NEWS FROM MARIN CONSERVATION LEAGUE

September—October 2015

MMWD studies forest health in the watershed

Dense understory and lots of dead or dying vegetation has led to increased risk of wildfire and loss of natural habitat.

courtesy MMWD

by Nona Dennis with Janet Klein

Much has been said recently about how to control the spread of broom and other invasive plants in the Marin Municipal Water District (MMWD) watershed and other open space lands in Marin, and whether the use of herbicides should be part of the solution. This focus has diverted attention from a larger, more wide-spread issue—forest health. Roughly 85 percent of the 21,000-acre watershed is essentially weed-free, but that does not mean that this large percentage is free of management problems. The majority of watershed lands are heavily forested, and as Janet Klein, MMWD's Natural Resource Program Manager, told the MCL Parks and Open Space Committee recently, "We can no longer take our forests for granted."

Fewer mature trees means less stored carbon.

Six tree species predominate in woodlands and forests of the MMWD watershed: Coast live oak, Douglas fir, Coast redwood, tanoak, California bay, and madrone.

Far from being merely a collection of trees, forests serve valuable ecosystem functions, such as storing carbon, providing wildlife habitat, modulating recharge and release of water, assimilating wastes such as excess nutrients, self-renewing, and not least, affording aesthetic pleasure. These functions have been jeopardized by decades without fire and, in the last 20 years, loss of tens of thousands of oak and tanoak trees to sudden oak death. These conditions, along with other primarily human-caused disturbances, have resulted in high fuel loading and large gaps in the tree canopy filled by dense brush. Regeneration of major

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999 3rd Street, San Rafael

30-year site cleanup reaches final stages

by Nona Dennis

Travelers along one of Marin's busiest corridors—2nd and 3rd streets in San Rafael—may well wonder at the big tent that will soon be erected at 999 3rd St. and at the steady flow of trucks in and out. It should come as no surprise to most San Rafael residents, however, that PG&E is cleaning up ("remediating") the last three acres of a 17-acre site in downtown San Rafael on which its manufactured gas plant once operated. According to PG&E, it will take up to a year for contractors to remove 35,000 cubic yards (52,000 tons) of contaminated soil under the tent and backfill the hole with clean fill, thereby bringing to a conclusion a project that began thirty years ago.

Between the mid 1870s and 1930, the gas plant on the site used coal and oil to produce gas for the lighting,

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A Message from the President

I spent a couple of weeks camping in the Colorado Rockies near Florissant Fossil Beds National Monument this summer. With me were my 80-year-old parents and a copy of Estella Leopold's book Saved in Time, a recounting of her and others' efforts in the 1960s to preserve the Colorado mountain valley where thin layers of mud and shale have trapped some of the world's richest paleontological records of plant and animal life of 34 million years ago. Among the fossils stand huge petrified redwood stumps (*Sequoia affinis*), and the remains of one "Redwood trio", a "family circle", evidence that this extinct species is of very close relation to our own Coastal redwoods (*Sequoia sempervirens*) which similarly reproduce by sprouting from the base of a parent tree.

It was while there, watching the migration of deer crossing fields of paintbrush and yarrow and listening to golden eagles protecting their nestlings in a tall stand of pines nearby, that thoughts of connection and continuum weighed in. There are no gaps in time, no separation between the past, the present, the future, but instead a continuum, and we are part of it. Our responsibilities lie in doing the best we can with our part of perpetuity.

This summer, as I left for Colorado, members of Marin Conservation League were busy playing a role in a variety of environmental issues, such as monitoring the County's progress on the Local Coastal Program, and supporting a Memorandum of Understanding between Marin County and the National Park Service to ease parking congestion outside Muir Woods and to increase protection of Redwood Creek salmonid habitat.

Recently, MCL joined with Marin County Parks at Roy's Redwoods Open Space Preserve, sometimes called "the other Muir Woods" for its magnificent old-growth redwood trees. It was MCL's 18th Walk into Conservation History, one in a series of walks that commemorate those who recognized the value in permanently protecting Marin's own significant natural lands, waters, and cultural heritage for future generations.

MCL's committees continue to work on environmental issues of countywide importance. We encourage you to communicate with us, attend our educational and member events, and participate in our committees. As members of our organization, you are critical to our efforts and an important part of the continuum that becomes MCL's history. We appreciate your ongoing support!

Kate Powers

Editorial

Control of invasive plants in public open space

Since at least 2009, Marin Conservation League has supported use of integrated pest management (IPM) (see sidebar, page 11) to control non-native invasive plants that threaten the survival of native plant species and biodiversity and heighten the risk of wildfire in Marin's open space and watershed lands.

