

Tideline



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

The Coyote Hills – A Relic of the Age of Dinosaurs

By Bruce Rogers,
US Geological Survey (retired)

The Coyote Hills are located at the eastern end of the Dumbarton Bridge in the City of Fremont in southern Alameda County. The bulk of the hills are north of Highway 84, where a regional park is named after the hills. The smallest of the hills, located south of Highway 84, is where the San Francisco Bay National Wildlife Refuge Headquarters resides.

They form an irregular, linear ridge roughly parallel to the western Coast Ranges and eastern Diablo Range. Surrounded by a piedmont of grassy fields to the east and mixed marshland and salt evaporator ponds to the west, they look strangely out of place. No other natural hills in the east bay exist in such close proximity to the San Francisco Bay. Their rugged red, brown, and greenish rocks also look unlike most of the rocks forming the surrounding hills and mountains. These seemingly out of place and exotic rocks comprising the Coyote Hills, however, offer a glimpse into the far distant past of Central California.

To start, we must travel back to the dawn of the Age of Dinosaurs, nearly 200 million years ago. The Fremont and Newark area was then covered by the proto-Pacific Ocean. Underwater volcanoes poured black basalt lava out onto the ocean bed floor while masses of silica ooze slowly, accumulating in the adjacent, deeper ocean basins. All these rocks were originally deposited in tropical waters just north of the equator and perhaps several thousand miles southwest of their present location.

A great deal of time passed as the North American Plate pushed its way west, overriding the older ocean floor. The thin

sediment covering of the older ocean floor called the Farallon Plate, was scraped off as it was subducted (pushed under) the advancing North American Plate, then heated, squeezed, and generally mistreated.

Rather quickly, geologically speaking, some of these rocks that made up the Farallon Plate top-most layer, were thrust under the North American Plate, and then pushed back up to the surface. Further plate tectonic movements cracked, bent, and moved these large blocks of rock around the western edge of North America. Some were smashed against the then coast where they were welded into place about 70 million years ago.

Along the joint between these two plates, exotic rocks formed nearly 10 miles beneath the ocean were then “squeezed” up along the deeply reaching boundary faults and intruded into the already highly mish-mash of assorted rocks at coast side. Subsequently, more tectonic movements pushed up the Coast Ranges, similar to pushing up folds in a rug. These rocks have fascinated geologist for nearly 150 years. First mapped in San Francisco in the late 1800s, they were named the Franciscan Assemblage or Group after the San Francisco-founding Franciscans.

Before we go further into how the Coyote Hills became a “high tide” island (one surrounded by sea water only at high tide), we should take a quick look at the rocks themselves. The most common rock exposed in the hills is a dark greenish-black colored rock called greenstone.

Greenstone, denoted as “gs” on the geologic map (Figure 2), is basalt lava, common in such places as Hawaii. Originally poured out onto the ocean floor as pillow-shaped blobs (amazingly called pillow basalt) during



Figure 1. Radiolarian Chert by the Harrier Spur Trail at Don Edwards Refuge.
Photo: Jose Garcia

its convoluted migration to Coyote Hills, it was metamorphosed, squeezed, heated, and subjected to alkali fluids nearly 500 degrees Fahrenheit in temperature. Once welded to the coast, this pervasively fractured rock was deeply weathered to an ochery brownish-yellow color. Thin veins of milky quartz and white calcite deposited from hot water solutions encountered during its wild ride commonly pattern these rocks.

Nearly as plentiful as the greenstone, bright reddish-orange chert (Figure 1) makes up most of the higher hills and pin-nacled outcrops of the Coyote Hills. Chert started its life as silica accumulating on the floors of deep ocean basins. Literally billions

continued next page

of tiny silica-shelled animals called radiolarians lived, died, and sank to form a jelly-like ooze. Compressed for millennia, this ooze slowly turned into hard, brittle chert. Traces of iron and manganese give the chert its red, yellow, orange, blackish-blue, and green coloration. In many places, thin beds of manganese oxides remain between the chert layers as thin, glossy bluish-black coatings.

Less common is feldspar-rich sandstone called graywacke. In the Franciscan Assemblage, graywacke usually forms the bulk of the rocks, but here it is far less common. Most of these rocks are deeply weathered. One can also see graywacke by digging nearly 30 feet down to fresh rock where the original light gray color can be seen.

Very minor amounts of highly metamorphosed limestone, denoted as "Is" on the geologic map, deposited on the original offshore island chain have been found in the hills. The scraps of this white to rose-colored rock only occur in a few places in the Coyote Hills including the northwestern end and center of the range in Coyote Hills Regional Park. Limestone often contains tiny fossils used to date the rocks and to figure out their origin. This limestone, in contrast to the more common reef deposits, was formed atop of submerged mountains called seamounts. Hot water from the cooling basalt precipitated lime from the seawater to form the limestone. Relatively pure limestone is colored creamy white while those colored in various shades of red and pink have more iron impurities within it.

Let us return to the days of yesteryear and see just what became of the hodgepodge of rocks of slightly differing age and mode of origin. About 24 million years ago, the east-over-west motion of the North American Plate slightly diverged and a large splinter of the coastal apron (rock) was split off. The resulting fracture separating this large block from the rest of North America is now called the San Andreas fault system (Figure 3). The Hayward and Calaveras faults are part of this system. A host of small, shorter faults are also present, one being the Silver Creek fault that extends from the northeastern San Jose area north towards Hayward. This fault actually marks the eastern edge of the Coyote Hills. Because these hills that are so distinct from the surrounding rocks and structure, it is postulated that a similar fault marks the western edge of the hills.

