

# Tideline



SPRING 2017  
Volume 40, Number 1

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

## California Gull Diet, Movements, and Use of Landfills in San Francisco Bay

By Dr. Josh T. Ackerman  
and Dr. Sarah H. Peterson

The California gull breeding population in San Francisco Bay has increased from just 24 individuals in 1980 to more than 53,000 today (based on annual counts made by the San Francisco Bay Bird Observatory). Expanding gull populations can sometimes be problematic for humans and wildlife, and consequently gulls are often actively managed, employing techniques such as hazing or culling.

Population increases of many gull colonies have been attributed to the availability of food subsidies from human sources, particularly those from landfills. The U.S. Geological Survey recently evaluated the influence of landfills on California gull diet and movements in San Francisco Bay at three of the largest breeding colonies. These breeding colonies comprise nearly 99% of all California gulls nesting in the Bay.

Using radio telemetry, we tracked 108 California gulls (Figure 1), recorded more than 7,000 locations, and obtained more than 1 million detections at automated data logging systems placed at each of the two main landfills in the South Bay (Newby Island Landfill and Tri-Cities Landfill), and the three main breeding colonies at Pond A6, Coyote Hills, and Mowry in 2007 and 2008 (Figure 2).

The vast majority of gulls were located within four miles of landfills throughout the breeding season, with post-breeding gulls located substantially closer to landfills (Figure 2). We discovered gulls were spending 20%-40% of their time each day at landfills.



Figure 1. California gull with an unattached back-pack style radio transmitter shown. California gulls were tracked continuously throughout the spring and summers of 2007 and 2008. Photo: USGS

Gull attendance at landfills increased from 20%-40% of their time each day during the pre-breeding season to 60%-80% of their time each day during breeding. During the breeding season, gulls increased their time at the landfills to 60%-80% each day.

The use of landfills declined during the post-breeding season to less than 20% of their time each day. In addition to the influence of season, the time of day also strongly affected gull attendance at landfills. Not surprisingly, gull use of landfills was highest during the time of day when garbage was being delivered from about 6:00 am

in the morning until 6:00 pm at night. Thereafter, gulls spent 50%-70% of their time at their breeding colonies.

We also sampled gull blood and common food items that gulls might eat at the landfills and within the surrounding wetland habitats to determine gull diet. Using stable isotopes, we found that gulls differed in their foraging strategies, with some gulls using landfills almost exclusively for food and other gulls feeding more often within the managed pond habitats adjacent

continued next page

to the Bay.

But in all cases, garbage made up a substantial portion of every gull's diet (Figure 3). We estimated that the proportion of garbage in the diet of gulls was 63%-82% for those gulls that foraged more extensively at landfills. For gulls that fed more within the estuary, the proportion of garbage in the diet of gulls was estimated to be 35%-63%. Diets of gull chicks also varied among foraging strategies, with 14% to 72% of their diets being derived from garbage.

California gulls are known to be voracious predators of other breeding birds in the Bay, and, in another study, we found that gulls were the main predator of Forster's tern and American avocet chicks, and caused 54% and 55% of chick deaths, respectively. Importantly, individual California gulls can specialize on eating waterbird chicks. We have even documented one gull that killed at least 11 Forster's tern chicks during nesting.

These results indicate that landfills play an important role in California gull habitat use and the timing of their movements in the Bay. Whether or not access to garbage at nearby landfills has contributed to the substantial increase in the Bay's California gull population is uncertain, but access to garbage has increased gull populations at several sites throughout the world. Current practices at some South Bay landfills in-

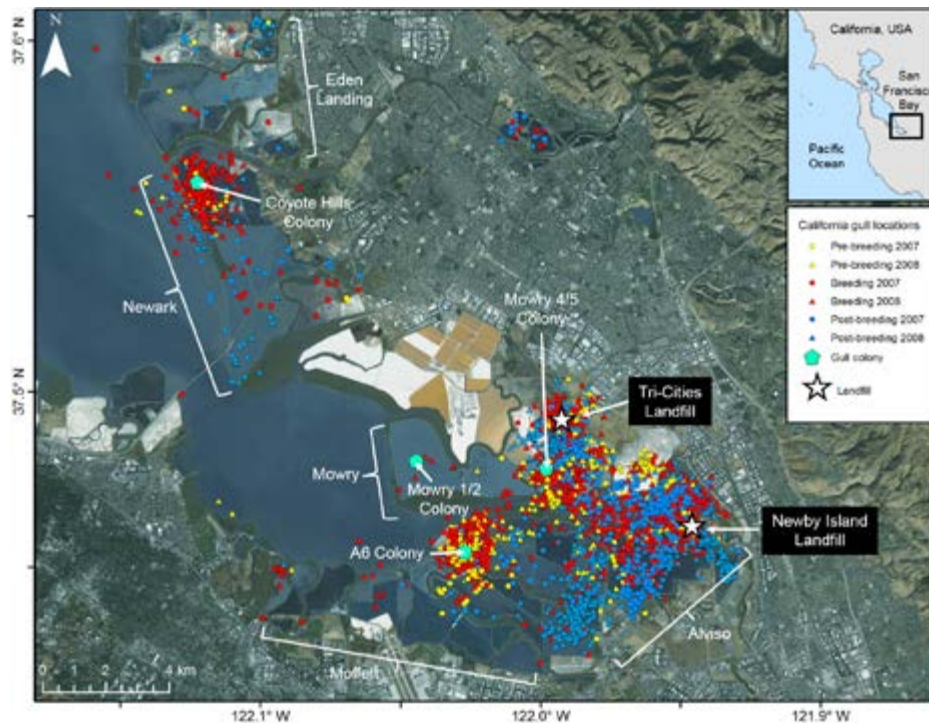


Figure 2. Locations of radio-marked California gulls in south San Francisco Bay, California during pre-breeding (yellow), breeding (red), and post-breeding (blue) in 2007 (circles) and 2008 (triangles). The locations of major urban areas, wetland complexes, gull colonies, and landfills are shown. Photo: USGS

cludes hazing gulls, and has resulted in some success in reducing gull use of landfills.

