



SUMMER/FALL

2015



ISSUE #5

# Water Rights in the Mattole Watershed

By Tasha McKee & Marisa Formosa, Sanctuary Forest, Inc.

“By the law of nature these things are common to mankind – the air, running water, the sea, and consequently the shores of the sea”  
– Emperor Justinian, 530 AD.

Water rights have always been important, however when water was more abundant there was less need to understand and obtain water rights. Today, water scarcity impacts to communities and wildlife are significant and regulation from the agencies charged with protection of water resources has increased. In this article we hope to provide a brief overview of water rights along with summary instructions, helpful tips and contact information.

An understanding of water rights begins with the public trust doctrine, dating back to Roman law: that the air, the sea, and running water belong to all of mankind. The public trust doctrine is the principle that certain resources are preserved for public use, and that the government is required to maintain them for the public’s reasonable use. In California, the public trust doctrine has been expanded to protect ecological values. California recognizes three classes or types of water rights: riparian rights, appropriative rights (including “pre-1914” and “post-1914”), and prescriptive. The State Water Resources Control Board (SWRCB) administers the state’s water quality and water rights functions. The California Department of Fish and Wildlife (CDFW) reviews all SWRCB water appropriation permit applications to determine the need for terms and conditions to protect fisheries. Two types of water rights most applicable to Mattole landowners are discussed below: riparian water rights and Small Domestic Use registrations (a type of appropriative right).

Most landowners in the Mattole River watershed have riparian water rights. Riparian rights are attached to the smallest tract of land that abuts a natural watercourse and held by the landowner through ownership of riparian land. Riparian land must be within the same watershed as the watercourse. A riparian right is typically unquantified, and entitles the landowner to a “correlative” portion of the natural water supply, to be shared with other riparian



A California Department of Fish and Wildlife-compliant submersible pump fish screen. Photograph courtesy of Sanctuary Forest, Inc.

users. In times of shortage, all riparian users on a watercourse must curtail diversions and share the common supply. Riparian use must be “reasonable” (i.e., non-wasteful) and “beneficial” (i.e., a valued use) and cannot be lost or reduced as a result of non-use of water. A riparian water right is for direct diversion and use from a stream, and does not include the right to “store” or hold water for more than 30 days before use. **The Water Code requires riparian right holders to file a Statement of Water Diversion and Use with the SWRCB to assist state documentation of riparian water use. As of 2009, there are penalties of up to \$1000/day for not reporting.**

Appropriative rights differ from riparian rights in that they are severable and distinct from ownership of land, and use is not limited to riparian lands. Like all water use in California, after being diverted under an appropriative right, the water must be used reasonably and beneficially. Appropriative rights may be lost, in whole or in part, after 5 years of non-use, and may also be abandoned. Appropriative rights can be obtained by application to, and permit from, the SWRCB. The permit defines the scope of

See “Water Rights” - continued on page 3

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### MATTOLE RESTORATION COUNCIL MISSION

The mission of the Mattole Restoration Council is the restoration of natural systems in the Mattole River watershed and their maintenance at sustainable levels of health and productivity, especially in regards to forests, fisheries, soil, and other plant and animal communities.

### MATTOLE RESTORATION COUNCIL VISION

"We look forward to a Mattole that has healthy, self-sustaining, productive forests, meadows, and streams, with abundant native fish and wildlife populations. We envision a community that draws its sustenance from and lives in harmony with the environment. We seek to understand processes of natural healing and enhance them using best land practices in harmony with the local environment. We seek to enhance the exchange of knowledge among all community members toward that goal. We look forward to a time in the Mattole watershed when "restoration" will no longer be needed."

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## From the Executive Directors

By Cassie Pinnell, Tasha McKee, and Sungnome Madrone



Dear readers,

As we rejoice in the longer days of summer and stay busy with all our endeavors here in the Mattole River watershed, we cannot help but notice the river. This river that runs through our lives, that pulses through our home valley, is at press time experiencing some of the lowest summertime flows of all 66 years on record. As we dig in and adapt to drought conditions on land – preparing our homes and forests for wildfires, working with neighbors and friends to increase our fire safety and ecological awareness – we also continue to turn our gazes back to the river, asking: does she flow? Do the otters tumble and splash, the tadpoles hatch, and do the juvenile salmon find their needed refuge in dark, cold pools that persist during the heat of summer and the parched days of fall?

Here in the organizations of the Mattole River and Range Partnership, we often walk a fine line between faith and concern. We have faith that the natural world, in its infinitely inspirational ways, will adapt and persist in times of challenge. And our work reflects our concern that, as humans, we have the abilities to impact our environment in both beneficial and destructive ways. Turning this concern into positive action, this newsletter includes articles on topics ranging from forest stewardship to our educational programs to water conservation opportunities.

