

Sierra Club YODELER

THE NEWSPAPER OF THE SAN FRANCISCO BAY CHAPTER ♦ SPRING 2023



**GET
OUTSIDE!
OUTINGS
CALENDAR
ON PAGE 12**

- ♦ **HYDROGEN: FUTURE OF CLEAN ENERGY OR FALSE SOLUTION?** ♦
- ♦ **HOW BAY AREA WAREHOUSE BUILD-OUTS THREATEN HEALTH** ♦
- ♦ **SEA LEVEL & GROUNDWATER RISE: A TOXIC COMBO** ♦
- ♦ **BUILDING JUST RELATIONSHIPS FOR DEMOCRATIC ORGANIZING** ♦

LETTER FROM THE CHAIR

Dear Sierra Club friends and supporters,

I hope your 2023 is off to a wonderful start!

Here at the Sierra Club, our staff and volunteer leaders have hit the ground running, working alongside frontline communities and elected officials to enact bold, transformational change across the San Francisco Bay Area with the goal to avoid raising global temperatures above 1.5°C, a tipping point that would almost certainly make the worst climate impacts inevitable.

But these impacts aren't unimaginable. Our communities are already experiencing the consequences of persistent droughts, wildfires in the wildland-urban interface, life-threatening flooding, asthma-inducing air pollution, catastrophic biodiversity loss, and a host of associated harms to ecosystems and public health. Sea level rise and higher intensity storms alone are estimated to cost the Bay Area \$70 billion dollars by the year 2100. What's more, these costs are disproportionately felt by communities of color.

The good news? We have the policies and the technologies to avert a climate crisis and create a livable Bay Area for all. But we need to make investments in our future today.

For the first time in our country's history, we have aligned funding at the federal, state, regional, and local levels to rapidly transition our communities toward a clean energy future. Now we need your help to ensure communities across the Bay Area can access these funding opportunities to lower energy consumption, increase the number of low-emission energy sources, electrify transportation, and leverage nature-based solutions to remove carbon from the atmosphere to regenerate our ecosystems.

Sierra Club's San Francisco Bay Chapter boasts hundreds of volunteer leaders and subject-matter experts across a dozen committees and working groups who are dedicated to helping local communities achieve equitable climate action now. Are you up for the task? I encourage you to reach out and find an issue that interests you. We need all hands on deck.

The scientific community is telling us we only have seven years to right the ship. And the longer we wait, the more difficult it will be to course-correct.

Let's seize this moment,

Chance Cutrano
CHAPTER CHAIR

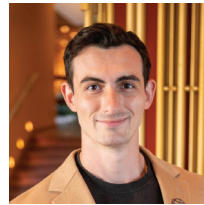
INSIDE THIS ISSUE:

Chapter News & Events ♦ 3, 5, 7, 9, 17

Outings Calendar ♦ 12 - 14

Educational Programs ♦ 15

Campaign Updates ♦ 4, 10 - 11, 16



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P.O. Box 2663, Berkeley, CA 94702
*Office closed until further notice

Email: info@sfbayclub.org
Phone: (510) 848-0800
Website: sierraclub.org/sfbay

Editor
Liana Warren
yodedit@sfbayclub.org

Design
Courtney Andujar
andujar-twins.com

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Address Changes
Sierra Club Membership Services
P.O. Box 421042
Palm Coast, FL 32142-1042
address.changes@sierraclub.org
(415) 977-5653

Cover Photo
Bobcat in Point Reyes. Photo by Lisa Spivack. Read more on page 6.



SPRING 2023 CHAPTER NEWS

All Hands On Deck for Historic Clean Air Vote on March 15

On March 15, the Bay Area Air District is voting on proposed amendments to two rules that limit nitrogen oxide (NOx) emissions from building appliances. The proposed amendments include a zero-NOx standard for both space and water heating appliances that would apply when new appliances are sold and installed after the proposed compliance dates ranging from 2027 to 2031. Gas appliances are a major driver of unhealthy air quality in the Bay Area and are responsible for more lung-damaging NOx pollution than all the region's passenger cars. Phasing out the sale of these appliances will deliver enormous climate and health benefits, but we need your help to show the Air District we support these amendments that will spur the transition. Sign up to speak at the March 15th meeting at tinyurl.com/bayareacleanair.

Beach Clean-Ups Coming to a Shore Near You

Our local watersheds and shorelines are critical to the health of the Bay and our communities. In many areas of the Bay, pollution from trash and dumping is a huge problem, causing lasting harm to our ecosystems and wildlife, not to mention making our beach experience less blissful. Join our chapter for monthly beach clean-ups to help us tackle our trash predicament!

So far, these clean ups have kept hundreds of pounds of trash out of our waterways and connected countless community members to new like-minded friends. Don't let this opportunity pass you by! Our next clean up takes place at 9 am on Saturday morning March 18th at Point Molate Beach Park. For more information, check out our

outings calendar at sierraclub.org/sfbay/events or on pg. 12.

If this month's clean-up feels too far out of your neck of the woods, don't worry! We will rotate locations and aim to clean up every beach around the Bay. To join our Shoreline Clean-Up Google Group, please email dani.zacky@sierraclub.org.

Chapter Leaders Welcome New National Executive Director



Pictured from left to right: SF Bay Chapter Chair Chance Cutrano, Sierra Club California Director Brandon Dawson, SF Bay Chapter Vice Chair Martha Kreeger, Sierra Club Board President Ramon Cruz, Sierra Club Executive Director Ben Jealous, Sierra Club California and SF Bay Chapter Executive Committee member Igor Tregub, and SF Bay Chapter Director Virginia Reinhart.

On January 31st, San Francisco Bay Chapter leadership took the train to Sacramento to meet the new Sierra Club Executive Director, Ben Jealous, who is on a national tour listening to local chapters and leaders. Prior to taking the helm at the Sierra Club, Ben served in roles ranging from organizer to investigative journalist to president of two of the nation's most influential groups pursuing equity and justice and protecting democracy and the environment. From 2008 to 2013, Ben led the NAACP, which has more than 2,400 chapters (the Sierra Club has 64, including the SF Bay Chapter), so he understands and believes in a chapter-centric, grassroots-led model of movement building. As Ben continues his national listening tour, we look forward to hosting him here in the Bay Area where the Sierra Club was founded and where so much cutting-edge environmental policy is dreamed up, tested out, and brought to life by our amazing community of volunteer leaders, staff, members, and partners.

You can read more about Ben Jealous at sierraclub.org/meet-ben-jealous.

PHOTO CREDIT: Photo courtesy of Virginia Reinhart.

Groundwater Rise Raises the Stakes at Richmond's AstraZeneca Site

DANI ZACKY

With rising global temperatures and this winter's bout of heavy rains and flooding, sea level rise has been at the top of many of our minds. Like other climate change impacts, sea level rise will disproportionately affect marginalized and underserved communities. Already, this can be seen in Richmond's AstraZeneca site. This area is a major example of environmental injustice, and rising water levels will only exacerbate the situation.

The AstraZeneca site sits just along the shoreline in Richmond. It was formerly owned by the Stauffer Chemical Company before being bought by AstraZeneca in the 1980s. Stauffer primarily manufactured sulfuric acid at the site by roasting pyrite ores, and for decades the company dumped the iron pyrite cinders into the marsh nearby. Additional toxic releases resulted from Stauffer's later manufacturing of fertilizers, herbicides, and pesticides. Today, chemicals found on the site include volatile organic compounds such as benzene, heavy metals including lead, arsenic, and uranium, and pesticides like DDT.

How might such a contaminated site be impacted by sea level rise? Well, because salt water is more dense than freshwater, a rising sea will push fresh groundwater up. Recent research led by UC Berkeley professor Dr. Kristina Hill shows that rising groundwater in the Bay will act as a vehicle to move toxic contamination up through soil and possibly into the Bay Area's notoriously cracked piping systems. While more accurate modeling of groundwater rise is in the works, current models suggest that groundwater can carry toxic particles up to three miles from the source of pollution. Knowing this, the highly contaminated AstraZeneca site is a ticking time bomb.

