



Bodega Land Trust



Journal

“...When we see land as a community to which we belong, we may begin to use it with love and respect.” . . . Aldo Leopold (1886-1948), *American Forester*

Coastal Prairie Enhancement in Sonoma and Marin Counties *by Suzanne Olyarnik, Bodega Marine Reserve*

Based on the Coastal Prairie Enhancement Feasibility Study Final Report to the California Coastal Conservancy, March 2014

Healthy grasslands perform essential services necessary to support life, contribute to human well-being, and provide beneficial goods. Despite their importance, grasslands have become endangered ecosystems; many have already been lost and those that remain continue to be under threat from development, non-native invasions, climate change, and other human-related activities. California’s native grasslands have been reduced by 99%, making them among 21 of the most endangered ecosystems in the United States.

Coastal prairie is a specific type of grassland that occurs in areas where the climate is influenced by coastal fog. California’s coastal prairies range from southern California all the way to Oregon, usually within 100 km (62 mi) of the ocean on bluffs, hillside slopes, marine terraces and low grasslands. The plant communities that make up the coastal prairie are highly diverse, with twice as many plant species compared to other types of North American grasslands. They include wildflower species and forbs as well as grasses, which creates beautiful and colorful displays along the coast in spring. They are also rangelands where animals are raised to provide meat, milk, wool, and leather. Coastal prairie plants are considered excellent forage even after a century of grazing use. Many wild animals use coastal prairies as their home, including badgers and black-tailed jackrabbits, grasshopper sparrows and meadowlarks, western fence lizards and skinks, rare butterflies and moths, and many other species.



Recognizing the importance of this diminished habitat, a group of researchers, ranchers, managers, and educators concerned about the ongoing loss and degradation of coastal prairie formed the Sonoma-Marin Coastal Grasslands Working Group, dedicated to

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Bodega Land Trust

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Member Land Trust Alliance

A Message from the President

Our mission

Our primary purpose is the conservation of land, particularly open space in the Salmon Creek watershed. Our main tools are conservation easements and education.

We have a total of 13 easements including three small ones in the Atascadero watershed.

The heart of our educational program is our annual Walks and Talks series. The Walks allow participants to become intimately involved with some aspect of the watershed. The Talks are by experts in their fields and allow for questions and personal observations.

BLT Board of Directors

Don Sherer, President; Mary Biggs, Vice President; Ellie Fairbairn, Secretary; Sharon Welling Harston, Russ Pinto

Newsletter Staff

Editors: Hazel Flett and Sandy Sharp
Layout: Sandy Sharp

The Bodega Land Trust is a volunteer organization; in fact we are almost 100% volunteer. Our Board members all contribute their time and expertise, and that keeps us moving forward. Monitoring our 13 conservation easements each year is a major effort, done largely by volunteers, and we are thankful to them.



But we cannot operate on goodwill efforts alone. Because Monitoring of easements is important to us, we have chosen to hire a part time Monitoring Coordinator. This ensures consistency in carrying out this critical aspect of our mission. In this modern world, we also need to pay for liability insurance, litigation insurance, printing and mailing costs for the Journal and office supplies among other expenses. We know that being able to pay for expensive appraisals on proposed conservation easements when landowners will not, or cannot afford to donate will increase the land we can protect. We want to be ready. We see there are critical easements (or interests in land) for which funds must be raised. In short, we need money to operate.

So, I must make this appeal. We have a very limited base of cash donors, to whom we are grateful. To them, I must ask if they can consider an additional or increased donation to the Bodega Land Trust. To those who have not contributed but who support our efforts to preserve the landscape, the agriculture, and the unique beauty of the Salmon Creek watershed, I have to say: PLEASE join us and send in your contribution. We need you!

We are looking for:

- A couple of clean used laptops with wi-fi
- A couple of volunteers to donate 2 hours/month for office work
- A volunteer recording secretary, 3-4 hours/month
- A volunteer who knows how to do on-line newsletters (bimonthly)
- Volunteers to monitor our easements (see p. 14)

All donations, including time, are tax deductible.



Coastal prairie natives

All photos by: Jim Coleman

(continued from page 1)

conservation of coastal grasslands. Since a workshop in 2006 when the group identified a list of top priorities for preserving coastal prairie, progress has been made toward those goals through a project called the Coastal Prairie Enhancement Feasibility Study. The California Coastal Conservancy funded Ocean Song Farm and Wilderness Center to develop this project, which evolved into a regional, multi-partner collaboration with additional funding by Sonoma Agricultural Preservation and Open Space District, University of California Natural Reserve System, and the UC Davis Office of Research. This study set out to map and classify coastal prairie in Sonoma and Marin Counties, prepare educational and volunteer training materials for coastal prairie management and restoration, conduct habitat enhancement activities, and recommend management methods for coastal prairie conservation.