We are also pleased to share information in this issue of the Mattole Watershed News about water rights. As local community groups, we are not regulatory agencies. We share this information to assist you in navigating a somewhat complex set of requirements and finding the resources you need to secure your access to water while keeping negative impacts to a minimum.

As we continue to live in a place blessed with such beauty and ecological diversity, with wild native salmon swimming beneath spectacular forests and amid the homesteads of thoughtful people, our hope is that we will all stay mindful of our water use. Our rural communities in this remote corner of the state encourage the sharing of ideas and innovations; we are blessed to live among resilient and free-thinking neighbors who continue to inspire us. Together, may we create a future where water – that most basic criteria for life – sustains us and all the creatures with whom we share our home.

Sincerely,

*Cassie Pinnell*

*Tasha McKee*

*Sungnome Madrone*

Cassie Pinnell, Tasha McKee, and Sungnome Madrone

## Mattole Salmon Group

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### MATTOLE SALMON GROUP MISSION

The Mattole Salmon Group works to restore salmon populations to self-sustaining levels in the Mattole watershed.

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US Fish and Wildlife Service

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# Water Rights in the Mattole

- continued from page 1

the appropriate water right, including the quantity and rate authorized for direct diversion or diversion to storage, the point of diversion, as well as the purpose of water use. The permit may also contain other terms and conditions of use, including instream flow or "bypass" requirements. SWRCB approval is required to change the place or purpose of use, or to change or add a point of diversion. The SWRCB maintains continuing jurisdiction over permits and licenses, and has broad authority to impose additional conditions on a permit or a license, including conditions for the protection of fish and wildlife resources.

If you have riparian rights and you plan to store water from the wet season for use during the dry season you will need an appropriate right in addition to your riparian right. If you do not have riparian rights then you will also need to apply for an appropriate right. Most landowners qualify for Small Domestic Use registrations for domestic use not to exceed direct diversion of 4500 gallons per day and diversion by storage of 10 acre-feet (3.2 million gallons) per annum. Domestic use means the use of water in homes including watering of domestic stock, irrigation not to exceed 1/2 acre, and shall include impoundment for incidental aesthetic, recreational, of fish and wildlife purposes. Institutional and business water use requires a full appropriate right with a few exceptions (schools, resorts, motels, campgrounds, etc.) Additionally landowners that irrigate more than 1/2 acre or exceed the maximum allowed diversion stated above also require a full appropriate right or a Small Irrigation Use registration.

Below are a few helpful steps to come into compliance, including information from the Salmonid Restoration Federation (SRF) website (<http://www.calsalmon.org/>). For more information and resources, see the end of this article.

## Riparian water rights reporting:

If you have riparian water rights, you must file a Statement of Diversion and Use prior to, or at the same time as, applying for a Small Domestic Use registration for storage! Water rights law requires all people diverting surface waters (springs, streams, and rivers), including diversion of water from subterranean streams flowing in known and definite channels, to file a basic statement that includes the following information related to the diversion: amount, location, method, and basis of water right.

## What if I Don't File a Statement?

If you received a legal notice and you fail to respond after 30 days, you may be subject to fines up to \$1,000, plus \$500 for every additional day of diversion when a Statement of Diversion has not been filed. If you do not have a valid basis of water right, your diversion could be subject to removal, particularly if your diversion is likely to contribute to significant and/or cumulative harms to public trust resources like fisheries.

## Who is Exempt from Filing a Statement of Diversion & Use?

A Statement is not necessary if your diversion (1) has a valid basis of appropriate right, such as a certificate, permit, or license, (2) if a Watermaster files a report that includes the diversion, or (3) if you are diverting from a spring that does not otherwise flow off your property and your combined diversions do not exceed 25 acre-feet per year.

## How to File

Download the Statement of Water Diversion and Use form at [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/diversion\\_use/docs/intl\\_stmnt\\_form.pdf](http://www.waterboards.ca.gov/waterrights/water_issues/programs/diversion_use/docs/intl_stmnt_form.pdf) The form is an initial filing. You will be notified every three years to file a supplemental Statement. There is no fee to file.

## Helpful Tips

Point of diversion: If you can't determine the latitude and longitude, you may indicate on a topographic map the location of your diversion and include this as an attachment.

Purpose of use description: Estimate and report the irrigation area in acres, the number of people served, stock watering and under "other," include fire and any other uses.

