs to be un-vegetated. They also prefer sand or small rock instead of bare dirt.

The edges of the islands were also reinforced with larger rocks in order to prevent erosion of the islands. Two islands were enhanced for Caspian Terns at pond A16.

Although this project was originally for the benefit of Caspian Terns, we are also enhancing one of the islands specifically for Western Snowy Plovers. Because of the sensitive nature of this threatened species we wanted to make certain there would be no conflicts with Western Snowy Plovers showing up on the Caspian Tern islands. Terns are strict fish-eaters, but may become aggressive to plovers if they nested too close to Caspian Tern nests. A similar process will take place on islands in pond SF2, on the southwest end of the Dumbarton Bridge where three islands will be enhanced for Caspian Terns and one for Western Snowy Plovers.

After the rock placement is complete, researchers from US Geological Survey and refuge staff will place Caspian Tern decoys on each of the islands followed by the sound



*Top: Rocks are being hauled out to the islands. Photo: Cheryl Strong/FWS
Bottom: Caspian Tern with fish. Photo Michael Lufting*

system. Throughout the nesting season (March through August), researchers will be monitoring the success of this project to determine if Caspian Terns and Western Snowy Plovers have found the site and are using it.

Other species may also nest on these islands, including Forster’s Terns and American Avocets. All of these species co-nest in other places, and we look forward to having all of them raising their young on these newly improved islands.



Owl Clover, Downingia, and Contra Costa Goldfields by Alex Baranda

Don Edwards San Francisco Bay National Wildlife Refuge

Free Vernal Pool Wildflower Tours in Fremont

April 17 and 18, 2015

10:00 a.m. – 12:00 p.m. and 1:00 p.m. – 3:00 p.m. on both days

Sign up for a special tour at the Warm Springs Unit to see wildflower blooms in some of the last intact vernal pools in the East Bay. This unit of the Don Edwards Refuge is normally closed to the public.

Visitors will enjoy learning about the unique features of vernal pool grasslands and about the endangered species supported by this habitat

Space is extremely limited and reservations are required.
Register at <http://DonEdwardsWarmSpring.eventbrite.com> or call 510-792-0222 ext. 135 and ask for Scott. Directions will be emailed after registration.

Volunteer Opportunities: Spring 2015

Don Edwards San Francisco Bay National Wildlife Refuge Environmental Education Center (Alviso, California)

If you have an interest in wildlife and their conservation, enjoy working with people, and are enthusiastic and dependable, the Environmental Education Center's Volunteer Program is for you! As a volunteer, you'll receive on-the-job training from staff and other volunteers in the project area you choose. Project areas are: restoration projects, information desk on weekends, interpretive programs, school field trips, and citizen science/community service.

Upcoming Volunteer Orientations for Spring

Volunteer orientations will meet in the auditorium of the Environmental Education Center in Alviso, 11 a.m. to noon.

Tuesday, February 10

Tuesday, March 10

Saturday, April 11

Sunday, May 3

Saturday, February 28

Sunday, March 22

Tuesday, April 14

Tuesday, May 26

Volunteer Requirements: attend a volunteer orientation; attend the scheduled trainings; meet the age requirements for the program. Volunteer Applications provided at Orientation.

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 1, 2014 and December 31, 2014. These gifts will be used for publishing *Tideline*, capital, environmental education, habitat restoration, and interpretive programs at the Don Edwards San Francisco Bay National Wildlife Refuge.

Employer Matching Gift Program

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Help Us Help the Refuge

Mail your donation to: San Francisco Bay Wildlife Society, P.O. Box 234, Newark, CA 94560.

You may also become a member at www.sfbws.com.

San Francisco Bay Wildlife Society is a not-for-profit 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*. Enclosed is my contribution of:

- \$20 Student/Senior \$50 Family \$100 Participant \$200 Corporation \$500 Sustainer
 \$35 Individual \$75 Supporter \$250 Sponsor \$1,000 Leader

Check For credit card payment, please use PayPal at www.sfbws.com/donate.

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Name _____

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Thank you for your support!

A Message From the San Francisco Bay Wildlife Society

The San Francisco Bay National Wildlife Refuge Complex and the San Francisco Bay Wildlife Society (SFBWS) have a long-term partnership relationship dating back to 1987. Beginning with a bookstore and financial support for projects like remodeling the Fremont pump house into a classroom, SFBWS over the decades continued to fund activities like summer camps and outfit environmental education programs with microscopes, binoculars, and publications at both the Environmental Education Center (EEC) and Fremont Headquarters. We spearheaded a fund raising campaign to build the EEC Boardwalk and worked with Fish and Wildlife Service (FWS) on many more projects, notably funding the Refuge Complex's quarterly newsletter *Tideline* since its inception. Since 1992, SFBWS has managed employees that support the Watershed Watchers Program funded by the Santa Clara Valley Urban Runoff Pollution Prevention Program and

the Living Wetlands Program funded by the City of San Jose.

The partnership with FWS has been a strong one. Driven by changes in FWS laws and policies, SFBWS's relationship will be changing over the next few months.

SFBWS is moving from a cooperating association footing to that of a Friends organization. This change has had one noticeable impact already. Bookstore operations are on hiatus at both the Fremont and Alviso locations, the reason being that only Friends organization volunteers, and not FWS volunteers, can handle monies for these kinds of fund raising activities. The transition from being a cooperating association to a Friends organization will take time and we are not yet set up for that management.

Going forward, the SFBWS will continue to support the Refuge Complex overall, with a focus on the Don Edwards San Francisco Bay NWR and Refuge Complex-level programs. Primary outputs

will include but not be limited to education and interpretive programs funded through grants, partnership agreements, donations from individuals, corporations, government agencies, and other not-for-profit groups. Partnership aims will be to increase stewardship of refuge resources, to support the Refuge Complex's volunteer program, to assist with the conservation of wildlife habitat, and to support wildlife-dependent recreation opportunities.