Coastal Prairie Mapping

Before this project, little information was available on the distribution of coastal prairie, and the diversity of coastal prairie community types was not fully described. It was not known how much high-quality coastal prairie habitat remained, what types of prairie required extra levels of protection, which areas may be more critical than others, and how local prairie types may respond to management actions. There was need for a vegetation map showing the spatial distributions on a regional level. The mapping team developed a model based on free remote-sensing data from Landsat combined with on-the-ground data collected by a field crew to create a GIS map of coastal prairie types in Sonoma and Marin Counties. They also described and categorized 34 plant communities and created an identification guide for them. The map can now be used to help land managers and organizations decide how and where to focus conservation efforts. For example, one realization that emerged is that the non-native, invasive velvet grass dominates along the coastal terrace whereas non-native annual grasslands are more abundant inland. Therefore effective non-native management techniques will be different in those areas.

The map can also be used to help find the best remaining native habitat patches and will help to prioritize conservation and management efforts. The mapping team shared their data and maps with the California Native Plant Society, who in turn shared with California Department of Fish and Wildlife and the Sonoma County Agricultural Preservation and Open Space District. The on-the-ground survey data will be used to refine the California Manual of Vegetation Classification System and the first-ever fine-scale vegetation map of Sonoma County.

Outreach and Education

Coastal prairie is still an under-recognized plant community. To increase the awareness and appreciation of coastal prairies needed for effective conservation, the outreach team created a coastal prairie website (www.sonoma.edu/preserves/prairie/), the most comprehensive resource on this topic available on the internet. In response to requests from landowners and managers who voiced the need for skilled workers that could assist them in grassland management and restoration activities, the outreach team also created a training course for community members, managers, and volunteers. The training course (available in 1-, 2-, and 4-day formats) was field tested for the last three years with college students, landowners, ranchers, and agency biologists. This training continues to be offered at Sonoma State University and the curriculum is also available for free on the website.

Habitat Enhancement Activities

Another goal of the project was to conduct enhancement activities on 35 acres in Sonoma County and test a few land management methods to assess their effectiveness in controlling non-native plants. Velvet grass was chosen as the target species as it is the most aggressive, threatening invasive species that can dominate coastal prairie habitat. The enhancement team explored different methods of controlling velvet grass: grazing (both by cattle and sheep), mechanical methods (mowing and raking) and application of two different herbicides. Different techniques were applied at five different project sites over three years: the Bodega Head portion of Sonoma Coast State Beach, Bodega Marine Reserve (University of California), Bodega Pastures, Estero Americano (managed by the Sonoma Land Trust), Occidental Arts and Ecology Center, and Ocean Song Farm and Wilderness Center. A field crew from Bodega Marine Reserve conducted spring monitoring each year from 2010-2013 and used the data to determine if the management techniques had any effect on controlling velvet grass.

The results of the study showed that velvet grass can be reduced using herbicide: a monocot specific herbicide (Poast®) showed greater results than a broad-spectrum herbicide (Aquamaster®). Herbicide treatment requires more than one application due to new plants recruiting from the seed bank. With this technique, land managers should expect the need for long-term removal of velvet grass re-sprouts, which can be done either by spot-spraying herbicide or by manual removal (with a tool like a “yard butler”), depending on the area and level of infestation. The type of herbicide preferred depends on how much of a native plant community is present: a monocot, or grass-specific herbicide, is recommended for areas where native forbs and grasses are present.

Mowing also appears to be an effective way to hold the line against velvet grass further, but it may take more than one mowing in a season to be effective. The important thing is to prevent velvet grass from going to seed, so timing is important and may differ from year to year depending on conditions. Raking with a tractor did not decrease velvet grass more than mowing did. Looking at grazing, which can be applied at a larger, landscape level than herbicide application and mowing, sheep grazing appears to be holding the line against velvet grass. Although the project team doesn't currently have a prescription for reversing a velvet grass infestation at this scale, there are promising approaches for intensive sheep and cattle grazing. A variety of grazing models have been shown to improve grasslands in other areas of the world and a few ranchers are applying these techniques with good results in Sonoma County.

The Coastal Prairie Enhancement and Feasibility Study has brought major advancements to management of this valuable natural resource. It has furthered our knowledge of where it occurs and of the numerous different types of prairie that currently exist; it has increased the general awareness and understanding of the importance and ecology of coastal prairie; and it has enlightened our management approaches to prioritizing, conserving, enhancing, and restoring coastal prairie habitat. Although there is still more work to do, we now have more tools that have been tested in our toolbox.

