On the Path to Balanced Watershed Use

By Robin Meadows

Ever since he was a little boy growing up in San Francisco, Andy Howse has wanted to hike in the hills that beckon just west of I-280 between San Bruno and Woodside. “I asked my dad why we couldn’t go there and he said it was to protect our water,” he recalled. Called the Peninsula Watershed, the 23,000 acres are owned by the San Francisco Public Utilities Commission (SFPUC) and provide part of the city’s drinking water.

Nationwide, most water agency-owned watersheds — areas that drain into a creek, lake, or reservoir — are off limits to the public. But “in the Bay Area, some water agency watersheds are open to the public, and New York City does this too,” said Tim Ramirez, who manages natural resources at the SFPUC. “The rest think we’re crazy.” The biggest risk is that people will spread pathogens, including intestinal parasites such as giardia and cryptosporidium. Another downside is that trails can erode, muddying water and filling reservoirs with sediment.

Today, the Peninsula Watershed hills are more accessible than when Howse was a child — but only a bit. Ridge hikes require a docent and are limited to 60 people a day, three days a week. Now a father himself, Howse hopes his infant daughter will someday be able to hike there freely. “There should be public access to nature,” he said. “We need to teach our kids to be stewards of the land.” So he founded Open the SF Watershed to advocate for opening the Peninsula Watershed to hikers and bicyclists, envisioning a trail system that connects it with the many parks along its edges. And he’s about to get part of his wish.

Open Access

Allowing more people on watersheds that supply drinking water can work. The Marin Municipal Water District (MMWD) gets most of its water from Mount Tamalpais, which is a state park. “We get 1.8 million visitors a year,” said Mike Swezy, who manages MMWD’s 22,000 acres of watersheds. “Hordes of people are eager to enjoy nature.”

But all those people come at a cost. Take the Cataract Trail, one of the most popular on Mt. Tam for its series of waterfalls. “It’s stunningly beautiful in the winter and there can be 400 people per hour,” Swezy said. “It’s getting loved to death.” People trample plants at waterfall overlooks and may have driven the endangered yellow-legged frog from Cataract Creek. “They’re no longer there, probably because

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their egg masses were disturbed,” he explained.

And after a good rain, trails are wet and fragile, crumbling easily along the edges and eroding. Worse, some hikers and mountain bikers go off trail. “Most are law-abiding, but a small group wants their own wilderness experience and will actually construct their own trails,” Swezy said. “Where people have access, you have unauthorized use.”

Trails that are not built properly are more likely to erode, and cutting new trails harms nature by letting weeds take root and spread, degrading habitat for wildlife. “We don’t have the resources to restore it all,” Swezy said, adding that Mt. Tam is home to at-risk species like the northern spotted owl and is a “hotbed” of rare plants.

**Biodiversity Hotspot**

The Bay Area is rich in native plants and animals, making it one of 25 biodiversity hotspots worldwide. Water agencies own about a fifth of Bay Area open space and “nearly 90 percent is essential to biodiversity,” the SFPUC’s Ramirez said.

The Peninsula Watershed that Howse wants to open up is particularly rich in native species, from wildflowers and bunch grasses to eagles and mountain lions. “It’s relatively untouched,” said Arthur Feinstein of the Sierra Club’s San Francisco Bay Chapter. “It has the highest density of listed species of any watershed around.” These at-risk species include the San Mateo woolly sunflower and the chocolate lily, which grows only in the Peninsula Watershed, as well as several butterflies, the San Francisco garter snake, and marbled murrelets — black-and-white seabirds that nest in the watershed’s old-growth Douglas fir trees.

Rather than allowing “uncontrolled” access to the Peninsula Watershed, the local Sierra Club and other environmental groups favor expanding the docent program. “When there are more people, wildlife diminishes,” Feinstein said.

**Balancing Act**

SFPUC is heading towards something in between what Howse and Feinstein want. “We have 11 to 12 miles of trails in the works that make connections with neighbors around us,” Ramirez said, adding that the new trails will be on the perimeter of the watershed. “There’s less risk when they’re farther from the reservoirs.” The planned trails, which he expects will open to the public by 2018, will bring the Peninsula Watershed’s total to more than 30 miles and will fill a six-mile gap in the Bay Area Ridge Trail.