As the SFBWS and FWS continue to finalize the new Friends agreement that will govern our relationship, we will become an even stronger partner in supporting the vision and mission of the San Francisco Bay National Wildlife Refuge Complex as well as our own mission.

We welcome your inputs on these changes. Email Ceal.Craig@SFBWS.com
Cecilia (Ceal) D. Craig, PhD
President, SFBWS Board of Directors

Bringing Back the Native Garden Tour May 3, 2015

Registration is now open for the free Bringing Back the Natives Garden Tour which will take place Sunday, May 3, 2015 from 10:00 – 5:00 at various locations throughout Alameda and Contra Costa counties. Participants on the 11th annual, free, self-guided Bringing Back the Natives Garden Tour can choose from 30 showcase

than 40 talks will be offered throughout the day at various locations. Although the event is free, registration is required. Registration will close on April 23 or when the tour is full, whichever comes first.

As a preview to the tour, the Don Edwards San Francisco Bay National Wildlife Refuge will be having two talks

on April 26 about how native plants can attract wildlife to your yard. The talks will include a short walk. We will meet at the Visitor Center in Fremont located 2 Marshlands Rd. These 1-hour talks and walks begin at 11 a.m. and at 1 p.m. Participants will receive a free packet of narrow leaf milkweed seeds while supplies last.

Visit the Bringing Back the Natives website at [http://bringingback-](http://bringingbackthenatives.net)

[thenatives.net](http://bringingbackthenatives.net) to register and to find a host of resources in native plant gardening. Photographs, native plant nurseries, native plant sales, and workshops are all listed on this website.



Ladybug on Aster chilensis. Photo: Kathy Kramer

native plant gardens. Participants will have the opportunity to learn how to select and care for California native plants, lower their water bills, design a low-maintenance garden, attract butterflies, birds, and bees, and garden without using pesticides. More

Event: Planting for Wildlife Talks and Walks at Don Edwards Refuge

Where: 2 Marshlands Rd, Fremont

When: April 26, 2015

Time: 11:00 a.m. and 1:00 p.m.

Cost: Free. Participants receive a free packet of milkweed seeds while supplies last. No registration required.

Event: Bringing Back the Natives Garden Tour

<http://bringingbackthenatives.net>

When: Sunday, May 3, 2015

Where: This award-winning, self-guided tour showcases 30 beautiful Alameda and Contra Costa county gardens that are pesticide-free, require minimal watering, provide habitat for wildlife, and contain 60 percent or more native plants. Garden addresses are mailed to registrants in April.

Cost: Free. Registration will close when the tour reaches capacity, or on April 23, whichever comes first.

Spring Activity Schedule

Children under the age of 16 must be accompanied by an adult.

*Trails are generally level.
Surface and trail conditions vary.
Please call for accessibility information.

March

Saturday, March 7

*Nature Walk for Health



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

Take a break from your busy schedule and refresh your spirit with nature at the refuge. Take a guided nature walk on the Tidelands Trail and hear what makes this National Wildlife Refuge unique. The 1.3-mile walk traverses through endangered species habitat and offers great views of south San Francisco Bay. Meet in front of the Visitor Center.

Fossils and Flumes

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

Fossils and Flumes help teach children about the South Bay Salt Ponds Restoration Project. Park Ranger Jose Garcia brings fossils from Triassic wetlands he collected in eastern Montana to show the similarities to wetlands today. We'll learn what their function is in nature. Interactive flumes allow for a hands-on experience of how wetlands protect the surrounding area from flooding. REGISTRATION REQUIRED. Go to <http://feec.eventbrite.com> or call 510-792-0222 ext. 141.

Twilight Marsh Walk

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

Experience the salt marsh at twilight on an easy stroll along Tidelands (1.3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Not suitable for young children. Register at <http://twilightspring.eventbrite.com> or call 510-792-0222 ext. 362.

Sunday, March 8

*Bird Watching for Beginners

Visitor Center, Fremont
9:00 a.m. – 10:30 a.m.

Thousands of birds winter on the Don Edwards Refuge every year. In this beginner's program, we will go over the use of binoculars, how to use a bird guide, and identify the birds we see on the trail. Recommended for ages 10 and up. Dress for the weather and wear comfortable shoes. Heavy rain cancels. Led by Carmen Minch.

*Tiny Drifters

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

There's plankton in our Bay! Learn about the different characteristics of plankton and how they have adapted to survive. We will become planktologists for a day, collect water samples and identify these incredible organisms under a microscope. All ages are welcome. Register at <http://eectinydrifters.eventbrite.com>.

*A Taste of the Refuge

Visitor Center, Fremont
2:00 p.m. - 3:30 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, March 14

Intro to Wildlife Illustration

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

Learn the basics of wildlife illustration with an introduction to techniques and local wildlife, then practice your new skills observing wildlife and creating drawings out in the field. Binoculars, clipboards, paper and pencils will be provided; artists are also welcome to bring their own materials. Be prepared to go outdoors. Recommended for ages 9-12, all skill levels are welcome. Children, please bring an adult with you. RESERVATIONS REQUIRED. Register at <http://wildlifeillustration.eventbrite.com> or call Carolyn at 510-792-0222 ext. 362.

Team Citizen Scientists! – Community Service

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

Become a citizen scientist! Learn how to monitor plants and animals while contributing to climate change research. RESERVATIONS REQUIRED. Go to <http://tcseec.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

*Family Bird Walk

Visitor Center, Fremont
2:00 p.m. – 4:00 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. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Go to <http://familybirdspring.eventbrite.com> or call 510-792-0222 ext. 362.

Sunday, March 15

Pacific Flyway

SF2 Trailhead in Menlo Park
11:30 a.m. – 1:00 p.m.

Our wetlands are an important stop on the Pacific Flyway, a major bird migration route. Stroll with docent Laurel Stell to learn why birds migrate, why they stop along the San Francisco Bay, and to spot the birds in action. Trail is easy and level. All ages and abilities welcome. Meet at the SF2 trail parking area on the west side of the Dumbarton Bridge. REGISTRATION REQUIRED. Go to <http://flyaway.eventbrite.com> or call 510-792-0222 ext. 141 for more information and directions.