Although California gulls are native to the western United States, they did not breed in the Bay prior to 1980. The main factor that limits California gull populations throughout their range is the availability of protected nesting habitat near areas with sufficient food supplies. After the creation of artificial salt evaporation ponds in San Francisco Bay from the 1930s through the 1950s, suitable nesting habitat for gulls was readily available in the form of internal salt pond levees and dry salt pond beds. They were also in close proximity to several landfills. In fact, 96% of California gulls that bred in San Francisco Bay nested within former salt ponds.

Therefore, the establishment and rapid growth of California gulls in San Francisco Bay may have been at least partly attributed to the availability of suitable nesting habitat (salt pond system) in close proximity to abundant food resources (garbage at landfills and brine flies and shrimp within salt ponds).

This work was conducted in conjunction with the U.S. Fish and Wildlife Service's Don

Edwards San Francisco Bay National Wildlife Refuge, California Fish and Wildlife's Eden Landing Ecological Reserve, and the South Bay Salt Pond Restoration Project.

Dr. Josh T. Ackerman and Dr. Sarah H. Peterson are Wildlife Biologists with the U.S. Geological Survey, Western Ecological Research Center in Dixon, California.

**References:**

Ackerman, J. T., M. P. Herzog, C. A. Hartman, and G. Herring. 2014a. Forster's tern chick survival in response to a managed relocation of predatory California gulls. *Journal of Wildlife Management* 78:818-829.

Ackerman, J. T., M. P. Herzog, C. A. Hartman, and J. Y. Takekawa. 2014b. Comparative reproductive biology of sympatric species: nest and chick survival of American avocets and black-necked stilts. *Journal of Avian Biology* 45:609-623.

Ackerman, J. T., S. H. Peterson, D. C. Tsao, and J. Y. Takekawa. California gull space use and movements in relation to landfills and breeding colonies. Submitted manuscript.

Peterson, S. H., J. T. Ackerman, and C. A. Eagles-Smith. Mercury contamination and stable isotopes reveal foraging ecology of generalist California gulls. Submitted manuscript.

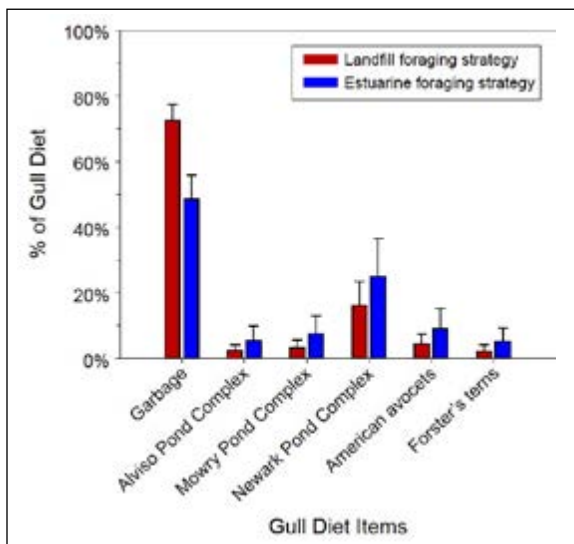


Figure 3. The proportion of diet for breeding California gulls coming from 6 possible prey sources: (1) garbage from landfills, (2) fish and brine shrimp from the Alviso Pond Complex, (3) fish and brine shrimp from the Mowry Pond Complex, (4) fish and brine shrimp from the Newark Pond Complex, (5) American avocet eggs and chicks, and (6) Forster's tern eggs and chicks. Graphic courtesy of USGS

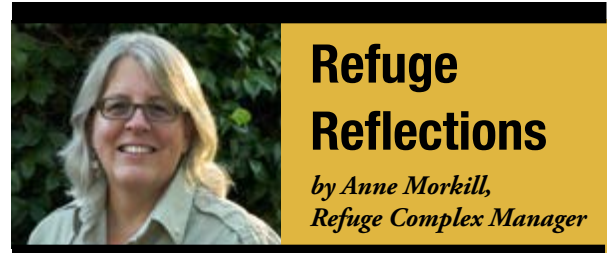
# Working Smarter, Maximizing Results

Our *Tideline* newsletters provide a snapshot of some of the great work that our refuge staff, volunteers, and partners do on the San Francisco Bay National Wildlife Refuge Complex, from wildlife protection to habitat restoration to public engagement. Our conservation mission is becoming even more urgent in the face of climate change, invasive species, urbanization, and other stressors. We've made a lot of progress in the past few years in restoration, monitoring, land acquisition, and urban community outreach, and participated in several regional planning efforts and collaborative partnerships, all of which help guide our work. However, our ability to achieve our conservation goals and objectives on the ground across seven refuges has been greatly diminished by declining budgets and less staffing.

In order to meet these challenges now and into the future, we must focus our limited resources on those wildlife conserva-

tion and public engagement strategies that will make the most difference in achieving our conservation mission. To do that, we are using an internationally recognized process called "The Open Standards for the Practice of Conservation." It provides a structured framework for bringing our staff together to prioritize conservation targets, identify threats, select effective strategies, and develop annual work plans that realize the greatest benefits. This effort will rely on our existing Comprehensive Conservation Plans and best available science, but recognizes the reality that we can't do everything so we must focus on what's most important.

It's essential to acknowledge that focusing on what's most important means that some things we are doing now will become lesser priorities. Activities identified as low priorities as a result of this process will still



be represented in our work plans so that they can be addressed when more funding is available. Many of you have a vested interest in our refuges or might be affected by changes in our activities, such as our Refuge Friends groups, cooperators, researchers, and volunteers, so we are available to meet with you about this process on request. For more information on the Open Standards, visit <http://cmp-openstandards.org>. We will also share highlights of our final work plan in the Fall 2017 *Tideline* issue.

