2018
JULY

Journal

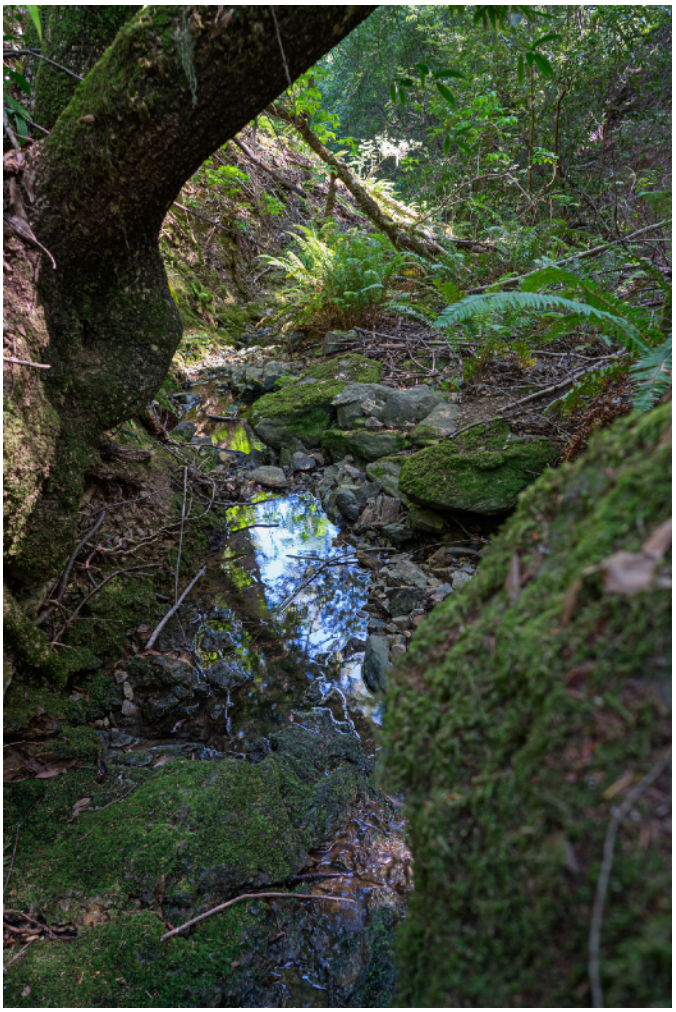
Bodega Land Trust

". . . 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*

SONOMA LAND TRUST DONATES GILCHRIST EASEMENT

A Partnership for Land Protection along Coleman Valley Creek

To ring in the new year, Bodega Land Trust received, from Sonoma Land Trust, a conservation easement over a beautiful quarter-mile stretch of Coleman Valley Creek west of Occidental (image shown is in the easement). The creek, which runs across a property donated to Sonoma Land Trust in 2017, is a major tributary of Salmon Creek. The new easement is named after Alden Gilchrist, who loved the underlying property and whose partner generously donated the land to the Sonoma Land Trust after Alden's death. The easement covers approximately 11 undeveloped acres of the 16-acre property. The creek adds about a half-mile of protected creek bank to our inventory in the Salmon Creek watershed.



Coleman Valley Creek Photo by Akiva Zaslansky

The easement includes Douglas fir, coast live oak, bay, a few redwoods and numerous native shrubs and grasses. Commercial timber harvesting is prohibited. Only firewood may be cut. All subdivision, new structures "with roofs", roads and cross fencing are prohibited.

Coleman Valley Creek is a major priority for our land and water protection work. This easement is especially important to Bodega Land Trust because it is contiguous with our 68.6-acre Salmon Creek Headwaters easement, donated in 1998. We also hold a 200-foot wide riparian corridor easement on the west bank of the lower reach of the creek, donated in 2001.

We are grateful for our partnership with Sonoma Land Trust. We look forward to increasing opportunities to protect the Salmon Creek watershed in the future. ❑

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Our mission

Our primary purpose is the conservation of land and its communities, especially in the Salmon Creek watershed. Our main tools are conservation easements and education.

A Message from the President

I am happy to report that in January the Bodega Land trust received a conservation easement donated by the Sonoma Land Trust. This easement protects a small property that was willed to the Sonoma Land Trust, but will not be retained in their ownership. It is however valuable environmentally, as it protects a quarter-mile of Coleman Valley Creek. We call it the Gilchrist easement.

For a land trust, protecting land must be a patient, long-term, and often infrequent process. It depends entirely on the environmental consciousness and generosity of private landowners. So we are fortunate now to have several new prospects for conservation easements. I hope to be able to report additional progress later this year.

Don Sherer
President, Bodega Land Trust

Don Sherer

Find us on

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A Note About Viewing Our Journal

Dear Reader, for reasons of cost of print reproduction we often must print our Journal with only the front cover page in color. However, we do publish our Journal in full color in electronic form. If you wish to view our Journal in color, please go to our website at WWW.BODEGALANDTRUST.ORG. Thank-you ❑

v1.4

We are very pleased to introduce our newest Bodega Land Trust Board Member Tim Flynn

Tim Flynn is our newest Board Member to join the Bodega Land Trust. He is a resident of Occidental and has been a licensed Contractor in California for the past 35 years.

He is the President of Constructive Ideas Inc., a design/build company that has focused on residential remodel and new construction primarily in the East Bay where he has won awards for green building.

Tim earned his Bachelor's degree in Architecture from the College of Environmental Design at UC Berkeley.

Throughout his career, Tim has taken special pride in creating beauty in his projects both in the structure and the surrounding environment.

Tim hails from a small town in Oregon and is the youngest of 8 children. He has been married to his wife, Tracy, for 36 years and they have three grown sons - Hunter, Sam and Kelly.

Tim is a student of yoga and he and Tracy love hiking trails both near and far.

Being a part of a community is very important to Tim and is one of the reasons he is excited to be joining the BLT Board. ❑

Bodega Land Trust Advisory Council

Carl Blanco
Website administrator

Alastair Bleifuss
Director, Santa Rosa Creek Stewardship Program, former BLT Board member

Ann Cassidy
Board member, Gold Ridge Resource Conservation District

Ellie Fairbairn
Post-Doctoral Research Fellow, Bodega Bay Marine Lab; BLT Walks & Talks; former BLT Board member

Hazel Flett
Shepherd; BLT Walks & Talks Program; BLT Journal editor

James Hansen
California Fish & Wildlife

Eric Koenigshofer
Former Chair, Sonoma County Board of Supervisors, former BLT Board member

Allison Pharis
Real Estate Broker

Robin Rudderow
President, Rancho Bodega Historical Society; lawyer

Subir Sandyal
Mycologist; chef

Sandy Sharp
Treasurer; Journal editor; former Board member

David Shatkin
Salmon Creek Watershed Council

Nick Tipon
Native American educator
❑

ANNUAL DINNER A GREAT SUCCESS

What a beautiful evening we all had; not only was the weather perfect but so was the food and entertainment. A full house crowd listened to the great classical guitarist Pablo Rodriguez while having great conversations, wines and food by the incomparable Jodie Rubin.

