

Tideline



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

Managing Wetlands for Sea Level Rise

By Karen Thorne

It was hot. It was one of those days in the San Francisco Bay Area that, despite hot temperatures, had crystal clear blue skies and sparkling bay water. I had just hiked half a mile across the salt marsh from Highway 37 to the San Pablo Bay edge while carrying heavy survey equipment. I was standing next to my summer intern who was probably wondering what he signed up for during his summer in California.

We were on the water's edge of San Pablo Bay National Wildlife Refuge which is comprised of a large pickleweed carpet with a fluffy fringe of cordgrass. We had spent the day conducting plant surveys in the marsh and detailed bottom elevation surveys of the wetland surface to see if we could measure where specific plants occurred in relation to the tide and bottom elevations.

Little did I know that this pilot project at San Pablo Bay National Wildlife Refuge that looks at the potential impact of sea level rise on coastal wetlands and its wildlife inhabitants was going to grow into a Pacific coast-wide U.S. Geological Survey program.

Sea levels are rising and threatening to drown tidal wetlands and the wildlife that depend on them. As the global temperature increases our oceans absorb heat, causing the water to expand and ocean levels to rise. Warming air temperatures also melt land ice sheets and glaciers, adding more water to the ocean. These events together are what make our oceans rise, putting coastal ecosystems and human settlements at risk.

In San Francisco Bay, the National Oceanic and Atmospheric Administration



Elevation Surveys. Photo: USGS

have been tracking sea levels since 1897 and their data shows that at the Golden Gate Bridge ocean levels have risen more than 1/16 of an inch a year, about the thickness of three credit cards growth each year. Over the last 100 plus years, this has amounted to more than half a foot, with the rise accelerating in more recent years.

Our coastal wetlands can protect the land behind them from flooding by acting as sponges that absorb water during daily tides and storm surges. Wetlands also provide habitat for wildlife, but they are threatened by the rapid rate of sea level rise and human development. In most cases the

best response to sea level rise is to improve the ability of our wetlands to “keep pace.”

Wetlands have the ability to build or raise their elevation by trapping sediment and organic matter, which can help keep pace with rising ocean levels. If tidal marshes cannot build vertically fast enough to keep pace with rising sea levels, the wetland plants will drown and be converted to a mudflat or open water.

Sea level rise effects on tidal wetlands are many and can include deeper inundation during high tides, changes in tidal flow

continued next page

patterns and sediment transport, shoreline erosion, landward “uphill” migration of tidal habitats, changes in plant and animal species composition, and habitat loss.

In the eight years since that hot summer day, the wetlands of San Pablo Bay National Wildlife refuge have revealed they are vulnerable to drowning under rapid rates of sea level rise. We collected detailed elevation data in the field and compared it to a study done 13 years prior. What we found was that much of the marsh was

sea-level rise scenario (17 inches by 2100) did the wetland not completely drown, with some marsh habitats still present by 2100. Low sea level rise scenarios assume people will cut carbon dioxide (CO₂) emissions greatly over the coming decades. But, under mid (37 inches) and high (65 inches) sea level rise scenarios all marsh habitats were lost by 2080.

I remember the day I presented the results of this work to the U.S. Fish & Wildlife Service staff who administers the San Francisco Bay National Wildlife Refuge Complex. The looks on people’s faces are

Refuge they have embraced both of these strategies. For example, they are improving the functionality of a marsh by increasing tidal flow across the marsh surface, a process called channelization. This project is called the Sonoma Creek Enhancement Project, which is being led by the refuge, the Marin-Sonoma Mosquito Vector Control District, and the National Audubon Society. They dug new channels across the marsh surface, which can help plants grow for better habitat, remove standing water to reduce mosquito breeding habitat, and deliver sediment to the inner reaches of the marsh.

Sea level rise impacts on tidal wetlands also depend on wetlands’ potential to migrate landward, which can only happen if there are no barriers such as levees and roads nearby. Given appropriate slope, sediment supply and other factors, wetlands can migrate landward, preventing overall loss of these habitats. However, in San Francisco Bay, most areas have been altered by humans and the upslope areas are artificially restricted by buildings, roads or levees. Therefore, where possible, a good management strategy is to remove those barriers and allow wetlands to move into these adjacent and upland areas next to San Pablo Bay National Wildlife Refuge. This increases the acreage and connectivity of wetlands for wildlife and improves exchange of water and sediment.

In partnership with Ducks Unlimited, the U.S. Fish & Wildlife Service recently completed the Cullinan Ranch Restoration Project which reintroduced tidal flow to 1,500 acres of subsided farmland north of Highway 37. In January 2015 they sliced holes into the levee, bringing tidal water back to the area for the first time in over 100 years. During the course of the restoration this area will trap sediment, which will build up its elevation relative to sea levels. Wetland vegetation will then colonize, increasing the amount of marsh available for endangered wildlife and migratory birds.

More recently the Sear’s Point Wetland Restoration Project, which includes 1,500 acres of subsided farm lands, became the flagship for tying wetland restoration and climate change planning together. Ducks Unlimited, Sonoma Land Trust, U.S. Fish & Wildlife Service and their partners designed a plan to restore habitats. By doing so, they created a wetland buffer from rising sea levels and storm surges.

Part of that design included gradual sloped levees to provide wetland migra-



Endangered Salt Marsh Harvest Mouse. Photo: USGS

subsiding. It was losing elevation relative to ocean waters, which can cause die-back of pickleweed, the home of the endangered salt marsh harvest mouse.

We also learned that the slope of the refuge from the upper edge near the levee to the water’s edge was only 12 inches, and within that small range are different plant communities and animals. Any increases in sea levels could increase the flooding of this marsh, chase these animals out, and drown the plants.

Using all the site-specific information we had collected, we developed a computer model to see how the wetland habitats of the refuge could keep up with rising sea levels under three different possible scenarios: low amount of sea level rise, middle amount of sea level rise, and high amount of sea level rise. We found that only under the low

always the same; shock and dismay. What do you do when someone tells you that everything you care about is at risk of drowning?