Story Hunters

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

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. After a brief introduction on how to use our GPS units, we'll give you a set of coordinates that will lead you to the landmarks that embody the rich human history that helped shaped refuge lands. GPS units are available for loan. Register at <http://donedwardsstory.eventbrite.com> or call 510-792-0222 ext. 362.

Saturday, March 21

Living Wetlands

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

Our refuge consists of salt marsh, salt ponds, and tidal and non-tidal sloughs. How do humans and wildlife depend on our wetlands? How does the marsh affect a seafood dinner at your favorite restaurant? The answers can be found by enjoying a slideshow depicting the life and death struggles of our marsh inhabitants. Best suited for ages 7 and up. Led by Ed Kantack. RESERVATIONS REQUIRED. Go to <http://livingwet.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Bring Back the Monarchs!

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

The North American monarch butterfly and its phenomenal migration are in trouble, but we can help! The Fish and Wildlife Service is developing monarch habitat by seeding and planting milkweed. Milkweed is the host plant for monarchs—the lone plant on which the butterflies lay their eggs in spring and the only food source for monarch larvae. Come to the refuge to learn all about monarchs and get a little dirty helping to make a home for them. RESERVATIONS REQUIRED. Go to <http://monarchs.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Sunday, March 22

*Ohlone in the Marshes – Tule Boats

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

How did the people who lived here 10,000 years ago travel from place to place in the water world that once was San Francisco Bay? By boat, of course. Join us on a short walk to view the raw materials used by the Ohlone in boat making. Then, using natural materials, we will make small replicas of their boats to take home. Very appropriate for children 8 and up who are accompanied by an interested adult participant. Program led by Laura Mello and Aja Yee. Register at <http://eecohlonetuleboats.eventbrite.com>

Sunday, March 29

*Monster Bacteria and Other Suspicious Critters

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

Come explore the salt marsh's hidden inhabitants. See monster bacteria, some of whom love rotten eggs. There are more of them than us. What makes the air we breathe? Microbial biologist Wayne Lanier knows. Join him for a short hike where we will use field microscopes to dive down into a tiny world, an ecology hidden from view. Don't miss this unique opportunity to see the marsh closer than you ever have before! Dress warmly. Ages 8 to 80 years. Register at <http://monsterbacteria.eventbrite.com> or call 510-792-0222 ext. 362.

*Salt Marsh Walk

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

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat, and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Register at <http://marshwalk.eventbrite.com> or call 510-792-0222 ext. 362.

April

Saturday, April 4



*Nature Walk for Health

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

Take a break from your busy schedule and refresh your spirit with nature at the refuge. Take a guided nature walk on the Tidelands Trail and hear what makes this National Wildlife Refuge unique. The 1.3-mile walk traverses through endangered species habitat and offers great views of south San Francisco Bay. Meet in front of the Visitor Center.

A Walk 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. Using a collection of old photographs, the last vestiges of a way of life such as salt production, the old railroads, and homes can be traced back to the 1850s that led to the construction of the town of Newark in 1876.

Water, Water, Everywhere

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

How much water is there and where does it come from? Where does it go? How much of the Earth's water supply can we use? Learn about the water cycle and watersheds. Build a model of a watershed and see if you can predict where the water will go. Open to all ages but best suited for third grade and up. Led by Ed Kantack. RESERVATIONS REQUIRED. Go to <http://waterwatereec.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Twilight Marsh Walk

Visitor Center, Fremont
6:30 p.m. – 8:00 p.m.

Experience the salt marsh at twilight on an easy stroll along Tidelands (1.3 mile) Trail. At the setting of the sun we will observe the beginning of nature's night shift. Come discover the sights, sounds, and smells of the refuge as night descends. Not suitable for young children. RESERVATIONS REQUIRED. Go to <http://twilightspring.eventbrite.com> or call 510-792-0222 ext 362. Led by Mary and Gene Bobik.

Sunday, April 5

*Life at the Bottom of the Food Chain

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

Wetlands microbes are often called "the lungs of the earth." Explore the dynamics of microbial communities in LaRiviere Marsh ponds. Join microbiologist Wayne Lanier, PhD for a brief presentation; then a microscope hike and view the most ancient creatures on earth. See how they produce the oxygen we breathe and take up the carbon dioxide we produce. Easy short hiking level. Ages 9-90 years. Register at <http://donedwardsfoodchain.eventbrite.com> or call 510-792-0222 ext. 362.

The Science of Seasons – Help Document Climate Change!

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

Become part of the scientific community and help scientists gather data on how the climate is changing. A presentation will be given about the importance of gathering data, how plants can be an indicator of climate change, and how to take measurements of Don Edwards Refuge plants to be uploaded onto the Nature's Notebook website. Over time, the information you provide can be used by refuge managers to manage land more effectively. To register for this free workshop, go to <https://donedwardsphenology.eventbrite.com> or call 510-792-0222 ext. 362. Led by Carmen Minch.

Returning the Tide at San Pablo Bay NWR

Cullinan Ranch Trail, San Pablo Bay NWR
3:00 p.m. – 4:30 p.m.

After 100 years, the Cullinan Ranch Unit of San Pablo Bay National Wildlife Refuge is now receiving tidal flow from the bay. The levee breach has brought back an incredible number of water birds in the winter. Will spring do the same? Hear what the refuge hopes to accomplish with the restoration. Led by Carmen Minch. Parking spaces are limited. Please carpool. Register at <https://returningtide.eventbrite.com>. Access to the trailhead can only be accessed from westbound State Route 37. Just after passing Walnut Avenue at Mare Island, travel 3.3 miles west to the Pond 1 Cullinan Ranch turn-off where a large wooden kiosk is located. There is a small parking lot.

Saturday, April 11

Community Service

Visitor Center, Fremont
9:30 a.m. – 12:00 p.m.