The evening was highlighted by a silent auction with many beautiful and exciting things, and culminated with a live auction for vacations at beautiful places from Santa Fe to Lake Tahoe.

In all the event was a great success; we more than met our fund raising goals, and yet again showed that a fall evening with the Bodega Land Trust in beautiful Bodega town was the event to attend. Thanks to everyone who attended and those that volunteered. ❑

4th of JULY, 1916 POSTER FOR CELEBRATION AT FERN GROVE, BODEGA

David Hamilton Collection

This WW I era 4th of July poster includes names of local speakers well known in the history of Sonoma Co. It also gives us a charming look at the local social life of the time. ▫

COHO AND STEELHEAD SUMMER SURVIVAL IN FAY & TANNERY CREEKS

Cleo Woelfle-Erskine, Laurel G. Larsen, and Stephanie M. Carlson

(abstracted from "Abiotic habitat thresholds for salmonid over-summer survival in intermittent streams" published in Ecosphere, February 2017)

Intermittent streams lose surface flow during part of the year but can provide important habitat for imperiled fishes in residual pools. However, extended intermittency can drive high mortality as pool contraction decreases pool quality, and some pools dry completely. We evaluated the influence of a suite of abiotic habitat characteristics on the over-summer survival of two imperiled salmonid fishes (coho salmon Oncorhynchus kisutch; steelhead trout Oncorhynchus mykiss) at four study sites on two tributaries of Salmon Creek (Sonoma County, California, USA) from 2012 to 2014, during deepening drought conditions.

Spawners in Fay Creek photo by Steve Killey

Central California coastal streams constitute the southern end of the range of coho salmon and also support anadromous steelhead trout populations, which are currently listed as federally endangered and threatened, respectively.

In the mid-1990s, coho salmon became locally extinct in Salmon Creek and have only recently been reintroduced through a captive broodstock program (Spence et al. 2008, Obedzinski et al. 2009). Today, both Fay Creek and Tannery Creek provide breeding and rearing habitat for coho salmon and steelhead trout (Spence et al. 2008, Obedzinski et al. 2009). Adults migrate upstream to breed during the rainy season, typically between December and February. Their offspring emerge from the nests in the late spring and spend one to two years in streams before migrating to the ocean.

METHODS

Study sites spanned some on Fay and Tannery Creeks from continuous flow to near-dry conditions, and included alluvial and bedrock stream reaches.

We estimated over-summer survival at the pool scale from fish presence–absence data based on paired early-late summer snorkel surveys. We measured pool dimensions and water quality parameters monthly (more frequently during summer dry down) and, in 2013 and 2014, recorded water quality with continuous loggers in selected pools.

To visualize the most severe conditions spatially, we conducted wet–dry mapping surveys in September in collaboration with citizen scientists from the Salmon Creek Watershed Council, using handheld global navigation satellite system-enabled GPS units (Garmin 65 or similar) to mark where the stream was flowing and where it was dry. These surveys extended from the junction with Salmon Creek to the limit of anadromy (upstream barrier impassable by spawning salmonids) and also covered portions of other tributaries and the mainstem.

Table 1. Reach characteristics and sampling effort.

Reach	Reach length	No. of pools sampled (2012/2013/2014)	Geomorphic setting	Flow conditions	Vegetation	Mean channel width	Slope
Tannery lower	199 m	4/7/6	Bedrock and deep alluvium, unconfined	Intermittent	Red alder (*Alnus rubra*)	9.7 m	0.01
Tannery upper	172 m	5/7/7	Bedrock and shallow alluvium, confined	Continuous; became partly intermittent in 2014	Redwood (*Sequoia sempevirens*)	11.0 m	0.02
Fay lower	444 m	7/7/7	Incised alluvial, somewhat confined	Intermittent, became isolated 2014	Red alder (*Alnus rubra*), Douglas fir (*Pseudotsuga menziesii*), willow (*Salix* sp.)	11.9 m	0.008
Fay upper	235 m	5/5/5	Alluvial, somewhat confined	Isolated	Red alder (*Alnus rubra*), willow (*Salix* sp.)	13.2 m	0.005

To characterize the hydro-geomorphic variability of the study reaches, we performed a principal component analysis (PCA) on all candidate abiotic variables: Initial pool volume (in June), days at sublethal dissolved oxygen (DO) levels, days disconnected, initial salmonid count (in June), minimum pool volume, minimum dissolved oxygen, maximum conductivity, maximum temperature, minimum depth, minimum surface area, presence of a clay or bedrock layer, surface area X initial salmonid count.

We performed: (1) logistic regression in a generalized linear modeling framework to identify factors limiting over-summer survival and (2) classification trees using the random forests ensemble learning method to identify abiotic thresholds for sustaining salmonids.

Results suggested that different factors governed mortality of the two species. Coho salmon, which tended to survive in large, deep pools, were limited by minimum dissolved oxygen (DO) concentrations. In contrast, steelhead trout, which tended to survive in pools with large surface area, were sensitive to pool geometry and temperature. Both species persisted for weeks in large pools with low DO levels, including in pools where at least part of the water column reached sublethal or lethal levels. Our results suggest that shallow, underground flow may be important for maintaining DO and temperatures suitable for sustaining salmonids in isolated pools, whereas groundwater discharge originating from deeper flow paths may generate low-DO conditions that inhibit salmonid persistence.

The differential sensitivity of coho and steelhead to DO and temperature that emerges from this study suggests that these species will be differentially impacted by different aspects of climate change. Although both species will ultimately be subject to threshold dynamics in over-summer survival with respect to DO and temperature (Richter and Kolmes 2005), our results suggest that coho in intermittent streams may be more immediately sensitive to climate change-related changes in baseflow, whereas steelhead may be more immediately sensitive to changes in temperature

Our results suggest that geomorphically complex environments that feature a range of shallow and deep flow paths to pools, high rates of hyporheic exchange and shallow groundwater inflow, and a variety of pool geometries are those most likely to sustain salmonid fishes through drought. These results lead us to recommend that conservation and restoration measures that promote sustained shallow baseflow and diverse pool geometries—with large pools being most important—will be those most likely lead to the greatest numbers and diversity of salmonids at the southern end of their range.