But, these findings and others became a catalyst for the U.S. Fish & Wildlife Service and their partners to figure out how they can increase the wetlands’ ability to adapt to rising sea levels. There is no doubt that ocean waters are rising. The ability for wetlands to adapt is critical to support the wildlife habitats we love and to protect the infrastructure that humans have created such as homes and highways. Climate change strategies for marshes can include improving the wetlands you have so they have a better chance to keep up with sea level rise, and creating new areas for wetland habitat.

At San Pablo Bay National Wildlife

tion potential and a place for wildlife to go and survive during high waters. Islands of sediment called Marsh Mounds were constructed throughout the restoration to help trap sediment for the new marsh. The Marsh Mounds have the added benefit of providing habitat for birds.

Little did I know that summer eight years ago that our work on climate change was just beginning, and how our efforts would help guide the conversation about climate change adaptation planning. Our research emphasized the importance of wetland restoration and protection. By restoring new upslope wetlands and protecting the existing wetlands we are enhancing our natural defenses. We have a chance to protect wildlife habitats, recreational opportunities and our homes and cities too.

In the coming years, the U.S. Geological Survey will continue to monitor the San Pablo Bay marshes to see how things are changing with sea level rise. In 2012 we installed instruments on the refuge called Surface Elevation Tables (SETs) to monitor wetland elevations over time. The U.S. Geological Survey takes measurements four times a year. The data collected will allow us to determine if the wetland is keeping up



Spartina on mudflat. Photo: USGS

with sea level rise. Sea level rise and other climate change stressors will create greater challenges for our coasts, but there are actions we can take now to help support our

wetlands and wildlife.

Dr. Karen Thorne is a Research Ecologist with the U.S. Geological Survey, Western Ecological Research Center.

Connecting With Neighbors

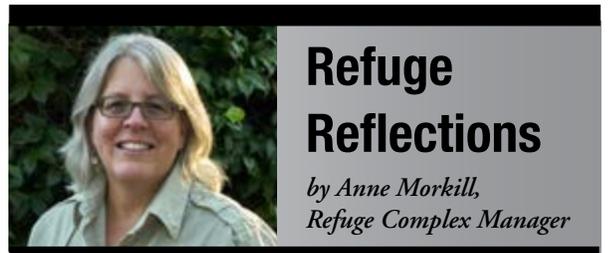
In the Winter 2014 *Tideline* issue, I wrote about the Fish and Wildlife Service's newest initiative to connect more meaningfully with our urban neighbors. With 80% of the U.S. population currently residing in urban areas, it is more difficult than ever to maintain the relevancy of wildlife and wild lands in the American conscience. The Service's Urban Wildlife Conservation Program strives to engage and inspire people who live in urban areas to become part of a conservation constituency, so that together we can leave a legacy of abundant and healthy wildlife and wild lands for future generations of Americans to enjoy.

The San Francisco Bay National Wildlife Refuge Complex has an outstanding opportunity to play a pivotal role in advancing the Service's Urban Wildlife Conservation Program goals. Our refuges, from the Antioch Dunes to the Salinas River, are virtually at the doorstep of millions of people living in ethnically and economically diverse communities that ring the San Francisco and Monterey Bay areas. Our refuges provide places for urban

dwellers to connect with nature, whether visiting for their daily walk, fishing from the shoreline, hunting waterfowl in the marshes, or participating in a docent-led guided walk or school field trip.

We are also exploring new opportunities to connect with urban audiences beyond our boundaries where you live – in your neighborhoods, schoolyards, parks, and green space – through place-based, outdoor experiences that foster connections with fish and wildlife and their habitats. Ultimately, the Service seeks to involve diverse urban audiences in nature-based experiences that move participants up a spectrum of engagement from nature awareness and comfort to conservation action and stewardship.

To do this, we must reach out to both our existing partners and foster new collaborations with community organizations that share our interest in conservation. The Service has launched a special Urban



Wildlife Refuge Partnership designation for partner-owned lands where we can highlight and celebrate the importance of these urban areas in creating a connected conservation constituency. The National Fish and Wildlife Foundation's Five Star and Urban Waters Restoration Program provides financial support for organizations and local governments that wish to engage in this new urban partnership. If you or your organization is interested in joining us in this endeavor, please contact me at anne_morkill@fws.gov. To learn more about the Urban Wildlife Conservation Program, visit the website at <http://www.fws.gov/urban/about.php>. See you outdoors!

Wildlife Passage at Warm Springs – A Win for Salamanders

By Ivette Loreda, Wildlife Refuge Specialist

Driving along Cushing Parkway, south of Auto Mall Parkway, I always scan both sides of the road to look at the lush grasses and inundated vernal pools. It has become a habit as I make my way across this section of road to the Warm Springs Trail entrance. How much water is in the pools? Are the vernal pool plants in bloom? Is the grazing program effective at keep the weeds at bay this year?

The Warm Springs Unit of Don Edwards San Francisco Bay National Wildlife Refuge (Warm Springs) is a 719-acre chunk of vernal pool grassland located in South Fremont. Vernal pools are rain-filled topographic depressions that fill with water during the winter rainy season and then completely dry out in the spring or summer. They are home to a highly diverse and largely endemic group of plant and animal species which are adapted to these extreme annual cycles. Three listed species are known to make their home here: the endangered Contra Costa goldfield and vernal pool tadpole shrimp, and the federally threatened California tiger salamander. Unfortunately, California's vernal pool ecosystems have been significantly fragmented and reduced in size due to urbanization and agricultural conversion.

If you have ever visited Warm Springs or driven along Cushing Parkway south of Auto Mall Parkway, you may have noticed something about this road which was completed in 2004. The 1800-foot portion of Cushing Parkway that bisects the Warm Springs Unit is *elevated*, a causeway of sorts. This gives drivers and pedestrians along Cushing Parkway, like me, a great view of the adjacent vernal pool grassland habitat throughout its changing seasons. But why was it built this way?