Richmond community members, especially those active in the Richmond Shoreline Alliance and Richmond Community Advisory Group, have been advocating for a more complete clean up of the site in light of groundwater rise. In the face of the proposed development of over 4,000 housing

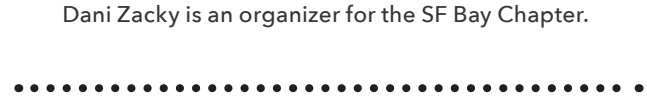
units on the site, the clean up becomes even more pressing. The commitment of these advocates to the health of the Bay and their community is not only inspiring, but it has spurred some advances by state regulators.

Recently, the site's new project manager for the California Department of Toxic Substances Control asked for greater analysis of the cleanup plan, based on up-to-date sea level rise projections. This is promising news, but we will be watching closely to make sure that revisions to the plan are based on the best available science and the strictest protections for the health of residents in this city already overburdened by environmental injustice.

The work of these community members can serve as inspiration to us all, and it must continue to ensure that environmental justice is upheld here in the Bay. There is a place for everyone in this fight, and we need your help. Our Sierra Club Bay Alive program offers opportunities to participate in local clean ups, education events, discussion of policies, and much more. If you are interested in becoming a Bay advocate and care deeply for the Bay, our communities, and our unique ecosystems, make sure to email me, Dani Zacky, at dani.zacky@sierraclub.org.

Dani Zacky is an organizer for the SF Bay Chapter.

CURRENT MODELS SUGGEST THAT GROUNDWATER CAN CARRY TOXIC PARTICLES UP TO THREE MILES FROM THE SOURCE OF POLLUTION. KNOWING THIS, THE HIGHLY CONTAMINATED ASTRAZENECA SITE IS A TICKING TIME BOMB.





Join the shared EV charging network for free! Share your charger or find charging to reduce carbon emissions. We'll donate to Sierra Club for each new signup! Your first charge is on us with promo code: **CHARGECODE**

Use referral name **SF Bay Sierra Club** at signup



Elevated State Route 37 a Major Opportunity for Wetlands

VIRGINIA REINHART

On February 2nd, World Wetlands Day, the Sierra Club submitted a letter to the California Department of Transportation stating our concerns about short-sighted plans for State Route 37, the 21-mile highway running along the northern shore of San Pablo Bay, linking Novato with Vallejo. Everyone involved agrees that rapidly advancing sea level rise, as well as worsening traffic congestion, means that adaptation is urgently needed. Done properly, the project could enable tidal marsh restoration on a historic scale, with enormous benefits for wildlife and climate through carbon sequestration. Elevating the roadway – and removing the existing highway that currently acts as a levee – would allow natural tidal flows to feed



a vast area of existing or potential wetlands. And, as sea levels rise and inundate existing marshes, places like San Pablo Bay where wetlands can slowly migrate inland with the rising water level will be crucial to the survival of wildlife.

Unfortunately, some stakeholders in the responsible transit agencies have argued for “band-aid” projects like lane widening at the elevation of the current flood-prone roadway. Rather than spending hundreds of millions of dollars on a

short-lived interim project whose construction would disturb acres of wetlands only to demolish and disturb sensitive habitat ten to fifteen years later, the Sierra Club believes we should proceed directly to the planning and phased construction of an elevated State Route 37.

The Sierra Club will continue to engage in this planning process to ensure

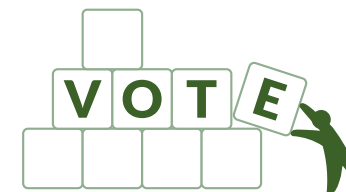
that we don't miss out on the opportunity to build climate-resilient infrastructure while simultaneously capitalizing on the largest wetland-migration opportunity on the West Coast.

Virginia Reinhart is the SF Bay Chapter Director.



Vote Early! Vote Often!

PEGGY DA SILVA



The Sierra Club is unique in that each of us has a voice and an opportunity to vote for leaders who will speak for us and shape our club and ultimately local policy. We recently completed the election cycle for Chapter and Group Executive Committees. Make it a New Year's resolution to check out our new leadership and get to know the people who make decisions for our local Sierra Club. Visit sierraclub.org/san-francisco-bay/leadership-roster to learn more.

But there's more! The Sierra Club National Board of

Directors election is coming up starting in April, and we have a great opportunity to choose our national leaders. The Board of Directors makes decisions, policies, and statements for all of us at the Sierra Club, so it's important that we continue to chart our Club's evolution—from John Muir to our new national Executive Director, Ben Jealous. Don't let your voice in the Club fall silent; let them know what you think and vote for the best candidates!

For more information on the Board of Directors, go to sierraclub.org/board-directors and keep an eye out for your ballot to vote in April.

Our Club and our Planet are better when we all contribute our voices – in many ways!

Peggy da Silva is the Outgoing Chair of the Chapter Nominations and Elections Committee.

PHOTO CREDIT: High tide at CA 37 at Tolay Creek (San Pablo Bay). Photo by CBDawson on Flickr (CC BY-NC 2.0). "Vote" graphic by Liana Warren.

On the Cover: Bobcat on the Prowl in Point Reyes

A NOTE FROM THE PHOTOGRAPHER,
LISA SPIVACK:

A bobcat's peak hunting hours are usually around dawn and dusk, about three hours between sunset and midnight. On occasion, you may see them earlier, but only for a fleeting moment before they hurriedly disappear into the brush. Luckily for me, a *Lynx rufus* was on the prowl at 2 pm on this special day. As a result, I was able to capture images of this beautiful cat in great lighting. I suspect I owe it to the long and intense rainy spell we had the week before this photo was taken. Most animals were still sheltering, taking cover during the unusually wet conditions. However, this bobcat was busy tracking its next meal. So busy, in fact, that it could care less about my presence, and I kept taking photos as fast as I could.



Curious to learn more about the wildlife in Point Reyes? Check out nps.gov/pore/planyourvisit/wildlife_viewing.htm for more information, and learn how to respectfully observe the seashore's stunning biodiversity.



PHOTO CREDIT: Photos by Lisa Spivack.

Martinez Refinery Under Investigation After Toxic Thanksgiving Fallout

REBECCA BARRETT & JONATHAN BASH



Last Thanksgiving, while gathered for their special meal, Martinez residents shared more than just turkey with their friends and family. Unknowingly, families across the area were doused in an extra-large helping of toxic heavy metals.

Without notifying residents or authorities—as required by law—the Martinez refinery released more than 20 tons of “spent catalyst” across a six-hour period, sprinkling aluminum, barium, chromium, nickel, vanadium, zinc and other toxic heavy metals over the town and into the lungs of feasting families. The short-term side effects of inhaling these heavy metals are nothing to be grateful for: coughing, a sore throat, and difficulty breathing are all costly impacts of this type of pollution.

In lieu of any word from the refinery, Martinez residents turned to Facebook to ask about the dust covering their cars and other surfaces. People contemplated the possibility that it was connected, but there had been no official announcement. In fact, the refinery waited a full two days to inform county staff of the release.

According to Contra Costa Health Services, this action was likely in violation of state law and county policy. Refinery staff are required to report the release via the county's Community Warning System, giving residents the opportunity to take steps to protect vulnerable residents by remaining inside

PHOTO CREDIT: Photo by Rebecca Barrett.

or leaving the area.

After the release, the refinery put out questionable information on social media, minimizing the health impacts of their actions and describing the dust as “naturally occurring materials.” The only remediation the company offered to residents was free car wash vouchers that could be used to wash off the “non-toxic” white ash on local vehicles. Lab tests on the dust, however, suggested that it was in fact toxic, noting elevated levels of heavy metals. Consequently, car wash staff and other members of the public may have been exposed a second time as they washed their cars and other surfaces, aerosolizing the heavy metals.

In response to the original release, the case has been referred to Contra Costa County District Attorney Diana Beaton who has begun an independent investigation in partnership with a citizen oversight committee. More information about the investigation is available at cchealth.org/hazmat.

Sierra Club members who live in Martinez and Pacheco are invited to join the Sierra Club Mt. Diablo Group and get involved with community efforts to ensure safe operations at the Martinez refinery. Please contact Jonathan Bash (jonathan.t.bash@gmail.com) and Rebecca Barrett (rebecca.faiith.barrett@gmail.com) to get involved.

Rebecca Barrett and Jonathan Bash are elected members of the Mt. Diablo Group Executive Committee.