Our research also shows that while juvenile steelhead and coho can survive for weeks to months in disconnected pools in this region, protracted disconnection depletes DO and shrinks pools, with lethal consequences for juvenile salmonids. Our findings on functional relationships between days of discon-

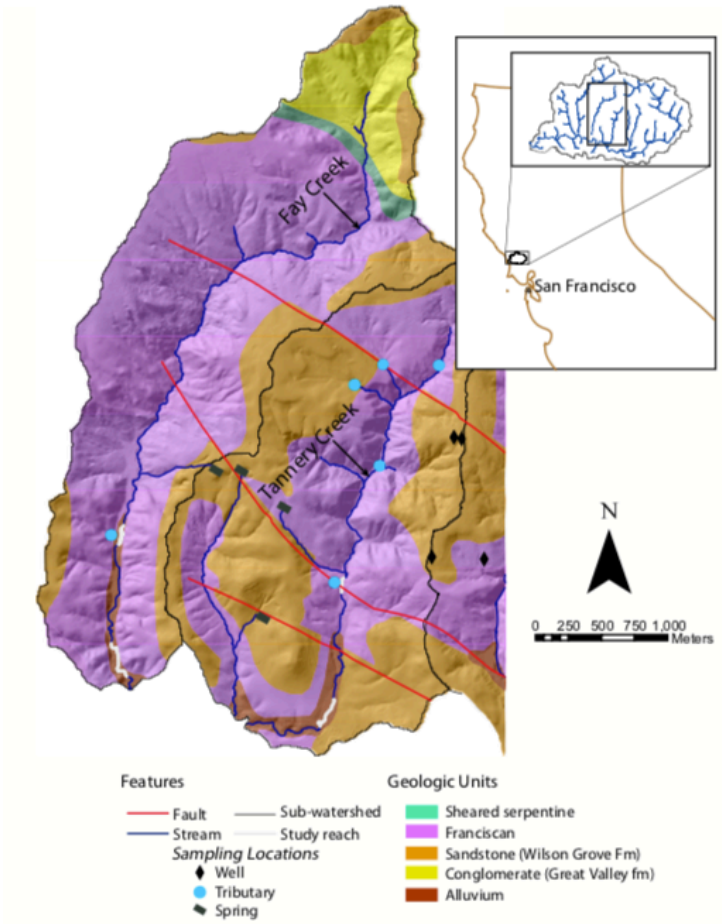


Fig. 1. Geologic setting, faults, and topography of study watersheds. Tannery Creek flows through a steep canyon and is surrounded by sandstone aquifers capping the ridges; the upper reach is in a bedrock canyon while the lower study reach is in a wide alluvial valley. The study reaches on Fay Creek are in a wide alluvial valley, and the watershed is almost completely underlain by impermeable metamorphic formations. Springs tend to lie along fault lines (shown in red). Inset shows location of Salmon Creek watershed, with study streams shown in dark blue and study reaches highlighted in white; spring-fed tributary points monitored at monthly intervals lie at their confluence with Fay and Tannery Creeks, in the upper study reaches.

nection and salmonid responses can support regional efforts to set environmental flow standards (Poff et al. 2010) and are already being used to set low flow standards and implement emergency drought releases in the Russian River basin (D. Hines, NMFS, personal communication).

Coupling wet–dry mapping with conductivity measurements (as CWE has done in collaboration with the Salmon Creek Watershed Council) should be incorporated into regional monitoring efforts.

Salmon Creek is typical of many salmon-bearing tributaries in coastal California because it possesses high-quality spawning and rearing habitat, but low flows in dry years eliminate much of this habitat. Our results demonstrate the importance of increasing late-season baseflow to benefit juvenile salmonids, and suggest that salmonid recovery and stream restoration strategies should target "sanctuary reaches" that possess adequate flow from shallow aquifers with high DO/low conductivity and sufficient structural complexity to support summer rearing, and restore flow to moderately intermittent reaches.

With climate change, more streams will become intermittent or undergo earlier and more severe summertime drying and conflicts between human and ecological need for water will likely increase. Valuing, understanding, and protecting these habitats will become critical for conserving Pacific salmonid species throughout their range. ❑

COHO SALMON ARE RETURNING TO SALMON CREEK

By Noël Bouck and Hazel Flett

Recently word spread like wildfire through the communities in the Salmon Creek Watershed that coho salmon, the silver salmon with the white gums, are once again coming in from the ocean to spawn in our creeks. The work of many agencies over many years seems to be paying off at last.

For centuries when the Miwoks managed this land coho salmon were stable inhabitants of our creek. Older residents say that even in the 1950's at the right time of year one could almost walk across the creek on the backs of spawning salmon. Although this salmon run survived the overfishing of the late 1800's and the intensive logging that devastated our stream beds in the early 1900's, by the 1960's it had begun to fail (see Figure 1). A series of fires and giant rain storms silted up the creeks where young fish spend their first year. These were closely followed by several years of drought and then by new demands on water resources that reduced the summer flow that is essential for young fish survival. By 1997, coho were entirely gone from our watershed.

The natural life cycle for coho salmon is complex. The young fish emerge from eggs laid in the fall and winter (October to January) deep in the gravel of the creek and the juveniles spend their first summer and winter in the freshwater stream where they hatched. In our region, the juveniles become smolts and from March through May of their second spring swim from the creek out into the ocean. Most of the coho spend about 18 months in the ocean, returning as three-year-old fish to mate and lay eggs in their natal stream. They find their way home through a process known as imprinting. Juveniles, on their way to the sea, memorize the odors or chemical constituents of the tributary where they hatched as well as those of other tributaries and features passed on their way downstream. When they return as adults the memories are played back in reverse, leading them to the stream from which they came.

Efforts to bring coho salmon back to Salmon Creek began in the early 2000's when local citizens organized to write grant proposals that funded studies to analyze the creek and laid the groundwork for future projects encouraging the return of salmon. Since recovery efforts began, the Gold Ridge Resource Conservation District has, in partnership with federal, state and local agencies and organizations, often under the "Save our Salmon" moniker, managed over three million dollars in grant funds that improved salmonid habitat in the creek, enhanced essential summer water supplies, and educated the community on fish-friendly practices. After helping to fund many of these projects, in 2008 the California Department of Fish and Wildlife (then CDFG, now CDFW) decided on a more active approach. The Russian River Coho Salmon Captive Broodstock Program was producing extra fish so

Salmon Creek Watershed Council members Erna Andre (left) and David Shatkin (right), assist California Department of Fish and Wildlife personnel in carrying hatchery-raised adult coho from the tanker truck to Salmon Creek.