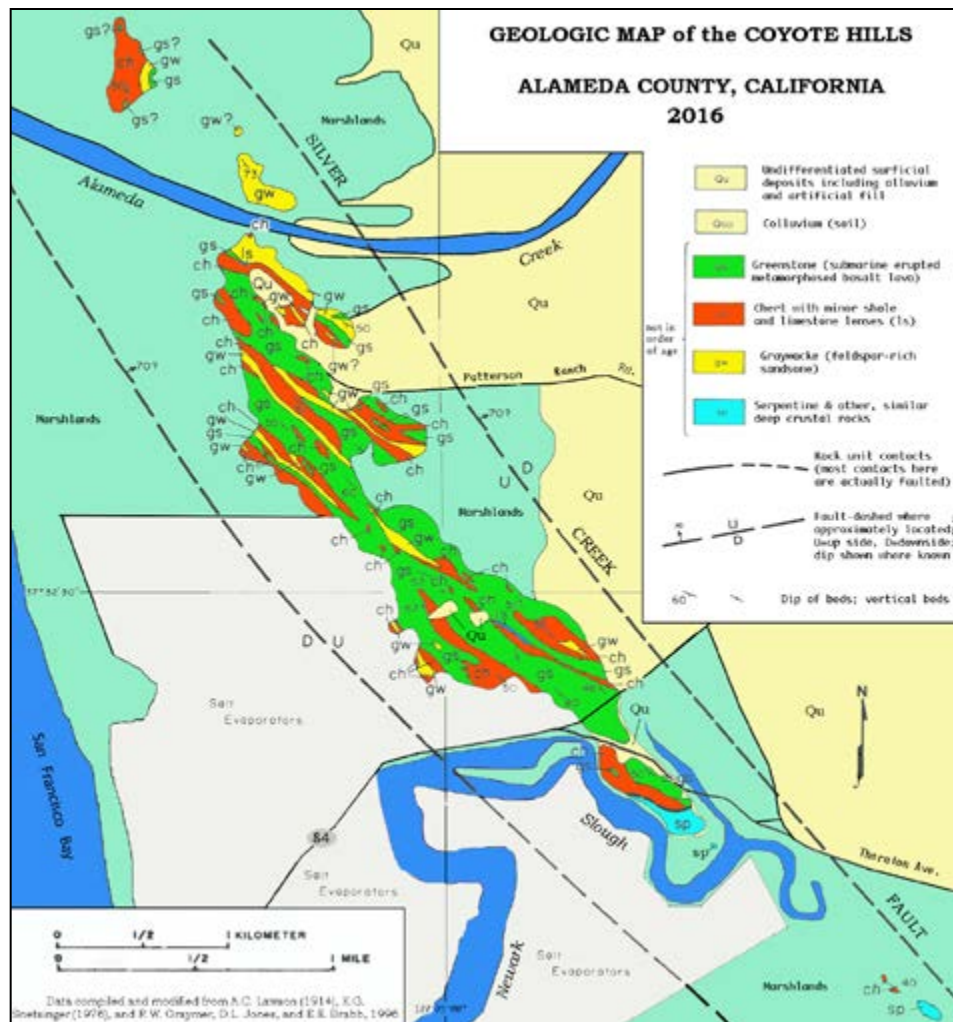


Figure 2. Geologic map of the coyote hills.

This package of former deep sea rocks are now considered one of 11 series of "terrane" or groups of similar rock groups in the San Francisco Bay Area and surrounding Central California geographic area. The greenstone-chert-graywacke combination of old ocean bottom rocks, is called the Marin Headlands terrane and extends from Coyote Hills north under San Francisco Bay, up through central San Francisco, and on into the Marin Headlands where it was first mapped by geologists nearly 120 years ago.

Sometime during all this shuffling of large plates of rock, deep crustal rocks made of dark green minerals were slowly extruded upwards along the nearly vertical faults as a plastic sheet. Partly metamorphosed by hot water solutions in the crust during their epic journey, the rocks were changed into bluish-green serpentine, California's State Rock.

This mass was intruded into the Marin Headlands terrane, as well as others, along the major faults separating the terranes from each other. Indeed, wherever you find serpentine, you are looking at a profoundly deep fault millions of years old. Waning heated water solutions added a final pulse

of magnesium-rich solutions, sprinkling thumb-sized bobbles of the orange to tan-colored mineral magnesite into the serpentine.

Once the Coyote Hills attained their final resting place, the forces of water and wind began their patient work of reducing them to low slopes adjacent to the San Francisco Bay. This, however, would take some time.

San Francisco Bay formed from a grassy valley about 12,000 years ago as slowly rising seawater from the melting of glaciers covered the aprons surrounding the hill. Saltwater marshes formed along the edges of the hills and extended outward nearly a mile into the bay. Slowly the adjacent slopes of the Diablo Range were eroded down to provide great quantities of sandy and silty sediment that Alameda Creek spread to nearly engulf the eastern shore of the Coyote Hills. As a result, the hills were formerly "high tide" islands, having a seawater moat during high tides.

The first peoples to occupy the area arrived about 10,000 years ago and, finding the climate and plentiful resources to their

liking, began to exploit these resources. Chert was used to make tools and weapons. Grinding pits for processing nuts and seeds were worn into both chert boulders and greenstone outcrops.

Modern settlers followed their predecessors and diked off marshlands to form salt evaporation ponds, creating the largest natural salt distillery in North America. In adjacent, drained marshes to the east of Coyote Hills, cattle ranches and dairy and vegetable farms thrived during the 1800s and early 1900s before everyone found the delightful climate of the Bay Area and moved in.

Modern developers, too, found the flanks of the Coyote Hills attractive and opened up several quarries to mine crushed rock aggregate for concrete. Indeed, the former Dumbarton Quarry once extended nearly 120 feet below sea level in its final stages.

So sit awhile atop the Coyote Hills and ponder the ages-old chain of events that raised a former ocean bottom to a new height. Delight in the rock colors, textures, and forms that, over the years, eroded to soils that provide a footing for the varied plants and animals that now inhabit the Don Edwards San Francisco Bay National Wildlife Refuge.