In the late 1990s Catellus Development submitted proposals to develop the area adjacent to Warm Springs now known as Pacific Commons. Catellus and the City of Fremont also proposed to extend Cushing Parkway from its terminus to connect with 880 on the south end, to allow access to the development from both sides.

The Pacific Commons development was determined by the U.S. Fish & Wildlife



Above: Cushing Parkway Top: California tiger salamander. Photo: John Cleckler/FWS

Service, the agency to review proposals that may affect sensitive wildlife species and habitats, to have a detrimental effect on vernal pool tadpole shrimp, Contra Costa goldfield, and California tiger salamander. In order to move forward with the development, Catellus needed to provide alternative habitat for the endangered species, and design a road that would minimize its impact on wildlife.

To combat that problem in the past, salamander tunnels were constructed under roads. Tunnels have had some success in channeling amphibian movements, but these have tended to be with smaller crossings.

The Cushing Parkway extension was proposed to be a four-lane road with dual bike lanes and pedestrian walkways! That's quite a stretch for a slow-moving animal. In addition, tunnels can have several issues that reduce their use by amphibians: they have

limited air movement and light, can flood, require maintenance of funneling fence, and can clog with debris.

Before a permit could be issued for expanding Cushing Parkway, the road must be partially elevated to allow for species movement under the road, minimize ecological impacts, and free passage for amphibians and other wildlife such as jackrabbits and ground squirrels to cross safely at Warm Springs. The result is a causeway that bisects the Warm Springs Unit from the original refuge lands to the south, and the vernal pool grassland to the north that Catellus restored in order to proceed with the Pacific Commons development.

So next time you drive over this section of Cushing Parkway and see the vernal pool habitat of Warm Springs, think of the wildlife dispersal and migration happening underneath. With careful planning, wildlife and humans can coexist in harmony.

Don Edwards San Francisco Bay National Wildlife Refuge presents

The Amazing Refuge Race

2 Marshlands Rd, Fremont
August 20, 2016 • 10:30 a.m. – 12:00 p.m.

Armed with GPS units, you and your team will “race” against other teams by attempting to complete required tasks on the refuge first. Teams will be given a set of coordinates where they must try to locate using a GPS unit. Once at that location, teams must work together to complete a task. When that task is completed, teams will receive the next set of coordinates. Those who complete all tasks and arrive at the finish first wins!

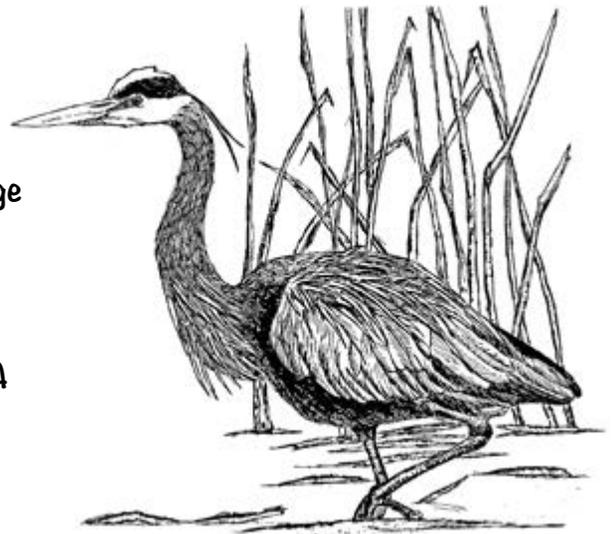
Intrigued? Go to http://www.fws.gov/don_edwards_san_francisco_bay or call Carmen at 510-792-0222 ext. 476 for additional information and rules. Don't have a GPS unit? Borrow one of ours.

Registration is required! You may register up to 5 people for your team. A minimum of 2 people per team. The refuge may place individuals on teams containing fewer than 5 people to ensure maximum participation. Registration deadline is August 17. Go to <http://amazingrefugerace.eventbrite.com> or call 510-792-0222 ext. 476. There is no cost to enter.

GPS Bootcamp by REI Outdoor School

Learn how to enter “System” and locate coordinates using a hand-held Global Positioning unit prior to the Amazing Refuge Race. We will have limited number of units to practice on. No reservations necessary.

When: August 20, 2016
Where: Visitor Center 2 Marshlands Rd, Fremont, CA
Time: 10:00 a.m. - 10:15 a.m.
Cost: FREE! No reservations necessary.



Volunteer Opportunities in Alviso: Summer 2016

Don Edwards San Francisco Bay National Wildlife Refuge

If you have an interest in wildlife and their conservation, enjoy working with people, and are enthusiastic and dependable, the refuge's Volunteer Program in Alviso 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, June 14

Tuesday, July 5

Saturday, July 23

Saturday, August 20

Tuesday, August 30

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



DON EDWARDS SAN FRANCISCO BAY NATIONAL WILDLIFE REFUGE ENVIRONMENTAL EDUCATION CENTER

Summer

FREE Marsh-In Summer Day Camp

2016

Live Animals, Outdoor Activities, Hikes, Crafts and Fun!

August 1-5

Monday- Bird Day!
Tuesday- Fish Day!
Wednesday- Mammal Day!
Overnight
Night hikes, star gazing, sleeping under the stars, and ice cream making!

**Grades 1-6 : Mon - Wed
9:15 am - 1:30 pm**

**Overnight (Grades 4 - 6)
Thursday 6:00 pm-
Friday 9:00 am**

Location:
1751 Grand Blvd, Alviso, CA 95002

Requirements:
Campers must be entering grades 1-6 in Fall 2016, provide their own transportation to and from camp, and attend ALL days of camp.

To Apply:
Download the application from our website. You can fill it out on the computer and email it to us or mail it. (See application form.)

Selections will be made by lottery--Applicants will be notified of their status by mail or email after July 1.
Applications due by June 30.