Photography by Noel Bouck

they decided to use them to plant ready-to-spawn adult coho into Salmon Creek each winter with the long-term goal of restoring a natural salmon run. It would have been ideal for CDFW to repopulate Salmon Creek with fish born there but in 2008 there were no salmon at all in our creek. The next best option was to use fish collected as juveniles from existing populations in streams north and south of Salmon Creek. So they used offspring of carefully selected males and females representing wild Russian River stock, wild Olema Creek stock, and crosses between the two stocks.

The coho used to restock Salmon Creek were raised at the Warm Springs Hatchery near Geyserville. When the Warm Springs Dam that impounded Lake Sonoma was completed in 1983 by the Army Corps of Engineers, hatchery programs to breed steelhead trout and coho salmon were set up to mitigate the loss of habitat that resulted from the dam. The steelhead hatchery acts as a production facility for steelhead recreational fisheries. But the coho hatchery is a conservation hatchery focused on mimicking natural conditions as much as possible and producing fish that can adapt and repopulate their natural habitat. Most winters since 2008 the CDFW has released 200-300 hatchery-raised adult coho salmon (2,411 in 10 years) into the Salmon Creek estuary hoping they will swim upstream and spawn. Sometimes Salmon Creek Watershed Council members get to participate by helping to carry the live fish from the hatchery's tanker truck to the creek (see Photos).

Salmon in Fay Creek Photo by Jerry Dodrill

Some success was seen at once. Counts of newborn fish in the major tributaries of Salmon Creek showed that the hatchery adults successfully mated and produced offspring (see Figure 1). But the key question, whether or not the progeny of the hatchery fish could actually recreate a natural run remained unanswered. No one knew whether or not these young fish truly did swim out into the ocean, grow to maturity there and then return to Salmon Creek. For years tissue samples of juvenile coho were collected from some of the tributaries for genetic analysis that could be used to answer this question but, for lack of funding they sat unanalyzed in a freezer at the NOAA Southwest Fisheries Science Center in Santa Cruz.

Finally, in November of 2017 the tissue samples collected in October of 2017 were tested. The results showed that a small but measurable number of coho had actually returned from the ocean to Salmon Creek. Libby Gilbert of the genetics team at the NOAA Center in Santa Cruz analyzed the samples collected in Fay, Tannery and Nolan, three of Salmon Creek's five major tributaries in which the coho spawn. By testing DNA from tissue of 83 juvenile coho she was able to infer brother-sister relationships and parentage. A total of 26 parents were found to have contributed their genes to these young. Hatchery adults that had been released in December of 2016 had successfully produced offspring in all 3 tributaries, mating with each other as well as with fish returning from the ocean. One male evidently mated in one tributary and then swam to another for a second assignation. The most startling finding was that among the 26 parents, 13 of them, 10 males and 3 females, had actually returned to the creek from the ocean. Michael Fawcett, a Bodega fish biologist who helped collect the samples, commented "Maybe this portends that all these past releases have resulted in some kind of natural run of coho in Salmon Creek developing".

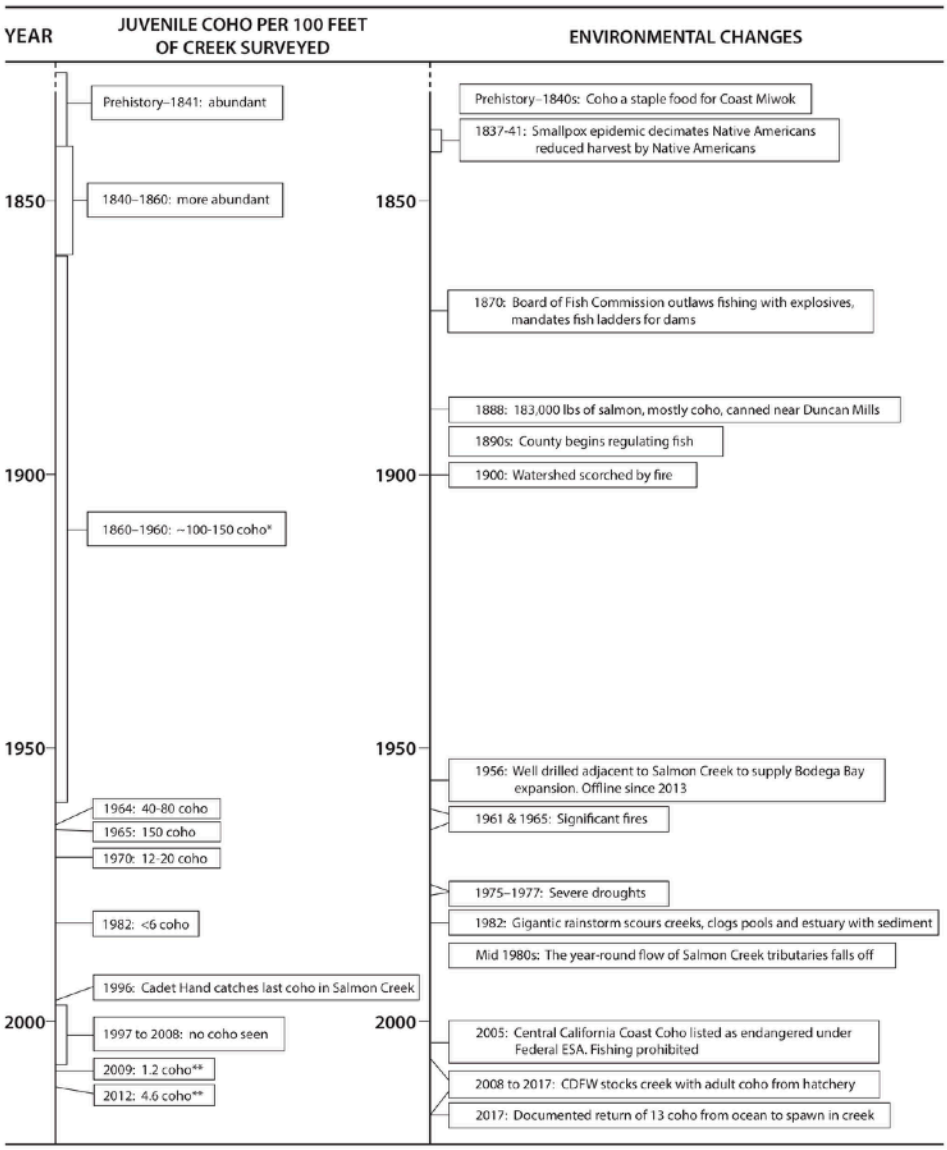
The goal of the coho hatchery program is to save coho salmon from regional extinction and it is working. In the past there have been problems associated with hatchery programs. These have included loss of genetic variability from inbreeding, occasional cases of disease transmission from hatchery