But access to the watershed will still be restricted. For example, SFPUC may adopt an annual permit system like the East Bay Municipal Utility District, which has 80 miles of trails near its Lafayette and San Pablo reservoirs. “You can

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**About the Bay Area Monitor**

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Air Quality Arsenal: Stockpiling Strategies across Sectors

By Leslie Stewart

This summer, Bay Area residents will have the chance to weigh in on policies that could shape the battle against climate change. How? The Bay Area Air Quality Management District is updating its Clean Air Plan, and will soon release a draft for public comment.

These state-mandated plans have historically targeted ozone, but the last version, adopted in 2010, also took aim at particulate matter, local air toxics, and greenhouse gases. Abby Young, a climate protection manager with the agency, called it a “groundbreaker,” remarking, “at the time we did it, a multipollutant plan was a very new concept.” So new, in fact, that “I don’t believe any other plan — even nationally — looked at the suite of pollutants our plan looked at,” she recounted.

However, of the plan’s 55 measures, only four were greenhouse gas-specific. Although many other measures reduced greenhouse gases as an added effect, observers both in and around the Air District saw room to strengthen the climate protection component of the plan. For years, the agency had been offering grant funding and technical advice to municipalities attempting to address climate change in their own planning efforts. Ramping up that aspect of its own plan made sense, so in November of 2013 the Air District’s board of directors adopted a resolution to do just that.

When the time came to begin updating the 2010 plan, Air District staff reached out to local government officials and staff, explaining the new approach and soliciting input. They also convened outside experts, sharing emissions data and other climate change information, while continuing to discuss how to accomplish goals regarding ozone, particulate matter, and local air toxics.

The external and internal brainstorming and winnowing created an extensive list. Although Young called it “our short list,” the resulting table includes 83 draft control measures grouped into nine sectors (stationary sources; transportation; buildings; energy; agriculture; natural and working lands; waste; water; and short-lived climate pollutants). These were distilled into fact sheets for each sector, with relevant graphs of emissions, a proposed overall approach, and specific action items. The fact sheets were distributed online and at a series of public open houses held this past February, while the agency’s new online Open Air Forum also gathered comments.

At first glance, the draft control measures may seem very ambitious. “We’re using all feasible measures” to create the new strategy, Young said. These range from very short-term rulemaking to actions looking out to 2050 or beyond, and they cover refinery emissions reductions, increased electric vehicle use, Plan Bay Area transportation measures, and carbon sequestration on rangelands, to name just a few.

“The initial list looks amazing,” said Jed Holtzman, a...
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cooridnator with the environmental organization 350 Bay Area. “We will fight for all of this,” he declared, describing the plan as “taking a look at the economy through a sectorial lens, getting down to a greater level of granularity — not just command and control legislation.”

Holtzman’s enthusiasm for the updated plan shows stark contrast with his opinion of the 2010 version. “We thought the Air District was massively asleep on the job,” he lamented, pointing out that “this is a regional agency which has the primary authority to regulate sources of air pollution, including greenhouse gases.” He credited community activism for compelling the Air District to more fully exert that authority in the new plan.

Of course, as any government regulator can attest, agencies like the Air District constantly receive just as much pressure to pull back their authority. Debates over this issue are sure to continue playing out among diverse stakeholders as the plan heads toward adoption in the fall.

As part of that public conversation, this past April the Air District held four working groups, each covering one or more sectors of the plan. Participants included experts involved in the original sector discussions, local government staff members, public health professionals, community organizations, business interests, and environmental advocates.

Draft control measures were the starting point, but participants also made suggestions on prioritizing implementation and addressing other policy issues. For example, Michael Kent, Hazardous Materials Ombudsman for Contra Costa County, expressed concern over health equity. “As they decide which measures to implement, they should be looking at it from the health equity perspective,” he said. “When do the CARE [Community Air Risk Evaluation] areas come into play? Do you support BART or buses? Those have different demographics.”

Young is aware that prioritization and efficiency will be key to managing the wide variety of actions. “Some areas may seem like they’re on the periphery,” she said, but there will be partnerships and other collaborative ways to approach those. She suggested that the Air District role will be “using our strengths” — for example, providing data — to add to efforts by others.

The shift in plan structure reflects a shift in the agency itself. Staff from different disciplines will work together in a newly organized climate protection team, collaborating on research, air-monitoring, and rulemaking. The new structure will allow an integrated approach to evaluating control measures, looking at regulations and incentives through different lenses, and focusing on co-benefits.

Kent supports this approach. “A lot of measures have benefits both for criteria pollutants and for greenhouse gases, but not equally for both,” he said. “An economic analysis may show that a measure which is not cost-effective for one aspect is actually quite reasonable when both are considered together. It’s the overlap that makes it worth considering.”