SUPPORT THE CHAPTER BY GOING SOLAR

Thinking of going solar? If you go solar through SunPower, you'll receive a \$1,000 rebate and SunPower will donate \$500 to the SF Bay Chapter. It's a win for you, your local Sierra Club chapter, and the planet. Head to bit.ly/sunpowerforthebay to get your free quote and find out how much you can save.

Jemez Principles for Democratic Organizing: A Column

JACOB KLEIN

#5 Build Just Relationships Among Ourselves

We need to treat each other with justice and respect, both on an individual and an organizational level, in this country and across borders. Defining and developing “just relationships” will be a process that won’t happen overnight. It must include clarity about decision-making, sharing strategies, and resource distribution. There are clearly many skills necessary to succeed, and we need to determine the ways for those with different skills to coordinate and be accountable to one another.

We’ve reached the penultimate column in this series, where I focus on “building just relationships”. In many ways, I see this principle as an amalgamation of the previous principles (read previous columns on each principle at sierraclub.org/san-francisco-bay/yodeler-archives). These columns explore the tools one needs to meet the criteria of resource sharing, accountability, and collaboration. Here, I want to explore the connections between relationship-building and cultivation of skills.

Relationships are essential for advocacy work in order to build up the grassroots movement that will achieve the change desired. As an organizer, it’s my job to get to know people so that I can learn about their interests and capabilities, understand what fires them up, and figure out how to create specific opportunities for them to take action.

In traditional organizing, goals and opportunities are often created by a lead organizer. Classically hierarchical, there is a person who is coordinating the campaign and slotting people in where their attributes make most sense. This isn’t an inherently bad way of organizing and can be very effective. However, in relying on classic structures of leadership, it can lead to a lack of democracy or opportunity for new leaders to flourish.



In distributed organizing, we instead recognize the inherent leadership of the grassroots. Priorities are set by the group, and while one person may be acting as the main coordinator, the structure is more similar to the hub of a wheel where someone can ferry messages and resources between the various spokes, rather than sitting at the top of a pyramid. This is a model that some of our partner groups, like Sunrise Movement, rely on.

Generally, I think the Sierra Club walks a delicate balance between traditional and distributed organizing. Our volunteer leadership model means that decision-making and action-taking happen largely through group processes. However, due to the limited capacity of many of our volunteers who often have jobs or other responsibilities, a more traditional style of organizing is helpful to fill in the gaps and keep the work advancing. It’s a line that I find myself walking often, even as someone who philosophically supports distributed organizing more.

But what brought me to this position?

Early on in my organizing history, I was still pretty intimidated by the kind of leadership that had me in public-facing roles. I preferred to work behind the scenes, administratively and logistically, to ensure the smooth running of events and actions. There was one group in particular that I was involved with where the leaders had very powerful voices, so it was easy to rely on them to work their magic with people.

From the time I was initially recruited to the end of my tenure in that group, I moved out from behind the shadows and began taking on more roles where I stood at the front and collaborated with people on larger scales. My comrades and mentors told me how this had been part of their plan from day one.

**BY TENDING TO OUR
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SHOW THE CARE WE HAVE
FOR ONE ANOTHER.**

GRAPHIC CREDIT: Image by Ciker-Free-Vector-Images on Pixabay.

By talking with me and getting to know me, they recognized both my visible skills and my latent talents. They created opportunities for me to try out new things and supported me as I did so. In this way, they helped shape me into the organizer I am today. This is an example of how relationships built on trust and attentiveness lead to greater equity and skills-sharing.

It’s an organizer’s dream to be able to pass along the work to another person, to have someone take up the baton of engagement and action to keep the movement moving forward. A strong organizing space should be one where people are able to act to the best of their abilities with the capacity that they have available.

That’s why distributed organizing can be better equipped for building just relationships—the inherent space-making of

this style of organizing gives more opportunities for skills to be flexed and grown. By bringing a justice orientation to relationships, we create space for the evolution of the individual and the movement.

Cornel West’s famous quote, “Justice is what love looks like in public,” points towards not just the structural nature of change-work, but also the personal aspect. By tending to our relationships across the movement and across the world, by sharing resources and power, by listening deeply and acting equitably, we can show the care we have for one another. Through the Jemez principles and other progressive values, justice can take root in our relationships.

Jacob Klein is an organizer for the Sierra Club SF Bay Chapter.

USEFULL Returnable and Reusable Cup Service Launches in Marin County

JINESSE REYNOLDS



It is estimated that every year 95 million single-use cups in Marin County end up in landfills, streets, and waterways. Additionally, many take-out and other single-use containers are made with PFAS and other toxic chemicals that leach into food and drinks and cause harm to both humans and the environment.

PlasticFree Marin, a Sierra Club project under the leadership of co-chairs Jinesse Reynolds and Susan Hopp, has been working hard to move the community to opt for reusable foodware instead of single-use. With a recent grant from Zero Waste Marin, we are happy to announce a new partnership between Good Earth Markets and USEFULL, a cutting edge returnable/reusable cup service that allows you to borrow stainless steel cups. This makes it even easier to reduce your waste, even when you’ve forgotten your reusable mug at home.

USEFULL’s service incorporates an easy-to-use app that makes checking out a stainless steel cup as simple as checking out a library book. It also provides users with impact metrics, locations for checkouts and returns, and notifications to remind them when their cup is due for return.

“We are incredibly proud to partner with USEFULL and support the effort to eliminate single-use cups,” says Al Baylacq, co-owner of Good Earth. “We hope to model success with this program, and expand it to include other like-minded businesses and additional reusable packaging options for take out foods. If we strengthen the infrastructure around reuse in our community, we empower each other to make single-use packaging waste a thing of the past.”

USEFULL’s to-go cups are now available in Good Earth’s Fairfax and Mill Valley cafes. To learn more, visit usefull.us online.

Jinesse Reynolds is the Co-Chair of PlasticFree Marin.

PHOTO CREDIT: PlasticFree Marin poses with Supervisor Rodoni in Mill Valley. Photo courtesy of Jinesse Reynolds.

BAY AREA WAREHOUSE BUILD-OUTS THREATEN COMMUNITY HEALTH

Developers eye lots in SoMA, East Oakland, Hayward, Fremont, North Richmond, and beyond.

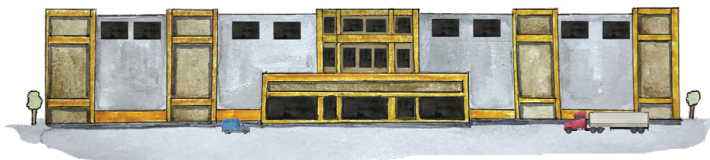
VRINDA MANGLIK

Instagram: @art_by_vrinda

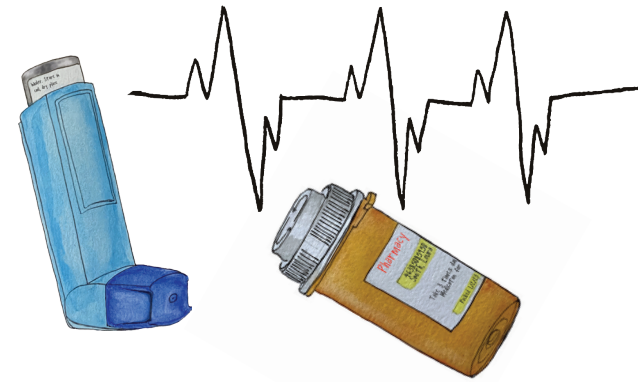
E-commerce has been rising nationally as consumers do more of their shopping online. The COVID-19 pandemic accelerated this trend. This has both global and local environmental impacts.



Online retail companies are building more infrastructure to facilitate last-mile distribution of goods. This means new warehouses, or fulfillment centers, popping up — and bringing with them heavy equipment and a steady flow of delivery trucks.



Because of decades of discriminatory land use practices, this often brings them to low-income communities that are already overburdened by polluting industries. The influx of truck traffic can bring more harmful pollution.

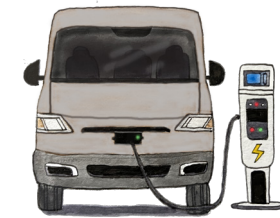


Diesel exhaust from trucks and stationary equipment emits pollutants such as nitrogen oxides, particulate matter, and ground-level ozone. These can contribute to a variety of harmful health impacts, including lung cancer, heart disease, kidney problems, and respiratory ailments such as asthma.