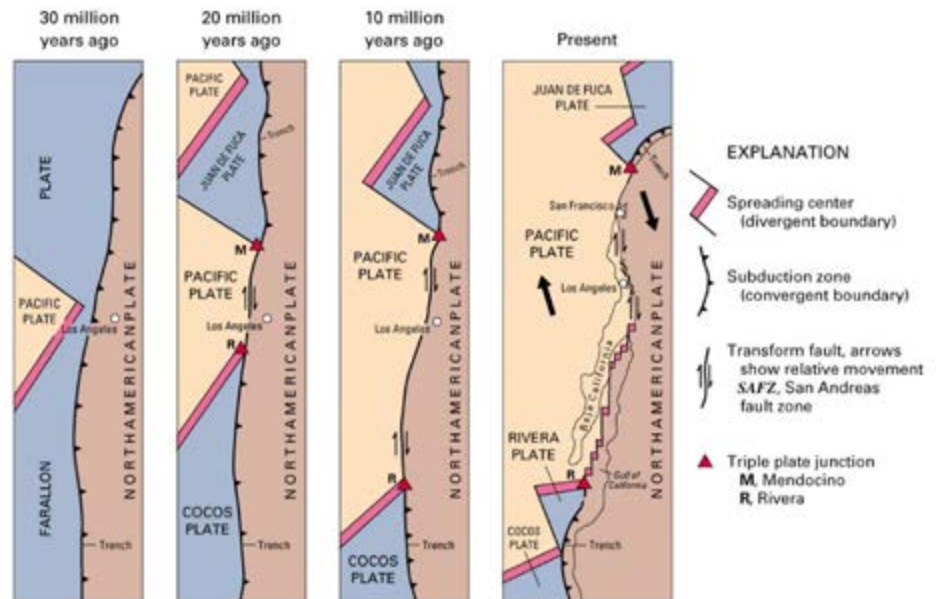


Figure 3. Formation of the San Andreas Fault system through time (from USGS Rocks and Geology in the San Francisco Bay Region Bulletin 2195).

Bruce Rogers began cave exploring in the wilds of New England in 1958. Since then he has explored the basements of North America from the Atlantic to the Pacific and from Alaska to the Guatemala border in addition to many of the islands of the Pacific Basin. Following college and a stint as an earth science consultant for four years, he took a posi-

tion as a field geologist at the US Geological Survey. After 33 years geologic mapping all over California, Nevada, Oregon, and New Mexico, and looking at and talking to rocks, he "retired." He now gives lectures; does geology walks, and writes articles, pamphlets, and books about earth science.

Birds Know No Borders

This year marks the centennial of the signing of the foundational treaty that recognizes and celebrates that migratory birds know no borders. On August 16, 1916, the United States and Great Britain (for Canada) signed the Convention for the Protection of Migratory Birds - also called the Migratory Bird Treaty. Ultimately this led to three more international treaties with Mexico, Japan, and Russia for the protection of migratory birds that travel among and inhabit these nations. These treaties connect the U.S. Fish & Wildlife Service with our federal, state, private, non-government, tribal, and international partners across a century of conserving, protecting, and managing migratory birds and their habitats.

Migratory birds connect people with nature and add beauty, sound and color to our daily lives, whether in an urban park or a remote wilderness area. They provide countless opportunities for enjoyment by birders, hunters, and outdoor enthusiasts, and they have cultural and spiritual importance. Protecting habitats for birds also ensures improved water quality, coastal

buffers (protection), ground water recharge, flood control, and many other benefits to society. Birds contribute other environmental benefits such as pollination, insect and rodent control, and seed dispersal. Birds also play a key role in the U.S. economy by supporting outdoor recreation such as bird watching, nature photography, and hunting that create jobs and generate billions of dollars in revenue for local communities.

Located along the Pacific Flyway, a virtual highway in the sky along which birds travel from as far as Alaska and Canada's arctic tundra to the neotropical forests of South America, the seven refuges in the San Francisco Bay National Wildlife Refuge Complex provide important nesting, roosting, and foraging habitat for a diversity of bird species throughout the seasons.

The Farallon Islands NWR hosts the largest seabird nesting colony outside of Alaska and Hawaii, and the Marin Islands NWR supports the largest heron and egret

rookery in San Francisco Bay. Hundreds of thousands of waterfowl and shorebirds visit the tidal marshes and salt ponds of the Don Edwards San Francisco Bay and San Pablo



Refuge Reflections

by Anne Morkill,
Refuge Complex Manager

Bay NWRs. Coastal dunes on the Salinas River NWR provide critical nesting habitat for the western snowy plover. A diversity of birds utilize the remnant sand dunes and riparian zone on the Antioch Dunes NWR, as do many species seeking food and cover in the oak woodlands and freshwater sloughs on the Ellicott Slough NWR. Join us in the coming months for a variety of programs and events where you can learn more about migratory birds!

Open House

October 9-15 is National Wildlife Refuge Week!

On October 15, drop by the refuge to view critters that live in the sloughs and mud that form the basis of our food chain, see the beauty of San Francisco Bay by going on a Bay Bike Ride, or take a relaxing stroll at dusk to view the setting sun. Take part in some or all of the activities listed below. Go to page 11 for more information.



October 15, 2016

- Native Plant Sale
- California Jr. Duck Stamp Winners Display
- Bay Bike Ride
- Introduction to Nature Drawing with Linda Knoll
- Plankton and Mud Lab
- Live Bird Show with Sulphur Creek Nature Center
- Twilight Marsh Walk

Visit our website at http://www.fws.gov/refuge/don_edwards_san_francisco_bay

Introduction to Nature Drawing with Linda Knoll

Date: Saturday, October 15

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

Where: 1 Marshlands Rd, Fremont. Follow the signs to the outdoor pavilion

Bring a sketchpad and other art materials if you have them.

We will also have some for you to borrow.

For more information, go to page 11.

Register at: <http://DrawingNature.eventbrite.com>



Sponsored by the San Francisco Bay Wildlife Society

LIVE BIRD SHOW

WITH SULPHUR CREEK NATURE CENTER



Sean Liu



Ansate Jones



Ansate Jones

OCTOBER 15, 2016 • 2 P.M. - 3 P.M.

1 MARSHLANDS RD, FREMONT. FOLLOW THE SIGNS
TO THE OUTDOOR PAVILION.



REGISTER AT [HTTP://LIVEBIRDSHOW.EVENTBRITE.COM](http://LIVEBIRDSHOW.EVENTBRITE.COM)

SPONSORED BY THE SAN FRANCISCO BAY WILDLIFE SOCIETY

Sale of Native Plants

Saturday, October 15

10:00 a.m. - 2:00 p.m.