Visit us at
http://www.fws.gov/refuge/don_edwards_san_francisco_bay/

Questions?
(408) 262-5513 x100
genie_moore@fws.gov



Don Edwards Refuge Updates

Bair Island

After 16 years of planning and restoration work, the Don Edwards Refuge is pleased to announce that the inner Bair Island Trail is now open! To accommodate the breach in the levee to allow for tidal flow, the once loop-trail has morphed into two trails culminating at observation decks. The longer trail is 1.7 miles long while the other trail is 0.3 miles. Enjoy birdwatching, hiking, and bicycling year-round from sunrise to sunset. No pets please. Directions to the Bair Island trail and parking lot can be found on the refuge website at http://www.fws.gov/refuge/don_edwards_san_francisco_bay.

In addition to enjoying the trails, San Francisco Bay Bird Observatory and the Don Edwards Refuge have implemented a monitoring project that visitors can help with. We hope the mudflat created from the restoration will turn into pickleweed marsh, and the recently seeded banks of the levee with native plants will establish and grow. Help us document this change! Directions along with a bracket are located



A visitor participates in the #RestoreBair project. Photo: Carmen Minch/USFWS

near the start of the long trail. Take a photo and upload it onto Flickr, Instagram, or Twitter using the hashtag #RestoreBair1. Over time, photos taken will be compiled into a time-lapse video at sfbbbo.org/habitats.

Do you CitiSci?

CitiSci is short for citizen science! Many projects involving data collection are done using the help of citizens just like you, including the RestoreBair project mentioned above. The Don Edwards Refuge has a variety of projects that you can help with. Below is a list. More information on the project and how you can be involved can be found on the refuge website at http://www.fws.gov/refuge/don_edwards_san_francisco_bay/Citizen_Science.html

- Bird Monitoring at the Environmental Education Center in Alviso using the eBird app
- Documenting trash on the refuge and uploading findings using the Litterati app
- Phenology using Nature's Notebook

Weekly Guided Walks Scheduled for Tuesdays at Don Edwards Refuge in Fremont

From June 7 to August 30, the Fremont location at the Don Edwards Refuge will be offering guided walks on the Tidelands and/or LaRiviere Marsh Trail every Tuesday at 10 a.m. Walks will be 1.5-2 miles in length. We will meet in front of the Visitor Center at 2 Marshlands Rd. Bring a hat and water bottle.



Photo of trash captured on refuge. Photo: Carmen Minch/USFWS

Spray Painting for Conservation

Have you noticed green and yellow lines painted on certain islands while walking the Mallard Slough Trail in Alviso or the SF2 Trail in East Palo Alto? This is year two of the Caspian tern nesting project where decoys are deployed and sound systems in use to attract the terns to the nesting site. Earlier this spring, U.S. Geological Survey biologists painted lines to delineate the colonies better and to count the live birds more accurately.



Preparing the Caspian tern nesting site. Photo: USGS

Teen Environmental Art Show

at Don Edwards San Francisco Bay National Wildlife Refuge

Artwork will be on display from October to December, 2016

Open for students entering grades 7-12 in fall 2016 to submit their artwork for display!

All artwork should be submitted in one of the following categories:

- 1. Bay Area wildlife or plant life**
- 2. Bay Area ecological conservation**
- 3. Global ecological conservation.**

All entry forms are due September 1, 2016.

Entry forms and art show rules can be found at http://www.fws.gov/refuge/don_edwards_san_francisco_bay/

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 January 1, 2016 and March 31, 2016. These gifts will be used for publishing *Tideline*, capital, environmental education, habitat restoration, and interpretive programs at the San Francisco Bay National Wildlife Refuge Complex.

Yellow Bus Fund Donations

George & Beatrice Castro, Peggy Robinson

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Gloria Laird, Cindy Lockhart, Laura E Mello, Richard Rawson, Phillip Shinn, Varon Smith, Mark A & Kathleen Soulard

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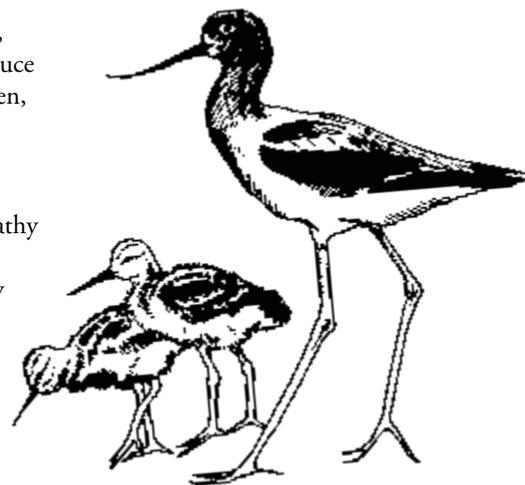
Michael Arneborn, B & John Bradley, Bill & Gladys Delameter, Alvin Dockter, Margaret S Eliot, James Kellenberger, Bruce Kelly, Robert W Kirby Jr, Donna H Olsen, Phillip Vallejo, L David Williams

Individual

Edward F Dowling, Lynne Fitzjarrell, Cathy Guernsey, Lynn P Hunwick, John B & Laura Jamieson, Katherine Jarrett, Penny Wells, Rose Mary Wright

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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.

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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| <input type="checkbox"/> \$35 Individual | <input type="checkbox"/> \$250 Sponsor |
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| <input type="checkbox"/> \$75 Supporter | <input type="checkbox"/> \$1,000 Leader |
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Check For credit card payment, please use PayPal at www.sfbws.com/donate.

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Thank you for your support!

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 Alviso 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
- Free book – *Exploring Our Baylands*
- The joy of giving in support of the protection of this important environment.