## Mother's Day Celebration!



Join us at the Don Edwards San Francisco Bay National Wildlife Refuge for a

**FREE** Mother's Day Event!  
**Saturday, May 13, 2017**  
**10:00 a.m. - 3:30 p.m.**



The U.S. Fish and Wildlife Service is committed to providing access to this event for all participants. Please direct all requests for sign language interpreting services, close captioning, or other accommodation needs to Genie Moore, 408-262-5513 ext. 100, [genie\\_moore@fws.gov](mailto:genie_moore@fws.gov), TTY 800-877-8339 by close of business May 6, 2017

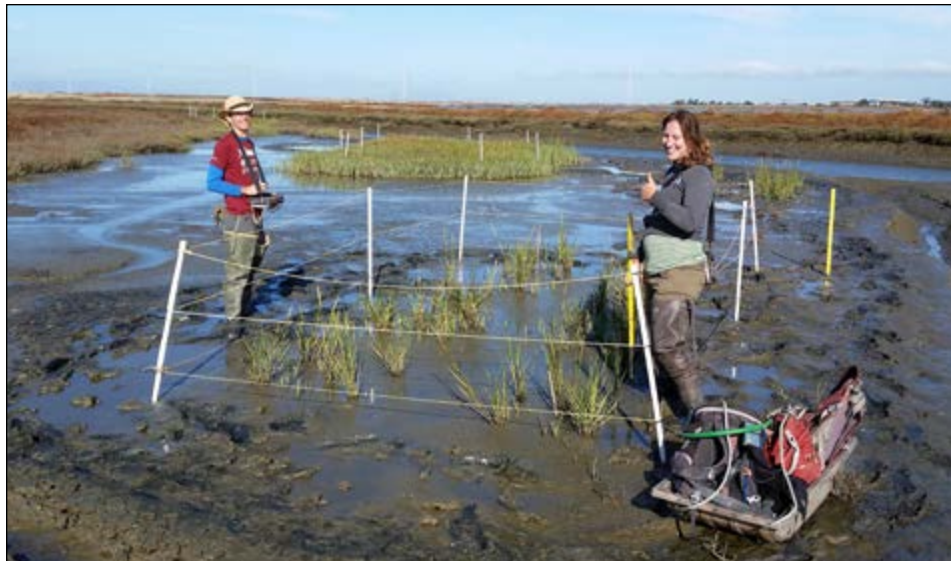
# The San Francisco Estuary Invasive Spartina Project: A Success Story

By Marilyn Latta, California Coastal Conservancy, Project Manager

There has been significant progress over the past few decades in protecting and restoring the natural habitats of San Francisco Bay. But transforming the estuary back to a healthy, functioning ecosystem has been met with several challenges, including the invasion by nonnative species. One of the more aggressive invaders is the Atlantic cordgrass (*Spartina alterniflora*).

Ironically, invasive *Spartina* was intentionally planted in the 1970s at the Alameda Flood Control Channel as part of an early restoration project, but at the time there wasn't an understanding of the future impacts this nonnative cordgrass would have on the estuary. Hybrids that formed between Atlantic cordgrass and native Pacific cordgrass (*Spartina foliosa*) were particularly aggressive, and the hybrid rapidly dominated and altered the structure and function of tidal marshes, mudflats, and tidal creek habitats, to the detriment of most fish and wildlife that depend on these habitats. Also as tidal flows were reestablished in thousands of acres of former commercial salt ponds and other diked wetlands, many restoration sites were quickly invaded and subsequently dominated by invasive *Spartina*.

To combat this invader from degrading wetland habitats and spreading into newly-restored areas, the San Francisco Estuary Invasive *Spartina* Project was formed in 2000 by the California State Coastal Conservancy and San Francisco Bay National Wildlife Refuge Complex. This successful state-federal partnership with more than 200 land-owning agencies and conservation organizations is a key step in tidal wetland restoration in the bay. The project is based on a coordinated regional approach with carefully planned monitoring and treatment using environmentally-safe herbicides and manual removal in over 60,000 acres of wetlands and mudflats along the shorelines of all 9 counties that surround the bay.



Olofson Environmental, Inc. biologist Whitney Thornton-Dunlop, and geneticist Brian Ort planting Pacific cordgrass. Photo: San Francisco Estuary Invasive *Spartina* Project

Eradicating invasive *Spartina* requires labor-intensive and meticulous fieldwork annually at low tides at very difficult-to-access sites. Highly-trained biologists, Geographic Information Specialists, and plant genetics experts from the project's lead consultant, Olofson Environmental, Inc., work carefully with all partners to monitor and treat invasive *Spartina*. The approach includes using GIS units to carefully map every hybrid location, from a few individual plants to clusters, spread over several acres.

A consequence of the invasion of nonnative cordgrass is that native marsh vegetation, including Pacific cordgrass, was displaced from some areas or precluded from establishing in newly restored marshes, by the more aggressive invader. This significantly altered marsh structure and function by filling in slough channels and mudflats that provide foraging habitat for shorebirds. It also replaces the pickleweed that is home to the endangered salt marsh harvest mouse.

On the other hand, the endangered California Ridgway's rail was one species that benefited from the tall, dense cover of the invasive *Spartina*; consequently, numbers of Ridgway's rails increased at most marshes where nonnative cordgrass became dominant. During the first several years of

*Spartina* treatment, rail numbers declined at some sites due to reduced habitat cover.

To help accelerate reestablishment of high-quality habitat and speed stabilization of the Ridgway's rail population, the project partners undertook an ambitious habitat enhancement program beginning in 2011. More than 400,000 seedlings of native Pacific cordgrass and the marsh gumplant, which provide hiding and nesting cover for rails, have been propagated and planted to date. Also 62 "high tide refugia islands" have been constructed so far to provide escape cover for rails and mice during high tides that flood the marshes.