2 Marshlands Rd, Fremont



Time to landscape your yard before the rains start with drought-tolerate, native plants from the San Francisco Bay Area. Create habitat for pollinators and birds.

For driving directions to the Don Edwards San Francisco Bay National Wildlife Refuge, log on to http://www.fws.gov/refuge/don_edwards_san_francisco_bay/drivingdirections.html

Sold by the San Francisco Bay Wildlife Society

Trash Birds? Foraging Ecology of Central Coast Western Gulls (*Larus occidentalis*)

By Scott A. Shaffer, Associate Professor of Biology, San Jose State University

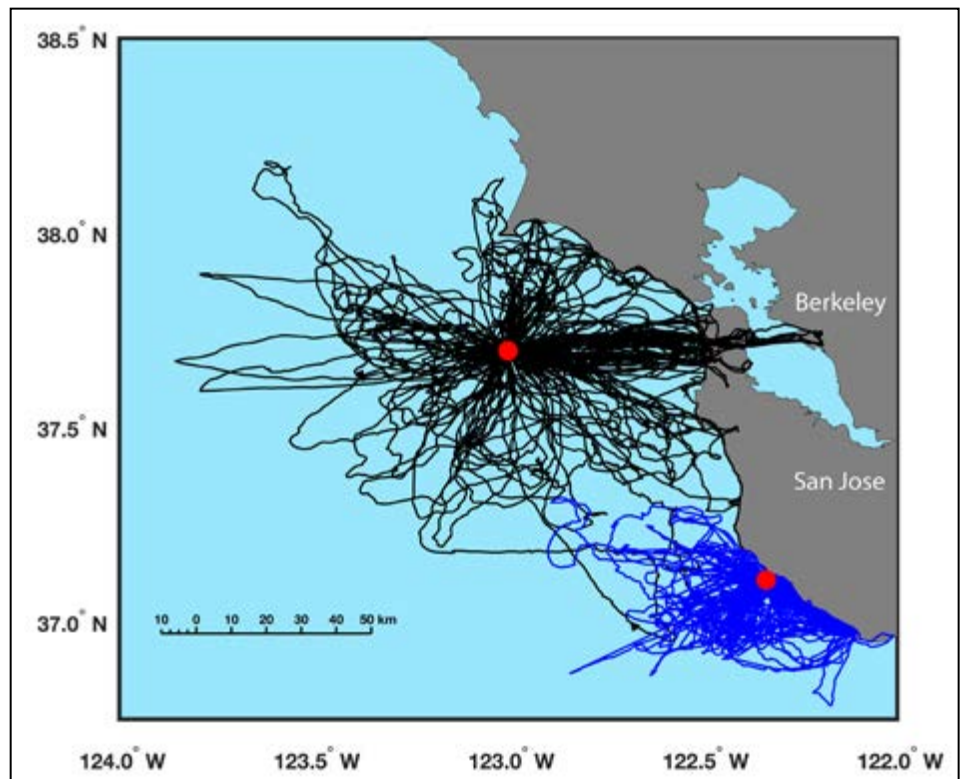
The first impression that typically comes to mind when someone mentions the word 'seagull' is 'trash bird', 'rats with wings', or those flocks of birds that arrive in the 9th inning at AT&T Park to help clean up. However, the word 'seagull' is not really correct because not all gulls (birds of the family Laridae) live around the sea. Nevertheless, western gulls (*Larus occidentalis*) are one of the most conspicuous birds found throughout coastal California. In fact, the San Francisco Bay region is home to the largest breeding colony.

Located 30 miles from the Golden Gate Bridge, Southeast Farallon Island has a breeding population that can exceed 20 thousand birds. There are additional colonies at Año Nuevo Island (San Mateo coast) and Alcatraz Island (San Francisco Bay) but these colonies are much smaller by comparison. The proximity of these colonies to the mainland, combined with the fact that western gulls are considered generalist predators with a really broad diet, puts them in frequent contact with urban centers along the coast.

This raises a number of interesting questions like, do all western gulls feed in the city or is that gull stealing your hotdog at Fisherman's Wharf just passing through to somewhere else? Do gulls from different colonies feed at the same places along the coast or does each colony have its own selection of sites? How often do western gulls



A western gull with a GPS data logger taped to its tail feathers (black object at start of tail). The logger weighs about 20 grams and the gull carries it for 4-6 days. Photo by Emma C. Kelsey 2014.



Flight paths of western gulls tracked using GPS loggers from Southeast Farallon Island (black lines) and Año Nuevo Island (blue lines). Red dots denote the colony locations for each population.

feed at sea versus making a trip to the local landfill? With recent advances in technology (e.g. like the mini GPS chip in your smart phone), it is now possible to answer some of these questions. You may be surprised by what we've learned.

Collaborating with Point Blue Conservation Science and the Farallon National Wildlife Refuge, we compared the foraging ecology of western gulls at Southeast Farallon Island and Año Nuevo Island. Gulls were captured at their nest and equipped with 20 gram GPS data loggers attached to four tail feathers using waterproof tape.

After four to eight days, gulls were recaptured and the tag removed. Overlap in foraging sites between colonies was relatively minor. Gulls breeding at the Farallon Islands foraged at sea more often (nearly 70% of trips) than feeding in the city but this trend was opposite at Año Nuevo Island (71% went to a site on land). Typical foraging trips away from the colony lasted three to four hours and gulls often flew 30-45 miles roundtrip.

However, when traveling all the way to Oakland, several gulls flew more than 90 miles roundtrip. Frequent destinations of Farallon gulls included Lake Merced, Recology San Francisco waste center (near Candlestick Point), and Waste Management in Oakland. Gulls from Año Nuevo frequented the Santa Cruz Resource Recovery Facility and several creek mouths along the coast. Overall, western gulls spent about half the time foraging at sea as they did on land (48% vs. 52%, respectively) but the foraging patterns differed markedly between colonies.