If you are interested in improving the refuge for visitors and for wildlife alike, join us at the Visitor Center for a community service project. We will do either a trash cleanup or a planting/weeding project. Dress appropriately for the task and for the weather. We will have gloves to lend and will provide the tools. Bring your own water bottle. Meet in the parking lot at the Visitor Center. Driving an additional 2.5 miles may be required since the project may be at a different location. For more information, or to make reservations, call 510-792-0222 ext. 361.

Plankton Lab

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

There are millions of tiny organisms drifting in our bay and sloughs. Learn about the different characteristics of plankton and how they have adapted to survive. We

will collect water samples and identify these incredible organisms under a microscope. All ages are welcome. Register at <http://donedwardsplankton.eventbrite.com> or call Carolyn at 510-792-0222 ext. 362.

Sunday, April 12

Insect Exploration

Environmental Education Center, Alviso
10:30 a.m. – 12:00 p.m.

Insects have been on this Earth for hundreds of millions of years. Come learn about the many different insects that call the San Francisco Bay Area their home. We will examine insects and learn how they've adapted to survive. Join us as we dig in the dirt and crawl through the plants in search for our six-legged friends. Be prepared to get dirty. Open to all ages, but best suited for ages 5 and up. Register at <http://eeceexploreinsects.eventbrite.com>.

Pacific Flyway

SF2 Trailhead in Menlo Park
11:30 a.m. – 1:00 p.m.

Our wetlands are an important stop on the Pacific Flyway, a major bird migration route. Stroll with docent Laurel Stell to learn why birds migrate, why they stop along the San Francisco Bay, and to spot the birds in action. Trail is easy and level. All ages and abilities welcome. Meet at the SF2 trail parking area on the west side of the Dumbarton Bridge. REGISTRATION REQUIRED. Go to <http://flyaway2.eventbrite.com> or call 510-792-0222 ext. 141 for more information and directions.

Story Hunters

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

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. After a brief introduction on how to use our GPS units, we'll give you a new set of coordinates that will lead you to the landmarks that embody the rich human history that helped shaped refuge lands. GPS units are available for loan. Register at <http://donedwardsstory.eventbrite.com> or call 510-792-0222 ext. 362.

Friday, April 17

Warm Springs Tour

Warm Springs Unit, Fremont
10:00 a.m. – 12:00 p.m. or 1:00 p.m. – 3:00 p.m.

Come see the wildflower blooms around some of the last intact vernal pools in the East Bay! Visitors will enjoy learning about the unique features of a vernal pool grassland and about the endangered species supported by this habitat, particularly the beautiful endangered Contra Costa goldfield. Space is extremely limited and reservations are required. Register at <http://DonEdwardsWarmSpring.eventbrite.com> or call 510-792-0222 ext. 135 and ask for Scott. There are no restroom facilities at the site. Driving directions will be emailed once registered.

Saturday, April 18

Earth Day Service Day

Ravenswood Point, Menlo Park
9:00 a.m. – 12:00 p.m.

Help protect wildlife! Join the refuge and Save the Bay for our annual Earth Day Service Day. For more information, call 510-792-0222 ext. 141. RESERVATIONS ARE REQUIRED. Please reserve your spot through www.savesfbay.org. Minors must be accompanied by an adult.

Spring Activity Schedule

Children under the age of 16 must be accompanied by an adult.

*Trails are generally level.
Surface and trail conditions vary.
Please call for accessibility information.

Saturday, April 18

*Marshlands of Dreams

Visitor Center, Fremont
9:30 a.m. – 10:30 a.m.

Join Paul Mueller on a 1-mile walk of the LaRiviere Marsh Trail to find traces of the past. Prior to marsh restoration, learn how Californians utilized the area for farming, quarrying, salt production, and transportation.

Going Native Garden's - Walking Tour

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

This garden was established to provide habitat for songbirds and butterflies, and to demonstrate herbicide-free gardening for wildlife using beautiful California native plants. It contains mature specimens of Ceanothus, fuchsia-flowered gooseberry, pink flowering currant, and black sage in a natural setting. Among trees, look for California buckeye, western sycamore, Fremont cottonwood, and alder. Join us for a walk and talk. RESERVATIONS REQUIRED. Go to: <http://gngteec.eventbrite.com> Questions? Call Julie at 408-262-5513 ext.104.

Warm Springs Tour

Warm Springs Unit, Fremont
10:00 a.m. – 12:00 p.m.
1:00 p.m. – 3:00 p.m.

See April 17 for program description.

Wildflower Drawing for Families and Adults

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

Come and draw wildflowers. Increase your confidence in drawing and learn skills to help you draw what you see. We will begin inside with some exercises designed to help you learn more about flowers while learning to draw lifelike representations. We will then go outdoors, weather permitting, and draw flowers in the wildflower garden. In case of rain, we will bring some wildflowers inside. We will provide materials, but feel free to bring your own sketch pad and pencils or watercolors if you have them. Appropriate for ages 8 to adult. Children, please bring an adult with you who would like to participate. Adults without children are welcome as well. All skill levels welcome. RESERVATIONS REQUIRED. Go to <http://wildflowerrec.eventbrite.com>. Questions? Call Julie 408-262-5513 ext.104.

Earth Day Community Service – Bring back the Monarchs!

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

The North American monarch butterfly and its phenomenal migration are in trouble, but we can help! The Fish and Wildlife Service is developing monarch habitat by seeding and planting milkweed. Milkweed is the host plant for monarchs—the lone plant on which the butterflies lay their eggs in spring and the only food source for monarch larvae. Come to the refuge to learn all about monarchs and get a little dirty helping to make a home for them. RESERVATIONS REQUIRED. Go to <http://monarch2.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Sunday, April 19

Nature Yoga

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

Enjoy the benefits of Yoga outdoors with great views of the salt marsh. Through story and postures, learn what attracted people and wildlife to the Bay. There will be a short hike to the site on top of the hill from the Visitor Center. Bring a yoga mat. A limited number of mats are available to borrow. Wear comfortable clothing. Consult with your doctor before participating. All ages and abilities welcome. Reservations are required. Register at <http://natureyogaspring.eventbrite.com> or call 510-792-0222 ext. 362. Led by Carmen Minch.