The San Francisco Estuary Invasive *Spartina* Project has successfully reduced invasive cordgrass by more than 96% bay-wide, starting from a high of 805 net acres in 2005 down to less than 29 net acres as of 2016, with the ultimate goal to eradicate completely. All partners are working together to restore native tidal marsh habitat for California Ridgway's rails and other species, and maintain un-vegetated mudflats for the more than one million shorebirds that forage and roost every year in the bay.

For more info on the project, please visit [www.spartina.org](http://www.spartina.org).

# Special Thanks from the San Francisco Bay Wildlife Society

by Mary Deschene

## Pollution Prevention

The **Litterati™** app-based pollution prevention trash clean-up, sponsored by the **Santa Clara Valley Water District**, is an ongoing success at the refuge. With the help of the San Jose Conservation Corps and volunteer groups, we have cleaned up nearly two tons of trash, keeping plastics and small pieces of trash often mistaken for food by wildlife and plastics out of the bay and ocean systems. A special thanks goes to Operations Coordinator Olivia Andrus for training and leading crews and volunteer groups, uploading more than 12,000 photos of trash into the Litterati database, and promoting this exciting new method of “inspiring a litter-free world.” The oceans will thank you forever for your efforts, Olivia.

**Whole Foods Markets** is supporting our efforts to preserve a clean San Francisco Bay for wildlife. Whole Foods is contributing donations from their Nickels for Bags program at their Fremont and Santa Clara stores to the Society.

**Clean Harbors Environmental Services** a Pollution Prevention exhibit that will keep the Litterati message going into the future.



## Explore the Coast Outreach and Field Trip Interns

Hundreds of low-income school children now have the opportunity to “**Explore the Coast**” of the Don Edwards Refuge by attending field trips enabled by the **California Coastal Conservancy’s Explore the Coast** program. By funding interns to assist with refuge programs, we are providing environmental education for diverse audiences that open up a world of environmental appreciation and stewardship for future generations and their families.



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## Help Us Protect Your San Francisco Bays Wetlands!

**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](http://www.sfbws.com).**

For a gift membership, call 510-792-0222 ext. 364.

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. My dues include a subscription to *Tideline*. Enclosed is my contribution of:

- |                                              |                                            |
|----------------------------------------------|--------------------------------------------|
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**For nearly 30 years, the San Francisco Bay Wildlife Society has:**

- Introduced the refuge to tens of thousands of students of all ages
- Helped fund the Bair Island restoration and Management Plan, restoration work at Antioch Dunes NWR, and uplands restoration at the Environmental Education Center
- Provided weekend staff in Alviso through long-term partnerships with the City of San Jose and the Santa Clara Valley Urban Runoff Pollution Prevention Program
- Provided funding for a new boardwalk at the New Chicago Marsh Trail at the Environmental Education Center
- Funded a new greenhouse
- Provided funds to create a native plant nursery
- And much more

**Help continue this tradition by becoming a Supporting Member of the Society.**

Benefits include:

- Free subscription to *Tideline* newsletter
- Tax Deduction to the extent permitted by law
- Free book – *Exploring Our Baylands*
- The joy of helping protect this important environment

**Thank you for your support!**

# 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, 2016 and December 31, 2016. These gifts will be used for publishing *Tideline*, environmental education, habitat restoration, and interpretive programs at the San Francisco Bay National Wildlife Refuge Complex.

## Fund Donations

### *Habitat Restoration Fund*

Karen Azevedo

### *30th Anniversary Celebration*

Christopher L Kitting, Ph.D

### *Unrestricted*

Jeannette D Jensen

Just Give Cisco's Community Connection  
Jed Somit

## Memorials/Honorariums

Shih Lin in Honor of Lido Melgar for appreciation of services at the refuge.

## Leader

Jon Graff, Brian Strom

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## San Francisco Bay Wildlife Society Quarterly Message

**30th Anniversary of the San Francisco Bay Wildlife Society:** Thirty years ago when Refuge Naturalist John Steiner, Dr. Chris Kitting, and others organized the Society, they were focused on raising funds to save the Fremont Pump House and support the newly formed San Francisco Bay National Wildlife Refuge. The Society accomplished those early goals and much more over the past years. Funded by the City of San Jose and the Santa Clara Valley Urban Runoff and Pollution Prevention Program, two Society employees were hired to staff the Environmental Education Center (EEC) in Alviso, and offer public programs and field trips for schoolchildren. The Society has also provided funds to help kick start the Bair Island restoration project, to build the EEC boardwalk, and to support many other projects these past three decades.

To celebrate the 30th Anniversary, the Society is launching an anniversary fundraising campaign with several objectives:

1. Support new and ongoing native habitat restoration projects
2. Obtain long-term funding for SFBWS employees at Fremont to keep Visitor Contact Station open on weekends
3. Support Refuge facility improvements; (i.e., support planning for a new Visitor Center and smaller more shovel-ready projects such as accessible boardwalks,

fishing platforms, trail improvements, multi-lingual interpretive signs, restroom facilities, nature play area and other visitor amenities)

4. Develop new and enhanced environmental education and stewardship efforts;
5. Expand the SFBWS Nature Stores and provide staffing support for expanding the visitor contact station hours of operation.

### **Volunteer & Donation Opportunities:**

Volunteers are vital to the success of the Nature Stores at Fremont and Alviso. Reach out to [Mary.Deschene@SFBWS.com](mailto:Mary.Deschene@SFBWS.com), or 510-792-0222, ext. 364 for more information or dates!

**Your skills NEEDED on Board of Directors:** The Society is seeking additional Board of Director members, in particular people with legal background and business financial experience. Let me ([Ceal@SFBWS.com](mailto:Ceal@SFBWS.com)) know if you want to chat about these opportunities to contribute your expertise in support of the Bay Area's national wildlife refuges.

**Out on the trail:** As I write this in mid-January, we are experiencing major flooding throughout the Bay Area after several winter storms arrived on our shores; in addition, the refuge saw king tides - giving us a glimpse of the future as sea levels rise. We must take collaborative action to protect our wildlife habitats, and by doing so we

help other species, including our own, with a more robust shoreline.