fish to wild fish, harmful effects on wild fish of competition with large numbers of hatchery fish, and, in the end, failure to establish sustainable runs. Following the listings of salmonids as threatened or endangered in the 1990's, hatcheries greatly changed their practices. The coho hatchery at Warm Springs makes extensive efforts to avoid crowding, naturalize diet and minimize inbreeding. It analyzes the genetic makeup of all parents and uses this information to select mating pairs that are as unrelated as possible. When available, wild fish are introduced to the program. Nonetheless, due to the limited capacity of the hatchery and to the very limited origin of the fish at the beginning of the program (only fish from dwindling runs in Green Valley Creek and Olema Creek) much of the genetic variability that was once present in the wild population has already been lost. This contraction will limit the ability of coho to survive future environmental disruptions that seem inevitable.

Although the data is limited (only 83 fish were tested and they were collected from short reaches in only three of the five creeks where coho spawn), it appears that the coho returning from the ocean are a vigorous lot, competing well with the hatchery raised fish. Half the successful parents were returnees. Returnees were found in each of the three creeks tested. It was a returnee that had the energy to mate twice in two different creeks. The returnees have of course been subjected to natural selection during their time at sea and finding their way home. It would seem ideal to be able to leave the winter run to oceangoing fish and hold the hatchery-raised coho in reserve to be used for triage, to replace natural stocks should one year's population of juveniles be lost to some disaster.

Figure 1

COHO IN SALMON CREEK THROUGHOUT THE YEARS



*est. by Bill Cox, Calif. Dept. Fish & Game.
** data from Salmon Creek Coho Monitoring 2008-2013 Final Report, Fawcett. Cantor and Michaud, 2013.
Remaining coho estimates from Salmon Creek Estuary Study, Prunuske Chatham Inc., 2006 and Salmon Creek Integrated Coastal Watershed Management Plan, Gold Ridge RCD and Prunuske Chatam, Inc, 2010.

Can we look forward to a time when the hatchery's initial successes will enable them to stop planting hatchery fish and let natural ocean-going fish take over? "Well", says Manfred Kittel who runs the program for the CDFW, "that is a long way off". The CDFW has found that there are 48 kilometers of useful Coho habitat in the Salmon Creek Watershed. Based on this figure, Kittel indi-

cated that for the coho run to be strong enough to no longer need CDFW supplementation, over 200 fish would have to return from the ocean to our creek each year and do so for three consecutive years. This is a high bar indeed. Sadly, considering the relative success of the recent returnees, there is currently no effective research underway to estimate how many adults are entering Salmon Creek annually from the ocean. It looks as if it will be a while before the hatchery program will be reduced and leave the Coho run to nature.

Watershed residents can help to speed coho recovery. In Salmon Creek young fish face several major obstacles. First there is the chronic lack of water during the dry summers. Everyone can help by using minimal water from the local aquifers that feed the creeks and by installing winter water catchment systems that save winter rain to use during the summer. A number of these systems have been installed throughout the watershed by the Gold Ridge RCD. A second problem for young fish is sediment that washes from county roads and deteriorating hillsides into the creek during winter downpours. Excessive sediment can smother buried eggs, clog the gills of young fish, and reduce insect production in the stream, thus curtailing food and reducing juvenile growth rate. Proper maintenance of dirt roads is essential to minimize the flow of sediment into the creeks. The RCD has helped with road assessment programs and implementation of repairs, and will continue to do so. In some years winter rains do not open the sand berm blocking the mouth of the creek in a timely fashion for fish to migrate in. Heavy rains usually open the creek naturally sometime after the first week in November but it can be as late as mid-January. Perhaps CDFW or Sonoma County could consider breaching the gap if its natural opening is unreasonably delayed and if there is sufficient high-quality water available for incoming adults to hang out until rainstorms stimulate them to move upstream to spawn.

Finally, should you own land that borders the creek the best thing you can do is to keep your distance, don't store things or build on creekside land (it is against the law), allow native plants to flourish, snags to stay put. And to insure future owners follow your fish-friendly example in perpetuity, you could obtain a riparian conservation easement.

Although many problems still exist, the recent data demonstrating the beginning of a return of a nascent salmon run in Salmon Creek has filled everyone interested in coho survival with hope. Past habitat improvements and current restocking methods are working. There is real reason to take a moment to celebrate their success in returning these beautiful fish to our creek.

The authors are grateful to Michael Fawcett, PhD, for his expert additions and corrections to this article. ❑

AUDUBON BIRD COUNT

Around New Year we are always pleased to see Audubon bird counters in the neighborhood of Salmon Creek Road. The Madrone Audubon Society's "Madrone Leaves" newsletter reports that the 51st annual Western Sonoma County Christmas Bird Count was held on Saturday Dec 30, with 116 counters and a preliminary species total of 173. This figure is on the low side but not unusual. Initial indications are that individual bird numbers were lower than normal. but appear not to be related to the fire, according to co-chair Peter Leveque. Highlights were an abundance of both woodpeckers and raptors.

Along with 2016 results (2017 awaited) we were sent an 11 year running total of the birds observed in Area Salmon Creek Rd #5 . In 2016 woodpeckers included Acorn, Downy and Nuttall's along with Redbreasted sapsucker and Northern flicker. Hawks included Cooper's, Ferruginous, Redshouldered, Redtailed, and Sharp-shinned along with Kestrels, Harriers and Peregrine Falcons. Owls seen were Great Horned, Northern Pygmy, Northern Saw-whet, Spotted and Western Screech owls. Among songbirds observers counted a host of Brewer's blackbirds, Western bluebirds, chickadees, Dark-eyed juncos, Kinglets (ruby- and golden-crowned), Western meadowlarks, Black Phoebes, Sparrows (Golden-crowned, White crowned, House and Song), American Robins, Hermit and Varied Thrushes, Towhees (California and Spotted), Warblers (Townsend's and Yellow-rumped) and wrens (Bewick's and Pacific). ❑

HOW TO HIT THE RESET BUTTON ON CALIFORNIA MEGAFIRES

Dr. Sasha Berleman, PhD, Audubon Canyon Ranch

In May, 20 acres of grasslands were torched in a controlled burn, in collaboration with Audubon Canyon Ranch, CAL FIRE, 12 local fire agencies, and the National Park Service, among others. When the catastrophic Sonoma fires swept through two weeks ago, burning entire neighborhoods to the ground and running uncontrolled across our undeveloped hillsides, those acres didn't ignite.