A tsunami of broom

Invasive non-native plants and control of their spread have been a recurring topic in this Newsletter over the past several years. The current controversy over whether chemical herbicides should or should not be used as one of the management tools to deal with the problem has brought it to the fore. Forty years ago, an article in the MCL *Newsletter* sounded an alarm: "We are observing the rapid spread of several non-native shrubs that put out pretty yellow blossoms in the spring but appear to be invading Marin County hillsides and woodlands. Are these shrubs going to crowd out our native grasses, ferns, and wildflowers?" At that time we were just beginning to take note of three species known collectively as "broom"—Scotch broom, French broom, and Spanish broom —that were appearing on Mt. Tamalpais,

Doug Greenberg/Flickr Creative Commons

on the MMWD watershed, and elsewhere around the County. Other non-native plants also were spreading beyond their original footprint, and new species were appearing.

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Status Updates

Climate Action Working Group focuses on energy efficiency

MCL has supported the twin mandates of Marin Clean Energy (MCE) since its inception: to grow sources of renewable energy and to increase efficiency with the energy we use. MCE has rightly focused most of its attention in its first five years on providing cost-competitive energy from renewable sources. What was once seen as a risk has since proven to be not only successful but a model for many other communities following in its footsteps. This year MCE has turned its attention to energy efficiency. Its 2016 Energy Efficiency Business Plan was adopted in June and its Draft EE Program Implementation Plans are now available for public review.

MCL's Climate Action Working Group (CAWG) has reviewed and commented on both documents to MCE. It found that improving the efficient use of energy will challenge MCE because of the need for a great deal of outreach to the varied sectors of energy users. Technical expertise, education, a variety of financing mechanisms, and follow-through also will be required. The CAWG stressed in its comments the value of working with groups of energy users in the market who share common needs and who might act together to achieve economies of scale. The North Bay Dairy Energy Alliance, a group of dairies in Marin and Sonoma Counties, provides a good example in the agricultural sector where energy efficiency, renewable energy and carbon farming can all contribute to reducing greenhouse gas emissions. Sharing resources can assist small farms that otherwise would not be able to invest in new technologies or replace outdated equipment.

The CAWG is both a working group and a forum where citizens and members of several community groups working on sustainability initiatives meet regularly to deal with climate-related issues. The group's interest in the success of MCE is based on a shared intention to deal effectively with climate change. Members of the CAWG have testified before the State Assembly and written letters to the State Public Utilities Commission, supporting MCE in a sometimes politically unfriendly climate dominated by the big utilities.

In coming months the CAWG will turn its attention to the task of bringing the many organizations and jurisdictions within Marin County together in order to address climate-related issues in a collaborative manner. Most but not all cities have adopted climate action plans (CAPs) and are in various stages of acting on them. The County of Marin recently finalized an update to its CAP, which will go before the Board of Supervisors for adoption in November. As part of this larger task, Supervisor Damon Connolly has been meeting with the CAWG as a contact point to engage community groups. CAWG is planning to help bring as many groups as possible into the conversation.

The Climate Action Working Group meets monthly on the third Friday of the month at 9:00 AM at MCL. —*Doug Wilson*

State Parks Forward: Partnerships

California State Parks Department is working diligently on implementing the State Parks Forward Commission's recommendations as completed last February and detailed in its Final Report. A Transformation Team, established to undertake a two-year action program, has been working on a number of fronts, including the examination of a wide range of partnerships, with the help of a "Parnership Advisory Committee" (PAC). MCL was asked to participate in the PAC, whose objective is to provide input on a draft plan for a Partnership function within the Parks Department. MCL 2nd

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Some State Parks in Marin, like China Camp (above) are operated by volunteer "partners," while others, like Tomales Bay, (below) have been unable to maintain volunteer support.

Dru Parker, 2011

Vice President Susan Stompe attended the first meeting on August 4. Meetings will continue into the fall.

The primary task of the Advisory Committee is to help the Transformation Team review partnerships for their benefit and value to the "twin towers" of resource protection and visitor services. It appears to be a foregone conclusion that every state park will have some kind of partnership, whether concession, not-for-profit cooperating association or cultural support group, other public agencies, etc., since it has been proven that partnerships increase visitors and revenue. The challenge, however, is in understanding the complexities of different types of partnerships with which the Department engages. Marin District state parks, for example, currently have several types of partnerships, including the Marin State Park Association, Friends of Mt. Tamalpais State Park, Friends of China Camp, and The Olompali People. For a variety of reasons, some parks in Marin have considerable support from volunteers (for example,

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Status Updates

State Parks *from page 3*

Angel Island Conservancy), whereas others, like Tomales Bay and Samuel P. Taylor State Parks, have been unable to attract, retain and/or organize requisite volunteers. Or they lack essential ranger support to keep volunteers engaged. The PAC will assist the Parks Department in designing a robust Partnership program.

Other initiatives also being worked on by the Transformation Team include: Budget and Finance; Human Resources; Modernization (technology and administration); Relevancy; Planning and Innovation; Operations; and Natural and Cultural Resources.