The Society is a Friends Group for the Refuge Complex and we hope you will join us as a volunteer, or with your financial support. Individual action will be critical in the times ahead.

**Your feedback desired!** We would like to connect with long-term members and new members to learn why you have supported the organization and what you would like to see the Society accomplish. We welcome feedback on the changed hours at the Visitor Contact Station (Fremont) and the Environmental Education Center (Alviso/San Jose), on the Nature Store, and on San Francisco Bay Wildlife Society's goals and mission.

**Please take a few moments to provide input at:** [sfbws.com/survey](http://sfbws.com/survey). Your suggestions are greatly appreciated and important to our success.

**Stay CONNECTED:** Want other ways to get involved or to learn more? Check out [www.sfbws.com](http://www.sfbws.com) and [refugeassociation.org](http://refugeassociation.org).

As always, I welcome your inputs involvement and inquiries. Send your thoughts to: [Ceal@SFBWS.com](mailto:Ceal@SFBWS.com)

**Cecilia (Ceal) D. Craig, PhD**  
**President, SFBWS Board of Directors**

# 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 4

#### Tai Chi at the Refuge

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



Morning Crane founder Chris Shelton is a certified Tai Chi and Qigong practitioner and instructor with 20 years of experience. Chris Shelton has helped thousands of people around the world reclaim their health and enjoy lives free from chronic pain. Sponsored by Morning Crane and Open Space Authority. No registration necessary.

#### \*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. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Go to <https://donedwardsfamilybird.eventbrite.com> or call 510-792-0222 ext. 362. Led by Ken Roux.

#### \*Restoring Inner Bair Island Walking Tour

Inner Bair Island, Redwood City  
10:00 a.m. - 11:00 a.m.

On this 1.5-mile walk, witness wetland restoration in progress. Hear the story of Bair Island and see how we are turning the former salt pond back into a healthy tidal marsh. Directions: Take Highway 101 and exit at Whipple Ave. in Redwood City. Head east toward the bay. The road winds 0.5 mile becoming East Bayshore, then Bair Island Rd. The Don Edwards National Wildlife Refuge Bair Island parking lot is on the right. Meet by the restrooms. RESERVATIONS RECOMMENDED. Go to <http://innerbairtour.eventbrite.com>.



#### \*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. Led by Matt Keehner.

### Saturday, March 11

#### Stewardship Day

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 stewardship 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.

#### Twilight Marsh Walk

Visitor Center, Fremont  
5:00 p.m. - 6:45 p.m.

Cap off the day by experiencing the salt marsh at twilight on an easy stroll along Tidelands (1.3 miles) 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. Go to <https://donedwardstwilight.eventbrite.com> or call 510-792-0222 ext. 362. Led by Mary and Gene Bobik.

### Saturday, March 18

#### Jr. Refuge Ranger

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

Become a 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 badge. Register at <http://donedwardsranger.eventbrite.com> or call 510-792-0222 ext. 362. Led by Ennis Chahaun.

#### Outfall

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

Have you ever wondered where your indoor water ends up? If you live in the south bay, it probably goes to the San Jose- Santa Clara Regional Wastewater Facility to be cleaned. Join us on a tour of the Facility's Outfall and see firsthand how it helps keep the San Francisco Bay and our refuge clean. Register at <https://eecoutfall.eventbrite.com>.

### Friday, March 24

#### Night Sky Party!

Environmental Education Center, Alviso  
7:30 p.m. - 9:00 p.m.

Meet the stars of Spring! Join our amateur astronomers as we learn about constellations. Make a star chart and then venture outside to view the night sky through a telescope. Afterwards, warm up with some hot chocolate. Bring your own binoculars or spotting scopes if you have them. Dress warmly as it gets cold in the evening. Fun for the whole

family! RESERVATIONS REQUIRED. Go to <http://wintersky.eventbrite.com> Questions? Call 408-262-5513 ext. 104.

### Saturday, March 25

#### Hiking Yogis

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



Have you noticed that many yoga poses and stretches often have animal names or imitate animal postures? Take a hike on the 1.3 mile Tidelands Trail with Carmen Minch. We will do some simple yoga stretches before, during, and after the walk that will highlight these similarities. Good for the mind, body, and soul.

#### Hike the Mallard Slough Trail

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

Look for birds, mammals, and animal tracks as we explore along the water's edge on this 3.7-mile nature walk. Bring binoculars and your favorite field guide to help enjoy the views. Have at least one liter of water, snacks, and appropriate clothing. Rain cancels hike. Led by Steve Stolper. RESERVATIONS REQUIRED. Go to <https://hikeeetrail.eventbrite.com>. Questions? Call 408-262-5513 ext. 104.

#### Indicators that Fox are in Your Area

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. Register at <http://donedwardsfox.eventbrite.com>. Led by Bill Leikam, the Fox Guy.

## April

### Saturday, April 1

#### Tai Chi at the Refuge

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



Morning Crane founder Chris Shelton is a certified Tai Chi and Qigong practitioner and instructor with 20 years of experience. Chris Shelton has helped thousands of people around the world reclaim their health and enjoy lives free from chronic pain. Sponsored by Morning Crane and Open Space Authority. No registration necessary.



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## Saturday, April 8

### Stewardship Day

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 stewardship 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.

### \*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. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Go to <https://donedwardsfamilybird.eventbrite.com> or call 510-792-0222 ext. 362.

### Crafts in the Outdoors: Beginning Leatherwork

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

Doing crafts outdoors is a wonderful experience. Make and decorate (tool) a small patch for your backpack or clothing made from vegetable tanned leather. Learn how Bay Area residents used the tanoak tree for food and for making leather. This family-friendly program lets you have fun crafting your own leather item. Bring water, snacks, and appropriate clothing. This program runs rain or shine. Led by Steve Stolper. RESERVATIONS REQUIRED. Go to: <https://eecleather.eventbrite.com> Questions? Call 408-262-5513 ext.104.