San Francisco Bay Wildlife Society Quarterly Message

Get Involved! Help Clean Our Watershed and Educate the Public

We will be partnering with the San Jose Conservation Corps to do a major cleanup of the southern portion of Don Edwards Refuge in Santa Clara County thanks to a \$39,000 grant received from the Santa Clara Valley Water District. In addition to the cleanup, the team will be using tablet computers to document what types of trash are found using the Litterati app (see litterati.org). Photos of trash will be used to develop a display with a call-to-action message to prevent litter pollution in the Bay. Volunteers are needed to work with the San Jose Conservation Corps. Look for announcements about volunteer days in fall 2016 to help remove trash. Additional financial donations are needed to help create the educational display. We will be hiring someone part-time to coordinate the efforts, projected to start in July/August until early winter. Please contact mary.deschene@sfbws.com if you are interested in helping in any way and join long term volunteers Larry and Marj Kastner to eliminate litter, one piece at a time.

Become a San Francisco Bay Wildlife Society Docent

We need a volunteer to lead tours or community service projects on the refuge. We often receive requests from companies wanting to offer their employees a team-building experience by learning more about the refuge or by participating in a group project (especially around Earth Day). As a San Francisco Bay Wildlife Society (Society) docent, you would give introductory talks and lead the groups on a guided walk or service project. Contact: mary.deschene@sfbws.com or 510-792-0222 ext.364.

Drawbridge, California: A Hand-Me-Down History

We are developing a new Drawbridge publication to replace the one we commissioned from O.L. "Monty" Dewey in 1989. The iconic structures at Drawbridge continue to remind us of what life was like a hundred years ago in our wetlands. To update the publication we would love to speak with someone who once lived there, whose relatives lived there, or have information. If you are that person or know someone who fits the bill, please write me at ceal.craig@sfbws.com. The new publication will also discuss the opportunities and challenges facing the South Bay's habitat restoration and impacts of sea level rise.

Conversations on the Trail

In January I represented the Society at a *Moving Friends Forward* conference held in the U.S. Fish & Wildlife Service's National Conservation Training Center (NCTC) in rural West Virginia just west of Washington D.C. Did you know that the Society was the second Friends group in the United States when it was formed in 1987? Along with 200 other Friends group members and U.S. Fish & Wildlife Service (Service) staff, we met for three days sharing ideas about programs, processes, and future plans for National Wildlife Refuges.

Francesca Demgen, President of Friends of San Pablo Bay National Wildlife Refuge (which includes championing Marin Islands and Antioch Dunes National Wildlife Refuges), and I developed a poster that we shared at the conference representing the Refuge Complex. I also shared a presentation on the collaborative efforts by the Society and Refuge Complex staff to help grow a more inclusive and diverse audience.

During the conference, we received



Ceal Craig with Puddles

41.5" of snow in less than 36 hours. Remember that big storm that hit the D.C. area in late January? We ended up staying two days later than planned. A skeleton NCTC staff kept us housed, warm, and fed. While snowbound, Friends volunteers and Service staff continued to share ideas and experiences, making the most of our time together until the roads were plowed well enough to leave. It was a memorable and productive experience. I discovered nearly all the Friends groups have similar challenges: finding volunteers for Nature Stores; building sustainable environmental education and interpretive programs that support refuge goals; engaging our total community; and finding the funds to make it all happen. All in all, an inspiring conference.

Want more? Check out www.sfbws.com and refugeassociation.org to learn more or for other ways to get involved. As always, we welcome your inputs. Send your thoughts to Ceal.Craig@sfbws.com

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

San Francisco Bay Wildlife Society Town Hall Forum

Saturday, July 9 1:30 p.m. - 2:30 p.m.

at the Environmental Education Center in Alviso

Share your ideas with the San Francisco Bay Wildlife Society. Open to San Francisco Bay Wildlife Society members and the public. As we prepare for our 30th anniversary in 2017, we want to learn more about what you want San Francisco Bay Wildlife Society to accomplish, and what is important to members. Short guided walk after the event, if desired. For more information or to RSVP, call 510-792-0222, extension 364.

Summer 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.

June

Saturday, June 4

Connections to Pier Fishing

Dumbarton Fishing Pier, Fremont
9:00 a.m. – 12:00 p.m.

Have you ever wanted to try fishing but didn't know how to begin? Learn the fundamental basics of catch-and-release fishing at the Dumbarton fishing pier! Discover the types of wildlife living in the San Francisco Bay, learn the safety and ethics of fishing, and then try your luck out on the pier with our fishing poles. All participants receive a free box with tackle. No fishing license needed. Space is limited to the first 50 people. Event is recommended for ages 5 and up. You must arrive at 9 a.m. to participate. REGISTRATION REQUIRED. Register at <http://donedwardsfishing.eventbrite.com> or call 510-792-0222 ext. 476.

Sunday, June 5

History of the National Wildlife Refuge System

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

Before heading out on your walk, learn about the national wildlife refuge system in this short talk by Art Garibaldi. Hear why and how the refuge system was created, and what makes it different than a park.

Saturday, June 11

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. Start with a slide show, 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 years and over with an adult are welcome. Space is very limited. RESERVATIONS REQUIRED. Go to <http://drawsummer.eventbrite.com>. Questions? Call Julie at 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.)

Fossils and Flumes

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

Fossils and flumes help to 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, and explain their function in nature. Interactive flumes allow for a hands-on experience of how the wetlands protect the surrounding area from flooding. An adult must accompany children. Call 510-453-6695 for reservations.

*Why Tides Matter

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

Docent Laurel Stell will talk and walk you through all things tides. What are they? How do they affect wildlife? How have humans reshaped the Bay's tidal lands? Program starts indoors but will move outside for an easy 0.5-mile walk. All ages are welcome. RESERVATIONS Go to: <http://tidesec.eventbrite.com>

Twilight Marsh Walk

Visitor Center, Fremont
7:30 p.m. – 9:15 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, June 18

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.

Jr. Refuge Ranger Program

Visitor Center, Fremont
11:00 a.m. – 12:30 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. Register at <http://donedwardsranger.eventbrite.com>.

Sunday, June 19

Bay Bike Ride

Meet at the Visitor Center, Fremont
10:30 a.m.