—Susan Stompe

RTMP moves on to Region 2

Marin County Parks will hold its second public workshop in the roll-out of the *Road and Trail Management Plan* (RTMP) on October 3, from 1:00 to 4:00, at the Lagunitas School. The focus of the meeting will be on designating roads and trails in Giacomini, Cascade Canyon, Loma Alta, White Hill, and other nearby open space preserves as part of the open space district's "system." Due to the popularity and heavy use of the area for recreation, and the number of unofficial ("social") trails that have proliferated over the decades, this promises to be a large and contentious gathering, as several hundred show up to advocate for their favorite trails. For all those who care about the long term ecological health of these public lands, which harbor many sensitive species of plants and wildlife, this is an opportunity to voice your concerns and insist that recreational demands should not eclipse protection of these important resources.

Safe Trails in Marin

As fall signals the opening of the new school year, another signal is showing up on signs and in public announcements: ***Share the Trail!*** This is a signal to slow down and look out for others on the County's paved multi-use paths—like the popular waterfront path between Mill Valley and Sausalito that is heavily used by school kids, elders, dogs, bikers, and dozens of people at any one time just enjoying fresh air.

©Jocelyn Knight, jocelynknightphoto.com

In the same spirit of sharing the dirt roads and trails that cross Marin's public parklands and open spaces safely, *Slow and Say Hello!* asks bike riders, equestrians, and people on foot, with or without their dogs, to acknowledge the needs of others on the trail. The new slogan represents a collaboration of Marin Conservation League, Marin County Bicycle Coalition and Marin Horse Council, in partnership with the federal, state, county, and water district land management agencies, to change trail culture from confrontation to courtesy. The campaign was launched on June 7—National Trails Day—and is aimed also at protecting natural resources.

Slogans like ***Slow and Say Hello*** and ***Share the Trail*** are not limited to celebrating one Trails Day or the opening of school. Our hope is that they will become *the new normal* for everyday, year-round, behavior on roads and trails throughout Marin County. *—Nona Dennis*

New Director Profile

Heather Furmidge, Pt. Reyes Station

Heather has recently retired from a 30 year career in high tech and business consulting.

She was most recently the Chief Operating Officer for SYPartners—a consultancy that works with CEOs and leaders of Fortune 500 companies to set vision and strategy. Previously, Heather held positions at Apple Computer, Netscape Communications, TechTV, and Liquid Audio among other tech firms.

She is currently volunteering with Point Blue Conservation Science's STRAW program learning habitat restoration and helping with business planning.

Heather is a graduate of the Environmental Forum of Marin, has served on the Forum board, and was the Program Director for Master Class 40. She lives in Point Reyes Station.

Marin Conservation League elected three new Directors at its April annual meeting. Meet the others in upcoming issues of the MCL News.

Events

A *Walk* in the woods at Roy's Redwoods

Kurt Rademacher

38 MCL members and friends gathered at Roy's Redwoods Open Space Preserve for MCL's August 9 Walk into (Conservation) History #18. Jean Berensmeier regaled the group with tales of intrigue during the years in which she and others saved San Geronimo Valley from urban growth. County Parks naturalist David Herlocker and Mia Monroe, Site Supervisor of Muir Woods, compared old-growth redwood trees and simulated boy-girl owl conversation.

2015 Picnic on the Patio — a great day for a BBQ!

Clockwise from top: Nona Dennis, Clem Shute, Shari Shute; Ellie-Moon Boughey; Damon Connolly, Kate Sears, Judy Arnold; Susan Kirsch, Molly Foley; Jack Krystal, Max Perrey, Doug Wilson

On July 25, close to a hundred picnickers of all ages enjoyed a sunny but not-too-hot day at MCL's Picnic on the Patio. MCL hosts this party every summer for members and guests on the lovely lawn of MCL's office building in North San Rafael—which is green from recycled water!

The barbecue featured grass-fed beef from Marin Sun Farms, Marin Brewing Company beer, and a diverse and delicious array of salads, appetizers and desserts provided by MCL directors and staff. Many thanks to all the volunteers who helped make this picnic a success.

Save the date for our next soiree: **MCL's Holiday Party on Friday, December 4, from 4:00—7:00**.

photos by Jana Haehl

A dairyman, a cheesemaker and energy opportunities

by Judy Teichman

On a recent June morning, MCL offered 46 attendees the opportunity to tour the Giacomini Dairy and Point Reyes Farmstead Cheese-making operation on Tomales Bay, with Bob Giacomini leading. It was an opportunity to learn about how a small family-run dairy typical of Marin conserves resources, to be introduced to emerging technologies that can realize significant greenhouse gas reductions in dairy operations, and to sample some fine cheese.

Jana Haehl

Bob Giacomini discusses dairy operations.

In 1959, newly-married Bob and Dean Giacomini purchased what is now known as Giacomini Dairy. With little interest in livestock and agriculture, the Giacominis' four daughters—Karen, Diana, Lynn and Jill—left the farm for other careers. In the late 1990s, Bob and Dean recognized that they couldn't stay in business without diversifying their conventional-milk dairy and lured their daughters back to establish the cheese making business. The first wheels of award-winning artisanal cheese from Point Reyes Cheese Farmstead Company were produced in August 2000. Today, the company's products are available throughout the country and in parts of Canada.