## Volunteer Orientation

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

Increase your quality of life with a resolution to volunteer for a good cause. Come to this presentation to see if volunteering at the Don Edwards San Francisco Bay National Wildlife Refuge is right for you. Begin by learning the mission and goals of the San Francisco Bay National Wildlife Refuge Complex, its parent agency U.S. Fish and Wildlife Service, and volunteer positions currently open at the Fremont location. Presented by Paul Mueller.

## Pacific Flyway

SF2 Trail, Menlo Park  
3:00 p.m. – 4:30 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 <https://pacificflyway.eventbrite.com>. Questions? Call 408-262-5513 ext. 104.

## Twilight Marsh Walk

Visitor Center, Fremont  
6:30 p.m. – 8:15 p.m.

Cap off the day by experiencing the salt marsh at twilight on an easy stroll along Tidelands (1.3 miles) 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. Go to <https://donedwardstwilight.eventbrite.com> or call 510-792-0222 ext. 362. Led by Mary and Gene Bobik.

## Saturday, April 15

### Jr. Refuge Ranger

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

Become a 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 badge. Register at <http://donedwardsranger.eventbrite.com> or call 510-792-0222 ext. 362. Led by Ennis Chahaun.

## Saturday, April 22

### Let's Go Native...In Our Garden!

Environmental Education Center, Alviso  
10:00 a.m. – 3:00 p.m.

Join us for a day in the native plant garden as we restore habitat for Monarch butterflies, learn about leaves and lichen identification, and go tour the native California plants we grow out by the marsh! Open to all – no reservation necessary. Questions? Call 408-262-5513 ext. 104.

## Saturday, April 29

### Nature Yoga

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



HEALTHY  
PARKS  
HEALTHY  
PEOPLE  
BAY AREA

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://donedwardsyoga.eventbrite.com> or call 510-792-0222 ext. 476. Led by Carmen Minch.

### \*A Taste of the Refuge

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

### Indicators that Fox are in Your Area

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.

# May

## Saturday, May 6

### Tai Chi at the Refuge

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



HEALTHY  
PARKS  
HEALTHY  
PEOPLE  
BAY AREA

Morning Crane founder Chris Shelton is a certified Tai Chi and Qigong practitioner and instructor with 20 years of experience. Chris Shelton has helped thousands of people around the world reclaim their health and enjoy lives free from chronic pain. Sponsored by Morning Crane and Open Space Authority. No registration necessary.

### Stewardship Saturday

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 stewardship 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. Driv-



ing 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.

### \*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. A limited number of binoculars are available to borrow. Recommended for children ages 5-10. RESERVATIONS REQUIRED. Go to <https://donedwardsfamilybird.eventbrite.com> or call 510-792-0222 ext. 363.

### \*Restoring Inner Bair Island

#### Walking Tour

**Inner Bair Island, Redwood City**  
10:00 a.m. – 11:00 a.m.

On this 1.5-mile walk, witness wetland restoration in progress. Hear the story of Bair Island and see how we are turning the former salt pond back into a healthy tidal marsh. Directions: Take Highway 101 and exit at Whipple Ave. in Redwood City. Head east toward the bay. The road winds 0.5 mile becoming East Bayshore, then Bair Island Rd. The Don Edwards National Wildlife Refuge Bair Island parking lot is on the right. Meet by the restrooms. RESERVATIONS RECOMMENDED. Go to <http://innerbairtour.eventbrite.com>.

### \*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. Led by Matt Keehner.

### \*Pacific Flyway

**SF2 Trail, Menlo Park**  
2:30 p.m. – 4:00 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 <https://pacificflyway.eventbrite.com>. Questions? Call 408-262-5513 ext. 104.

## Saturday, May 13

### \*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.

### Mother's Day at the Refuge

**Environmental Education Center, Alviso**  
10:00 a.m. – 3:00 p.m.

The eggs have hatched! Let's celebrate these new mamas! Come with your family to experience the refuge for FREE guided bird walks, a live bird show, crafts for mom, and games. Spread your wings for bird conservation as you get up close and personal with real refuge wildlife and their habitats. Fun for the whole family, especially mom! Priority to those who register: <https://eecomotherscelebration.eventbrite.com>. For more information call 408-262-5513 ext.102 or 104.

### 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.

### Welcome Back Swallows

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

The swallows have just arrived from their long voyage from South America to their breeding grounds here in the Bay Area. Join docent Roy Sasai to view the swallows as they begin building their unique nest design. We will learn why they chose the Bay Area, their courtship rituals and unusual choice of building materials. We will hike to various spots to view their unique homes and discuss how seal level rise may risk their building material in the future. The hike is approximately 1 mile with medium hills. Register at <https://donedwardsswallows.eventbrite.com>.

## Saturday, May 20

### \*Bird Watching for Beginners

**Visitor Center, Fremont**  
8:30 a.m. – 10:00 a.m.

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. Led by Carmen Minch.

### Intro to Geo PDF Maps

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

What's a Geo PDF map? How do you use it? A Geo PDF map is a map that you download and store on your smart phone. Use the free app called PDFMaps to view and navigate from the stored map in your phone. Use it on hikes or bike rides to log your distance, start time, and duration, as well as perform other functions. You don't need wi-fi or a data connection once the app is installed. It uses your phone's GPS feature so it works even if you are out of range of mobile phone service. Meet at the Visitor Center to see a slideshow and find out how to obtain a copy of a Geo PDF map of the Don Edwards SF

Bay National Wildlife Refuge. A live demonstration will follow. Led by docent Gregg Aronson. Register at <https://geopdf.eventbrite.com>.

### Twilight Marsh Walk

**Visitor Center, Fremont**  
7:00 p.m. – 8:45 p.m.

Cap off the day by experiencing the salt marsh at twilight on an easy stroll along Tidelands (1.3 miles) 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. Go to <https://donedwardstwilight.eventbrite.com> or call 510-792-0222 ext 362. Led by Mary and Gene Bobik.