Go on an 11-mile bike ride with docent Gregg Aronson along Marshlands Road and on the

Shoreline Trail to observe birds and the occasional leopard shark! Pass through several habitat types along the way including salt marsh, salt pond, and the bay. The paved and dirt trails are almost flat and trail and hybrid bicycles highly recommended. Helmets are required. Recommended for more experienced bicyclists. Program cancels if it rains the day before and the day of due to mud. Register at <https://donedwardsbike.eventbrite.com> or call 510-792-0222 ext. 363 for reservations.

Saturday, June 25

*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.

Saturday, June 25-26

The GREAT American Campout

Environmental Education Center, Alviso
1:00 p.m. – 9:00 a.m.

Never camped before but looking to learn? Join us as we pitch a tent and campout for wildlife! You will learn the fine skills of the great outdoors with your family as you enjoy the wetlands of the bay. All camping gear is provided by Bay Area Wilderness Training whose primary goal is to get youth outdoors. No experience necessary or camping gear needed. Please check out the registration page for more information at <https://gaceec.eventbrite.com> Also learn more about the movement as you join CAMPIES <http://www.nwf.org/Great-American-Campout.aspx>. Questions? Call Julie at 408-262-5513 ext.104.

Sunday, June 26

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. 362. Led by Carmen Minch.

*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.

July

Sunday, July 3

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 Carmen Minch.

Saturday, July 9

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. Start with a slide show, 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 years and over with an adult are welcome. Space is very limited. RESERVATIONS REQUIRED. Go to <http://drawsummer.eventbrite.com>. Questions? Call Julie at 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.)

Sunday, July 10

*Bird Watching for Beginners

Visitor Center, Fremont

9:00 a.m. – 10:30 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.

Geology Rocks at Don Edwards Refuge

Visitor Center, Fremont

11:00 a.m. – 12:00 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? Want to know why some rocks look like layer cakes and others are bright orange? 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 and hand lenses are encouraged. Trail is 1.3 miles and family-friendly. Call 510-792-0222 ext. 141 for more information.

*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 <https://eectinydrifters.eventbrite.com>.

Saturday, July 16

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 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

7:30 p.m. – 9:15 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. 363. Led by Mary and Gene Bobik.

Sunday, July 17

Bay Bike Ride

Meet at the Visitor Center, Fremont

10:30 a.m.

Go on an 11-mile bike ride with docent Gregg Aronson along Marshlands Road and on the Shoreline Trail to observe birds and the occasional leopard shark! Pass through several habitat types along the way including salt marsh, salt pond, and the bay. The paved and dirt trails are almost flat and trail and hybrid bicycles highly recommended. Helmets are required. Recommended for more experienced bicyclists. Program cancels if it rains the day before and the day of due to mud. Register at <https://donedwardsbike.eventbrite.com> or call 510-792-0222 ext. 362 for reservations.

Saturday, July 23

*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. This hike runs rain or shine. Led by Steve Stolper. RESERVATIONS REQUIRED. Go to: <https://hikeeectrail.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext. 104.

*Going Green, the Restoration of the South Bay Salt Ponds

Environmental Education Center, Alviso

10:00 a.m. – 11:00 a.m.

Join an interpretive walk to photograph the wildlife and wetlands in the South Bay Salt Pond Restoration Project. Learn about wetland restoration and why we are doing it. Knowing the area will both increase your appreciation for the baylands and the ability to see them in whole new way. Discover plants and animals in its habitat and the best time to see them. Digital or film cameras welcome. Led by Joseph Garcia. Call 510-453-6695 for more information.

*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.

*Jr. Refuge Ranger Program

Visitor Center, Fremont

2:00 p.m. – 3:30 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. Register at <http://donedwardsranger.eventbrite.com>.

Sunday, July 24

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. 362. Led by Carmen Minch.

Saturday, July 30

*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.

Summer 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.

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.

Sunday, July 31

History of the National Wildlife Refuge System

Visitor Center, Fremont

1:00 p.m. – 1:30 p.m.

Before heading out on your walk, learn about the national wildlife refuge system in this short talk by Art Garibaldi. Hear why and how the refuge system was created, and what makes it different than a park.

August

Saturday, August 6

From the Ohlone to the Gold Rush

Environmental Education Center, Alviso

10:00 a.m. – 12:00 p.m.

How did the first settlers in San Francisco Bay change the natural environment and how did their culture and the culture of those who followed them irrevocably alter the natural landscape? For a new and challenging perspective on human development come join us. Program led by Laura Mello. RESERVATIONS REQUIRED. Go to: <http://ogreec.eventbrite.com> Questions? Call Julie at 408-262-5513 ext.104.

*Cullinan Ranch Walk

San Pablo Bay NWR

10:00 a.m. – 11:00 a.m.

Take a nature trail walk with Park Ranger Jose Garcia, and enjoy the abundant wildlife. Come see and be a part of the exciting transition. Learn about the breach of the levee and how the marsh

land develops afterward. Observe the wonderful views and myriad of birds moving in to the new habitats. A peaceful place to enjoy and learn. Cameras welcome. Location: Bayfront Expy and Marsh Rd Menlo Park, CA 94025. An adult must accompany children. Call 510-792-0222 ext. 141 for more information. Driving directions: The trailhead can only be accessed from westbound State Route 37. Head westbound on SR 37. Just after passing Walnut Ave at Mare Island, travel 3.3 miles to the Cullinan Ranch turn-off where a large wooden kiosk is located. There is a small parking lot. If coming from the west, you must drive past the trailhead 3.3 miles. Exit at Walnut Ave, turn around and head west on SR 37.

*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.

Volunteer Orientation

Visitor Center, Fremont

1:00 p.m. – 2:00 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.

Saturday, August 13

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. 363.

Sunday, August 14

* Wetlands Walking Tour

Environmental Education Center, Alviso

10:30 a.m. – 12:00 p.m.

Our refuge consists of salt marshes, salt ponds, tidal and non-tidal sloughs. How do humans and wildlife depend on our wetlands? Come enjoy a 0.5 mile walk through the wetlands, depicting the life and death struggles of our marsh inhabitants. Open to all ages, but best suited for ages 7 and up. Register at <http://eecwetlandstour.eventbrite.com>.