Measures can be taken to reduce harmful impacts. For example:



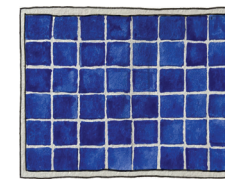
Local and regional policy



Vehicle fleet electrification requirements



Community benefit agreements



Solar panels



Buffer zones to protect the most at risk



Bans on diesel truck idling and diesel equipment

But ultimately...

"As a resident, I would rather have what the community wants rather than concessions. There are other things the community wants. I don't like for people who aren't residents to come in and make decisions for residents."
-Latifah Abdullah, resident / homeowner in impacted community



To get involved, visit addup.sierraclub.org/campaigns/bay-area-warehouses

ABOUT THIS CALENDAR

Activities listed here are abbreviated. For full listings, registration, and waivers visit: sierraclub.org/sfbay/activities. The online calendar will also include changes, cancellations, and outings submitted after the print deadline.

Hike and backpack ratings

Hike ratings are based on distance and elevation gain (the sum of all gains in elevation per day):

- | | |
|------------------|-----------------------|
| 1. up to 6 miles | A. under 1,000 feet |
| 2. 6 - 10 miles | B. 1,000 - 2,000 feet |
| 3. 10 - 15 miles | C. 2,000 - 3,000 feet |
| 4. 15 - 20 miles | D. over 3,000 feet |
| 5. over 20 miles | E. over 3,500 feet |

Backpack ratings include a third digit for travel:

- T. trail
1. limited/easy crosscountry
 2. moderate crosscountry
 3. strenuous/difficult crosscountry

What to bring

For day hikes, always bring lunch and enough water. Consider layered clothing, sunscreen, good hiking boots with treads, and hiking poles. Non-service dogs are allowed only if specified in the listing; canine hikers should bring leashes, litter bags, and water for their dogs.

Liabilities

To participate in a Sierra Club outing, you will need to sign a liability waiver. To read a copy of the waiver form, call (415) 977-5630 or visit tinyurl.com/outingswaiver.

COVID-19 Protocol

Masks are optional for adults in outdoor areas but required in indoor close quarters such as vehicles, public transport, restaurants, or visitor centers. Vaccinations are not required, so please be aware you may be on trips with unvaccinated individuals. Masks are required at all times for unvaccinated minors. If you are experiencing any possible COVID-19 symptoms, do not attend the outing and contact the outing leader. Report any positive COVID-19 tests after an outing to the outing leader.

Carpooling

Carpooling helps the environment and allows people without cars to participate. You can arrange carpools on our Meetup group: [meetup.com/sanfranciscobay](https://www.meetup.com/sanfranciscobay). Outings will be listed there 2 - 3 weeks prior to the event. Masks are required in carpools.

SPRING 2023 OUTINGS CALENDAR

WEEKLY • TUES

Lake Chabot Reservoir 1A Hike. Scenic weekly 3-mile hike. Park free on street, \$5 in lot, or annual pass from East Bay Regional Park District. MEET: 4:00 pm at boathouse/cafe. LEADER: Dolores Gruenewald, (510) 798-7897 or doloresgru@aol.com. (Solo Sierrans)

WEEKLY • WEDS

Lafayette Reservoir 1A Hike. Enjoy the lovely weather while walking around the beautiful reservoir. We have both faster and slower walkers, or you can walk at your own pace. COST: 5 quarters for 1hr, 15 minutes of parking. MEET: 4:00 pm at the west end of the parking area near the picnic tables and permanent bathrooms. LEADER: William Gilbert, wmgibr@gmail.com. (Solo Sierrans)

SECOND SUNDAYS AND FOURTH SATURDAYS

MAR 25 • SAT | APR 9 • SUN | APR 22 • SAT |
MAY 14 • SUN | MAY 27 • SAT | JUN 11 • SUN

Let in the Wow: Luxurious Walking in Delight Zen. A slow walking practice designed to relax and balance yourself resulting in deepening connection to your inner nature. MEET: 11:00 am at 1853 Solano Ave, Berkeley. ENDS: 12:30 pm. LEADER: Halley, sierragreenforest@gmail.com. (Hiking)

APR 5 • WEDS | MAY 5 • FRI | JUN 3 • SAT

Moonlight Hike Mission Peak. Moonlight hike from Ohlone College to Mission Peak summit on the Peak Trail. LEVEL: Moderate ++ (2C) Not a beginners hike as we must complete the hike before the park closes and there is significant elevation gain. COST: \$4.00 parking fee. BRING: Two liters of water, lamp, snack, layered clothing, and enthusiasm. MEET: 6:30 pm at Mission Peak Trail Head near Parking Garage. ENDS: 10:00 pm. LEADER: William Yragui, (650) 642-5150 or wyragai@missionpeakconservancy.net. (Southern Alameda County Group)

MAR 18 – 19 • SAT – SUN

Forestdale Creek (Explore Taboe Series). This snow camping trip will explore the Forestdale Creek drainage area. We will travel a total of 6 miles round trip with a total elevation gain of approximately 1000 ft, weather and snow conditions permitting, ascending the Divide to intersect with

the Pacific Crest Trail. TRIP RATING: Moderate. COST: \$35.00. BRING: All the personal items needed for winter camping as you learned in SC training series. MEET: 8:00 am in Kirkwood, CA. Participants accepted to this outing will be provided with additional emails with all other trip information, including location for Friday night meeting. LEADER: Sanjay Reddy, (925) 828-3229 or redaysanjay@comcast.net. (Snow Camping)

Explore Angel Island - Urban Backpacking. We will be walking 4 miles to the campsite on Angel Island. There will be a tour of the Immigration Station that is included in the cost of the trip. COST: \$25.00. BRING: You will need backpacking gear, a tent, sleeping bag, stove, and food. A detailed list will be provided after sign-up. MEET: 9:00 am near Kayak Camp in Tiburon. ENDS: 11:00 am. LEADER: Diane Appel, (925) 360-2249 or diane_appel@yahoo.com. (Backpacking)

MAR 18 • SAT

Pleasanton Ridge Sunol Peak Hike. Hike from Tyler Ranch staging area at Pleasanton Ridge to the top of the Sunol Peak. No cost. BRING: Two liters of water, snack, layered clothing, and enthusiasm. Recommend well-fitting boots for traction and ankle support. Hiking poles are very helpful for this hike. MEET: 9:00 am at Pleasanton Ridge Regional Park - Tyler Ranch trailhead. ENDS: 3:00 pm. LEADER: William Yragui, (650) 642-5150 or wyragai@missionpeakconservancy.net. (Southern Alameda County Group)

Beach Clean Up at Point Molate. Come out to clean up the Point Molate Beach Park! MEET: 9:00 am at Point Molate Beach Park, Stenmark Dr, Richmond. ENDS: 11:00 am. LEADER: Dani Zacky, (818) 919-3023 or dani.zacky@sierraclub.org. (Chapter)

Presidio Overlooks Hike. This moderate 6.5 mile loop hike with 600 ft. elevation will pass through many of the highlights of the Presidio. BRING: Water, snacks/lunch, and layers for San Francisco's capricious weather. MEET: 10:30 am at 210 Lincoln Blvd, San Francisco. LEADER: Paget Valentzas, (415) 271-2945 or pagetvalentzas@gmail.com. (Rainbow Sierrans)

Volunteer and Hike in San Bruno Mountain. Come join three hours of volunteer work of planting seedlings in San Bruno Mountain with San Bruno Mountain Watch. Water, drinks, snacks, working gloves and tools are provided. After working, we will do a short 2-mile Saddle loop hike. BRING: Layered clothing, sturdy hiking boots, a backpack, and lunch. MEET: 12:00 am at Crocker Gate (Crocker Ave and South Hill Blvd, Daly City). ENDS: 3:00 pm. LEADER: Lucy Zhang, (415) 816-1850 or lucyzhang2@hotmail.com. (Sierra Singles)

MAR 20 • MON

Pole Hiking Training, Mori Point, Pacifica. Learn individualized strategies for enhancing performance and confidence on the trail. Top quality poles provided or bring your own. Registration required. COST: Free for Veterans & their family members. MEET: 9:00 am at Mori Point, Mori Point Rd, Pacifica. ENDS: 1:00 pm. LEADER: Jayah Paley, (415) 699-3333 or jayab@adventurebuddies.net. (Hiking)

BECOME AN OUTINGS LEADER

If you enjoy exploring wild lands, meeting new people, and leading adventures for them, you could make a great Sierra Club outings leader!