## Saturday, May 27

### Drawbridge Van Excursion

**Environmental Education Center, Alviso**  
9:30 a.m. – 12:00 p.m.

An abandoned town in the San Francisco Bay? That's right! Nestled on an island in the salt marshes of South San Francisco Bay, the town of Drawbridge once boomed. Was it a quiet, peaceful town full of nature lovers, or people scrabbling out a living? How long did it exist? Find out at this program, led by Ceal Craig. We will start with a slideshow, and then take a short van excursion to view Drawbridge across Coyote Creek. Program will be of most interest to adults interested in history or nature; children 13 and over with an adult are welcome. Space is very limited. RESERVATIONS REQUIRED. Go to: <http://drawsummer.eventbrite.com> Questions? Call 408-262-5513 ext.104. (Note: we do not visit the town itself – we go to the closest spot that one can legally view Drawbridge.)

### 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://donedwardsyoga.eventbrite.com> or call 510-792-0222 ext. 476. Led by Carmen Minch.

### Indicators that Fox are in Your Area

**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.

# 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. We are piloting new and modified activities that support Next Generation Science 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.**

## Field Trips at Learning Center in Fremont

### Wetland Round-Up Field Trip

**Field trip programs are fully booked for spring 2017.**

Contact the Environmental Education Staff at Fremont:

Office: (510) 792-0222 ext. 475

Cell: (510) 377-7269

E-mail: [tia\\_glagolev@fws.gov](mailto:tia_glagolev@fws.gov)

## Field Trips at the Environmental Education Center in Alviso

### Wetland Round-Up Field Trips

**Field trip programs are fully booked for spring 2017.**

Contact the Environmental Education Staff at Alviso:

Office: (408) 262-5513 ext 100

Cell: (510) 377-5250

E-mail: [genie\\_moore@fws.gov](mailto:genie_moore@fws.gov)

### Living Wetlands Program

Living Wetlands provides a 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 & Wildlife Service, and the San Francisco Bay Wildlife Society.

**Program Offerings:** (See below for information about priority schools)

#### 5<sup>th</sup>-12<sup>th</sup> 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. There is a limit of 60 students per field trip, and a 1:10 chaperone to student ratio is required.

**5<sup>th</sup>-12<sup>th</sup> 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.

*Due to funding restrictions, first priority will be given to Title 1 schools in San Jose. Second*

*priority will be given to schools in Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino.*

For more information, or to make a reservation, contact the Living Wetlands Program Coordinator at 408-262-5513 ext. 102 or at email [livingwetlands@sfbws.com](mailto:livingwetlands@sfbws.com).

## Programs for Colleges and Universities

**Guided Field Trips are offered at the Environmental Education Center in Alviso.** Programs generally last from 1.5-2 hours. *Reservations must be made at least 8 weeks in advance of the desired field trip date.* Please contact the Watershed Watchers Program Coordinator at 408-262-5513 ext. 104 or at [watershedwatchers@sfbws.com](mailto:watershedwatchers@sfbws.com) to make a reservation.

**College instructor-led tours are allowed at the Environmental Education Center in Alviso.** All college instructors planning this type of field trip must make a reservation at least 8 weeks in advance of the desired field trip date. If your group size is over 25 you will need to acquire a Special Use Permit from our Headquarters office in Fremont. Please contact Genie Moore, at 408-262-5513 ext. 100 or at [Genie\\_moore@fws.gov](mailto:Genie_moore@fws.gov) or the Watershed Watchers Program Coordinator, at 408-262-5513 ext. 104 or at [watershedwatchers@sfbws.com](mailto:watershedwatchers@sfbws.com) to make a reservation.

## Application for 2017 Blue Goose Bus Funds

The Blue Goose School Bus Fund provided by the U.S. Fish & Wildlife Service and San Francisco Bay Wildlife Society was created to help Title 1 schools and schools with proven hardships to come the Wetland Round-Up and Living Wetlands Field Trip Programs in Alviso and the Newark Slough Learning Center in Fremont.

Please refer to our website for more information: <http://go.usa.gov/3GJhm>

**You may also contact Genie Moore at 408-262-5513 ext. 100 or at [genie\\_moore@fws.gov](mailto:genie_moore@fws.gov).**

# Vernal Pool Tours at Warm Springs Unit on Don Edwards San Francisco Bay National Wildlife Refuge

Sign up to receive notification of when Vernal Pool Tours are available. These popular tours to view wildflowers and endangered plants occur in an area normally closed to the public due to the sensitivity of the habitat. Tours are free of charge.

You will learn about the unique features of a vernal pool grassland, and hopefully observe the pools in what will likely be a good rain year! Participants will see endangered Contra Costa goldfields (*Lasthenia conjugens*), *Downingia pulchella*, several *Plagiobothrys*, and other native vernal pool and upland species.

Warm Springs Unit is located in south Fremont. The walking tour will last about 1.5 to 2 hours. Total walking distance will not exceed one mile, but terrain is uneven.

To optimize the botanical beauty of the tours, we will set the tour dates three weeks before the peak bloom. Typically, tours are in April and will be conducted on one Saturday and one weekday with two tours on each day. Once dates and times are determined, you will receive email notification on how to register and driving directions.

Spaces are limited.

Sign up now! Email Ivette Loredo at [Ivette\\_loredo@fws.gov](mailto:Ivette_loredo@fws.gov) to be put on the notification list.