A Model Watershed:

The new 3-D Model of the Salmon Creek Watershed *by Diane Masura*

Passion for the Salmon Creek Watershed led two members of the Salmon Creek Watershed Council and long-time supporters of the Bodega Land Trust, Noel Bouck and Diane Masura, to frequently be involved in outreach efforts for the Council and BLT. Besides assisting with BLT's "Walks and Talks", creating lessons with teachers for Salmon Creek School students, and building a resource library at the Kurt Erikson Room, they assist with staffing a table at the Farmers' Market in Occidental.

At the tabling they noted how popular maps are. The public is drawn to see how their location on the map fits in with other land uses, protected lands, sub-watersheds, and history. It occurred to them that if two dimensional learning aids were good, three dimensional ones might also have a place.

After noting a three dimensional copy of Yosemite Valley at the Sebastopol Radio Shack, Diane contacted owner Andy Cohen about making a copy of the Salmon Creek Watershed. He put her in touch with Whitney Potter and learned from him that the model was developed from special laser scanned data called

LIDAR. An aircraft flies over an area, records reference points, and feeds the data to computers. He found that NOAA Coastal Services Center's Digital Coast website had good data for our area.



Noel and Diane hard at work

Photo: Ben Bouck

Supplied with longitude and latitude points for the watershed's 35 square miles and a map, Whitney sent a review map for the Council's approval. Features were accurate to about 3 meters. It was perfect. It was to be printed in three sections totaling a model 8" by 16". The 3D print would be at one mile = 1 3/4" lateral scale. In order to retain details of the sub-watersheds, we decided to print elevations at 3X scale.

Tap Plastics built a case for it. Diane and Noel painted it to help users orient themselves while looking at it. It will reside in the Kurt Erikson Room Library to be used as an effective aid to those who study it. One can lose oneself in perusing its contours and locating oneself in the watershed.



Photo: Noel Bouck

Our Walks and Talks for 2014

We would like to give a very special “Thank you” to all our leaders and speakers. They have helped us fulfill our educational function by being both entertaining and enlightening. Here is a review of our Walks and Talks in 2014.

1 and 2 Lambing at Bodega Pastures, with Hazel Flett

January and February

Back by popular demand again this year, Hazel led two lambing walks at Bodega Pastures.



We learned how to care for new lambs, check the pastures twice a day and bring any sheep needing special attention to the barn, how to distribute the hay and water on the pastures, and how to bring the flock through the drought.

3 Bodega Marine Lab, with Board member Ellie Fairbairn, PhD

March

Ocean Science on the Sonoma Coast

Before Hitchcock’s “The Birds”, and before PG&E excavated the “Hole in the Head”, researchers were studying the coastal environment near Bodega Head. The area surrounding Bodega Head has been a destination for coastal researchers since the early 1900s, drawn to its diverse, productive and relatively unspoiled habitats. The Bodega Marine Laboratory (BML) was founded and the first building was completed in the 1960s, located on the 362-acre Bodega



Marine Reserve. Initially UC Berkeley’s lab, BML was transferred to UC Davis in 1983. Now, BML is home to research programs on climate change; coastal oceanography; ecology, evolution and conservation; ocean health (including disease and toxicology); and animal physiology.

In March 2014, Bodega Land Trust hosted a Walk and Talk at Bodega Marine Laboratory. In addition to hearing about the current research going on at BML, visitors enjoyed a bluff-top walk where they saw harbor seals, studied the waters for gray whales, and learned about the environmental monitoring



Photos: Ellie Fairbairn

systems in place on land and at sea. Visitors were also treated to a behind-the-scenes tour of the lab, where they were introduced to a variety of local invertebrates. Visitors saw abalone, octopus and crabs, and were invited to hold sea stars, sea urchins and fat innkeeper worms. Several colorful marine aquariums featuring local fish and invertebrates were also on display.

Bodega Land Trust may host another Walk and Talk at Bodega Marine Laboratory in 2015. If you’re interested, please let us know and we’ll get it on our calendar!

4 The North Pacific Coast Railroad, with Rick Coates

March

An appreciation of Rick Coates' railroad Walks and Talks *by Hazel Flett*

I have heard all three of Rick's talks for BLT and as a result have a deeper understanding of local history and a different view of the landscape. Those embankments, trestle remains, lines of cypress and eucalyptus - they are current signs of the railroad.

The North Pacific Coast Railroad was incorporated in 1871. Four well known Californians - Charles Crocker, Leland Stanford, Cornelius Huntington and Mark Wilkins - pushed the idea of the Pacific railroad. Effectively it was a cartel. Originally the Grange supported the idea, to help agriculture.

The line was 84.3 miles long. Understandably, a lot of political in-fighting occurred about the route, depending on investors' land-holdings. The eventual route was from Sausalito, through Samuel P. Taylor State Park, San Geronimo to the tip of Tomales Bay, up the east side of the Bay to Tomales, then to Valley Ford and Freestone, Occidental, Monte Rio, Duncan Mills and Cazadero. All the villages on the railroad are there because of the railroad - what we'd now call transit centered development.