Dairy resource conservation

Integrating dairy farming, pasture management and cheese making presents significant opportunities for closed loop systems and resource conservation. The Giacomini operation is an apt demonstration. For example, the water used to cool milk fresh from the cows and clean the cheese making equipment is reused several times to wash down the manure in the barns. The flushed manure flows by gravity to a concrete collection basin, where solids are screen-separated from liquid. The liquid is pumped into a covered lagoon, where bacteria produce methane from residual manure through anaerobic digestion. The electricity generated from methane provides over half of the dairy's electrical needs. The left over solids are used as bedding and compost marketed locally as "Bob's Best." The residual liquid from the digester is used to irrigate during the dry season.

Used grain from Lagunitas Brewing Company is used for part of the Giacomini cows' feed.

Stuart Smith

The Giacomini Dairy emphasizes other environmentally sound, sustainable business practices. Its cattle are fed silage from the ranch, and whey from the cheese making operation "sweetens" the mix. Also added are by-products from other food and agricultural industries, such as almond husks for roughage, cottonseed for high protein and energy, and brewer's grain from Lagunitas Brewing Company.

Each day a cow producing milk eats roughly 60 pounds of feed mix and drinks 30—35 gallons of water to produce 15 gallons of milk. The amount of milk produced varies with life-stage and other factors, including genetics and nutrition. Each month a nutritionist examines milk production and the feed and develops four different rations. A computerized record on each cow includes information about when the cow is bred, when a calf is due, the volume of milk produced and which feed mix is appropriate.

Adding value: cheese, "The Fork"

The Giacomini Dairy makes Point Reyes Farmstead Cheese onsite. The Company's original "Point Reyes Blue" is made from non-pasteurized milk. Anticipating possible government regulations, it is experimenting with a "Blue" made from pasteurized milk. Although the dairy is not organic, growth hormones are not used. It takes ten gallons of milk to produce one pound of cheese. The Dairy sells its excess milk, but volume has decreased significantly as cheese production has increased.

Cheese made and aged in a specific place develops a unique flavor profile based on the animals' feed, local climate, and natural microbes in the air. Since all of the milk used in making cheese comes from the Giacominis' own dairy and is made on the property, it is one of the few cheeses in the country to legitimately use the "farmstead" designation.

Associated with the cheese operation is "The Fork," a state-of-the art kitchen and educational and entertainment facility used for culinary classes, farm tours and a variety of events.

Methane digesters and dairies

Both the Giacomini Dairy and the Straus Family Creamery in Marshall use methane digesters to produce electricity. Unlike intermittent wind and solar power, the power produced is consistently available. Thanks to modern technology, Jim Kehoe, Giacomini's dairy manager, can operate the methane digester from his home.

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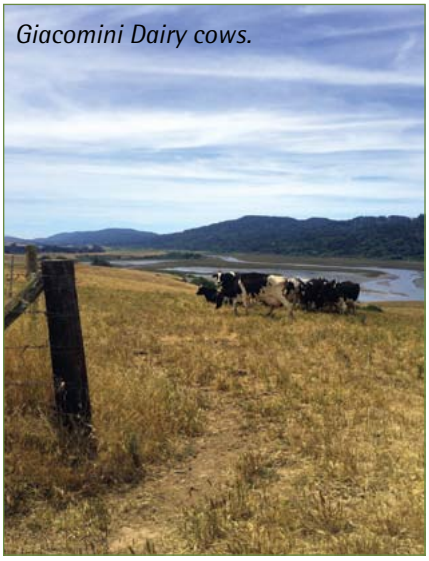
Giacomini *from page 6*



Giacomini Dairy cows.

Stuart Smith

Bob estimates that without the digester the dairy's monthly energy bill would run around $14,000. Methane digesters are not inexpensive (between $300,000 and $3 million), and there are only 20 statewide. In the Central Valley, where air conditioning is necessary for cow health, energy costs on dairies are second only to labor costs.

Following the tour, Dr. Jeff Creque of the Carbon Cycle Institute reported that studies published by the Nicholas Institute and U.C. Berkeley have shown that converting methane to electricity can lead to "carbon negative" dairies. If implemented on dairies statewide, the benefits from reducing green house gas emissions would be significant. Energy consultant Tom Flynn focused on improving energy efficiency on dairies. He described the North Bay Energy Alliance's efforts to help smaller North Bay dairies with updated lighting, pumps, refrigeration systems, and other equipment, which could increase their energy efficiency and realize both energy cost savings and achieve greenhouse gas reductions. MCL has joined the Alliance in recommending that Marin Clean Energy fund comprehensive dairy energy audits to facilitate efficiency, renewable energy such as methane digestion, and carbon farming (sequestering atmospheric CO_2 as soil carbon) in its 10-year plan.

A video of the Giacomini tour can be viewed at marinconservationleague.org/resources/videos.