That small burn, located at Bouverie Preserve, a property of the conservation and education nonprofit Audubon Canyon Ranch where I direct the fire ecology program, was one of just a few areas in the entire region that had been prescribed burned in the months leading up to the fire. The difference is -- literally -- black and white: the fire burned at relatively high intensity through the oak woodlands and mixed conifer forests, hotter than ideal for that ecosystem, torching trees and leaving the ground scorched black. But when the flames reached the controlled burn line, the fire came to a halt and was forced to find its way slowly around the treated site, leaving the ground a light tan, and the trees still healthy and loaded with acorns, ready to rebound in the spring.

Tubbs Fire Photo Captain Boone Vale BodegaVFD

California is a land adapted to fire -- there is not a "no fire" option -- and the influence of climate change may make our lands even more susceptible to severe fire events. Yet, for a century, we have prioritized fire suppression and continue to do so, allowing our Northern California and Sierra Nevada forests to accumulate unnatural fuel loads like dead woody debris, leaf material, and crowded trees. To counteract, we can conduct fuels treatments, from mechanical thinning, to animal grazing, to prescribed burns to restore an ecosystem balance. But we need to keep in mind that each region has a different fire tolerance. Here in Sonoma and Napa, our patches of knobcone pines and chaparral prefer to burn at high severity, but they are interspersed with oak and mixed evergreen forests and grasslands, that thrive with lower-severity fire. A thoughtful and thorough regional fuels treatments and prescribed burning program, such as the one that we at Audubon Canyon Ranch are organizing in the North Bay, can revolutionize our relationship with fire -- if the residents in these wildland-urban interfaces embrace it.

The fires in Northern California this month have been devastating for many communities, including my own at Audubon Canyon Ranch. Thousands of people lost everything they own, and some lost their lives. And yet, there is another face to these fires; a silver lining if you will. On undeveloped lands, these fires represent a sort of reset button on fire prevention in those regions: together, we can work to prevent such devastating fire effects in the future by becoming a culture that understands the fire-dependent landscapes we live in.

Fire-aware placement of new homes means not building adjacent to the knobcone pines or chaparral that need and facilitate high intensity fire. Fire-aware construction assures decks and attics won't be inviting to embers. And of key importance, we need broad-scale land management that accepts ecological dependence on fire as a process, by increasing the pace and scale of fuels treatments, including the use of prescribed fire in addition to mechanical treatments, grazing, and browsing.

Northern California and the Sierra Nevada natural landscapes can benefit from these approaches -- and all of us can benefit from learning to better live with our fire-adapted landscapes.

We need fire-prone communities to clamor for such fuels treatments on local undeveloped lands throughout Northern California and the Sierras -- not shut them down, as has occurred in the past. Retrofit your house and yard for fire. Let your neighbors and politicians know how important controlled burns and other fuels treatments are in many parts of California. Educate yourself on the ecological adaptations of our local plant communities to fire. If we can live with fire, then we can continue to live. If we choose to live against it, we will suffer the consequences, again and again. ❑

WALKS & TALKS

NOTES ON "LIVING WITH FIRE IN SONOMA COUNTY"

A talk given by Caerleon Safford of Fire Safe Sonoma for the Bodega Land Trust and Salmon Creek Watershed Council on April 14, 2018.

Her information is too crucial not to share with Journal readers. It is well based on research as well as a great deal of personal experience.

There is no such thing as a fireproof home in the wilderness-urban-interface. It is down to individuals. Start with the house and work out.

Home destruction is related to:

1) vulnerabilities on the structure itself;
2) fuels in the 100 feet surrounding it;
3) weather;
4) position on the slope.

The biggest culprit is embers. Protect from embers. Harden structures to resist ignition.

The roof; wood is bad, tiles and slate better. Stuff on the roof is a big risk. Regularly inspect the roof; remove leaves and crud. Gutter covers are important. Cover vents under the eaves, in the attic and in foundation with fine mesh to prevent embers blowing in.

The critical 5 feet of defensible space around the house should be non-combustible. Use rock or concrete, not duff or wood chips. Shrubs and trees are not recommended. Aromatics such as rosemary are highly combustible.

Windows and doors. Have dual paned windows. Replace you windows with WUI rated windows. Close windows before you evacuate.

Replace wood decks and patios with non-combustible. Keep decks clean. A broom leaning against the deck can be ignited by embers. Place aluminum strips between planks underneath. Stuff under the deck is bad. In a fire throw deck furniture, wooden planters etc. into the house. Close the pet door; the wind will blow it open.

Siding. Use non-combustible siding. Fire can get through joins. You need a ground to siding distance of 6 inches.

Don't have wooden fence coming right up to the house; use steel fence near the house.

Defending the house is the number one priority and the 100 feet from the house. Our County Supervisor is working on funding for the landscape. The ecosystem needs fire. We need to fix the forest but after the houses are more defensible.

Doug Jones, Captain, Cal Fire and Darrin DeCarli, Battalion Chief from Gold Ridge Fire Dept. helped answer questions on the surroundings.

Defensible space does save homes, should improve forest health, is required by law and is the responsibility of the homeowner. Remove all ladder fuels and brush, limb up to 10 feet, reduce the volume of vegetation, separate trees.

Zone 1 is 0 to 30 feet from the house, of which 0 to 5 is most critical. The requirements are to remove all branches within 10 feet and any dead or dying plants next to or over the house. Remove or separate live ground cove and shrubs; just have islands of vegetation. Keep firewood at least 30 feet from the house. Zone 2 is 30 to 100 feet or up to the property boundary if less than 100 feet. If the next property is more than 100 feet from the boundary it is important to make your property as non-combustible as possible.

Propane tanks should have no vegetation or trash around them. Full tanks are safer.

Finding your property. Get green reflective house number signs and put on steel posts, since wooden posts burn. Some local fire departments sell them. The sign should be clearly visible from the street or access road. It needs to have 4 inch lettering on a contrasting background. Electrically powered gates: open them for fire departments. Adjust the gates so they have manually removable pins; you don't want to be trapped.