North Pacific was a narrow gauge railroad, a 3 feet gauge (the standard today is 4' 8 1/2"). A narrow gauge was cheaper to build because it allowed lighter carriages on lighter rails and a tighter turning ratio, hence trains could deal better with curves, so needed fewer tunnels and trestles. Construction began in 1873 at a time of serious recession in California, with high unemployment. Much of the labor was Chinese. The work was very hard and dangerous, but progress was quick: the Sausalito to Tomales section opened in 1875 and by 1877 the railroad reached Duncan Mills. In 1889 it reached Cazadero; a passenger service from there to San Francisco took about 6 hours.

This railroad had huge social effects including:

- 1) increasing manufacturing in California. At the time California was like a third world country, exporting resources and importing manufactured goods including railway ties, box cars and locomotives;
- 2) promoting the logging industry. There were mills at Bodega, Camp Meeker, Tyrone, Bohemia, Moscow, Duncan Mills and Screeton (between Camp Meeker and Monte Rio);
- 3) spawning the tourist industry, e.g. at Monte Rio, where thousands went on July 4. Huge hotels were built, and camps established at different spots along the Russian River and at Camp Taylor in what is now Samuel P. Taylor State Park. The NPCRR scheduled picnic trains, which were discontinued when the rough behavior of some visitors aroused protests from the locals;
- 4) enabling agriculture; for example, trains picked up milk churns at Bodega Road;
- 5) spurring innovation, such as the first cab forward train, fueled by oil.

Hard times fell on the railroad in the 1890s. Recession reduced trade, big redwoods were becoming scarce, and there were many accidents. In 1902 six investors bought the NPCRR and electrified it. They had the trains run faster and accidents increased. Then came the earthquake of 1906 and it was sold again. As buses and trucks increased, traffic on the railroad decreased. The Occidental line was closed permanently in 1936. Today Howard's Station Restaurant remains as a reminder of days gone by.

5 Singing Frogs Farm, with Paul Kaiser

April

Soil Is Life, Tillage is Death: A Future with No-Till Agriculture *by Paul & Elizabeth Kaiser*

Agriculture is such a huge part of all of our lives - most of us eat at least 3 times a day - and yet, did you know that agriculture accounts for almost one third of all anthropogenic (human induced) greenhouse gas emissions?! In fact, 89% of the greenhouse gas production from agricul-

ture is carbon and nitrogen being released from the soil into the atmosphere through plowing and tillage. Our 8,000 year old plow & tillage based farming technology is killing our planet, and our soils.

Let's back up a bit....

Soil is the basis of life. This has never been in doubt, not by soil scientists, or our ancestors. Adam, comes from the Hebrew word 'Adama' which means *soil*, and Eve means *life*. There are only three things which allow for the abundance of life we have on this planet: the sun, the

rain, and soil. We understand the importance of the sun and rain, but the soil - specifically the organic matter in the soil - is *the major mechanism* by which our planet transforms death into available nutrients and the next generation of life. Unfortunately, we have an 8,000 year legacy of soil degradation... by way of the plow. Tillage breaks up the soil's natural aggregates, reducing particle size and increasing surface area while simultaneously injecting oxygen into the soil system. This combination works much like a bellows on a forge creating rapid and dramatic combustion of the soil's nutrients (such as carbon and nitrogen) and volatilizing them into the atmosphere where they combine with oxygen to form carbon dioxide, nitrous oxide and other potent greenhouse gasses. In fact, between 50% and 70% of all the carbon in our planetary agricultural soils has already been lost into the atmosphere from plowing and tilling.

Plowing and other forms of tillage are employed in part to clear ground and create bare dirt for agricultural activities. However, soil scientists agree that bare soil is the fastest way to *degrade* soil organic matter. Almost half of the nutrients and energy produced from plant-based photosynthesis is released through a plant's roots as exudates to feed soil microorganisms - bare soil starves soil microorganisms of energy and nutrients. In addition, bare soil is exposed to the sun, wind and rain which not only causes visible erosion, but also causes the evaporation of precious moisture from the soil, causes further volatilization of soil nutrients into the atmosphere, and increases soil temperature fluctuations all of which conspire to kill soil organisms and degrade the functional capacity of the soil biology.