Rate of your diversion: use your pump rate specifications or measure the rate. A bucket and stopwatch works well and it is usually easy to disconnect the inlet pipe to your tank to facilitate measuring the flow. Divide volume/time and report in gallons/minute.

Quantity of water diverted each month: If you do not have a meter then prepare estimates using the number of people and the irrigated area. Save your worksheet for future reference - you will need it to help you with reporting in the future. We recommend using the SWRB "suggested water duty for domestic use." See the sample calculation at the end of this article.

Method used to measure water diverted: If you do not have one of the measuring devices listed in Section 8a of the form, indicate alternative method under 8b. If you are estimating your water use based on calculations for the number of people and irrigated area, then check the box crop duty estimates/consumptive use estimates. In the box "explain your measurement alternatives," the statement "simple and effective" is adequate.

Maximum rate of diversion achieved in each month: Report the maximum gallons per day (gpd) pumped on any one day for each month. If your pumping rate is 10 gpm, multiply by 1440 minutes per day for a maximum diversion rate of 14400 gpd.

See "Water Rights" - continued on page 12

## Sanctuary Forest

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## Mission Statement

Sanctuary Forest is a land trust whose mission is to conserve the Mattole River watershed and surrounding areas for wildlife habitat and aesthetic, spiritual and intrinsic values, in cooperation with our diverse community.

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# Working Together to Foster Positive Change

By Joe Whitney, Sanctuary Forest, Inc.

As California's extended drought stretches into another summer, its effects have become impossible to ignore. People everywhere are talking about the lack of water and how it has affected them, and they are trying to conserve this precious resource in any way they can. There is also growing awareness of the drought's impact on wildlife species and their habitat, and in particular the effect of low streamflows on anadromous species like our native coho salmon. Sanctuary Forest has been addressing these concerns in the upper Mattole River since 2004 and we are eager to share what we have learned with the larger community. To this end, we have created the Mattole River Conservation Technical Assistance Program, the purpose of which is to promote water conservation on a watershed-wide scale in order to protect landowners as well as at-risk species from the effects of drought, both now and in the future.

The program will be funded through a grant from the California Department of Fish and Wildlife (CDFW), who have enthusiastically given their support to this ambitious project. Sanctuary Forest will work with our partners, the Mattole Salmon Group and Mattole Restoration Council, to engage landowners all along the Mattole, and on six of its tributaries as well. This outreach will take many forms, including community workshops, the formation of tributary stewardship groups, and water conservation education in Mattole elementary schools. In this way, Sanctuary Forest will strive to bring people together to solve the persistent low flow problem for the wellbeing of the entire Mattole River ecosystem.

One of the main goals of this project is to spread the knowledge that Sanctuary Forest has gained through six years of our successful Storage and Forbearance Program. We will do this by developing and distributing technical support materials for water conservation, storage and permitting. These materials will be full of practical information, such as the schematics for three types of water storage systems, tables for comparison of storage and pump options, and a design and materials list for CDFW-compliant pump intake screens. Also included will be a helpful summary of resources such as suppliers and installers, and a list of possible funding sources. Sanctuary Forest will meet with individual landowners to assess existing water systems and make recommendations on how to make them more efficient. Although a watershed-wide Storage and Forbearance Program is not feasible due to cost and a lengthy permitting process, the materials and consultations provided by Sanctuary Forest will impart the know-how for landowners to initiate forbearance measures on their own if they are able. For those who cannot afford the cost of a multi-tank storage system, Sanctuary Forest can assist in the development of a long-term plan to stage the installation over the course of a few years.

Sanctuary Forest will host two community workshops, one upriver and one downriver, which will feature on-the-ground demonstrations of water conservation and storage as well as a discussion of best practices for land and water stewardship. To assist in the development of comprehensive stewardship plans, Sanctuary Forest will be enlisting the aid of community experts as well as representatives from agencies such as the National Resources Conservation Service. The grant also includes funding to hire a permaculture practitioner to help develop a water conservation brochure. The brochure will show how to use permaculture techniques to greatly reduce gardening irrigation needs. This permaculture expert will be available to perform consultations with landowners in order to assess land impacts and determine ways in which to improve streamflow at their water source.



*Participants in Sanctuary Forest's resilient homestead hike learn water-wise agricultural techniques. Photograph courtesy of Sanctuary Forest, Inc.*

Another function of this program is to promote the formation of collaborative tributary stewardship groups. These groups will be somewhat like the road associations that already exist in many neighborhoods, in that they will consist of landowners coming together to work for a common cause, in this case the development of strategies to weather drought in ways that benefit landowners and wildlife alike. Sanctuary Forest will begin this process by engaging landowners on six tributaries of the Mattole: three upriver, two mid river, and two downriver. The tributaries to be included will be selected based on their importance for coho recovery. Factors to be considered are historic and current coho presence, low flow problems and the ability to improve these conditions by changing human use. Three high-priority tributaries in the headwaters have already been determined: Thompson Creek, Ravashoni Creek, and McKee Creek. Other tributaries currently being considered are Lower Bear, East Mill, Mattole Canyon, Blue Slide and Eubanks creeks.