Clear the road so you have got 10 foot width and 12 foot height clear of vegetation to aid escape. Groups of neighbors working together are good and may get free chipper use, for 3 hours or more for neighborhood projects; contact Soon County Chipper Program at 565-6070. First contact the County's Dept. of Transportation and Public Works. Calfire website has a list of grants available. It also has a template for Community Wildfire Protection Plans (CWPP) for local communities or watershed groups. Caerleon encouraged us to consider making such plans.

www.FireSafeSonoma.org email info@firesafesonoma.org 707-206-5467

FireSafe Marin has a good web site at http://www.firesafemarin.org ❑

LAMBING WALK

by Hazel Flett

On January 13, 2018, we introduced the public to this year's new generation of lambs. This year's lambing was unlike any other. The weather was so dry and mild that all the sheep lambed on the range. No barn sheep: I missed them when we had visitors! So we hiked on the range, admired the babies, and met the new Llama who is a sheep guardian. We looked at areas already grazed, currently grazed and soon to be grazed (rotational grazing), and we viewed our beautiful wool products whose sale helps toward economic sustainability. ❑

Photography by Julia Kalkbrenner

Guardians of the Sheep: Hazel and Tony

THE GEOLOGY & ENVIRONMENTAL HISTORY OF THE BODEGA HEAD ATOMIC PARK PROPOSAL

Aaron Dal Poggetto
2017 BLT Intern From Sonoma State University

Bodega Bay is a place that many people go to visit and recreate, but very few know the history and environmental science behind the area. In the 1960's, PG&E wanted to build a nuclear power plant at Bodega Head. However, PG&E did not take into account the fault lines surrounding this area, the topography, nor the earthquake that occurred in Anchorage Alaska in 1964. (If this earthquake erupted again, it would cause major damage to this area, which would lead to other natural disasters.) If a power plant was built on Bodega Head, and a natural disaster occurred, it could have led to a nuclear power plant explosion. In effect, it would have created radioactive fallout on land and sea, other toxic waste being released into our environment. Bodega Head was considered one of the worst places to build a nuclear power plant, in the eyes of Rose Gaffney, who owned the land, and other activists who did not want this power plant built in this area. In response she and community members and individuals from all over fought against it, and ended up winning this debate. Since then, the area has healed itself and become a place that people come to visit and leave without even knowing that PG&E started building a nuclear power plant here.

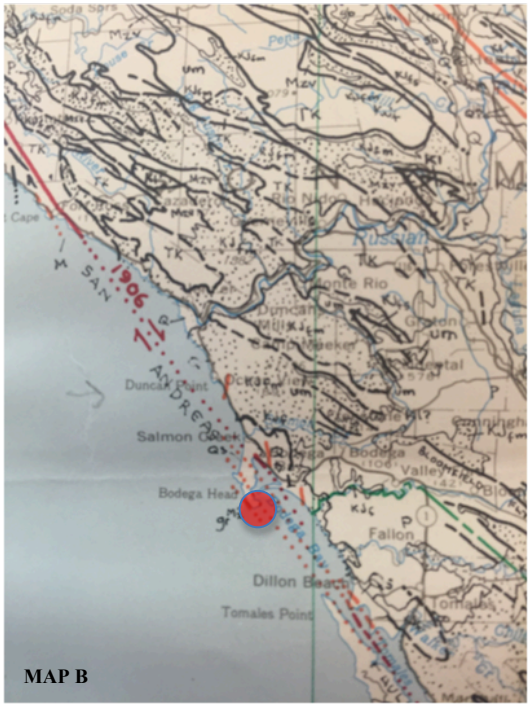
The protests against having the plant being built go back to 1962. As we can see in MAP A, the area of the Atomic Park would be along Bodega Bay. Rose Gaffney became one of the most well known advocates in the fight against having the power plant being built. She didn't want PG&E to buy out her land that her family had owned for generations and didn't think it was right to build something where each home in the area had to have their own insurance and exclusionary clause just in case something went wrong. PG&E knew that there was a major fault line running through Bodega Bay, but insisted that it would not jeopardize the safety of the area and wouldn't be an issue in the future. PG&E's planning commissioner K. J. Diereks said, "The plant, because of branches of the San Andreas fault, will not be at Horseshoe Cove where speculation had placed it in the past, but rather at the south end of the head on the Stroh property and a portion of the Gaffney and key properties for right-of-way". PG&E was saying that they were taking the fault line into consideration and are making sure to build far enough away from it to ensure the safety of the area at the expense of some of the locals land. Once Rose Gaffney found out that PG&E was going to buy out her land, she instantly fought back. The government was willing to use eminent domain, where in they would compensate her for her land. She had to jump through a lot of hoops to prove that she was not interested in giving up the land dear to her for an atomic park siting.

Map A

Gaffney began to collect attention from others in the area and became a leader for the movement against the nuclear power plant. She started getting followers that were willing to help argue against the construction and eventually she became better known. David Pesonen, who was an environmental activist, lawyer, and judge in the San Francisco Bay Area, discussed the importance of the land, and the conservation efforts put into place by people like Rose Gaffney. He then went on to pioneer a movement to oppose this proposal from PG&E, as well as discuss why this would be a terrible place to build a nuclear power plant. According to Pesonen, "One of his assignments was to represent the club [Sierra Club, being executive director] at the May 1962 hearings of the Public Utility Commission on PG&E's plans to build a nuclear power plant in Bodega Bay. He emerged as leader of what seemed to be a quixotic campaign by the north coast locals to defeat the utilities giant, and two and one-half years later his group, the North-

ern California Association to Preserve Bodega Head and Harbor, celebrated PG&E's abandonment of the Bodega plan". Two other activists that played a role in this were Bill and Karl Kortum. Karl Kortum was the founder and director of the San Francisco Maritime Museum, and was an activist during this fight against the atomic park. His brother, Bill Kortum, was a veterinarian who contributed to the California Coastal Committee, which was created to fight with this campaign". David Pesonen, along with Rose Gaffney, Karl Kortum, and Bill Kortum were all huge contributors to the stoppage of the proposed nuclear power plant at Bodega Head.

With the earthquake that occurred in Alaska in 1964, people realized the major consequences that earthquakes can create. "…Dr. Pierre Saint-Amand [a California seismologist], who was the Navy's top geophysicist … had just come back from Chile where he had been studying the devastating earthquakes that had happened there. He wrote an official report that said… [Bodega Head was] one of the worst places you could build a nuclear power plant.". After the earthquake in Alaska, Pierre Saint-Amand stated that Bodega Head wasn't a safe area for a nuclear power plant to be built. In response to his statements, C. C. Whelchel stated, "The record in this case includes a report from the Geological Survey dated December 1963… 'Displacement on the order of a few feet, either horizontally or vertically, should be anticipated'. A primary question concerns the ability of the plant, located approximately a thousand feet west of the edge of the San Andreas Fault zone, to withstand as much as a few feet of shear displacement, without undue hazard to the health and safety of the public…". Bodega Head was a terrible place to build an atomic park, due to the safety reasons, the fault lines, as well as the environmental threats. PG&E decided to stop the plans in 1964.