MCL Business Member Profile

Equinox Landscape

by Linda Novy

23 years ago, Patrick and Heather Picard had a dream of creating an ecologically principled landscape company. This idea has grown into Equinox Landscape (Equinox), an award-winning and respected landscape design, build, and maintenance firm serving Marin and Sonoma Counties. Sustainable landscape design principles and permaculture concepts of holistic systems and practices guide their installations and vision for aesthetically pleasing and low maintenance gardens. Their staff, using organic maintenance techniques, carefully oversee the new installations and other landscapes, and the results are "beautiful gardens for a sustainable future." It's no surprise, then, to learn that Equinox Landscape is a committed member of the Marin Conservation League, joining as Business Members in 2012 to support MCL's advocacy for conserving land and other natural resources.

An Equinox crew installs Rainwater Harvesting Tanks that connect directly to an existing drip irrigation system.

Some of the company's sustainable practices include integrated water resource management systems, such as bioswales, rain water harvest, and graywater systems. Their staff are attentive soil managers, testing soils and applying compost teas that encourage soil health. Equinox also includes an interesting permaculture technique in their tool box: Hugelkultur, or "raised beds with a difference." This approach, which repurposes pruned branches and vegetation, retains soil moisture, builds fertility, and creates opportunities to grow plants while keeping carbon on site. The company also brings sustainability to its fleet and energy sources – look for their biodiesel powered fleet on the road towing their mobile solar powered generator, used for operating power equipment at installation sites! The Equinox commitment to sustainable practices extends to their Petaluma office where not only is there an environmental purchasing and recycling program, but much of the site furnishings are repurposed windows, doors, ceiling tiles, hardware, and similar materials! Their vision for the future is to help California meet the challenges of the drought. Patrick explained that this year alone they have converted innumerable lawns into native planting and edible food forests.

A visit to the website, Equinox Landscape, is a real treat; be sure to check out the Sonoma Cornerstone Gardens installation, *The Future Feast in the Garden* , which featured a living table modeled on green roof technology! Equinox Landscape's talented and dedicated staff of land stewards is a deep green resource for our region and MCL members.

Gas plant site *from page 1*

cooking, and heating needs of local residents before natural gas was available as an energy source. Such plants existed throughout California, the United States, and Europe. The technology of gasifying coal and oil, which pre-dates the Civil War, was considered a major step forward, revolutionizing street lighting, enhancing public safety and enabling businesses to work into the night. According to some estimates, there were as many as 50,000 such plants across the United States. When coal gas and oil gas were replaced by natural gas, the San Rafael plant, like thousands of similar plants, was shut down. It remained idle until being dismantled in 1960.

Left behind was a legacy of toxic residue, much of it from the coal tar byproduct. Some coal tar was collected for sale and eventually found its way into dozens of other organic chemical compounds, but recovery was incomplete and the residue remained in surface soils. Also, a tar/water emulsion was often discharged into nearby water bodies or leaked onto the ground from storage on the site and percolated into groundwater.

A heritage of contamination

In 1985, the Environmental Protection Agency (EPA) began to investigate the soils and groundwater underlying some 1,500 former plants around the country and found an array of contaminated residues that had remained onsite or had entered nearby water bodies. Following the EPA study, PG&E began a voluntary program overseen by the California Department of Toxic Substances Control to identify the location of gas plant sites they had formerly owned or operated and to begin a process of testing water and soil samples. As a consequence, some 41 PG&E sites in California are now are in various stages of investigation, remediation, or post-remediation monitoring. Throughout the program, PG&E has been reassured by toxicologists and health experts that exposure to manufactured gas plant residues is not common because, in most cases, they are located below the ground surface.

The former PG&E gas plant site at 999 3rd Street in San Rafael. The residential development Lofts at Albert Park show in the background to the right.

Dru Parker

As part of this program, PG&E began an investigation into the residues that had entered the soil during the San Rafael gas plant's operation. In 1986, it began clean-up of two sites totaling 14 acres by constructing a slurry wall to prevent migration of contaminated groundwater into adjacent waters. They installed monitoring wells and a groundwater extraction and treatment system in 1986 and began to monitor groundwater to detect any off-site migration. As will occur with the current project, contaminated soils were removed, ground water was remediated, and clean soils were imported in order to cap the entire site. All of this took place a number of years ago and enabled construction of the San Rafael Corporate Center buildings on the site.

Final site to be cleaned up

That left the three-acre site at 999 3rd St. still needing remediation. Beginning in 2007, under DTSC oversight, PG&E collected hundreds of samples of soil, soil gas and groundwater from the site and adjacent sites. Found were residues in the soil similar to those found in the earlier site: polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), cyanide, and metals such as chromium and lead. Samples of groundwater also contained varying levels of PAHs, TPH, and VOCs.

When the project gets underway, the tented site will be excavated in increments. Impacted soils will be loaded into dump trucks at the estimated rate of three to five truckloads per hour—maximum 35 per day, for a total of 2,200—and taken to Richmond to be loaded onto rail cars for transport to a licensed off-site disposal facility in Utah. Excavated areas will be filled with clean soil, and the site will be restored with new paving and landscaping in preparation for development. Some contaminated soil will remain, however, buried under adjacent streets capped by asphalt.