*Salt Marsh Walk

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

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Register at <http://marshwalk.eventbrite.com> or call 510-792-0222 ext. 362.

Geology Walk – Don Edward Refuge

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

Ever wonder what the dirt on the trail is made of, what the rocks are by the shore, and how wetlands are created? Join Jose Garcia at the refuge as he deconstructs the area around you and explains how geology influences the landscape. Discover how knowledge of geology helps rebuild wildlife habitat and provides flood protection for us all. Cameras welcome. Trail is 1.3 miles and family-friendly. Register at <https://geowalk.eventbrite.com> or call 510-792-0222 ext. 141.

Tuesday, April 21

Litterati Art Exhibit Opening Reception

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

Trash is everywhere. Soda cans, plastic bags, and cigarette butts litter the environment, choke wildlife, and threaten our planet. By combining technology, social awareness and art, the Litterati is tackling this ever-escalating problem one piece of litter at a time. Come find out how you can play

your part. RESERVATIONS REQUIRED. Go to: <http://litteratiyec.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Saturday, April 25

Photographing Salt Ponds

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

Find the magnificence in mud cracks, beauty in salt crystals, and of course birds! Join an interpretive walk to photograph the wildlife and wetlands in the South Bay Salt Pond Restoration Project. Learn and be a part of the history of wetland restoration. Seeing the area in a different way will increase your appreciation for its beauty, function, and role in the environment. Digital or film welcome. Led by Park Ranger Joseph Garcia. Register at <https://photosalt.eventbrite.com> or call 510-792-0222 ext. 141 for reservations.

Jr. Refuge Ranger Program - Fremont

Visitor Center, Fremont
1:00 p.m. - 2:30 p.m.

Become an honorary Jr. Refuge Ranger by completing activities on the refuge. We will guide you in some of the activities that will help you earn the Refuge Ranger Badge. The rest of the activities can be completed on your own. Those who complete the activities in the booklet for your age group will receive a Jr. Refuge Ranger button. Register at <http://fremontjranger.eventbrite.com> or call 510-792-0222 ext. 362.

5 Tools You Can Use to Find the Elusive Gray Fox

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

Do you sometimes see paw prints in mud or scat (poop) on the trails and assume that a dog left it? It could be from something else. Come along with me and I will show you how to distinguish and identify the markings of a gray fox. Gain some insights into the fox's nature and their behavior during the walk. By the time we are through, you will have a set of "tools" you can use to identify the presence of foxes in any area that you are in. Bring a hat, binoculars, and good walking shoes. Led by Bill Leikam, the Fox Guy.

Sunday, April 26

Bringing Back the Natives: Native Plant Gardening Talk

Visitor Center, Fremont
11:00 a.m. – 12:00 p.m. or 1:00 p.m. – 2:00 p.m.

The native plant garden at the Don Edwards San Francisco Bay National Wildlife Refuge demonstrates how native plants can attract wildlife and beautify your yard. Come for a short walk to view the types of plants that attract butterflies and birds. The walk will feature the garden in front of the Visitor's Center, and along parts of the Tidelands Trail, time permitting. All participants will receive a free packet of milkweed seeds while supplies last.

*Ohlone in the Marshes -Staves

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

Do you want to know more about the Native Americans that lived in the Bay Area before us? Come to the refuge to learn about some of the tools and games the Ohlone might have used. Play Ohlone games and take home your own customized staves. Best suited for ages 8 and up. Register at <http://eecohlonestaves.eventbrite.com>.

May

Saturday, May 2

*Nature Walk for Health

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

Take a break from your busy schedule and refresh your spirit with nature at the refuge. Take a guided nature walk on the Tidelands Trail and hear what makes this National Wildlife Refuge unique. The 1.3-mile walk traverses through endangered species habitat and offers great views of south San Francisco Bay. Meet in front of the Visitor Center.

Jr. Refuge Ranger Program - Alviso

Environmental Education Center, Alviso

11:00 a.m. – 12:30 p.m.

Become a Jr. Refuge Ranger! Our Jr. Refuge Ranger program is an introduction to the Don Edwards SF Bay National Wildlife Refuge from its wildlife to its plants. You'll taste pickleweed while you learn about endangered species. Jr. Refuge Rangers will participate in several fun hands-on activities in order to earn their badge at the end of the program. Dress in layers- we'll be going on a nature walk with volunteer and Brower Youth award winner Lynnea Shuck. Best suited for ages 8-11. RESERVATIONS REQUIRED. Go to <http://rangerspring.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

*Habitats, Etc.

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

What is a habitat besides a place to live? Come and explore our wetland habitats and find out what creatures like to call these places home. This outdoor activity may be moved inside if we experience inclement weather. Led by Ed Kantack. RESERVATIONS REQUIRED. Go to <http://eehabitats.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

Sunday, May 3

*A Taste of 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, May 9

*Marshlands of Dreams

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

Join Paul Mueller on a 1-mile walk of the LaRiviere Marsh Trail to find traces of the past. Prior to marsh restoration, learn how Californians utilized the area for farming, quarrying, salt production, and transportation.

*Climate Change Challenges and the Restoration Project

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

Climate Change is worldwide, affecting wildlife biodiversity, habitats, and our urban centers. The South Bay Salt Pond Restoration Project is currently facing these global challenges right here

in the Bay Area. How will the future affect this urban refuge? How is the refuge managing the Restoration Project to meet these changes? Join Park Ranger Joseph Garcia on a walk and a lecture about how the restoration plans to meet the global challenges in our area. REGISTRATION REQUIRED. Go to <http://climateeec.eventbrite.com> or call 510-792-0222 ext. 141 for more information.

Twilight Marsh Walk

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

See April 4 for program description.