MAP B

The geology of Bodega Head is fascinating. Overall the area consists of perisima formation, salinian granitic rock, and beach dune/alluvium. "The main rock formation of Bodega Head is granite on the opposite side of the San Andreas Fault line. This is a softer rock formation, which made the peninsula slide up to the north, which put stress on the San Andreas Fault. The Franciscan Complex is more diverse. It consists of sandstone, limestone, shale, greenstone, chert, serpentine, and blueschist". Pierre Saint-Amand discovered this and stated, on his return from Chile and having experienced the earthquake that occurred there, "I had no trouble imagining the consequences on the San Andreas if the Big One—or even a little Big One, like the 1906 quake—seized the containment vessel of a nuclear reactor and shook it like a rat.". Amand concluded that due to the rock formation, the topography of the area, as well as the movement of the San Andreas Fault, that an earthquake was inevitable. On MAP B, the diagonal arrows indicate the San Andreas Fault Line. Not only is there the San Andreas Fault, but also there are several smaller fault lines all around the area of Bodega Head. Some of the other fault lines include the Point Reyes Fault, San Gregorian Fault, and the Golden Gate Fault. Although PG&E thought that they were building far enough from the fault line, maps show that there are several fault lines around the area. These fault lines also show potential for an earthquake, which PG&E did not consider.

As far as the topography of the area goes Bodega Head is a peninsula that goes out into the Bodega Bay. There are three small peaks at an elevation of 107', 204', and 265'. On some maps one can see where PG&E made the hole where they planned on building the power plant and the roads. There is now a lake where the power plant was to be built. There are several mud flats and sand dunes around the peninsula. It is understandable why PG&E thought that Bodega Head would be a good place for the construction because it would have the circulation of the ocean water to cool the nuclear power plant.

It is also far enough away from any major cities, and would not affect neighboring housing and landscapes. However, PG&E did not take into consideration the safety issues of building a power plant. The power plant would produce radioactive waste that would affect the ocean marine life, and other species living on land. In his Papers Ernest Smith stated, "In normal operation of the plant, radioactive wastes in small, steady quantities will be given off through the 300' smokestack…But neither PG&E nor Alexander Grendon, California's coordinator of atomic energy development and radiation protection, can or will say what or how much radioactivity will be released…This radioactivity will be blown downwind through Sonoma and Marin Counties to the Bay Area". PG&E did not take into account how the radioactive wastes would affect the habitats surrounding the "downwind" areas that the wastes would reach.

In conclusion, since the 1960's the natural environment has been coming back to Bodega Head and it is now a place that many come to recreate. The roads now lead to the trails and even camps sites on the other side of the peninsula. The proposal for the nuclear power plant at Bodega Head was halted, and is now just the "Hole in the Head". ❑

MORE WALKS & TALKS

PHOTOGRAPHY WORKSHOP WITH JERRY DODRILL

On February 24, 2018, award-winning photographer Jerry Dodrill shared amazing photos, techniques, & tips, both in the "classroom" and in the field at beautiful Bodega Pastures Ranch! ❑

Photography by Michael Eller

HIKING

POINTING

SMILING

ENDING

WALKS & TALKS REPORTS TO FOLLOW IN THE NEXT JOURNAL

On May 19, 2018, Lisa Hug, a naturalist , avid birdwatcher, and local coordinator of the Sonoma County Breeding Bird Atlas guided a **Birdwatching Walk in Bodega.** ❑

On June 3, 2018, Hank Birnbaum, Guide, Instructor & Historical Specialist at Fort Ross Conservancy, presented an overview of the mid-19th century Russian ranches, port & hunting station south of Fort Ross, **The Russian-Era Khlebnikov Ranch of Bodega**, followed by a visit to the Ranch (property of Michael Costello), with background info. ❑

NEXT WALKS & TALKS

On July 22, 2018, Join us for a walk on the **Kortum Trail** - Cea Higgins, the Executive Director for Coastwalk, will lead us on an easy hike. We'll experience the legacy and beauty of Kortum Trail, and learn its history and unique features. Register online at http://coastwalk.org ❑

On October 14, 2018, Join us for a talk on Jasper O'Farrell by Frank Baumgardner, starting at 2 PM at Salmon Creek School. ❑

Watch our website for Walks & Talks in August and September, 2018. ❑

EASEMENT MONITORING TRAINING

On April 22, 2018, Earth Day!, Sharon Sadler, our Monitoring Coordinator, held an Easement Monitoring training at the Salmon Creek Falls Education Center. If you wish to help Monitor our Easements in the future, or learn more about what is involved, please contact Sharon for information on how to get involved. ❑

Sharon Sadler 707-483-5407

VOLUNTEERS AT THE 2017 BODEGA LAND TRUST ANNUAL DINNER

A HUGE THANK YOU TO: JODIE RUBIN FOR COOKING AND PROMOTING THE EVENT … AND ALSO IN THE KITCHEN:

CHARLOTTE REIS, ALYSSUM REVALLO, ELAINE HARDS, DEVAN HEMMINGS, JAY SLIWA & DONNY FRAITS

… AND TO THE SERVERS:

DEMETRI & MOSES VOELKER, ORION BURNHAM-POHLMANN & CAYDEN MARTIN

AND TO OUR OTHER VOLUNTEERS:

BOB FINK, DAVID KATZ, SHARON SADLER, SUSAN ANDERSON, DAVID SHATKIN, ERIC MENUEZ, ELLIE FAIRBAIRN, JAMES FITZGERALD, STEVE KILLEY, SUE HEAD, HAZEL FLETT, MARY BIGGS, and SANDY SHARP ❑

THANK-YOU TO OUR DONORS of 2017!

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- WESTERN HILLS GARDEN
- WORKER BEE FARM

SPECIAL THANKS TO OUR WONDERFUL GUITARIST PABLO RODRIGUEZ !

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bodegalandtrust.org

IN THIS ISSUE OF THE JOURNAL

*** COHO AND STEELHEAD SUMMER SURVIVAL IN FAY & TANNERY CREEKS ***
&
*** COHO SALMON ARE RETURNING TO SALMON CREEK ***

*** HOW TO HIT THE RESET BUTTON ON CALIFORNIA MEGAFIRES ***
&
*** NOTES ON "LIVING WITH FIRE IN SONOMA COUNTY" ***

REGISTER FOR OUR NEXT WALKS & TALKS EVENT

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