So, why study the foraging ecology of western gulls? Quite simply, gulls are a vital link for nutrient transfer between marine and terrestrial ecosystems and their capacity to feed at refuse sites in urban environments possibly subsidizes gull populations with unintended consequences (e.g., transport of garbage and contaminants).

Comparison of gulls with other locations like Alcatraz Island and colonies in southern California and Oregon are underway and more results will be forthcoming in the next year.

Sixteen-Year-Old Wins Best of Show in 2016 California Junior Duckstamp Contest, Then Takes National Award Competing With 27,000 Young Artists

By Pam Bierce, External Affairs, Pacific Southwest Region

“It was April Fool’s Day, so naturally my reaction was disbelief at first,” says 16-year-old Stacy Shen, describing her initial reaction to winning Best of Show in the California Junior Duck Stamp Art and Conservation Contest.

Shen’s color pencil drawing of a pair of Ross’s geese was one of over 5,000 entries in the 2016 contest held earlier this spring at the Sacramento National Wildlife Refuge.

However, winning in California was only the beginning for the Fremont, California, native. Shen’s artwork also was selected by a panel of judges to appear on the 2016-17 Federal Junior Duck Stamp, placing first among over 27,000 national entries.

“It was such a shock; I didn’t expect it at all and never thought about being able to win it nationally,” Shen says. “Through my five years of participating in this contest, it had always been something that has been far away, something that someone else would get.”

Shen, along with the National Duck Stamp winner, Joe Hautman, were re-

cently honored by the U.S. Fish & Wildlife Service, U.S. Postal Service and Bass Pro Shops at the first day of sale ceremony held earlier this month in Springfield, Missouri. All funds from Duck Stamp sales go to environmental education programs, and increase the opportunities for wildlife education and habitat conservation across the U.S.

Shen’s favorite part of the contest, other than drawing beautiful birds, is the conservation aspect.

“It’s great knowing that I get to pursue my passion while raising awareness and funds for waterfowl and habitat conservation,” she says.

She specifically chose to draw two Ross’s geese because of their simple snowy plumage that she feels allows for both elegance and a dramatic contrast. “White can be graceful and playful, and I was able to utilize the background to show that. Overall, Ross’s geese give the piece a serene, vibrant effect,” Shen says.



Stacy Shen, national Junior Duck Stamp artist, poses with Joe Hautman, 2016-2017 Federal Duck Stamp artist at the first day of sale event at the Bass Pro Shops Outdoor World, Springfield, Mo

Meet National Jr. Duck Stamp Contest Winner Stacy Shen!

Date: Saturday, October 15
Where: Don Edwards San Francisco Bay National Wildlife Refuge
 Newark Slough Learning Center, Fremont
 Down the hill from the Visitor Center
Time: 1:00 p.m. - 1:45 p.m.

You are invited to meet and greet award-winning artist Stacy Shen and view her winning entry into the Federal 2016 Jr. Duck Stamp contest. All California winners from the contest will also be on display.

Stacy will be on hand to sign the Jr. Duck Stamp available for \$5 at the day of the event. Proceeds of the sale goes toward environmental education.

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 April 1, 2016 and June 30, 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.

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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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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

Volunteer Opportunities

Volunteers are needed to operate the Nature Stores and the visitor information desk at the Fremont Visitor Contact Station (Contact Station) and the San Jose Environmental Education Center (Education Center). We are also seeking volunteers to help with an exciting cleanup program in Santa Clara County for which the San Francisco Bay Wildlife Society (Society) received a grant. Reach out to Mary.Deschene@SFBWS.com, 510-792-0222, ext. 364 for more information or dates! Look for more volunteer positions as we plan for the future, see below.

Challenges Ahead

Earlier this year, a new effort spearheaded by Fish & Wildlife Service Education Center Director Genie Moore was aimed to develop a Visitor Services strategic plan for the Don Edwards San Francisco Bay NWR. Two staff and one volunteer from the Society worked alongside Fish & Wildlife (FWS) staff and a community leader for many hours to develop a work plan that would incorporate the goals from the refuge's Comprehensive Conservation Plan, the FWS Standards of Excellence and the Next Generation Science Standards being implemented in California schools. The desired outcome was an action plan that is SMART (specific, measurable, achievable, relevant, and timely) and sustainable to be used in natural resources management plans to be developed in the coming year for the Refuge Complex. However, FWS staffing losses have proved to be a challenge and the Society has decided to suspend its direct involvement in this effort and focus instead on primary program priorities for Living Wetlands and Watershed Watchers programs.

FWS personnel losses in recent years have become constraints affecting the facilities and services available to the public. For more than 20 years, our partners (City of San Jose and Santa Clara Valley Urban Runoff Pollution Prevention Program) have fiscally supported employees to allow the Education Center to be open on weekends now supplemented by a FWS intern on a few Saturdays each month. With additional recent FWS staff reductions, the FWS and Society cannot keep the Education Center or the Fremont Contact Station open on

Saturdays and Sundays consistently. The Society did not support this decision to reduce services and we shared our concerns about fewer programs and lost Nature Store revenue.

After much discussion, FWS and the Society have agreed to close the facilities on Sundays until further staffing is available, and to keep the rest of the days the same. Check the refuge's website for more details.

We look forward to your inputs on this significant change: take our survey at <https://www.surveymonkey.com/r/SFBWS-Survey2016>.

Current Projects

The Board of Directors is moving through a strategic planning process to develop goals for the upcoming years, and to migrate the organization into a Friends organization for the Refuge Complex. In particular, we want to broaden our focus to include the needs of the four refuges within the Refuge Complex that the Society supports (Don Edwards San Francisco Bay, Salinas River, Ellicott Slough, and Farallon NWRs), and maintain a fruitful collaboration with the Friends of San Pablo Bay who assist the other three refuges in the North Bay (San Pablo Bay, Marin Islands, and Antioch Dunes NWRs).

Much is happening around San Francisco Bay such as the next phase of the Salt Pond Restoration efforts at the Eden Landing ponds in Hayward; Measure AA and its impacts on upcoming restoration efforts; the Shoreline Levee Project; habitat restoration and associated studies; environmental education and stewardship projects; recreational improvements such as interpretive mobile apps; and much more.