Sunday, May 10

*Mother's Day Wetlands Tour and Bird Watching

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

Come join us for a special Mother's Day wetlands walking tour and bird watching. This will be a great way to spend time with family and also learn about many local and migratory birds. Borrow binoculars and take a walk to try out your new skills. All ages welcome. Register at <http://eeemothersday.eventbrite.com>.

*Salt Marsh Walk

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

Take a walk with docent Gregg Aronson around the wetlands of the wildlife refuge and learn about their history. See examples of salt collection ponds and learn what is being done to convert them back to their original, natural salt marsh state. Hear how wildlife is affected by the two types of habitat and why it is important to control the rate of conversion from salt ponds back to the salt marshes. Binoculars and/or a camera are recommended. Go to <http://marshwalk.eventbrite.com> or call 510-792-0222 ext. 362.

Saturday, May 16

A Walk Back in Time

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

See April 4 for program description.

2015 Annual SOUTH BAY BIRD FEST!

Environmental Education Center, Alviso
12:00 p.m. – 3:00 p.m.

This year's theme is Restoring the Habitat for Birds. What better place to witness this than on the refuge! Come experience the largest tidal wetland restoration project on the West Coast. Explore avian antics in a LIVE BIRD SHOW featuring bird behavior! Get up close and personal with real refuge birds and their habitats on the Flying Frenzy Expedition and learn how you can help birds. Everything is FREE! Fun for the whole family. No reservations necessary. Visit our website for directions. For more information contact Aja at 408-262-5513 ext. 102 or Julie at ext. 104.

Sunday, May 17

Story Hunters

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

Discover what stories lie hidden on the Don Edwards Refuge in this series by Art Garibaldi. After a brief introduction on how to use our GPS units, we'll give you a set of coordinates that will lead you to the landmarks that embody the rich human history

that helped shaped refuge lands. GPS units are available for loan. Register at <http://donedwardsstory.eventbrite.com> or call 510-792-0222 ext. 362.

Saturday, May 23

Community Service

Visitor Center, Fremont
9:30 a.m. – 12:00 p.m.

If you are interested in improving the refuge for visitors and for wildlife alike, join us at the Visitor Center for a community service project. We will do either a trash cleanup or a planting/weeding project. Dress appropriately for the task and for the weather. We will have gloves to lend and will provide the tools. Bring your own water bottle. Meet in the parking lot at the Visitor Center. Driving an additional 2.5 miles may be required since the project may be at a different location. For more information, or to make reservations, call 510-792-0222 ext. 361.

Habitat Under Construction Walk

San Pablo
Cullinan Ranch Unit, San Pablo Bay NWR
10:00 a.m. – 11:00 a.m.

Take a nature trail walk with Park Ranger Jose Garcia and learn about the Cullinan Ranch Unit at San Pablo Bay National Wildlife Refuge. Enjoy the abundant wildlife, and beautiful scenery. Cameras welcome. REGISTRATION REQUIRED. Go to <http://sanpablo.eventbrite.com> or call 510-792-0222 ext. 141 for driving directions.

*Family Bird Walk

Visitor Center, Fremont
2:00 p.m. – 4:00 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. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Go to <http://familybirdspring.eventbrite.com> or call 510-792-0222 ext. 362.

Saturday, May 30

5 Tools You Can Use to Find the Elusive Gray Fox

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

Do you sometimes see paw prints in mud or scat (poop) on the trails and assume that a dog left it? It could be from something else. Come along with me and I will show you how to distinguish and identify the markings of a gray fox. Gain some insights into the fox's nature and their behavior during the walk. By the time we are through, you will have a set of "tools" you can use to identify the presence of foxes in any area that you are in. Bring a hat, binoculars, and good walking shoes. Led by Bill Leikum, the Fox Guy.

Sunday, May 31

Nature Yoga

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

Enjoy the benefits of Yoga outdoors with great views of the salt marsh. Through story and postures, learn what attracted people and wildlife to the Bay. There will be a short hike to the site on top of the hill from the Visitor Center. Bring a yoga mat. A limited number of mats are available to borrow. Wear comfortable clothing. Consult with your doctor before participating. All ages and abilities welcome. Reservations are required. Register at <http://natureyogaspring.eventbrite.com> or call 510-792-0222 ext. 362. Led by Carmen Minch.

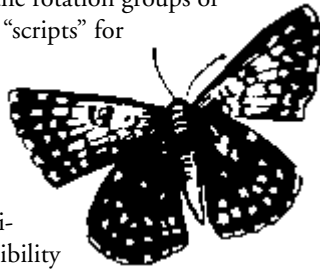
Field Trips to the Refuge

General Education Program Information

We offer FREE field trip programs at two sites at the Don Edwards San Francisco Bay National Wildlife Refuge. Wetland Round-Up field trip programs are offered at our Headquarters in Fremont, and Wetland Round-Up and Living Wetlands 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 the students. All programs have been correlated to the appropriate State of California Education Standards.

Educators and adult leaders conduct their own field trips after attending a Field Trip Workshop. The workshops allow you 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 Workshop. **New teachers must attend a Field Trip Workshop.**

Location of activities and trail conditions may vary. Please call for accessibility information.



Field Trips at Learning Center in Fremont

Wetland Round-Up Field Trips– Spring 2015 field trips are fully booked. Please contact us for more information.

Contact the Environmental Education Staff at Fremont:

Office: 510-792-0222 ext. 475

Cell: 510-377-7269

E-mail: tia_glagolev@fws.gov

Field Trips at the Environmental Education Center in Alviso

Wetland Round-Up Field Trip

Spring 2015 field trips are fully booked. Fall 2015 dates will be announced in August 2015. Please check our website in mid-August for more details.

http://www.fws.gov/refuge/Don_Edwards_San_Francisco_Bay/Field_trip_Programs.html

New Teachers that have not yet attended a field trip orientation must attend a training. The workshops are offered from 4 pm to 6:45 pm on weekdays in the fall.

We highly recommend that **returning teachers accompany Parent Leaders and Chaperones** to a workshop prior to your field trip. The workshops are offered from 4 pm to 6 pm on weekdays in the fall. The workshop dates will be announced on-line with the Field Trip Registration information.