The Sierra Club's outdoor activities aim to connect all people with the natural world and with the Club. As an outings leader with the San Francisco Bay Chapter, you can join others in exploring wild lands, grappling with conservation issues, and even changing perceptions. Because trips are often specialized around a unique theme or activity, you could be hiking, backpacking, kayaking, bicycling, or doing service work – it's up to you to choose, because you ultimately design and lead your very own trip.

To be an outings leader, you must be a current Sierra Club member, at least 18 years of age, and have completed First Aid training and the Sierra Club Outings Leader Training. You then must choose a current outing leader to act as your mentor and lead your provisional outing with them in attendance. Following the outing, the mentor leader will provide feedback. After a positive evaluation, you will be a full-fledged outings leader and able to lead outings on your own. And then, Happy Trails!

You can choose what type of outing you would like to lead and which activity section you would like to affiliate with. You can find a list and descriptions of our activity sections online at sierraclub.org/sfbay/activities.

For more information on requirements, trainings, mentors, and more, head to sierraclub.org/sfbay/how-become-outings-leader.

MAR 23 • THURS

City Night Hike—Telegraph and Russian Hills. Forget the gym and join us as we walk up and down 4 miles of staircases and hills on Telegraph and Russian Hills. MEET: 5:30 pm at Ferry Building, San Francisco. LEADER: Paget Valentzas, (415) 271-2945 or pagetvalentzas@gmail.com. (Rainbow Sierrans)

MAR 31 – APR 2 • FRI – SUN

Backpacking the Ohlone Trail. Discover the Ohlone trail over 3 days. BRING: Individual commissary. Participants bring their own food and cooking equipment. Participants need to furnish their own

overnight backpack gear. The leader will send a detailed equipment list to approved participants. MEET: 7:00 am in Sunol. This trip requires a car shuttle between the trailheads Del Valle and Stanford Ave. ENDS: 1:00 pm. LEADER: Nora Di Bene, (408) 375-3040 or norabackpacking@gmail.com. (Backpacking)

Pinnacles Campout. Rainbow Sierrans is headed to Pinnacles National Park! We have two group sites reserved in the National Park. MEET: 1:00 pm March 31 at Pinnacles Campground Store, 2400 Pinnacles Hwy, Paicines, CA. ENDS: 12:00 pm April 2. LEADER: Beth Bittle, (510) 759-6225 or callingu2@gmail.com. (Rainbow Sierrans)

MAR 31 • FRI

Pole Walking for Exercise & Maintaining Mobility, Oakland Vet Center. Join us to learn skills and techniques to help improve balance, endurance, spine function, walking gait and posture. Top quality poles provided. Registration required. COST: Free for Veterans and their family members. MEET: 11:00 am at 7700 Edgewater Dr, Oakland. ENDS: 1:00 pm. LEADER: Jayah Paley, (415) 699-3333 or jayah@adventurebuddies.net. (Hiking)

APR 5 • WEDS

Early Bird Hike. This is for the early birds out there! This is a fast paced 3 mile hike to get your morning going. We leave promptly at 6:30. BRING: Water, hiking poles, layers. MEET: 6:30 am at 11500 Skyline Blvd, Oakland. LEADER: Anita Bowen, (415) 519-5457. (Rainbow Sierrans)

APR 12 • WEDS

Pole Hiking Training, Oakland. Learn individualized strategies for enhancing performance and confidence on the trail. Top quality poles provided or bring your own. Registration required. COST: Free for Veterans & their family members. MEET: 9:30 am at Joaquin Miller Park, Oakland. ENDS: 12:30 pm. LEADER: Jayah Paley, (415) 699-3333 or jayah@adventurebuddies.net. (Hiking)

APR 18 • TUES

Pole Walking for Exercise & Maintaining Mobility, War Memorial Veterans Bldg, SF. Join us to learn skills and techniques to help improve balance, endurance, spine function, walking gait and posture. Easy-to-learn techniques can help people navigate everyday obstacles and strengthen muscles that support your joints. Top quality poles provided. Registration required. COST: Free for Veterans and their families. MEET: 1:30 pm at War Memorial Veterans Building, 401 Van Ness Ave, San Francisco. ENDS: 4:30 pm. LEADER: Jayah Paley, (415) 699-3333 or jayah@adventurebuddies.net. (Hiking)

APR 30 – MAY 1 • SUN – MON

Beginners Backpack Point Reyes. The trip is designed as a field trip for participants of the annual Sierra Backpack Beginners Class. It will give you the opportunity to get started and try out your equipment. COST: \$25.00. BRING: Individual commissary. Participants bring

their own food and cooking equipment. Other standard overnight backpack equipment (pack, tent, boots, sleeping pad, sleeping bag) and appropriate clothing are required and need to be provided by the participants. The leader will provide a detailed equipment list to approved participants. MEET: 9:30 am at Visitor Center Access Road, Point Reyes Station. ENDS: 12:00 pm. LEADER: Thomas Meissner, (707) 479-4465 or meissner.thomas2011@gmail.com. (Backpacking)

MAY 4 • THURS

Bernal Heights evening bike. Forget the gym and come on this invigorating after-work power walk up over hills and stairways in Bernal Heights. Anticipate steep streets, varied stairways, community gardens, darkness, full moon, memorable views (weather dependent) and neighborhood charm. BRING: Flashlight or headlamp, water, snacks to tide you over until 7:30. MEET: 6:30 pm at 27 Bernal Heights Blvd, San Francisco. ENDS: 8:30 pm. LEADER: Paget Valentzas, (415) 271-2945 or pagetvalentzas@gmail.com. (Rainbow Sierrans)

JUN 7 • WEDS

Pole Walking for Balance & Maintaining Mobility, Finley Senior Ctr, Santa Rosa. Join us to learn skills and techniques to help improve balance, endurance, spine function, walking gait and posture. Top quality poles provided. Registration required. COST: Free for Veterans and their families. MEET: 12:30 pm at Finley Community Park, 2060 W College Ave, Santa Rosa. ENDS: 3:30 pm. LEADER: Jayah Paley, (415) 699-3333 or jayah@adventurebuddies.net. (Hiking)

JUN 16 – JUN 18 • FRI – SUN

Yosemite NP Waterfalls Car Camping Extravaganza. Join us for a three-day weekend of Sierra Club-sponsored day-hikes in Yosemite National Park which Naturalist John Muir regarded as nature's grand landscape garden. Leader approval required for participating. MEET: 8:00 am at Lower Yosemite Falls, Yosemite Valley, CA. ENDS: 6:00 pm. LEADER: JP Torres, jpinkflo@xecu.net. (Backpacking)

JUL 2 – JUL 7 • SUN – FRI

Hetch Hetchy Valley to Jack Main Canyon. Join us on this enchanting 6-day loop starting at the Hetch Hetchy Reservoir in Yosemite National Park. BRING: Individual commissary. Participants bring their own food and cooking equipment. Participants need to furnish their own overnight sleeping gear. The leader will send a detailed equipment list to approved participants. MEET: 8:00 am at Hetch Hetchy Valley, CA. ENDS: 6:00 pm. LEADER: JP Torres, jpinkflo@xecu.net. (Backpacking)



ILLUSTRATION CREDIT: Illustration by DreamDigitalArtist on Pixabay.

SPRING 2023 EDUCATIONAL PROGRAMS

Beginner Backpacking Course

LEARN THE BASICS OF BACKCOUNTRY TRAVEL!



Suggested donation to the Backpack Section: \$30

Learn how to travel safely and comfortably with only a pack on your back during the annual Beginner Backpacking course run by the Backpack Section. We are offering this opportunity for folks who have little to no experience in backpacking but want to explore backcountry trails and get away from the crowds.

Pole Walking & Hiking Classes for Veterans

Sierra Club's Military Outdoors program offers free classes to Veterans and their family members all around the Bay Area. Learn life-long skills to enhance your outdoor experiences and improve endurance, strength and spine function. For more information, check out our outings calendar on pages 13 and 14 or go to sierraclub.org/loma-prieta/military-outdoors.