Future Ideas

July 30, 2017 marks the 30th anniversary of the San Francisco Bay Wildlife Society. How would you like to celebrate this milestone? We would like to connect with long-term and new members to hear your reasons for supporting the organization, and your ideas about its future.

On July 9, we had a Town Hall Forum to gather ideas from members and the public for the Society's next 10 years. The full notes from the meeting are up on the SFBWS.com website blog.

A sampling of the ideas generated were:

potentially developing long-term partnerships with Alameda and San Mateo county agencies/cities to fund environmental education and interpretive programs (similar to the partnerships we currently have with the City of San Jose and Santa Clara Valley Urban Runoff Pollution Prevention Program); becoming involved in the Urban Wildlife Conservation Program, a Refuge Complex priority; dealing with the challenges and constraints that stems from lower FWS staffing levels at the Refuge Complex; and ways to expand the Nature Stores as a means to raise funds for Refuge Complex programs.

Need more? Check out www.sfbws.com and refugeassociation.org on other ways to get involved or to learn more. As always, we welcome your inputs. Send your thoughts to [Ceal\[dot\]Craig\[at\]SFBWS\[dot\]com](mailto:Ceal[Craig]@SFBWS[dot]com)

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

New Hours at the Visitor Center in Fremont and Environmental Education Center in Alviso

Effective September 1, 2016

Visitor Center in Fremont:

Wednesday-Saturday,
11 a.m. – 4:30 p.m.

Federal Holidays: Closed

Environmental Education Center in Alviso:

Saturday, 10 a.m. - 4:30 p.m.

Monday-Friday/Non-Field Trip
Days: Open 9 a.m. - 4:30 p.m.

Monday-Friday/Field Trip Days:
Closed

Federal Holidays: Closed

Trails remain open sunrise
to sunset.

Autumn 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.

September

Saturday, September 3

*Marshlands of Dreams

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



*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, September 10

Twilight Marsh Walk

Visitor Center, Fremont
6:00 p.m. – 7:45 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.

Skaggs Island Bike Day

San Pablo Bay NWR
10:00 a.m. – 2:00 p.m.

Come join us to bike the 8-mile loop of Skaggs Island, which is normally closed to the public. Hear about the island's fascinating past, present management, and future plans for restoration at strategic stops. Bring your bike (hybrid bike highly recommended), sunscreen, helmets (required) and water. Bike path is mostly paved with some gravel surfaces. A chemical toilet is available at the beginning of ride. For more questions, please call Melisa Amato at 707-769-4200 ext. 102.

Saturday, September 17

Coastal Cleanup!

Dumbarton Bridge Parking Lot, Fremont
9:00 a.m. – 12:00 p.m.

Join thousands of people around the world for International Coastal Clean-Up Day. Bring a hat, sturdy shoes, water, sunscreen, and gloves if you have them. No reservations needed. All groups welcome. For more information, contact Paul Mueller at 510-792-0222 ext. 361.

Saturday, September 24

Drawbridge Van Excursion

Environmental Education Center, Alviso
10:00 a.m. – 12:30 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 scabbling 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://draweec.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.)

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.

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.



October

Saturday, October 1

BAY DAY at Inner Bair Island

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

Bair Island is now open! 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 west toward the bay. The road winds 0.5 mile becoming East Bayshore, then Bair Island Road. 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>. Questions? Call Julie at 408-262-5513 ext.104.

BAY DAY Litter Poster Making

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

Using paper cuts, found plastic debris and photography, create a poster on how to protect our watershed, including our bay. This workshop is led by Michele Guieu who is exhibiting her installation "Coastal Clean Up" at the Education Center for the summer. Please bring your smart phone and/or tablet, and please download the free app PicCollage before coming. Thank you! Age 7 and up please. RESERVATIONS REQUIRED. Go to: <http://baydaylitter.eventbrite.com>. Questions? Call Julie at 408-262-5513 ext.104.

BAY DAY Bike Ride

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

Every day is Bay Day! See the beauty of San Francisco Bay by taking a 4.5-mile bike ride that winds around Mallard Sough and ends up at Coyote Creek overlooking Drawbridge. See how wetland restoration benefits the San Francisco Bay and the overall ecosystem. Bring your hybrid or mountain bike, water, helmet, and sense of adventure. You'll never know what you'll see. Led by Steve Dill. Register at <http://baydaybikeride.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.

Friday, October 7

Night Sky Party!

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

Meet the stars of Fall! 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 Julie at 408-262-5513 ext.104.

Saturday, October 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.

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. 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>.

October 9-15, 2016 is National Wildlife Refuge Week!

Saturday, October 15

Native Plant Sale

Visitor Center, Fremont
10:00 a.m. – 2:00 p.m.

This is your chance to purchase that perfect native plant to add to your garden! Whether you're looking to re-landscape your yard with drought-resistant plants, or you want to create habitat for neighborhood birds and butterflies, this is the place to be!

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.

Jr. Duck Stamp Display – California Winners

Learning Center in Fremont
Down the hill from the Visitor Center
10:00 a.m. – 3:30 p.m.

Marvel the winning artwork from youths from all over California. Stacy Shen's (of Fremont) rendition of Snow Geese was entered into the national Jr. Duck Stamp contest and took the top prize! Stacy's artwork is featured in this season's Federal Jr. Duck Stamp. Meet and greet Stacy from 1:00 p.m. -1:45 p.m. and have her sign your Jr. Duck Stamp! Stamps are \$5 each and goes toward environmental education programs across the United States.

Introduction to Wildlife Drawing with Linda Knoll

Learning Center, Fremont
Down the hill from the Visitor Center
11:00 a.m. – 12:30 p.m.

Join children's book illustrator, Linda Knoll, at a wildlife drawing session for the whole family. You'll learn how to look at birds and animals, draw their shapes and add details in a colorful painting using wax pastels. Linda will share her picture book *Over in the Valley* which features animals native to Central California. Register at <http://DrawingNature.eventbrite.com>. Sponsored by San Francisco Bay Wildlife Society.