Once the tributaries are decided upon, they will be assessed to determine their current human population and habitat conditions. Existing streamflow monitoring data will be reviewed and additional monitoring will be done if necessary. After this, workshops will be conducted and Sanctuary Forest will discuss with landowners how they can collectively steward their own tributary. We will share strategies learned from other water stewardship groups, such as the Village Council in Rajasthan, India, where non-governmental groups have successfully worked with villagers to restore groundwater and streamflow. We will also meet with individual landowners to help identify site-specific options for improving flow. The aim is for the members of these groups to reach agreement as to which stewardship practices will be of greatest benefit to restoring the health of their tributary, and to create a network with which to share the knowledge and skills necessary to achieve their goal.

The Mattole Watershed Conservation Technical Assistant Program is dynamic and far-reaching in scope, but ultimately its success will depend upon community involvement. The residents of the Mattole will have to work together to bring about the changes that are necessary to keep the Mattole flowing, the salmon swimming, and the forests healthy. Despite the vagaries of climate change and dire predictions for the future, this is not an insurmountable task. Through ingenuity, cooperation, and the pooling of resources, we can lessen our human impact and ensure the health of the Mattole watershed for generations to come. 🐟

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# Return of the Kings!

By Nathan Queener, Mattole Salmon Group

Many Mattole watershed residents know that spending some time at the right spot on the river in the fall and early winter can yield sightings of Chinook (also called King) salmon as long as your leg. They'll be swimming lazy circles in deep pools waiting for the next storm to move upriver; or on the spawning grounds, females working their tails literally to the bone to move grapefruit-sized stones to ready the streambed for their eggs, while the males – all spots and scales and teeth and leering eyes and blind aggression – are chasing each other about for the chance to fertilize those eggs.

Less well appreciated is that much of the Mattole River is also alive with Chinook in the spring and early summer. These fish, the progeny of the single-minded adults from the winter before, are much less conspicuous than their forebears, since they are only a few inches long. But they are much more numerous, with literally hundreds of thousands of them headed out to sea every year.

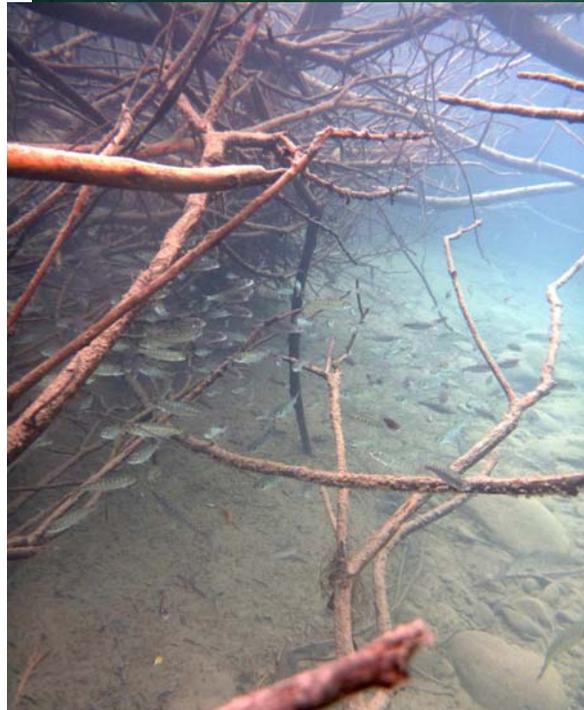
MSG staff have been conducting biweekly dives in a river reach downstream from Petrolia beginning in April of this year, in part to monitor juvenile salmon and steelhead use of recent restoration projects. We've seen large numbers of juvenile Chinook, literally thousands, in just a short stretch of river (a few pools).

While this is just a snapshot of conditions in a small portion of the watershed, these observations seem to suggest that spawning incubation and fry emergence from the relatively strong Chinook run from the winter of 2014-15 was fairly successful. We would expect this to be so, given that December rains allowed the bulk of the Chinook run to move upstream into tributaries and the mainstem in the upper portion of the watershed, reaches with generally more favorable spawning conditions than the lower river, and the subsequent mild flows and lack of large storms probably led to high rates of survival of eggs and fry.