PG&E will maintain a project hotline at (510)334-4866 or tacm@pge.com

PG&E has made extensive outreach in San Rafael leading up to this work. Removal and loading of soil onto trucks will occur under the tent, which will be fitted with negative pressure and odor suppressants to minimize dust and odors similar to petroleum, moth balls, and roofing tar. Air quality will be monitored at the fence line throughout the project term. Neighbors can expect noise and vibrations from the excavation activity, and motorists will encounter truck traffic. An extra lane will be added to 3rd Street to ease truck entry and exit, and a flagger will help to manage pedestrian and truck traffic.

The Bay Area Air Quality Management District has encouraged public comment on the project. While the public comment period closed on August 27, PG&E Community Relations staffer Tracy Craig will continue to field inquiries at (510)334-4866, or *tacm@pge.com.*

Measure A funds at work

MCL to host Senior Walks

©Michael Hanrahan, 2012

The *Parks, Open Space and Farmland Preservation (Measure A) Tax* was passed in 2012. Among numerous plans and facility upgrades that were made possible by Measure A funds, the Parks Department instituted a small Community Grant Program offering a total of $100,000 in annual funding to support programs and projects that can connect underserved communities in Marin with the County's parks, preserves, and other recreational facilities. The program is named *"Breathe/Respira!"* to highlight the purpose of the program, which is to promote healthy and active living choices. The elderly were identified as a community that would benefit, particularly those seniors who may be living alone and may be challenged by difficult transportation or other obstacles that impede their ability to enjoy the open space preserves and other natural lands in the County.

Marin Conservation League was awarded a small grant for the 2015-2016 fiscal year. It will enable the organization to host a series of six walks for seniors into open space preserves, featuring their natural and cultural histories. The program is based on MCL's popular *Walks into (Conservation) History* series that began in 2009 and continues to feature the stories of how Marin's public lands were conserved.

The Community Grant "miniseries" will transport small groups of seniors by van to explore the County's open space preserves and at least one state park, and learn about their natural and cultural histories.

One Walk will be fully accessible to wheelchair. The others will require that participants be able to walk comfortably for as much as a mile on uneven terrain, such as a foot path. The first event, **September 24**, will feature a visit to St. Margareta Island, the smallest of Marin County's open space preserves, and a walk around Turtle Back at China Camp State Park (pictured). The second event, **October 22**, will be a walk into Rush Creek Open Space Preserve. The remaining four Walks will happen in Spring 2016. For further information call 415-485-6257, or email mcl@marinconservationleague.org.

MMWD *from page 1*

tree species is poor and natural biodiversity has been compromised.

As a consequence, the risk of wildfire has increased, and fewer mature trees means less stored carbon. Water yield, a major interest of the water district, is likely reduced as the forest understory has become dominated by brush. Measured in terms of canopy die-off, the problem areas shown in aerial maps are wide-spread and worsening. These conditions, states Klein, constitute the "new normal."

Research to address these issues

Before taking broad and possibly uninformed action to address these problems, MMWD has begun a formal study into the myriad problems and their possible causes and resolution. The District recently teamed with UC Davis and the USDA Forest Service researchers in a pilot program designed to examine key parameters that make up what one might call a "healthy forest"—what does a healthy forest "look like"?

What does a healthy forest look like?

Working in 1.5-acre plots distributed near Laurel Dell, on Bolinas Ridge, and on San Geronimo Ridge, researchers will soon install instrumentation and test and monitor multiple treatment methods over a period of up to 5 years. A total of 30 acres will be included in the study. The study will focus on these questions: How can the district reduce brush, reduce fuel, increase tree diameter (that is, promote more mature trees), optimize carbon storage, optimize water yield, improve fire resiliency (response to wildfire), improve habitat value, and fund the necessary work at a meaningful scale?

There will be no simple answers; the work will, in fact, raise other questions, such as what the environmental effects of various treatments might be. As a research project, the program is exempted from formal review under the California Environmental Quality Act. However, that does not obviate the need to examine the effects of equipment and treatments on wildlife, such as on threatened spotted owl, nesting song birds, and other seasonally-sensitive species. How will treatments affect rare and sensitive plant species and creek habitats, soil and runoff into creeks and reservoirs? How will the desired "healthy forest" perform in all of these areas of environmental concern?

A key question for the District will be: if environmentally desirable treatments can be found for small sample plots, can they be scaled up to become both effective and cost-efficient over large areas of the watershed? We will look forward to periodic reports of progress and responses to environmental questions as this timely and important research goes forward.

IPM *from page 2*

Over the ensuing decades, we have witnessed a "tsunami" of broom take over entire hillsides and woodlands of Marin in spite of attempts at control. A recent count of non-native plant species in the County's open space preserves numbered almost 300, occurring in many different native plant communities. Twenty-seven of these are identified in the County's recent Vegetation and Biodiversity Management Plan as Priority Invasive Plants that need immediate management attention.