Meet and Greet National Jr. Duck Stamp Winner Stacy Shen

Learning Center, Fremont
Down the hill from the Visitor Center
1:00 p.m. – 1:45 p.m.

Local teen Stacy Shen took top honors in the National Jr. Duck Stamp art contest! Meet this incredible young woman, see her winning entry, and have her sign your Jr. Duck Stamp! Stamps are \$5 each and goes toward environmental education programs across the United States.

Live Bird Show with Sulphur Creek Nature Center

Learning Center, Fremont
Down the hill from the Visitor Center
2:00 p.m. – 3:00 p.m.

Take this opportunity to see live birds up close. Learn the behavior and habits in the wild by this fascinating presentation by Sulphur Creek Nature Center. Register at <http://livebirdshow.eventbrite.com>. Sponsored by San Francisco Bay Wildlife Society.

Mud and Plankton Labs

Learning Center, Fremont
Down the hill from the Visitor Center
12:00 p.m. – 2:00 p.m.

Tiny organisms are drifting in our bay and sloughs, and living in the mud. Learn the different characteristics of plankton and invertebrates and how they have adapted to survive. We will collect water samples and mud samples to identify these organisms under a microscope. All ages welcome.

Twilight Marsh Walk

Visitor Center, Fremont
5:30 p.m. – 7:15 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://donedwardstwillight.eventbrite.com> or call 510-792-0222 ext 362. Led by Mary and Gene Bobik.

Saturday, October 22

Drawbridge Van Excursion

Environmental Education Center, Alviso
10:00 a.m. – 12:30 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://draweec.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.)

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, October 29

*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.

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.

Autumn 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.

*Bird Watching for Beginners

Visitor Center, Fremont
3:00 p.m. – 4:30 p.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.

Pacific Flyway

SF2 Trail, Menlo Park
4:00 p.m. – 5:30 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 Julie at 408-262-5513 ext. 104.

November

Saturday, November 5

*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.

*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.



* 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, November 12

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.

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 <https://marshwalk.eventbrite.com>

*Returning the Tide at San Pablo Bay NWR

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

Pacific Flyway

SF2 Trail, Menlo Park
1:00 p.m. – 2:30 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 Julie at 408-262-5513 ext. 104.

Twilight Marsh Walk

Visitor Center, Fremont
4:00 p.m. – 5:45 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://donedwardstwillight.eventbrite.com> or call 510-792-0222 ext. 363. Led by Mary and Gene Bobik.

Saturday, November 19

*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.

Restoring Inner Bair Island Walking Tour

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

Bair Island is now open! 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 west toward the bay. The road winds 0.5 mile becoming East Bayshore, then Bair Island Road. 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>. Questions? Call Julie at 408-262-5513 ext. 104.

Saturday, November 26

*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.

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.

“Exploring Our Baylands” Book Review

by Roy Sasai, San Francisco Bay Wildlife Society Volunteer and San Francisco Bay National Wildlife Refuge Complex Docent

Exploring Our Baylands by Diane R. Conradson, Ph.D. is a well-written, concise book (only 69 pages) packed with information regarding the history and ecology of the San Francisco Bay Area. The book begins with the formation of the San Francisco Bay through seismic and glacier activity. The bay has gone through several transformations and the bay we see today is only 2,000 years old. At one time, the California coastline was west of the Farallon Islands. That’s 30 miles out in the ocean from today’s coastline!

Conradson then delves into the plants and animals around the bay, how the

presence of certain plant communities indicate the different tidal zones identified by scientists, and how these plants have adapted to the harsh, salty environment. Conradson also reveals that there are two different species of the endangered salt marsh harvest mouse in the Bay Area due to being isolated by rising bay waters from long ago.

The book captures the story of how human progress has changed the bay, how resource exploitation drove many species to near extinction, and how environmental awareness and stewardship is reversing some of those effects. Seeing snowy egrets feeding



in the marsh may bring a more appreciative perspective after reading this book.

Exploring Our Baylands can be helpful in identifying the plants and animals in the San Francisco Bay Area as it is full of photographs. It is a wonderful book to have while visiting our baylands as there is a story behind everything you see.

Note: *Exploring Our Baylands* can be purchased for \$5 at the nature stores on Don Edwards SF Bay National Wildlife Refuge in Fremont and Alviso (normal retail price \$9.95). Order the book by emailing info@sfbws.com, or by making a donation. See page 8.

Don Edwards San Francisco Bay National Wildlife Refuge

Coastal Cleanup Day

Dumbarton Fishing Pier Parking Lot

Marshlands Rd, Fremont

Saturday, September 17, 2016

9:00 a.m. – 12:00 p.m.



Do you want to help wildlife and the environment? Join the thousands of people around the world for International Coastal Cleanup Day. At Don Edwards SF Bay NWR you can remove invasive weeds or pick up trash along the parking lot and trails.

We’ll supply plastic gloves (or bring your own) and trash and recycling bags. You supply energy, sturdy shoes, sun protection, and clothes you don’t mind getting dirty. Bring a reusable water bottle.

For more information, call 510-792-0222, ext. 362 for the Visitor Services Intern or Paul Mueller at ext. 361.

No reservations necessary.

Children under age 18 must have parental approval. Children under the age of 16 must be accompanied by an adult. To expedite the registration process, log on to http://www.fws.gov/refuge/don_edwards_san_francisco_bay to download the forms and bring to the registration table. Forms are also available at the registration table.

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

Wetland Round-Up Field Trip programs will not be offered in fall 2016. Details about scheduling a Wetland Round-Up field trip for spring 2017 will be posted on our website on November 21, 2016 and in the winter issue of *Tideline*.

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

Investigate the butterflies in the butterfly
Page 14

garden, taste pickleweed in the salt marsh, or discover the creatures that live in the slough and salt pond water on a Wetland Round-Up Field Trip.

This field trip program is designed for up to 65 students in grades K-5. This fall, Wetland Round-Up is offered from late October through mid-December, 2016.

Mail In Registration

Instructions on how to request field trip dates and registration forms are available on our website at <http://go.usa.gov/xx8pC>.

Registration forms must be received by September 5, 2016.