The new cross-pollination within the Air District will extend outside as well. For example, a new monitoring station and a new mobile van will contribute valuable greenhouse gas emissions data not only for the agency, but also for research entities like UC Berkeley, Lawrence Berkeley National Labs, and the Climate Readiness Institute.

Some stakeholders hope the Air District will create model plans that can be adopted by other jurisdictions, perhaps even other air districts still struggling to achieve attainment with state and federal regulations. As Holtzman put it, “We are doing work not just for the Bay Area, but for a lot of urban areas.”

Leslie Stewart covers air quality and energy for the Monitor.

General Proposals to Reduce Greenhouse Gases, by Sector, for the 2016 Clean Air Plan

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<td>Improve Soil Management</td>
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Benefits Package: Program Eases Commute Expenses and Emissions

By Cecily O'Connor

Anyone who's slogged through Marin County to the Golden Gate Bridge or battled gridlock on the Peninsula's Highway 101 knows the discomfort of traffic pain and pressure.

But the Bay Area Commuter Benefits Program is showing promise in treating some regional congestion symptoms. That's because a growing number of employers are registering to offer commuter benefits, which not only ease workers' monthly transit expenses, but nudge those inclined to drive solo to consider vanpools, biking, or public transit. The program also has potential to save employers money by lowering payroll taxes.

Green-lighted by Senate Bill 1339 (Yee) in 2012, the program has been operating as a pilot under the direction of the Bay Area Air Quality Management District and the Metropolitan Transportation Commission (MTC) from April 2014 to the present.

A total of 3,999 employers had registered with the program through the end of this past April, up 25 percent from September 30, 2014, the deadline by which employers with 50 or more full-time employees working in the nine-county region were required to comply. Collectively, the participating companies employ well over a million people across the region.

Approximately 2,329 employers, or nearly 60 percent, said they had begun offering commuter benefits for the first time. The remainder were offering benefits before the program took effect. Employers must update their registration annually.

“There is room for more growth in the program. But overall, we are happy with where we are right now,” said David Burch, principal environmental planner at the Air District.

Like the Clipper Card and 511.org, commuter benefits represent another investment aimed at improving Bay Area transportation. San Francisco introduced a commuter benefits ordinance in 2009, later followed by Berkeley and Richmond. Success in those cities was a driving force in establishing a regional effort.

Now, newly introduced Senate Bill 1128 (Glazer) seeks to remove the program’s December 31, 2016 sunset date, based on improvements in mobility, air quality, and greenhouse gas emissions realized so far.

“There is no opposition on record and we’re feeling optimistic it will pass the legislature and be signed by the governor,” said Rebecca Long, legislative analyst at MTC.

Carbon dioxide emissions were cut by 35,778 tons during the program’s first year, equal to a reduction of 149 tons per day, according to a February legislative report by MTC and the Air District. About 44,000 workers switched to an “alternative mode” like transit, shuttle, vanpool, or bike, instead of driving alone over the same period. About 28 percent of employees at registered worksites take advantage of commuter benefits provided by their employers on a full- or part-time basis.

“With the level of congestion getting worse in the Bay Area, [commuter benefits have] been beneficial in terms of providing employees options,” said Krute Singa, senior clean transportation program coordinator at the San Francisco Department of the Environment.

Still, there’s work to be done to realize the program’s full impact. It may apply to as many as 6,000 to 7,000 additional employers, according to estimates in the MTC/Air District report. The list is drawn from information compiled by the data analysis firm Dun & Bradstreet and the California Employment Development Department, offering a base to target employers through outreach and education.

Some cities and counties also maintain their own employer lists, so given the variety of sources, businesses can fall through the cracks, several transit officials noted. It’s also likely companies are providing benefits, but haven’t registered.

“It will require continual outreach at the local level to make sure all employers subject to the ordinance are making efforts to be compliant,” said John Ford, executive director at Commute.org, a public agency that provides commute assistance service in San Mateo County. He estimated half of eligible employers there are registered.

The Air District has contacted 9,800 employers so far via phone, e-mail, and multiple direct mailers, said Tom Flannigan, a public information officer with the agency. It has spent $115,000 on radio and television ads, and turned to social media plugs, webinars, tutorials, FAQs, and registration how-to videos as part of a broad-based outreach approach.

If an employer refuses to comply, the Air District can impose a financial penalty as authorized by the California

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Health and Safety Code. However, most transit officials said they view that tactic as a last resort. “Our intent is really [employer] compliance assistance,” added the Air District’s Eric Pop. “The first step is to register.”