IMAGE CREDITS: Photo courtesy of Thomas Meissner. Illustration by StarGladeVintage on Pixabay.

The Backpack Beginners Class 2022 consists of:

- Part 1. A virtual class via Zoom on 3/15 (7 pm - 9 pm), and**
- Part 2. An outdoor class on 4/22 (10 am - 3 pm), which is held at Samuel Taylor State Park.**

Topics covered:

1. Map and navigation
2. Backpacks
3. Tents
4. Boots and socks
5. Stoves and cooking gear
6. Sleeping gear
7. Water treatment
8. Clothing
9. Backcountry cuisine
10. Bear cans
11. Campsite selection and leave no trace camping
12. Trip planning
13. Medical problems in the wilderness

Several overnight field trips suitable for beginners are planned during the season and will be announced online in our activities calendar at sierraclub.org/sfbay/events and in the outings calendar on page 12. The first trip is scheduled for April 30 - May 1. Please check the outings calendar and sign-up directly with the trip leader.

To register for the course, please RSVP online at sierraclub.org/sfbay/events. For questions and more information, you can reach out directly to Thomas Meissner at meissner.thomas2011@gmail.com.



East Bay Regional Park District Decisions Becoming Less Public

NORMAN LA FORCE



The Sierra Club closely follows issues in the East Bay Regional Park District — the largest urban regional park district in the country. We work to ensure that everyone has equitable access to safe and enjoyable experiences in nature, as well as ample space for wildlife to thrive in protected local ecosystems. As we have reported in recent Yodelers, our work with East Bay Parks currently includes efforts to push back on the trend to place bikers, hikers, and equestrians on the same narrow trails. We're also tracking a disturbing rise in illegal bootleg bike trails. In Briones Regional Park alone, there are over 30 miles of bootleg trails, which degrade the park's landscapes and fragment wildlife habitat. The Park District is currently engaged in a pilot project to expand bike access in Briones. While we applaud the District for increasing access to our parks for bicyclists, we are concerned that not enough attention is being paid to protecting natural re-

sources and pedestrians, who account for 80% of trail users in East Bay Parks. One solution, which has the support of bike advocates, equestrians, and the California Native Plant Society, is a “trails master plan” that takes a district-wide look at increasing access for all user groups, while still protecting fragile natural resources.

While we press for more transparency and accountability in decision-making, Park District staff seem to be moving in the opposite direction. East Bay Parks recently amended its operational ordinance, Ordinance 38, to give expansive plenary powers to the General Manager. The General Manager now has the authority to decide on expanding or contracting any use on any trail or in any park without the Park District Board first knowing about it or voting on it. For example, the general manager could decide without any public input to ban off-leash dogs from Albany Beach or to allow e-bikes on single-track narrow trails in protected habitat areas. The Sierra Club believes that such changes on our public lands should require public notice and input and a vote of the Board of Directors. The Board vote that approved the Ordinance 38 amendment was, unusually, not unanimous. We thank Directors Echols and Lane for opposing the change. Director Wieskamp abstained. This matter will come before the Board later in the year, and we will see what we can do to get this amendment revoked. To get involved with trail and public lands issues, please reach out to Norman La Force at n.laforce@comcast.net.

Norman La Force is the Chair of the East Bay Public Lands Committee.



99% OF DISADVANTAGED COMMUNITIES IN CALIFORNIA LIVE IN AN OZONE NONATTAINMENT AREA. TACKLING POLLUTION FROM GAS APPLIANCES IN HOMES IS KEY TO DELIVERING CLEAN AIR.

Go to bayareacleanair.com for more information, and join the fight for healthy lungs at addup.sierraclub.org/campaigns/bayareacleanair.

SF Group Announces New Housing Sub-Committee



For the San Francisco Group, the annual November election ushered in a large number of brand-new Executive Committee members. In the month of February alone, the new Executive Committee successfully voted to support public transit, safer streets, more open space and parks, and a new bicycle lane along part of 17th Street. Additionally, the new Executive Committee has voted to create a Housing Sub-Committee, which adheres closely to the Sierra Club's urban infill policy. To get involved with the Housing Committee, all Sierra Club members residing in San Francisco are welcome and encouraged to attend committee meetings, for which you can register online at sierraclub.org/sfbay/events.

WHAT WILL YOUR LEGACY BE?

Ensure your environmental legacy by naming the Sierra Club's San Francisco Bay Chapter in your will or trust.

If you have named your local Sierra Club chapter as a beneficiary or would like to discuss doing so, please contact us today:

MATT BIELBY
matt.bielby@sierraclub.org
 (510) 848-0800 x 321

Read the earliest issues of the Yodeler online!

GO ALL THE WAY BACK TO THE VERY FIRST YODELER FROM 1939 ON THE SIERRA CLUB COLBY LIBRARY'S INTERNET ARCHIVE AT ARCHIVE.ORG/DETAILS/SIERRACLUBLIBRARY

PHOTO CREDIT: Moraga, Mt. Diablo, and the McCosker Loop Trail at Sibley. Photo by David Abercrombie on Flickr (CC BY-SA 2.0).

PHOTO CREDIT: Photo by Olga Mandrussov.

Hydrogen: Future of Clean Energy or a False Solution?

CARA BOTTORFF

More and more over the past year, hydrogen has been appearing in the Bay Area energy sector. Richmond has a potential hydrogen production plant currently in the application and environmental review process. Oakland has put forth a bid to join in California's application to the Inflation Reduction Act's hydrogen hub funding. More hydrogen fueling stations have been proposed in the area.

These examples and more point to a growing trend. As this new technology emerges, it raises many questions on how hydrogen is produced and what it could, should, or shouldn't be used for. This article from Sierra Club's managing senior analyst, Cara Bottorff, explains Sierra Club's position on hydrogen and explores the potential benefits and pitfalls.

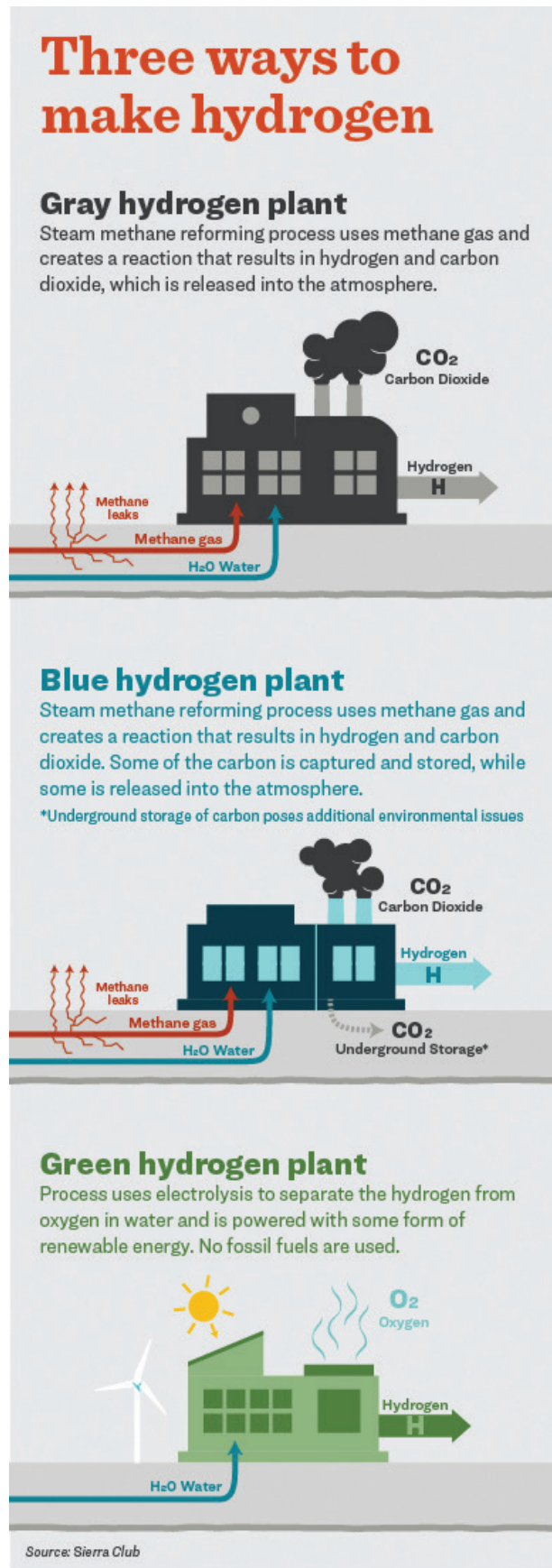
The fossil fuel industry is hyping hydrogen of all kinds as a low-carbon replacement for all sorts of uses of fossil fuels—from powering vehicles and heavy industry to heating buildings. In reality, many hydrogen projects will only lock us in to continued fossil fuel use and additional investments in fossil fuel infrastructure.