Native soils, before tillage-based agriculture, tended to average between 6% and 10% organic matter (the rest of soil being mineral, air and

water). With the application of tillage, these same soils quickly degraded in a few years or decades to 1% or 2% organic matter. Organic agriculture (particularly the use of cover crops) is intended to restore soil-health, but, and this is crucial to understand, even the best organic tillage trials conducted by the Rodale Institute, UC Davis, UC Santa Cruz, and other institutions have only managed to bring back soil organic matter by half a percentage point (0.5%) or less over multi-decade time periods (for example: from 2.0% to 2.5%). Organic tillage practices can stop the outright degradation of soil organic matter, but it does NOT restore true soil health to pre-tillage levels... and it can't, because organic tillage is using the very same tools and thinking to try and solve the problem which created the problem in the first place! Organic agriculture is wonderful, and we fully support it, but we have to replace organic tillage-based systems with organic no-till systems. It is time for some out-of-the-box thinking, for a new paradigm of soil management and soil health. We don't have all the answers, but we're excited to be sharing our experience with (and learning from) so many other organic no-till farmers from around the world. Singing Frogs Farm's no-till system has brought our soil organic matter levels from 2.4% up to over 7% (tested at a depth of 12 inches) in just 5 short years - back to where it was before agriculture and tillage destroyed the soil, back to the natural, optimal soil health and qualities that would have been found before human tillage and intervention. In addition to the 4.6 percentage point increase in organic matter levels, when we test for total soil biological life, our soils have more than triple the agricultural "average" quantity of soil microbial life. The return to natural (>6%) organic matter levels and the associated high microbial content of our soils has benefitted our farming potential immensely. Besides having sequestered

huge amounts of carbon in our soil, we have greatly increased our productivity per acre per year, decreased water use per crop, increased crop resiliency to weather extremes, and decreased pest, weed & disease pressure immensely. Everything benefits, everyone wins.

Change is difficult. We understand this. It's scary to throw much of what you know about your farming or ranching system out the window and start from scratch, especially when you feel you're barely holding your own battling against the numerous challenges of farming such as diseases, pests, weeds, bank loans and drought. We get that. However, we have met quite a few of the hundreds, maybe thousands, of farmers and ranchers in many countries around the globe who are applying these very same principles we've spoken of to their production systems with the same *or better* results. We know a handful of dry land ranchers in the Australian desert outback and the rolling hills of South Africa, a few grain farmers in the deserts of northern New Mexico, a vegetable farmer and a few grass and cattle ranchers on the frigid, high and dry plains of Montana and South Dakota, a vegetable farmer on the rocky and thin, clay soils of the Sierra Nevada mountains, a handful of subsistence farmers on the edge of the Sahara Desert, a couple of diversified growers on thin tropical soils clinging to rocky, steep slopes in Costa Rica, a smattering of innovative individuals in a few pockets in Europe, a few quiet no-till vegetable growers in Vancouver, Nova Scotia, Louisiana and upstate New York, and Singing Frogs Farm right here in Sebastopol, California. All of these people we've met (and many more we haven't) have broken out of the mental tillage box and are bringing true health, vitality and resiliency back to their soils, their crops, and their lively hoods, in a way that no form of tillage ever can.



Photo: Singing Frogs Farm

6 Ground Water in the Salmon Creek Watershed: balancing the human and ecological needs for water in drought years. May

Co-sponsored by the Salmon Creek Watershed Council, the Gold Ridge Resource Conservation District, the UC Berkeley Watershed Governance Group and BLT.

The Second Salmon Creek Collaborative Workshop *by Cleo Woelfle-Erskine*

In May, a broad array of people attended the second Salmon Creek Collaborative Workshop, sponsored by the Bodega Land Trust, The Salmon Creek Watershed Council and the Gold Ridge Rural Conservation District. The theme, “Balancing the human and ecological need for water in drought years”, fostered lively discussion, since little grass had grown, stream flows had already dropped to mid-summer levels, and many residents wanted to augment their water supplies.

The Workshop aimed to forge a shared understanding of how groundwater and surface water interact, explore how ranchers and other residents are coping with water scarcity, and discuss how drought affects aquatic life.

The presenters were myself, currently a PhD candidate at U.C. Berkeley; Daisy Gonzales, U.C. Berkeley student, speaking on “Land Parcels and Water Demands in the Salmon Creek Watershed Since 1863”; Jim Baird, well driller and provider of potable water since 1968 and current student of water quality in the watershed; Diane Masura, long-time resident at the top of the watershed, whose well level readings going back to 1992 indicate the rate at which our aquifer has been losing water; Jan Hildebrand, geology student at U.C. Berkeley, speaking on “Some Ecological Aspects of Salmon Creek Watershed Hydrology”, a comparative study of fluorescence fingerprint data gathered from a variety of samples from Fay and

Tannery Creeks; Lauren Hammock, fluvial morphologist with Prunuske Chatham Inc., speaking on the Salmon Creek Watershed Plan and its implementation.

After the presentations the participants broke up into small groups to discuss their own drought experiences, and how collaborative research, monitoring, and planned ongoing water storage and infiltration projects might help people and salmon thrive in drought years.