Why should we be concerned? Marin hosts exceptional habitat biodiversity because of its many microclimates and microenvironments, ranging from coastal dunes to bay wetlands, from serpentine soils and rock outcroppings, to grasslands, chaparral, and native woodlands. County open spaces are home to dozens of species that are considered rare, threatened, or endangered. Marin Open Space Preserves lie within one of the world's 34 biodiversity "hot spots" recognized by The Nature Conservancy and are adjacent to the Golden Gate Biosphere Reserve.

The nature of weeds

Invasive non-native plant species are weeds, and a weed is basically a plant growing in the wrong place. A weed can survive nutrient-deficient soil, drought, and total neglect and live to bear flowers, set seed (or other means of propagating) and reproduce again and again. Weeds display mind-boggling survival strategies, among them production of thousands of readily-dispersed seeds, aggressive spreading roots and runners, or mechanisms to capture and turn nitrogen into useable form, like broom, which also produces prolific, long-lived seeds.

Hardy non-natives, uncontrolled, can take root in newly exposed soil, spread, displace less tolerant natives, alter soil chemistry, obliterate wildlife habitat and interfere with other complex ecological processes, and ultimately trigger the loss of biological diversity. Such infestations are documented across most of Marin's watershed, park and open space lands.

Humans are not the only vector in the spread of invasive plants, but their activities are by far the primary cause. Build a road or carve a trail into new territory, and non-natives will follow! Consider also the alarming addition of weeds like broom to the existing load of vegetative fuel on Marin's public wildlands; the need for effective control of this potential fire hazard is acute.

A full set of IPM tools can control weeds

To manage these weeds land managers need a complete set of tools. *Integrated Pest Management* (IPM) provides the necessary science-based system for determining which treatment option (tool), or combination, will be effective in controlling weeds. These options can include hand-pulling individual plants, mulching or smothering small populations with black plastic, mowing, controlled burning, mechanical removal (tractor, excavator), introducing biological predators, and applying steam or acid.

Each of these methods can bring its own impacts. When these methods fail, or require follow-up, the IPM decision progression is to use the least-toxic chemical herbicide, narrowly targeted to address the specific situation and applied minimally and carefully to avoid contact with non-targeted vegetation, waterways, people, animals, and the surrounding natural environment. Glyphosate, the focus of current controversy, is just one of numerous available herbicides. In its recent listing as a "probable human carcinogen," a listing that is under debate, glyphosate joins a lengthy list of familiar substances like creosote, lead, malathion, and UV radiation, which we treat with a high degree of regulation and care.

Weeds typically can be eradicated from most gardens using hand methods. Weeds in wildlands, in contrast, may be scattered across hundreds of acres. Hand-pulling alone cannot keep pace with annual new seedlings. Anyone who has wielded a "weed wrench" for a day in a field of broom will testify to the intensity of labor that never ends. With early detection, a "new" invader can be nipped literally "in the bud," but established infestations often require a multi-year program using multiple tools, including a targeted herbicide where necessary, to bring a population under control. The objective in all cases should be to phase out the need for continued intervention and restore the area with appropriate native vegetation, followed by monitoring.

Most of Marin County's open space management agencies apply minute amounts of herbicides, in conjunction with other IPM methods, to manage invasive plants on their lands. MCL supports this

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Stuart Smith

Invasive broom (detail, top right) crowds a fire road on San Pedro Ridge in San Rafael.

Established infestations such as this require a multi-year IPM program.

IPM *from page 10*

approach. At the same time, we encourage continuing technical oversight and a high level of public transparency when herbicides are used. MCL has never supported the widespread use of glyphosate in industrial agriculture on GMO ("Roundup"-resistant) crops or in other large-scale commercial operations, where the risks of exposure to humans, wildlife, and environment are greater by many orders of magnitude.

In a carefully written policy (2008) on appropriate and inappropriate use of herbicides, the California Native Plant Society, conservator of California's native flora, found herbicides to be a potentially useful tool for controlling weedy or invasive plants that threaten native vegetation, when used with precautions and considerations of the herbicide selected, affected native vegetation, and site factors. A recent letter from the CNPS Marin Chapter to the County warned that, with the number of advocates calling for an outright ban on chemical herbicides on public lands, we are at a critical juncture in Marin's environmental history. MCL agrees! Our County open space managers need all the tools in the IPM tool box to deal with the scourge of weed invasions on Marin's open space lands.

Marin County's open space managers apply minute amounts of herbicides in conjunction with other IPM methods to manage invasive plants on public lands and open space.

Meanwhile, these and other herbicides, in a variety of concentrations and packaging, are widely available at nurseries and hardware stores across the county and used by the general public with no technical oversight.

Stuart Smith

HAVE YOU RENEWED YOUR MEMBERSHIP FOR 2016?

Don't miss out on a year of the MCL News, updates on local issues, invitations to our special events, and most importantly, the opportunity to make your voice heard by decision-makers.

MCL's calendar-year memberships start at just $35 and remember, our Leaders Circle members ($250 and above) are invited to our annual October Leaders Circle picnic!