The Sierra Club only supports the use of green hydrogen—hydrogen made through electrolysis that is powered by renewable energy. Even in the case of green hydrogen, other conditions must be met for its use to be a good idea:

1. Green hydrogen is a promising solution only for uses that cannot otherwise directly rely on clean electricity, which is much more efficient.
2. Green hydrogen should not be used to justify a buildout of facilities that otherwise increase pollution or fossil fuel use.
3. If green hydrogen is being used, the goal should be to switch to 100 percent green hydrogen once the technology is available. We should not support projects that label themselves as “sustainable” because their fuel source includes a small fraction of hydrogen when the lion's share of it is fracked gas.

How is hydrogen produced?

The fossil fuel industry is generating a ton of interest



Source: Sierra Club

PHOTO CREDIT: Sierra Club.

around hydrogen, presenting it as a solution to the climate crisis and conflating green hydrogen produced from renewables with hydrogen produced from fossil fuels. Currently, more than 99 percent of the United States's annual supply of hydrogen, about 10 million metric tons, comes almost entirely from fossil fuels through “steam methane reforming” (SMR), an energy-intensive process in which methane gas is broken down into hydrogen and carbon dioxide. Hydrogen produced through SMR is a high-emissions product given the name “gray hydrogen.” In contrast, “green” hydrogen is produced by splitting water into its constituent hydrogen and oxygen components through electrolysis, which is powered by renewable energy. While industry touts hydrogen as a “clean” solution, globally only 0.02 percent of current hydrogen production is green. “Blue” hydrogen production uses carbon capture and sequestration (CCS) to remove carbon dioxide (CO₂) that is emitted during hydrogen production.

The most common types of hydrogen, their feedstocks, and associated CO₂ emissions from production are shown in the table below. Green hydrogen is the only type that the Sierra Club would consider supporting, but even green hydrogen projects should be evaluated on a case-by-case basis.

The Colors of Hydrogen

Green	Electrolysis Splitting of water powered by renewable energy ¹
Blue	Steam Methane Reforming of gas + Carbon Capture and Sequestration Hydrogen from gas with some of the carbon dioxide captured via carbon capture and sequestration
Gray	Steam Methane Reforming² of gas Steam methane reforming, no carbon dioxide capture; most common form globally
Brown	Gasification of coal Hydrogen from coal/lignite, no carbon dioxide capture

Source: Sierra Club

1. For the purpose of this report, “renewable energy” includes wind, solar, or geothermal energy. Industry groups are also using the term “green” hydrogen to include electrolysis powered by biomass or biogas, both of which harm the climate and public health.
2. There is another process that can be used instead

PHOTO CREDIT: Sierra Club.

of SMR, which is autothermal reforming (ATR). ATR is already used in the production of ammonia and methanol, and is being suggested as a replacement for SMR because it allows carbon capture at higher rates than conventional SMR, at lower cost. See: Gorski, Jan, Jutt, Tahra, Wu, Karen T., “Carbon intensity of blue hydrogen production,” (Pembina Institute, August 2021).

What is hydrogen used for?

Once hydrogen is produced, there are essentially two options for using it to generate carbon-free electricity: through fuel cells or combustion turbines. Both methods have pros and cons, depending on the application. Fuel cells have a larger energy density (i.e., smaller space requirements), but are typically more expensive. When used in a fuel cell, the only byproducts of hydrogen are heat and water vapor. Hydrogen can also be combusted, like gas, to produce electricity, which results in water vapor and nitrogen oxide (NO_x), a harmful pollutant. There are also proposals to use hydrogen to produce synthetic fuels (i.e. for maritime fuel or aviation).

Current Uses

Crude oil refineries are the largest consumer of hydrogen in the US, consuming about 60 percent of all domestic hydrogen as an input to diesel production. The production of ammonia, which is used as a feedstock for chemical fertilizers, consumes another 30 percent. The remaining 10 percent is used to make synthetic hydrocarbons, which are used in various fuels and chemical markets. These existing uses of hydrogen should be switched to green hydrogen. However, hydrogen should never be used to justify expansions of fossil fuel infrastructure, like oil refineries.

Buildings: Hydrogen is not a reasonable replacement for gas in heating and cooking appliances in buildings. Electrification is a better option; it is already available, more efficient, more cost-effective, and provides cleaner indoor air than gas. Gas appliances can only handle hydrogen blending of 5 to 20 percent by volume, which severely limits the potential for emissions reductions (as discussed below). Hydrogen use in buildings beyond that level would require all new appliances to be installed for safety and emissions control. Hydrogen is also extremely flammable, and can catch fire even in small concentrations. One study found that if hydrogen were used in homes to replace gas, the annual predicted number of explosions would more than quadruple, which would subsequently increase injuries.

Electric Sector: Hydrogen should largely not be used to generate electricity. Currently, turbine technology can handle between 5 and 20 percent hydrogen blended with gas, with newer technologies, close to commercialization, reaching 30 percent. At these low blending rates, emissions of carbon are only minimally reduced by the use of hydrogen, given hydrogen's low energy density (more below). There are not yet any commercially available power plants that can burn 100-percent hydrogen. Burning a gas/hydrogen blend would likely increase NOx emissions (more below). Renewable energy should be used directly whenever possible. Hydrogen, even green hydrogen, should not be used to mask existing gas plants as "clean," nor to justify investment in new gas plants.

Green hydrogen does have some potential uses as a long-term (e.g., multi-day to seasonal) energy storage option. It could be produced during periods of excess renewables, using otherwise curtailed power, and then used in fuel cells to balance the grid with no CO2 or NOx emissions. Used this way, green hydrogen could complement batteries as a CO2-free way to replace gas peaker plants, while reducing fracking and methane emissions that come from the production and transport of gas.

Transportation: Hydrogen should not be used to power most vehicles. Electric vehicle options are available, more efficient, and cheaper to purchase and operate than hydrogen vehicles. This is especially true for light-duty cars. Due to advancements in electric vehicle technology, auto companies should be investing in electric cars, not hydrogen cars. School buses, transit buses, and trucks that maintain shorter routes should also be electric, not hydrogen-powered. States should focus on subsidizing electric vehicle infrastructure, not methane-sourced hydrogen infrastructure.

Potential Uses: There are some ways in which green hydrogen use could be part of getting to zero emissions economy-wide, but they are likely most appropriate for hard-to-decarbonize sectors, like long-haul freight trucking. Green hydrogen has the potential to help store intermittent renewable energy; be converted to a "zero-emissions" fuel for maritime shipping and aviation; be used in high-heat industrial processes that cannot otherwise be electrified; or, be used as a feedstock in some industrial processes, like steel production.

Hydrogen is an inefficient use of clean electricity.

It is always more efficient to use renewable power directly than to convert renewable energy to hydrogen for use as an energy source. This is true across sectors and end uses. Using renewables to produce hydrogen is about 20 to 40 percent less

efficient than using renewable energy directly, when direct use is feasible. For this reason, the Sierra Club would always prefer to use renewable electricity directly where possible. Potential uses for green hydrogen should be limited to cases in which the renewable energy cannot be used directly or stored effectively.

Hydrogen's climate benefits are limited.

Green hydrogen does not produce greenhouse gases, so if it is used to displace other sources of energy that do, it can have a climate benefit. The potential climate benefit of a green hydrogen solution must be assessed against other reasonable alternatives. For example, injecting a small amount of green hydrogen into a methane gas stream reduces a small amount of the methane that would otherwise be burned, and the subsequent climate impact of that methane. However, replacing that methane gas stream with an electrification of end uses (i.e., electrified buildings) would do far more to reduce planet-warming emissions.