For more information call the Environmental Education Staff at Alviso:

Office: 408-262-5513 ext. 100

Email: genie_moore@fws.gov

Living Wetlands Program

Living Wetlands provides a first-hand learning environment for students and educators to explore the topics of watershed health, wetlands, and habitat preservation. Activities and presentations focus on the relationship between personal habits and their effects on their local wetlands. Living Wetlands is an environmental education program offered at no cost through the cooperative efforts of the City of San Jose, U.S. Fish and Wildlife Service, and the San Francisco Bay Wildlife Society.

Educators are encouraged to contact us to discuss options for customizing field trips and classroom presentations. **Reservations for the Living Wetlands program are on a first-come basis. For more information, or to make a reservation, call Aja Yee, the Living Wetlands Program Coordinator at 408-262-5513 ext. 102 or email LivingWetlands@sfbws.com.**

Program Offerings:

5th – 12th grades: Integrated Field Trip Program – This program incorporates multiple activities related to wetlands and watershed health. Participating classes will receive one pre-classroom presentation from Living Wetlands educators, a field trip to the Don Edwards Refuge, and one post-classroom presentation all including hands-on activities and demonstrations. For the Integrated Program, participating classes must be from the following cities: San Jose, Alviso, Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino. There is a limitation to 60 students per field trip, and a 1:10 chaperone to student ratio is required.

5th – 12th grades: Classroom Presentations – Presentations include an in-depth look at the habitats of the south bay along with the pathways of indoor and outdoor water use. Students will have a better understanding of the role they play in the health of their watershed and what personal actions they can take to help. The presentation takes approximately one hour. Please contact us for specific classroom presentation needs.

Other Schools, Colleges, Universities, and related organizations: - Field Trip and Guided Tours – General presentations and guided tours are available, and generally last 1.5 hrs. in length.

Scout and Youth Group Programs

The Don Edwards San Francisco Bay National Wildlife Refuge offers free hands-on programs for youths. During the programs participants learn about endangered species, migratory birds, wetland habitats, and the relationship between personal habits and their effects on the San Francisco Bay. These programs are designed to meet badge/patch requirements of Scout Groups, but anyone can participate. Because of the popularity of such programs, reservations are required. Children under the age of 16 must be accompanied by an adult. **Badges are not provided.**

Below are the names, dates, and descriptions of the programs. Programs at the Environmental Education Center are sponsored by the Santa Clara Valley Urban Runoff Pollution Prevention Program and the San Francisco Bay Wildlife Society.

Youth Group Programs at the Environmental Education Center in Alviso

The Environmental Education Center offers three types of youth programs which are listed below. Email julie.kahrnoff@sfbws.com to schedule a date, and to customize your visit. *Note: Ratio of 1 adult per 5 children maximum. Space is limited to 20 people, including siblings. Once the program is full there will be a waiting list.*

*Webelos Naturalist Badge

Anyone out there need to earn a Naturalist badge? We've got the program that's right for Webelos! Learn about birds, migration, flyways, food chains, human impact, and the importance of wetlands. Then take a walk and use our binoculars to spot birds in the wild.

Daisies Journeys

Environmental Education Center, Alviso

Journeys: *5 flowers, 4 stories, 3 cheers for animals* (Sessions 1-6) *Between earth and sky* (Sessions 1-5)

Brownies Journeys and Badges

Environmental Education Center, Alviso

Journeys: *WOW! Watching our Water*: Without water, we cannot exist. Can you return the favor? On this journey, take action by discovering how to love water, save water, and share water. Badges: (from WOW badge activity set): *Household Elf*: make a natural cleaner, water log on ways to save water, trash clean up, discover natural filters. *Hiker*: go over trail map, leave no trace, detective hike with birds.

Juniors Journeys and Badges

Environmental Education Center, Alviso

Journeys: *Get Moving!* Are you prepared to use your energy to save the planet? On this Journey, find out how to reduce your energy use, make buildings energy efficient, and create a plan to fix an energy problem in your community. Badges (from Get Moving badge activity set): *Gardner*: outdoor garden, native plant garden design, seasonal plants, seeds and soil, plant own native plant to take home. Badges (from aMUSE badge activity set): *Animal Habitats*: puppet show, explore 5 different habitats, make bird house, learn about endangered wetlands and animals, help clean up.

Cadet Journeys

Environmental Education Center, Alviso

Breath (Sessions 1 & 3)

Happy Birthday Girl Scouts!

Saturday, March 14

Environmental Education Center, Alviso

3:00 p.m. – 4:00 p.m.

Birthdays are something worth celebrating! On this date in 1912, the first 18 girls gathered to hold their first meeting as Girl Scouts. If you are looking to show your friends, family, and other Girl Scouts how you've taken action to make a difference come to the refuge where we will throw a party in your honor. Please email Julie at Julie.kahrnoff@sfbws.com to reserve your spot.

Youth Group Programs at the Refuge Headquarters in Fremont

The Refuge Headquarters offer Webelos programs for up to 15 Webelos. To register, call 510-792-0222 ext. 362 or at <http://springwebelos.eventbrite.com>. Program is led by June Smith.

Webelos Naturalist Program

Saturday, March 21

Sunday, April 26

Saturday, May 16

Visitor Center, Fremont

10:00 a.m. – 12:30 p.m.

Attention Webelos! Earn your naturalist badge in just 2.5 hours. During this hike, learn about birds, flyways, food chains, and the importance of wetlands. Bring your binoculars, or borrow one of ours.