Visit marinconservationleague.org **to renew securely online.**

What is Integrated Pest Management (IPM)?

The term "Integrated Pest Management" (IPM) represents a common sense decision framework for controlling populations of undesirable species ("pests") while maintaining a quality environment. Pests can include insects, pathogens, weeds (including invasive non-native species), and other unwanted species. As an ecological approach, IPM combines cultural, physical, and biological methods of control, using chemical controls only as a last resort when other methods have failed or are not feasible, and when used, incorporating the least-toxic chemical control.

A common sense decision framework for controlling pests while maintaining a quality environment.

The roots of IPM are as old as agriculture itself; biological, physical, and cultural methods have been applied for millennia to minimize harm to crops from pests. Chemicals like sulfur and arsenic compounds have also been used to control pests at various times in history.

As the use of synthetic chemical pesticides exploded in the years following World War II, scientists recognized the need to control pests from an ecological perspective. In the late 1950s, a group of entomologists at University of California, Riverside, coined the term "Integrated Control." This evolved into "Integrated Pest Management" in the early sixties, a term that was formalized by the US Academy of Sciences in 1969 and is recognized internationally. In the U.S., IPM was first recognized for use by federal agencies by President Nixon in 1972, and is used at state and local levels, as well as in many facets of private practice. In Marin, the IPM method is disseminated by the University of California Cooperative Extension. The County manages its own facilities in accordance with its adopted IPM ordinance, which is overseen by an IPM Commission.

In practice, IPM is a process, not a set of absolute standards, unless adopted as such in an ordinance. As a process for managing invasive plants (weeds) in Marin County open space lands, IPM provides a systematic method for determining which treatment option (tool), or combination, will be effective in controlling invasive weeds, based on understanding the species, the environment, the goals of management, and the effectiveness of physical, biological, and, where necessary, chemical (herbicide) tools to meet those goals.

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Board of Directors meetings are held at 7:00 PM on the 3rd Tuesday of the month at the MCL office and are open to the public.

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Issue Committee Meeting Schedule (subject to change—check website)

Land Use and Transportation:
1st Wed. of the month, 9:00 AM—Noon

Parks and Open Space:
2nd Thurs. of the month, 3:00—5:00 PM

Invasive Plant Subcommittee of POS:
3rd Wed. of the month, 3:00—5:00 PM

Climate Action Working Group: 3rd Fri. of the month, 9:00 AM—12:00 PM

Agricultural Land Use: meets quarterly; Water and Watersheds, North Marin Unit: Check website for times and locations

Marin Conservation League was founded in 1934 to preserve, protect and enhance Marin County's natural assets. MCL is a non-profit 501(c)3 organization. All contributions and memberships are tax-deductible to the extent allowed by law.

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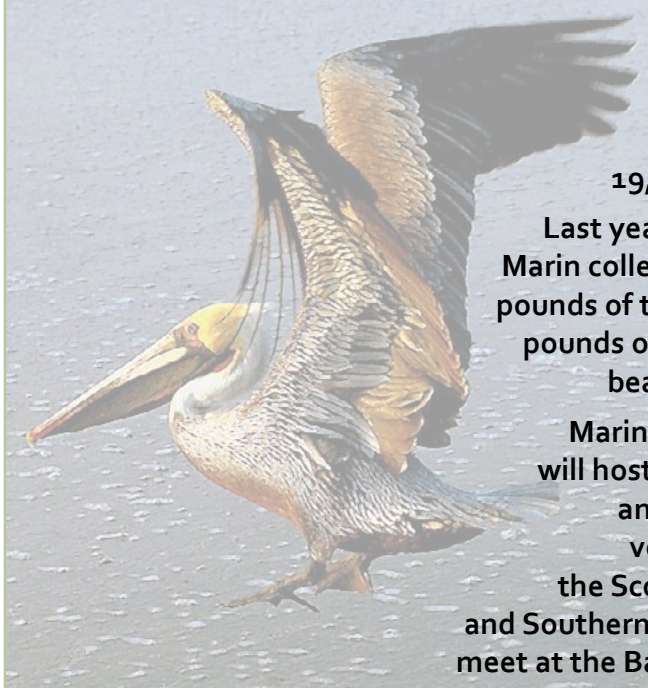
Coastal Cleanup is Saturday, September 19th



Mike McDonough/Flickr

The 31st Annual California Coastal Cleanup is Saturday, September 19, from 9 a.m. to noon.

Last year, 1,526 volunteers in Marin collected more than 5,590 pounds of trash and nearly 1,346 pounds of recyclables from our beaches and waterways.

Marin Conservation League will host two locations for the annual cleanup: Novato volunteers will meet at the Scottsdale Pond Gazebo and Southern Marin volunteers will meet at the Bay Model in Sausalito.

The Sausalito Lions Club and Friends of the Bay Model provide a free BBQ for all volunteers following the cleanup at the Bay Model Visitor Center. Visit marinconservationleague.org/events.