The gas industry touts "blue hydrogen" as a climate-friendly solution because theoretically, carbon dioxide is removed and stored during the hydrogen production process. However, recent research indicates that producing blue hydrogen does not actually reduce climate emissions compared to using methane gas. In fact, using hydrogen made from gas with or without CCS at a power plant actually produces more emissions than burning gas alone at that power plant, due to the emissions intensity of creating blue or gray hydrogen. Even if leakage is reduced to 1.5 percent (an optimistic assumption), one study found that using blue hydrogen still created more emissions than using gas. This means that as a power plant uses increasing amounts of blue hydrogen mixed with gas, its lifecycle emissions will actually increase.

Hydrogen does not produce carbon emissions when burned at end use. If hydrogen is blended with methane gas at a power plant, the carbon emissions from that power plant will be lower. However, hydrogen has a lower energy density than gas, meaning it takes a larger volume of blended hydrogen and methane to provide the same energy input as an equal volume of gas. Because of this, a blend of 30 percent hydrogen and 70 percent gas by volume only results in a 13-percent decrease in carbon emissions at end-use.

Additionally, any hydrogen leakage could undermine the benefits of green hydrogen and increase the lifecycle emissions of other types of hydrogen because it is an indirect greenhouse gas—meaning it combines with other compounds in the atmosphere to cause warming—that is five times more

potent than carbon dioxide over a 100-year time frame.

Hydrogen produces pollution.

When hydrogen is combusted, it does not produce carbon emissions, but it does produce NOx emissions up to six times worse than those released by methane combustion. NOx can cause serious health effects, including asthma and increased chance of respiratory infections; NOx is also a precursor to particulate matter and ozone, which harm the respiratory system. While there are methods of controlling NOx emissions at gas power plants, those technologies are only effective at controlling NOx at a blend of 30 percent hydrogen or less.

Hydrogen used in fuel cells does not result in carbon emissions, only electricity, water, and heat. The production of hydrogen through steam methane reforming (SMR) produces emissions that are known to be harmful, including NOx, particulate matter, carbon monoxide, and volatile organic compounds (VOCs).

How is hydrogen stored and transported?

Pipelines: About 96 percent of existing gas transmission pipelines in the US are steel. Steel is susceptible to "hydrogen embrittlement," which is the loss of strength of the metal due to hydrogen entering into tiny spaces in the metal, causing the pipe to crack. This makes nearly all of the current transmission pipelines in the US unsafe for transporting hydrogen in high volumes. Researchers estimate that hydrogen can only comprise about 20 percent by volume, or 7 percent of energy content, before it creates safety hazards in unmodified pipelines. Safe transportation of hydrogen requires either plastic pipelines with a coating to prevent hydrogen leakage or substantial modification of steel pipes. Today, plastic pipelines comprise a very small portion of the

existing transmission pipeline system, but over half of distribution pipelines are plastic. There are currently 1,600 miles of hydrogen pipelines in the US (primarily along the Gulf Coast); for comparison, there are 3 million miles of methane gas pipelines. Replacing existing pipelines with new infrastructure that is safe for hydrogen would be very expensive. Additionally, current leak detection systems are designed for gas, not hydrogen, and would have to be upgraded to detect hydrogen, a colorless, tasteless, odorless gas.

Storage: Hydrogen is less dense than gas, which makes it particularly hard to store. Hydrogen can be stored in bulk in salt caverns, which are limited to a few locations in the U.S. For long-term storage, hydrogen must be converted to a liquid, a process which can be more expensive than producing the hydrogen itself. Storing hydrogen as a gas requires high-pressure tanks, and storing it as a liquid requires maintaining cryogenic (very cold) temperatures. If hydrogen were to replace gas in the global economy, it would require 3 to 4 times more storage infrastructure, at a cost of \$637 billion by 2050, to provide the same level of energy security as the world would have with gas.

Some projects propose converting hydrogen to liquid ammonia for storage and transportation, then converting the ammonia back to hydrogen at the site of power generation.

The energy for this process is about equal to that of cooling and liquefying hydrogen, but far more infrastructure exists for safely handling, transporting, and storing ammonia.

Other Infrastructure: Since hydrogen is less dense than gas, adding hydrogen to gas requires larger total volumes to produce the same amount of energy. Additional volume means additional compressor stations to move comparable amounts of energy through the pipeline system, resulting in a host of environmental justice, health, and climate issues.

How can we tell good hydrogen from bad?

- 1 Does the proposed project rely on green hydrogen?** If so, is it exclusively considering green hydrogen, or is it considering an eventual switch to green hydrogen?
- 2 Is producing green hydrogen from renewables actually necessary,** or could renewables instead be used to provide power directly (or through electrification of end uses)?
- 3 Does the use of hydrogen for this purpose preclude meeting energy needs** through a lower-emissions or lower-cost pathway?
- 4 Is the green hydrogen being produced onsite?** Is there appropriate infrastructure for transporting and storing the fuel that will not create environmental justice concerns, and can guarantee it will not be commingled with gray or blue hydrogen?
- 5 If a project is proposing to use green hydrogen blended with gas in existing infrastructure, is there a clear and enforceable commitment to using 100 percent green hydrogen in the future,** or is the real purpose to extend the life of fossil gas infrastructure?

Source: Sierra Club

Hydrogen blending would also impose the cost of creating different metering systems at the city gate and residential levels.

How much water does hydrogen use?

Generating 1 kilogram (kg) of hydrogen through electrolysis uses 9 kg of water. For context, supplying hydrogen for a 288-megawatt power plant using 100-percent hydrogen would require the equivalent of an Olympic-size swimming pool of water every 12 hours. The power plant would need additional water for cooling, which would increase the total water usage to 15 to 20 kg of water per kg of hydrogen. While this is a large amount of water, and could be problematic for water-scarce areas, hydrogen’s water requirements are much less than the amount of water required for the extraction and processing of fossil fuels today.

Hydrogen and Environmental Injustice

Many existing and proposed hydrogen projects are located near existing oil, gas and chemical facilities, which are disproportionately sited in communities of color. New hydrogen projects must be evaluated to ensure that they are not simply an attempt to prop up the fossil fuel industry or extend the lifetime of fossil fuel projects. Oil and gas production, transport and burning has significant environmental justice im-

pacts, and hydrogen buildout must not make these impacts worse. Safe storage (of either ammonia or hydrogen) must be considered, especially at retrofitted facilities. Finally, any project that proposes combusting hydrogen must not increase NOx emissions and other pollution in fenceline communities.

Hydrogen is costly compared to clean electricity.

“Currently, conventional fossil hydrogen costs between \$1.25/kilogram and \$2/kilogram in the United States, while green hydrogen costs between \$2.50/kilogram and \$4.50/kilogram. Three sets of analysts —at BloombergNEF, Wood Mackenzie, and McKinsey—have recently found that green hydrogen could become cost-competitive by 2030 as economies of scale drive down the cost of electrolyzers and the price of wind and solar power continues to fall.” Industry has been pushing for blue hydrogen development with the dubious argument that investing in sub-optimal (or harmful) hydrogen infrastructure today might allow the deployment of green hydrogen in the future. In reality, the cost of green hydrogen will decline based on advancements in electrolyzer technology and continued reduction in the costs of wind and solar power, not based on gray or blue hydrogen development.

Cara Botorff is Sierra Club’s managing senior analyst and is based out of Washington, D.C.

Volunteer at the Yosemite Conservation Heritage Center

The Yosemite Conservation Heritage Center is looking for volunteers to assist with interpretation during the months of August and September, Wednesday through Sunday from 10:00 am until 4:00 pm. Volunteers arrive on Saturday by 3:00 pm and depart the following Saturday at 4:00 pm. Monday and Tuesday are free days to explore Yosemite National Park. Entrance to the Park, camping in a designated campsite, and showers are free. No family members, friends, or pets are permitted. Volunteers supply their own tents, food, and supplies.

Contact Bonnie Gisel at bonnie.gisel@sierraclub.org or (209) 347-7300 to learn more. **Deadline to apply is June 1, 2023.**



PHOTO CREDIT: Yosemite National Park. Photo by Franky Magana on UnSplash.



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- Our blog, updated regularly
- The full events and activities calendar
- Group information and leadership roster

ANNOUNCEMENTS

- Chapter leaders welcome new national Executive Director Ben Jealous (p. 3)
- Sign up for a beginner backpacking course (p. 15)
- SF Group announces new housing sub-committee (p. 17)

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