*Endangered Contra Costa Goldfields.  
Photo: FWS*

## National River Clean-Up Day is in May!

**Alviso Slough Cleanup – DATES available at <http://sloughkeepers.com/joining-sloughkeepers> Alviso Marina through the Alviso Slough**

*Love to kayak? Love to clean up the environment? Why not combine the two and partner with Slough Keepers as they clean up Alviso Slough. Bring a kayak out to the upper lot's launch ramp at the Alviso Marina and be prepared to paddle through the slough and some reeds to clean up our neighborhoods waters. Due to the reeds, this is recommended for those who have some kayaking experience. Slough Keepers will provide garbage bags and even some garbage barges. To sign up, contact Eric Norris at [sloughkeepers@gmail.com](mailto:sloughkeepers@gmail.com) and visit [www.sloughkeepers.org](http://www.sloughkeepers.org) for more information. Space is limited to 25 kayakers.*

### TIDELINE

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**Volume 40, Number 1**

Editor: ..... Carmen Minch

To receive *Tideline*, email [carmen\\_leong-minch@fws.gov](mailto:carmen_leong-minch@fws.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.

**Tideline is On-Line** Visit our web sites at

- [http://www.fws.gov/refuge/antioch\\_dunes](http://www.fws.gov/refuge/antioch_dunes)
- [http://www.fws.gov/refuge/don\\_edwards\\_san\\_francisco\\_bay](http://www.fws.gov/refuge/don_edwards_san_francisco_bay)
- [http://www.fws.gov/refuge/ellicott\\_slough](http://www.fws.gov/refuge/ellicott_slough)
- <http://www.fws.gov/refuge/farallon>
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- [http://www.fws.gov/refuge/san\\_pablo\\_bay](http://www.fws.gov/refuge/san_pablo_bay)



Follow us on Facebook:  
San Francisco Bay NWR Complex

## 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.

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

Please email the Watershed Watchers Program Coordinator to make a reservation and customize your visit at [watershedwatchers@sfbws.com](mailto:watershedwatchers@sfbws.com). Programs offered are:

- Webelos Adventure Into the Wild
- Daisies Journeys
- Brownies Journeys and Badges
- Juniors Journeys and Badges
- Cadette Journeys

All minors must be accompanied by an adult.

UNITED STATES  
DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE  
DON EDWARDS SAN FRANCISCO BAY  
NATIONAL WILDLIFE REFUGE  
1 Marshlands Road  
Fremont, CA 94555

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## SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE COMPLEX

SPRING 2017  
Volume 40, Number 1

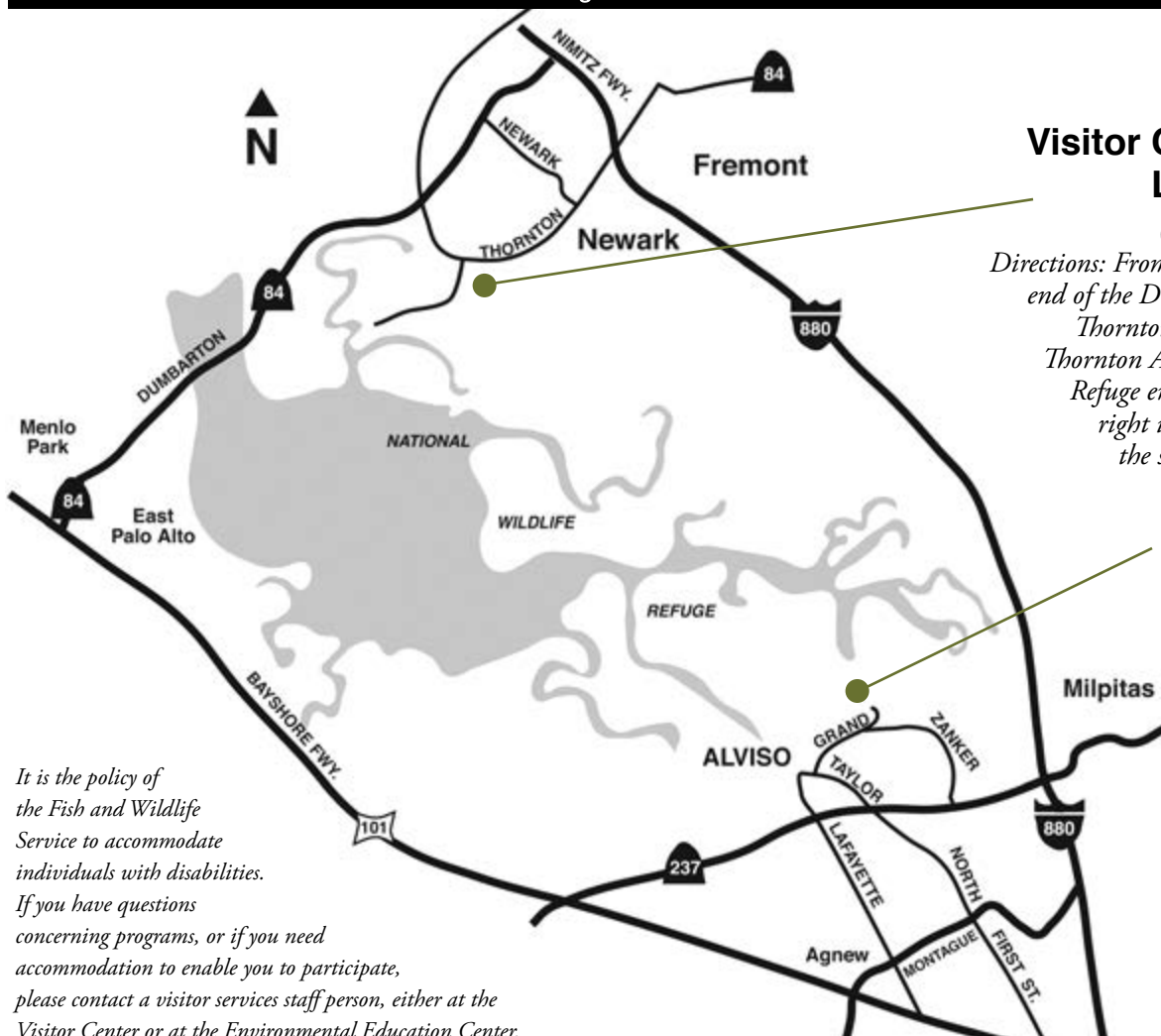
# Tideline



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Don Edwards / Antioch Dunes / 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.*