Bay Bike Ride

Meet at the Visitor Center, Fremont

10:30 a.m.

Go on an 11-mile bike ride with docent Gregg Aronson along Marshlands Road and on the Shoreline Trail to observe birds and the occasional leopard shark! Pass through several habitat types along the way including salt marsh, salt pond, and the bay. The paved and dirt trails are almost flat and trail and hybrid bicycles highly recommended. Helmets are required. Recommended for more experienced bicyclists. Program cancels if it rains the day before and the day of due to mud. Register at <https://donedwardsbike.eventbrite.com> or call 510-792-0222 ext. 362 for reservations.

Friday, August 19

Night Sky Party!

Environmental Education Center, Alviso

8:30 p.m. – 10:00 p.m.

Meet the stars of summer! 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://nightskysummer.eventbrite.com> Questions? Call Julie at 408-262-5513 ext.104.

Saturday, August 20

Why Tides Matter

Environmental Education Center, Alviso

10:00 am - 11:00 pm

Docent Laurel Stell will talk and walk you through all things tides. What are they? How do they affect wildlife? How have humans reshaped the Bay's tidal lands? Program starts indoors but will move outside for an easy 0.5-mile walk. All ages are welcome. RESERVATIONS Go to: <http://tide-seec.eventbrite.com>

GPS Unit Bootcamp by REI Outdoor School

Visitor Center, Fremont

10:00 a.m. – 10:15 a.m.

This GPS unit bootcamp led by REI Outdoor School. Data point entry and coordinate location is taught and practiced. Intended as a precursor for the Amazing Refuge Race. No reservations necessary. GPS units will be available for loan.

Amazing Refuge Race

Visitor Center, Fremont

10:30 a.m. – about 12:00 p.m.

Sign up to participate in the Amazing Refuge Race! Using a GPS unit, teams of five will “race” to the coordinates given and perform specific tasks. Once the tasks are completed, teams will be given another set of coordinates. First team to the finish line wins! Prizes will be awarded. Teams may use their own GPS unit, or borrow one of ours. Form your own teams or one can be assigned to you. Reservations are required! Go to <http://amazingrefugerace.eventbrite.com> or call 510-792-0222 ext. 476.

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. 363. Led by Mary and Gene Bobik.

Sunday, August 21

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. 362. Led by Carmen Minch.

*Returning the Tide at

San Pablo Bay NWR

Cullinan Ranch Trail, San Pablo Bay NWR

3:00 p.m. – 4:00 p.m.

After 125 years, the Cullinan Ranch Unit of San Pablo Bay National Wildlife Refuge is now receiving tidal flow from the bay. After a short talk about what the refuge hopes to accomplish with the restoration, we will take a walk to view the changes. Led by Carmen Minch. Register at <http://www.returningtide.eventbrite.com>. The trailhead can only be accessed from westbound State Route 37. Head westbound on SR 37. Just after passing Walnut Ave. at Mare Island, travel 3.3 miles to the Cullinan Ranch turn-off where a large wooden kiosk is located. There is a small parking lot. If coming from the west, you must drive past the trailhead 3.3 miles. Exit at Walnut Ave, turn around and head west on SR 37.

Saturday, August 27

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. Bring water, snacks, and appropriate clothing. This program is family-friendly and runs rain or shine. Led by Steve Stolper. RESERVATIONS REQUIRED. Go to <http://craftleather.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

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. Start with a slide show, 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 years and over with an adult are welcome. Space is very limited. RESERVATIONS REQUIRED. Go to <http://drawsummer.eventbrite.com>. Questions? Call Julie at 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.)

*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.

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.

Sunday, August 28

History of the National Wildlife Refuge System

Visitor Center, Fremont

1:00 p.m. – 1:30 p.m.

Before heading out on your walk, learn about the national wildlife refuge system in this short talk by Art Garibaldi. Hear why and how the refuge system was created, and what makes it different than a park.

Connections to Pier Fishing

Learn how to fish for free at the
Dumbarton Fishing Pier in Fremont!

Saturday, June 4

9:00 a.m. -noon

Space is limited to 50 people. All

equipment will be provided.

No fishing license needed.

Please come on time.

To register, go to

<http://donedwardsfishing.eventbrite.com>

or call 510-792-0222 ext. 362.

For more information, see page 10



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

Field Trips at Learning Center in Fremont

Wetland Round-Up Field Trip

Registration information for the 2016/2017 school year will be announced on the refuge’s website in August 2016.

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 Trips

Registration information for the 2016/2017 school year will be announced on the Refuge’s website in August 2016.

For questions contact Genie Moore, 408-262-5513, genie_moore@fws.gov.

Wetland Round-Up Field Trip Workshops

The workshop dates will be announced on-line with the Field Trip Registration information (see above).

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.

Summer 2016 programs are fully booked. For more information, and information about fall 2016, call the Living Wetlands Program Coordinator at 408-262-5513 ext. 102 or email her at livingwetlands@sfbws.com.

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

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. 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.

Due to funding restrictions: First priority will be given to schools in the following districts: Alum Rock Union Elementary, East Side Union High, Franklin-McKinley Elementary and San Jose Unified. Second priority will be given to schools in San Jose, Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino.

Programs for Colleges and Universities

Guided Field Trips are offered at the Environmental Education Center in Alviso. Programs generally last from 1 ½ hour – 2 hours. *Reservations must be made at least 8 weeks in advance of the desired field trip date.* Please contact Julie Kahrnoff, at 408-262-5513 ext. 104 or at Julie.kahrnoff@sfbws.com to make a reservation.

College Instructor-Led Tours are also 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 or Julie Kahrnoff, at 408-262-5513 ext. 104 or at Julie.kahrnoff@sfbws.com to make a reservation.