Wetland Round-Up Field Trip Workshops

New teachers that have not yet attended a field trip orientation must attend a training. The workshops are offered from 4 p.m. – 6:30 p.m. on weekdays in the fall.

We highly recommend that **returning teachers accompany parent leaders and chaperones** to a workshop prior to your field trip. The workshops are offered from 4 – 6 p.m. on weekdays in the fall. The workshop dates will be announced on-line with the Field Trip Registration information (see above). For more information call the Environmental Education Staff at Alviso: Office: 408-262-5513 ext 100
Email: genie_moore@fws.gov

Living Wetlands Program

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

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 activi-

ties 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 Title I schools in San Jose. Second priority will be given to schools in Milpitas, Santa Clara, Saratoga, Monte Sereno, Los Gatos, Campbell, and Cupertino.

Living Wetlands program applications are available online at <http://go.usa.gov/xxWzC>. Applications are due by Wednesday, August 31, 2016. You will receive a notice by email on or before September 17, 2016 if your class(es) have been chosen to participate in a free Living Wetlands Program.

For more information, and information about fall 2016 call Colter Cook, the Living Wetlands Program Coordinator at 408-262-5513 ext. 102 or email him at 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 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 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 & 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

Saturday, October 1
Saturday, November 19
10:00 a.m. - 12:30 p.m.

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

TIDELINE

Published quarterly by San Francisco Bay National Wildlife Refuge Complex, with funding from San Francisco Bay Wildlife Society.

Volume 39, Number 3

Editor: Carmen Minch

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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/don_edwards_san_francisco_bay
- http://www.fws.gov/refuge/ellicott_slough
- <http://www.fws.gov/refuge/farallon>
- http://www.fws.gov/refuge/marin_islands
- http://www.fws.gov/refuge/salinas_river
- http://www.fws.gov/refuge/san_pablo_bay



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San Francisco Bay NWR Complex

Volunteer Opportunities in Alviso: Fall 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 Fall Volunteer orientations will meet in the auditorium of the Environmental Education Center in Alviso,

11 a.m. to noon.

Saturday, October 1

Saturday, November 5

Saturday, December 3

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

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

AUTUMN 2016
Volume 39, Number 3

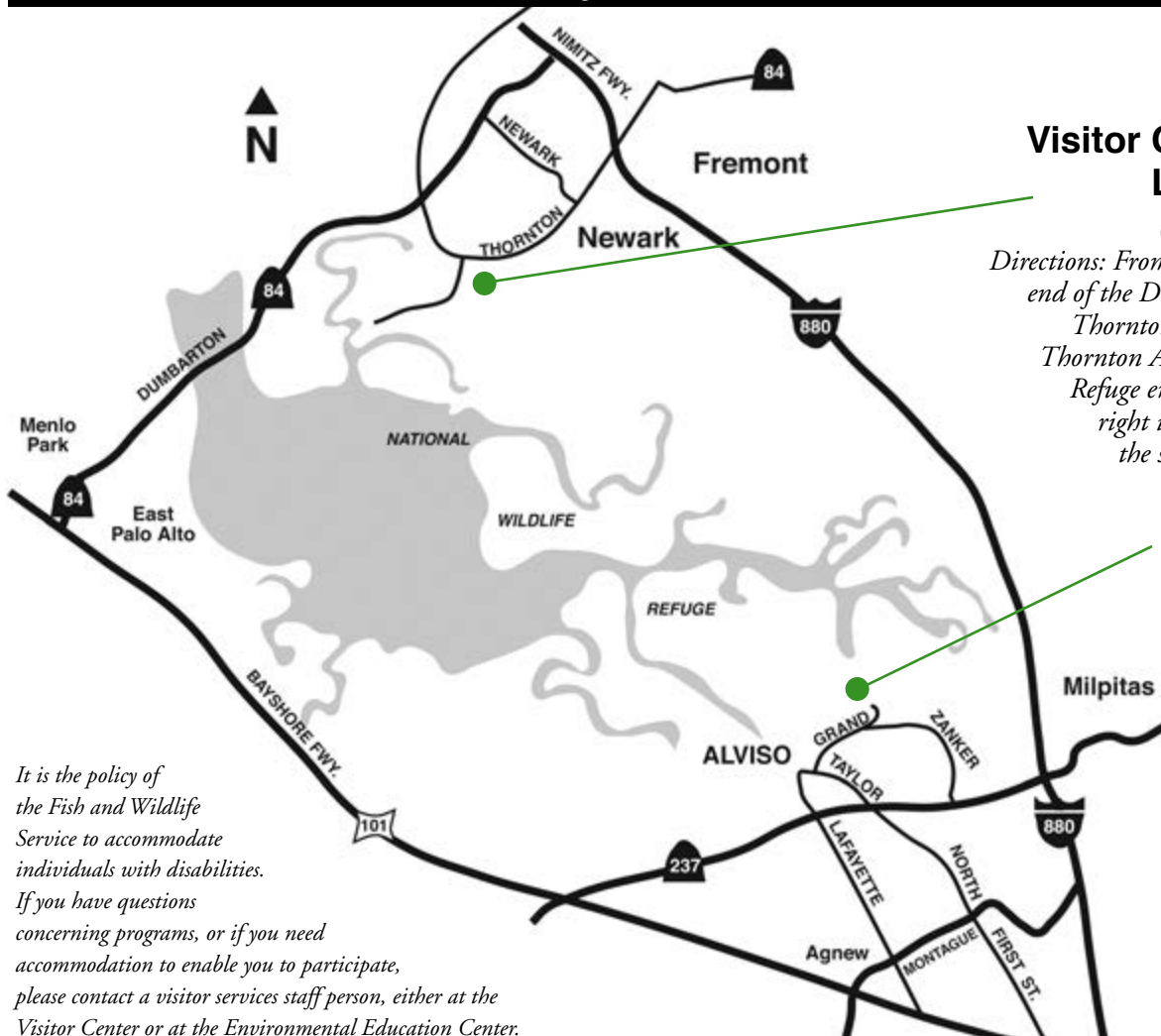
Tideline



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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.