Many participants expressed interest in understanding our local groundwater system better. Collecting and analyzing this data without compromising landowner privacy can be challenging, but several volunteers stepped forward to participate in the U.C. Berkeley study to map aquifer boundaries and to determine which aquifers are responsible for sustaining spring flow. My research assistants and I have collected samples from the headwaters of Fay and Tannery Creeks and are currently analyzing them. Spring flow is critical for coho and steelhead, as only spring-fed reaches maintain enough flow and dissolved oxygen for salmonids to survive. We plan to present the results of this study to the community next fall.

I am interested in hearing about any monitoring or data sharing projects that arose from this workshop. If you would like to talk further about your well or spring monitoring efforts I can be reached at (510) 406-9442, or cleo.we@berkeley.ed

Linking Residential Water Demands to Salmon *by Daisy N. Gonzalez*

Intermittent streams in northern California are fascinating in that they provide complex homes for salmon, allowing these fish to choose the best habitats depending on their changing needs year round. During the wet season, streams swell and flow more rapidly - they need space to spread out. During the dry season, streams partially dry up, sometimes becoming a series of unconnected, individual pools. Salmonids need cool temperatures, and rely on different kinds of habitat at different times. Salmon use deep pools, large woody debris, and overhanging banks to escape wading birds and terrestrial predators, and as shelter from fast currents during floods. Human activities that alter the dynamic nature of such stream habitats place salmon survival at risk.

In the Salmon Creek Watershed, coho salmon and steelhead trout are known to have been robust in the various climate and ocean conditions and to Native American fishing practices for thousands of years.^{1,2} This changed in the last half century however.² Although there are few official records that document fish populations in the watershed, anecdotal evidence suggests that steelhead populations diminished after the 1970s.¹ In 1996 the last wild coho was seen in the stream.²

While the reduction of steelhead and the extirpation of coho have many causes, all forms of water extraction for human use have direct and indirect cumulative impacts on the fish in these local streams.² For this reason, I decided to explore the connection between residential land use, water demands, and salmon.

Last spring, I undertook a research project that aimed to document the change in the number of parcels within the Salmon Creek Watershed in the last 150 years. I used original 1863, 1900, 1934, 1980 and 2014 Sonoma County parcel maps to determine the change in the number of parcels within the watershed over time. In my study I also estimated the change in residential water demands in the last 150 years using two different water demand averages: 7,000 gallons per residence per year and 90,000 gallons per residence per year. Using anecdotal experiences shared by local residents, I determined the first average to be appropriate for the earlier period of 1863-1934, before water-intensive appliances and landscape irrigation became common. Similarly, I selected the second average, which is based on professional knowledge of more recent water use trends specific to the Salmon Creek watershed area, to reflect water use for the 1980-2014 period.⁴

This project was a product of close collaboration with Noel Bouck and Diane Masura of the Salmon Creek Watershed Council as well as Cleo Woelfle-Erskine, a PhD candidate at the University of California at Berkeley. The project was supported by the UC Berkeley Science Shop, a grant-funded organization that helps to translate com-

munity research questions into projects that university undergraduate and graduate students can carry out. My findings suggest that the number of parcels within the Salmon Creek Watershed steadily increased between the 1860s and the 1980s, and most notably increased in the last thirty years by more than 400%. In these last thirty years, I estimated that residential water demands proportionally tracked the growth of parcels. According to my estimates, the most distinct increase in residential water demands occurred between the 1930s and 1980, when demands increased by 25 times as a product of both parcel subdivisions and per-residence water increases.

Even though we don't know exactly how residential use compares to streamflow, we suspect that streams are drier overall as a result of residential diversions, and agricultural diversions also likely play a role. Future research could look at how residential water use compares to summer stream volume, or model streamflow under different water and land-use scenarios, including increased rainwater harvesting conservation, and groundwater recharge.

Limiting residential development and conserving water in residential settings within the watershed would help to maintain summer streamflow, which would in turn maintain the complex features of salmon habitat. Currently, 95% of the land within the Salmon Creek Watershed is privately owned.³ A 2010 study found that 73% of all water use within the watershed was for residential purposes.² Further residential development would result in increased water demands that would put more stress on an already water scarce region. Additionally, increased residential development could lead to the building of new roads which increases rainfall runoff, fine sediment, and sources of pollution, all of which are also detrimental to stream ecosystems.

Residents of the Salmon Creek Watershed and surrounding areas can contribute by continuing to support water conservation education efforts around topics such as enhanced groundwater recharge, water use monitoring, and the use of rainwater harvesting technologies, among others. I also encourage the community to take advantage of the educational tools made available by the Salmon Creek Watershed Council. Some of these include an ecological timeline of the watershed developed by Diane Masura and Noel Bouck, the historical parcel maps I used for this study, and my final research report, which will soon be made available on the Salmon Creek Watershed Council website and housed in the Council's library in the Erickson Room at the Salmon Creek School.