Application for 2016/2017 Transportation Funds

The Yellow School Bus Transportation Fund provided by the U.S. Fish and Wildlife Service and San Francisco Bay Wildlife Society was created to help Title 1 schools and schools with proven hardships to access 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 email genie_moore@fws.gov.

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 Julie to make a reservation and customize your visit at Julie.kahrnoff@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.

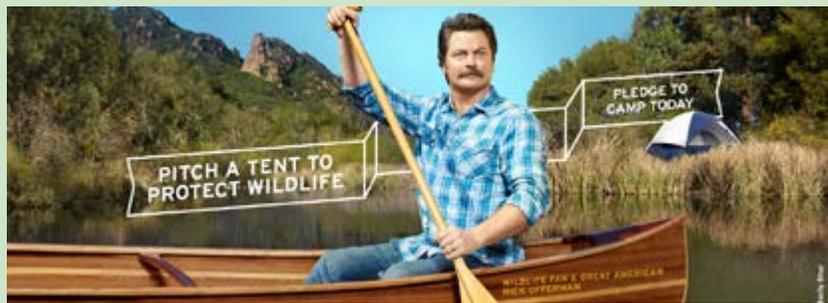
Youth Group Programs at the Refuge Headquarters in Fremont

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

Webelos Adventure Into the Wild Sunday, June 12 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.

Don Edwards San Francisco Bay National Wildlife Refuge
The Great American Campout
At the Environmental Education Center located 1751 Grand Blvd, Alviso
June 25, 1:00 p.m. - June 26, 9:00 a.m.



Learn how to camp! All equipment will be provided.
Register at <https://gaceec.eventbrite.com>

TIDELINE

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Editor: Carmen Minch

To receive *Tideline*, email 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.

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Deputy Project Leader: Chris Barr
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Farallon Refuge Manager: Gerry McChesney
Farallon Wildlife Refuge Specialist: Jonathon Shore
North Bay Refuges Manager: Don Brubaker
North Bay Wildlife Refuge Specialists: Melisa Amato and Louis Terrazas
Monterey Bay Refuges Manager: Diane Kodama
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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. Find us at www.sfbws.com.

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Tideline is On-Line Visit our web sites at

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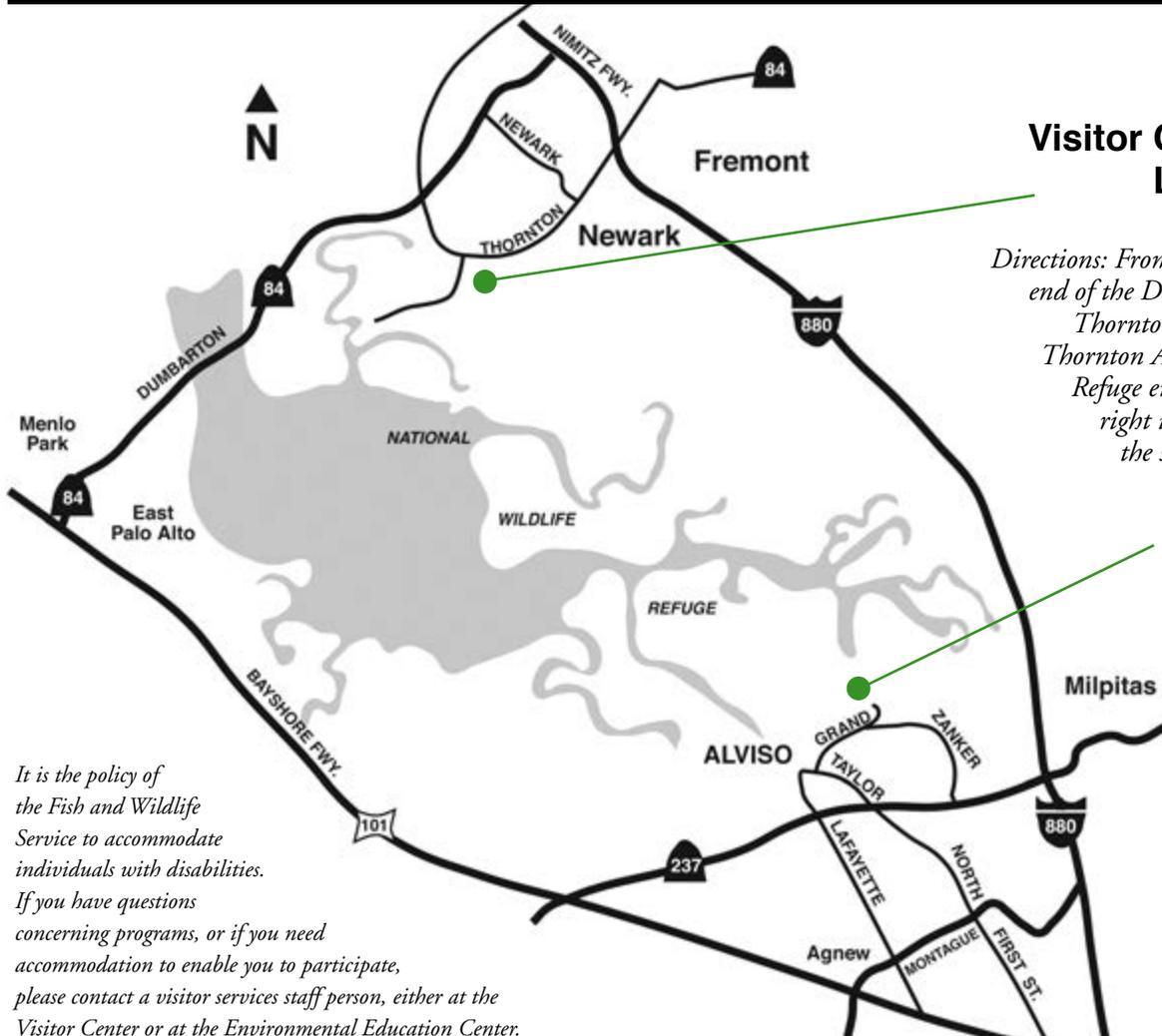
Tideline



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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.