Then comes explanation of the four options from which employers must choose. The majority, or 82 percent, have picked “Option 1,” which allows workers to deduct transit fares from taxable income. This tends to be easier to administer and saves money, since employers aren’t subject to payroll tax on amounts employees set aside.

Option 2, in which the employer provides a subsidy to offset transit and vanpool fares, has been the second most popular, at 10 percent. About 7 percent offer Option 4, in which employers propose their own alternative commuter benefit program, and 2 percent extend Option 3, which is employer-provided transportation, such as bus service to the worksite or shuttles from a nearby transit station.

The program has been successful in expanding the number of smaller employers who are located outside of central business districts to offer commuter benefits, according to archaeologist Mark Hylkema. The Air District hopes this will increase the use of alternative commute modes and reduce emissions on a region-wide basis. For example, 75 percent of participating employers in Napa are offering commuter benefits for the first time, according to the MTC/Air District report.

“A lot of employers are encouraging carpooling in different ways, some with preferential parking,” said Judy Leaks, project manager for the Solano/Napa Commuter Rideshare Program. Cities, too, are thinking about ways to support workers while planning for possible long-term growth of the Commuter Benefits Program.

San Francisco instituted services like the “Emergency Ride Home” for commuters who take transit or carpools to jobs in the city. When an emergency requires them to leave early or work late, then they can take a taxi, and will be reimbursed up to $150 per trip, for as many as four trips a year.

“This is targeted around drivers to give them a safety net to try a different transit mode,” Singa said.

Cecily O’Connor covers transportation for the Monitor.

Archaeologists Unearth Useful Clues about Land Management

By Elizabeth Devitt

Decades ago, after a hit movie featured an adventure-prone archaeologist, the profession suddenly acquired an aura of derring-do. But there’s more to archaeology than treasure hunting in faraway places. The Bay Area has a wealth of history hidden underfoot, from Gold Rush ships buried beneath the streets of San Francisco to Ohlone Indian shellmounds at Coyote Hills Regional Park in Fremont. A cadre of archaeologists — on staff at state parks, national parks, public utilities, and universities — work to preserve these traces of earlier lives and cultures.

But it’s not all about the past. Mark Hylkema, a state park cultural resources manager and tribal liaison, is one local archaeologist who works with Native American tribes, university colleagues, and land-holding organizations to improve open space management in the future.

“There’s a shift in archaeology — it’s not just about objects anymore. Now it’s about context and landscapes,” said Hylkema, whose district of operation covers 32 parks from San Francisco to south of Santa Cruz. “Collecting more shelves full of boxes isn’t the goal,” he added.

After almost three decades of working for the state parks, Hylkema has filled his fair share of boxes. Tucked away in archives are artifacts you’d expect from an area that was once home to more than 50 Native American tribes: grinding stones, arrowheads, and Olivella shells edged with cryptic notches that served as tribal currency. But other things were left behind as well, such as microscopic pieces of plants, pollen, and bits of bones. Upon closer inspection, these historical remnants offer clues about how the landscape once appeared, and how it was managed.

“The context of our work has changed,” said Hylkema. “We’re looking at botanical residues because if you want to look at how to manage landscapes, as we do, we need to know: What are we managing?”

A main “laboratory” for collecting such information sits along the San Mateo County coast, in a 225-acre site called...
the Quiroste Valley Cultural Preserve. Located inside Año Nuevo State Park, this is where Spanish explorers from the 1769 Portolá expedition encountered local tribes. At the time, the explorers described an area of grasslands and a variety of plant-based foods. But centuries later, when Hylkema returned to survey the site in the early 2000s, it was overgrown with poison oak. In the intervening years, a succession of landowners grazed cattle or grew crops on the land.

Quiroste Valley provided a test case for landscape changes in the absence of human disturbance because the property was untouched from 1982 to 2012, said Rob Cuthrell, director of archaeological resource management for the Amah Mutsun Land Trust. During that time the grasslands shrunk from about 40 percent of the landscape down to about 15 percent. At the same time, Douglas fir trees increased more than 300 percent. This untended landscape model is at odds with the landscape described by the early Spaniards.