TIDELINE

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Editor: Carmen Minch

To receive *Tideline*, email carmen_leong-minch@sfbws.gov, or write to: *Tideline*, San Francisco Bay National Wildlife Refuge Complex, 1 Marshlands Rd, Fremont, CA 94555

San Francisco Bay National Wildlife Refuge Complex

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

Project Leader: Anne Morkill
Wildlife Refuge Specialist: Anna Fisher
Don Edwards Wildlife Specialist: Melisa Amato

Don Edwards Warm Springs

Unit Manager: Ivette Loreda
Farallon Refuge Manager: Gerry McChesney
Farallon Wildlife Specialist: Jonathon Shore
North Bay Refuges Manager: Don Brubaker
North Bay Wildlife Specialist: Louis Terrazas
South Bay Refuges Manager: Diane Kodama
Public Affairs Officer: Doug Cordell
Refuge Planner: Winnie Chan
Chief of Visitor Services: Jennifer Heroux
Park Ranger/Outdoor Recreation Planners: Joseph Garcia and Carmen Minch
Environmental Education Specialists: Tia Glagolev and Genie Moore

Volunteer Coordinator: Paul Mueller
Law Enforcement Officers: Jared Klein, Jesse Navarro and Chris Wilson

Biologists: Joy Albertson, Christopher Caris, Susan Euing, Allison Fuller, Meg Marriott, Cheryl Strong, and Rachel Tertes

Administrative Staff: Lucinda Ballard, Ellen Tong
Maintenance Staff: Juan Flores, James Griffin, Calvin Sahara, Michael Springman, and Ed Van Til

San Francisco Bay Wildlife Society

A nonprofit 501(c)(3) cooperating association established in 1987 to promote public awareness and appreciation of San Francisco Bay and fund education and outreach programs at San Francisco Bay National Wildlife Refuge Complex.

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Tideline is On-Line

Visit our web sites at

http://www.fws.gov/refuge/antioch_dunes

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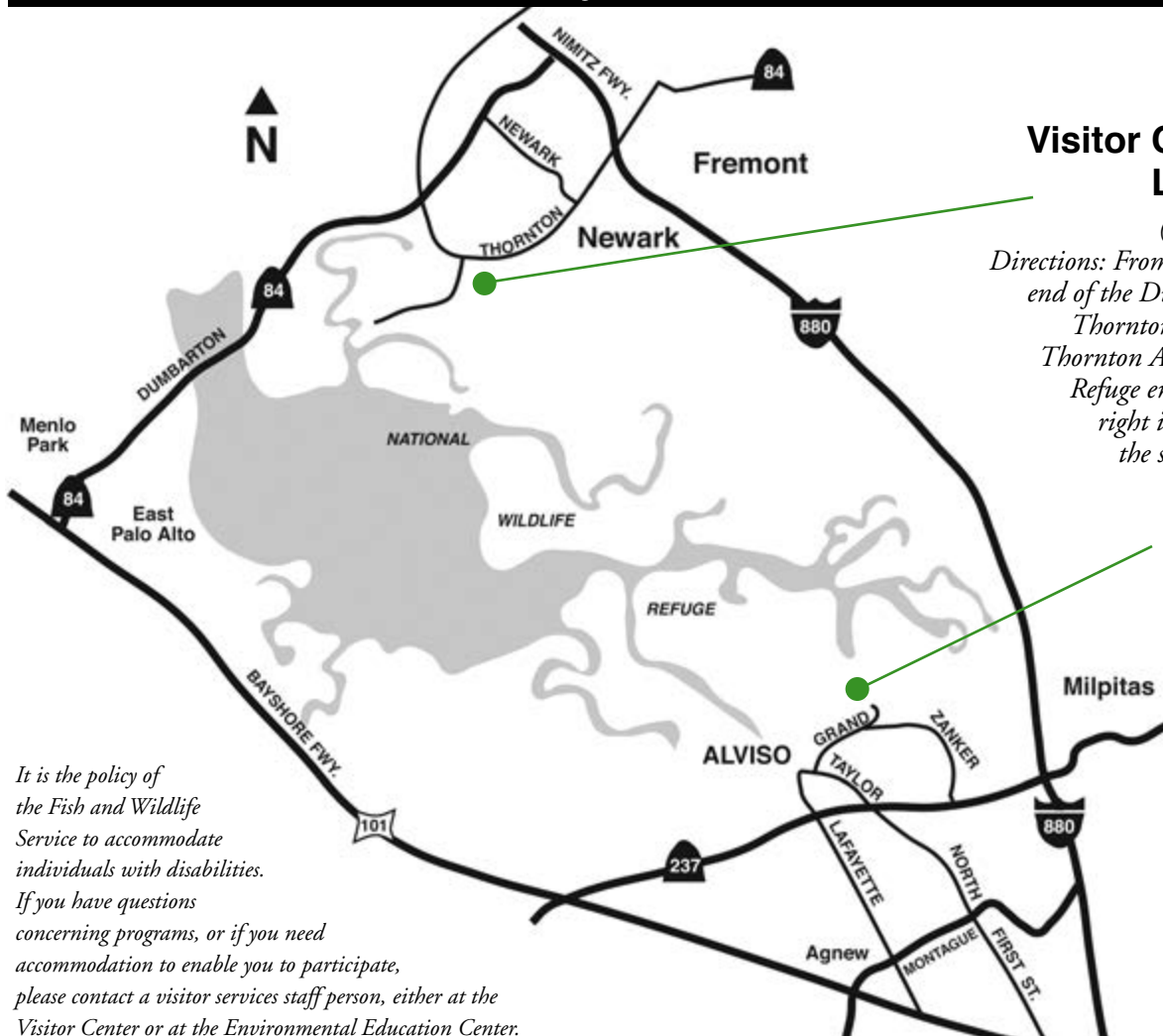
Tideline



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Antioch Dunes / Don Edwards / Ellicott Slough / Farallon Island / Marin Islands / Salinas River / San Pablo Bay



Visitor Center, Fremont Learning Center

(510) 792-0222 ext. 363
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 the signs to the Visitor Center.

Environmental Education Center, Alviso

(408) 262-5513
Directions: From I-880 or US-101, exit on CA-237 toward Mountain View/Alviso. Turn north onto Zanker Road. Continue on Zanker Road for 2.1 miles to the Environmental Education Center entrance road (a sharp turn at Grand Blvd.).

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.