Footnote Sources will be found at the end of "Walks and Talks" on page 12.

7 Tannery Creek Preserve with Darlene La Mont

June

Walking in Tannery Creek Canyon *by Darlene LaMont*

Bodega Land Trust sponsors walks every year at the delightful Tannery Creek Canyon's Forever Wild Easement. We wander through the forest gazing at the giant redwoods and ancient Douglas Firs. Are the mosses and lichens going to be dry – or has rain and fog fluffed and puffed them up into their full green glory? Members like to follow trickling creeks and watch waterfalls of all sizes start to flow after a storm.



The fall rains bring mushrooms and fungi of many kinds. We must look carefully - many are hiding in plain sight! Take the time to look underneath them to see if there are gills or spores – and what color they are. Smell them too! Some smell like garlic, others smell spicy. The orange and white fungus (below left) is probably a lovely Dry Rot fungus! The Wood Ear (center) is easy to overlook, but the Turkey Tails are easy to find (right).



The new fronds of Sword Ferns uncurl gracefully, then mature and by spring will have dots of spores on the backside. Fetid Adder's Tongue blooms in early spring. This tiny gem of a lily has beautiful white flowers with purple stripes – and its leaves are shiny green with maroon spots -- but it smells rather bad. Don't miss the tiny insects & spiders!

Tannery Creek Preserve is a private canyon – a real treasure that has been protected from development and logging as a wildlife habitat forever! If you have a piece of land that you too would like to protect forever, or know someone who might, please contact Bodega Land Trust at info@bodegalandtrust.org.

On July 12, 2014, we enjoyed a talk by Hank Birnbaum, the Programs Manager at the Fort Ross Conservancy. In addition, Michael Costello hosted a visit to his property, which was the site of an adobe building from the Russian occupancy.

Hank reviewed Russian California history, including the attraction of the otters, which have since apparently become victims of toxic kitty litter effluent. Rancho Khlebnikov (“khleb” means bread) was established just north of present day Bodega, to provide food for the Russians in Fortress Ross. Russian brick ovens were built. The period was captured in a book: “So Far From Home: Russians in Early California,” edited by Glenn J. Farris. The local Russian names have various origins; apparently Sebastopol was named in a bar as the result of an argument about the Crimean War; the current Russian River was the Slavianka River.

Michael Costello took us on a tour of his property. Mark Silverstein, had excavated around the “adobe melt” (adobe bricks returning to the soil) on the property. He found shells and glass, the latter possibly from a glass plant near Yakutsk. The meadow near the Costello property was the home of a Native American village called Suwutene (“Gopher Chest”), with several hogans. It was later relocated, probably to Round Valley, around 1870.

Hank is currently researching local Russian farms. We hope to publish an abstract of his work when it is finished.

This was our last Walk and Talk of 2014 due to our many other activities.

(continued from p.10)

Sources

1. Harrison, Katherine, “Salmon Creek Oral History Project” in Salmon Creek Estuary: Study Results and Enhancement Recommendations, Prunuske Chatham Inc., 2006
2. Salmon Creek Water Conservation Plan. Prunuske Chatham, Inc. June 2010.
3. Salmon Creek Integrated Coastal Watershed Management Plan. Gold Ridge RCD and Prunuske Chatham, Inc. June 2010.
4. Pilot Study of Groundwater Conditions in the Joy Road, Mark West Springs, and Bennett Valley Areas of Sonoma County, California. Kleinfelder, Inc. September 2003

The Annual Audubon Salmon Creek Christmas Bird Count

This is an extract of a communique from Bill Payne of the Madrone Audubon Society concerning the annual bird count in the lower Salmon Creek area. This count is usually one of the top 10 in the nation for number of species.

Dear Audubon Friend,

Jan 12, 2015

As always, the weather was a big factor in our day, and again this year we had a wonderful day for the count. A very welcome difference was the abundance of water in the usual wet areas and strong flows in the creeks. In response we had an excellent count, recording a total of 75 species for the day – a record number for the Salmon Creek count area!

High-lights – where to begin! We had thirteen raptors, including two Bald Eagles and a Prairie Falcon, both never seen before in our count, and six Peregrine Falcons. Another new species for our area were 26 Snow Geese flying west in a perfect V. Virginia rails were seen for only the second time in 26 years. Also of note were seven woodpecker species and extremely high numbers of American Robins. Wow – quite a day!

As always we look forward to next year’s count. Thank you again for your continued support and cooperation,

- Bill Payne

Find more info at: www.madroneautubon.org.