To reconstruct that former landscape, archaeologists used a combination of modern technology and classic methods. They hunted for centuries-old hearths using ground-penetrating radar, which helped them avoid digging into places that might be ancient burial sites. Once a hearth was located, they dug a square pit, unearthed in 10-centimeter increments. They used flotation — pouring dirt in a bucket of water — to search for macroflora such as seeds from grasses, tarweed, and clover, as well as nut remains from oak and hazelnut trees. Then they sieved out tiny fish bones and other remnants from the soil. Among this microflora are phytoliths, the minuscule rock-hard remnants from plant cells that have long since degraded. Some phytoliths are unique to certain plants so they can be used to estimate the spectrum of plants that once grew on the landscape. Additional information was coaxed from bones or shells through the use of carbon dating and the analysis of oxygen isotopes.

By taking such inventories, the archaeologists get an idea of what once grew there, under what conditions, and when. By further considering what would grow there without any type of human land management, and comparing that scenario with the plant and animal remains found when Native Americans lived on the land, they formulate models of land management practices that could be useful today.

Taking these ethnographic accounts together with findings at excavation sites, researchers surmise there were many ways the land had been managed by pruning, weeding, seeding, and other techniques. “But the primary tool appears to be fire, and it appears to be important all across the state,” said Kent Lightfoot, professor of archaeology at UC Berkeley.

Through modeling, the researchers found human-induced fires (as opposed to those caused by lightning strikes) tended “to create and maintain grassland vegetation communities,” according to journal articles coauthored by Lightfoot, along with his former doctoral student Cuthrell, and Hylkema. During those periods of increased burning, there’s evidence of more diversity in the plants and animals that were economically important to the native people.

“There was this idea that tribes were living off the land — eating berries and hunting game — with no impact on it. But that’s not so,” added Lightfoot.

Tribal members, such as those representing the Amah Mutsun, are eager to have this information. “At first we were kind of down on science,” said Valentin Lopez, tribal chair of the Amah Mutsun. “But — with great care for the land — science can help restore our indigenous knowledge,” he said.

Land agencies, such as the federal Bureau of Land Management (BLM), are also interested in these studies because many public lands have heavy fuel loads from plant overgrowth. “Although fire is typically considered a destructive force, the small scale, low-burn indigenous practices can be quite healthy and at least minimize the risk of huge catastrophic fires, like the one that hit Clear Lake last summer,” Lightfoot said.

But it's not just about fire management, either. Working with California State Parks, the Amah Mutsun Land Trust’s Native Stewardship Corps program gives tribal members the opportunity to get in the field and relearn traditional land lore. For example, finding tarweed seeds dating back 1,000 years at the Quiroste Valley site is one piece of archaeological evidence which is changing their land use plans. The native tarweed plant, considered a “pest” plant and removed by some range managers, still grows well in the valley — along with tens of thousands of poisonous hemlock plants. So tribe members are removing the hemlock plants before they can drop their seeds. With time, they hope to progressively

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deplete the toxic plants so they can safely harvest the tarweed seeds as their predecessors once did, explained Cuthrell. “We don’t necessarily have to bring things back to the way they were,” he said of this landscape work. “We’re dealing with climate change and invasive plant issues, but archaeological evidence offers information the tribe can use to decide how they want to restore their relationship with the landscape.”

On May 26, the BLM and the Amah Mutsun Land Trust signed a “memorandum of understanding” that will provide the tribe with access to the nearby Coast Dairies property acquired two years ago by the federal agency (photo below). The organizations will work together on the 5,700 plus acres of land “to incorporate tribal traditional resource and environmental management practices to restore, enhance, and promote ecosystem health for present and future generations,” according to the BLM press release.

Another land management collaboration is taking place north of San Francisco. In Petaluma, Kent Lightfoot supervises Peter Nelson, a UC Berkeley doctoral candidate in anthropology. Nelson is a member of the Federated Indians of Graton Rancheria in Sonoma County, and he’s working with his tribe and the Sonoma County Regional Parks Department to restore and manage Tolay Lake Regional Park.

“We are still generating baseline data with these studies,” said Hylkema, of the work in Quiroste Valley and two upcoming investigations at other sites along the Central Coast. “But we’re changing our way of looking at managing lands. Our ecologists are now thinking about managing for successions of plants and the biodiversity they support, instead of just fire reduction.”

Elizabeth Devitt covers open space for the Monitor.

Valentin Lopez, chair of the Amah Mutsun tribe, at left, with Rick Cooper, field manager of the Bureau of Land Management’s Central Coast Field Office, after the two signed a memorandum of understanding between the Amah Mutsun Land Trust and the BLM that will facilitate the preservation and continuity of local Native heritage. Photo by Elizabeth Devitt.