Delta Smelt Win Two

Long-time BLT member Bill Bennett, a scientist at the Bodega Marine Lab, has researched and defended the delta smelt for many years. We were delighted to read in the current Earthjustice Quarterly that, thanks to the efforts of Earthjustice, the courts have added protection to the endangered smelt in two recent decisions based in part on Mr. Bennett's research. The first ruling upheld the 2009 decision to manage water flows so as to protect salmonids and restore the Delta ecosystem. The second "preserves long-standing interpretations of the strength of the Endangered Species Act, defending the sorely imperiled smelt from excessive water diversions". More power to them all!

Bodega Red Potato News

A few years ago BLT helped to provide the genetic analysis of the Bodega Red, formerly very popular and recently almost extinct, that proved it was Peruvian in origin. It is now widely assumed that it was brought to Bodega from Lima in 1843 by Maria Smith, the new bride of Capt. Stephen Smith who had just received the Rancho Bodega land grant from the Spanish government.

Our thanks to Chef Jenni Emory (jaquith@yahoo.com) who was cooking these two recipes at the Sebastopol Farmer's Market. Bodega Reds are available at several farmers' markets in the area.

Rosemary Bodega Red Potato Hash

1 lb. Bodega Red potatoes – medium dice
3 TBSP rosemary – fresh, minced
½ red onion – medium dice
3 cloves garlic – sliced thin
Roasted garlic oil
Salt and pepper to taste

Method

Preheat sauté pan over medium high heat. Add 2 TBSP roasted garlic oil, potatoes, salt and pepper to the pan and sauté on high heat for 2 min. Add rosemary, red onions, and 1 TBSP garlic oil and cook for another 3 min. Add sliced garlic and sauté the hash until tender and golden brown around the edges. Season to taste with salt and pepper and serve!

Smashed Bodega Red Potatoes

1 lb. Bodega Red potatoes – whole or cut into equal chunks
3 cloves garlic - crushed and minced
4 TBSP parsley – fresh, chopped
¼ tsp cayenne pepper
1 stick organic salted butter, or high-heat oil (avocado, coconut)
Salt and pepper

Method

Steam potatoes until just tender. While potatoes are cooking, place butter, cayenne and garlic into a saucepan. Melt butter on low heat and leave it on until ready to pour onto potatoes. Spread potatoes onto a backing pan and smash open with the back of a spoon. Sprinkle with salt and pepper. Pour butter and garlic over the potatoes and sprinkle with parsley. Serve as soon as possible!

Thanks to all our 2014 monitors *by Sharon Sadler, Monitoring Director*

Our monitoring program is thriving thanks to the awesome monitors new and old who visited Bodega Land Trust's protected properties. They tromped around redwood forest, riparian zones, steep canyons and coastal prairies finding photo points and taking notes in 2014. We can't thank you enough! As you know we have 13 beautiful easements and 14 monitoring teams. Tannery Creek Preserve (187.2 acres) has three teams to itself.

The veteran monitors are more and more taking on the role of lead monitors and leaving me and Sandy Sharp (who taught me everything I know about monitoring) to hang out in our offices.

* indicates monitors who were leads or team members on more than one easement.

*Carol Sklar	Paula Smith	Richard 'Bear' Clark
*Jack Proctor	Leif Mortenson	Bradley Gordon
*Jackie Screechfield	Joan Mortenson	Mark Burchill
*Lori Curtis	Kathleen Kamins	Dan Arendt
Jay Sliwa		

There were also some awesome new monitors this year, which is what we like to see as there is always some attrition and we really are very happy to include/engage more of the community in our monitoring work: Janet and Walt Drucker, Russ Pinto, Eileen Jang, Lareina Earls, and Jessie Grant (Sonoma State intern).

We are now looking forward to the 2015 season. There are easements that are different levels of difficulty from flat smaller easements to medium sized hikes and then there are some more steeper, more challenging opportunities.

The annual Monitor Training for new monitors will be held on Sunday, May 3, 2015 from 10:00 A.M. to 2:00 P.M. at the Salmon Creek School (lunch provided). Call Sharon at 707-483-5407 for further information and/or to sign up.

Not yet an associate? Here's your opportunity!

Yes! I want to help my community protect land and agriculture in West Sonoma County.
Here is my contribution of \$ _____

Support Level

<input type="checkbox"/> \$1000	Redwood Sponsor	<input type="checkbox"/> I am interested in volunteering
<input type="checkbox"/> \$500	Prairie Protector	<input type="checkbox"/> I am interested in talking about an easement on my land
<input type="checkbox"/> \$100	Salmon Creek Supporter	
<input type="checkbox"/> \$25	Individual Donor	

Name: _____
Address: _____
Phone: _____
E-Mail: _____

Please mail this form and your tax - deductible donation to:
BODEGA LAND TRUST PO Box 254, Bodega, CA 94922

Thank You for Your Support!

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SPECIAL THANKS TO JACK PROCTOR
FOR HIS WONDERFUL SIGNAGE

SPECIAL THANKS TO MUSICIANS
TERRY ANN AND WAYNE.