Juvenile Chinook habitat preferences change over the course of the spring. Early in the spring (April in our observations from this year,) they have a strong preference for areas with woody cover (such as willows or alders dragging in or fallen into the water) and relatively low velocity adjacent to higher-velocity areas suitable for drift-feeding. Juveniles are concentrated in these spots, and generally absent elsewhere, and their growth and survival is likely strongly limited by the availability of these areas, especially in years with big spring storms. By mid-May, more Chinook are out, away from cover, feeding in riffles and more open water, and over the next few weeks the majority of Chinook seen in the river are actively feeding in low-velocity riffles. As they grow, young Chinook have an increasing ability to hold in faster water, and their need and preference for areas with overhead cover decreases. And, as river flows decline through the spring and entering the dry season, velocities decrease and a greater percentage of the channel is not too fast for them.

Another pleasant surprise on dives in late April and early May were observations of numerous coho smolts. Seeing a coho salmon smolt in the lower Mattole River feels a bit like finding the proverbial needle in a large and dimly lit haystack. Seeing a dozen in one pool is better!

For the sake of all these fish, hopefully temperatures remain mild, we get some summer rain, and all of us Mattole bipeds do our part to conserve water and keep more in the river. 🐟



*Top: Juvenile Chinook salmon in the lower Mattole River on May 11, 2015.*

*Middle: School of juvenile Chinook salmon (with some juvenile steelhead as well) utilizing small woody cover in the lower Mattole River.*

*Above: Coho salmon smolt (top right of photo) in the lower Mattole River (with steelhead at top left and bottom right, and a juvenile Chinook in bottom left corner). Photographs by Nathan Queener*



**We invite you to experience Mattole Camp!**

Situated along the Mattole River, Mattole Camp has served Humboldt County for over 60 years as a year round gathering place for churches, schools, organizations and events in a serene location away from the distractions of life.

**Weddings, Receptions, Reunions.**

**707-629-3308 [info@mattolecamp.com](mailto:info@mattolecamp.com)**

# The Mattole Field Institute Takes Lead

By Flora Brain, Mattole Restoration Council



## Spring 2015 Course a Resounding Success!

In May, the Mattole Field Institute implemented its third field course here in the Mattole Valley. Ten students from Humboldt State spent five days immersed in watershed restoration techniques, and a new twist to this year's course was increased participation from local landowners and elder restoration practitioners. Along with spending substantial time with young professionals from the Mattole Restoration Council, Mattole Salmon Group, the Bureau of Land Management and the Natural Resources Conservation Service, students in the course also spent a whole day in the Mattole headwaters with Richard Gienger, introduced as "the grandfather of restoration" by Tasha McKee, Executive Director of Sanctuary Forest. Tasha – herself a sheer force of nature in the restoration world – took the students on a walking tour of Whitethorn's community water storage site, and gave them a whirlwind introduction to her organization's work in creating community standards and forbearance agreements for water conservation. The students also spent a day focused on fire safety and forest ecology, visiting first with Dick Scheinman, who has been reducing fuels in his forest in Petrolia for a decade, and then hiking through a glorious oak woodland in the Upper North Fork with Pete Marshall to learn about oak and Douglas-fir ecology.

The true value of this course, I believe, lies in facilitating interactions between university students and ecological restorationists, and recognizing that the latter includes not only the current staff members of our organization and partner nonprofits, but certainly also our elders who began this movement in the 1980s, as well as agency biologists and foresters, community members, and land stewards of all stripes. We are particularly grateful for the participation of Richard Gienger, Tasha McKee, Pete Marshall, Dick Scheinman, Hugh McGee, Nathan Queener, Monica Scholey, Chris Gilda, A.J. Donnell, Marisa Formosa, Mat Cocking, Claire Trower, and Sungnome Madrone. The Mattole Field Institute is supported by, and deeply grateful for, funding from the Bella Vista Foundation.



## New Partnership with HSU's Environment & Community Graduate Program to Begin August 2015

The Mattole Field Institute is pleased to announce a new field course to begin this August, created especially for the Environment & Community Graduate Program in Social Sciences at Humboldt State University. Our new course, Natural Resource Use and Restoration in the Mattole Valley, will focus on integrating socioeconomic questions and research with natural resource issues here in the Mattole River watershed. If you live in the Mattole and would like to share your own life experiences, or your observations of land use changes that you have seen over time, please contact Flora Brain soon by emailing [Flora@mattole.org](mailto:Flora@mattole.org). 🐟



# Learning in Place to a New Level



What students had to say about the Spring 2015 field course in watershed restoration:

"The course definitely met my expectations. I was very impressed with the number of different people we were able to meet doing work in the Mattole. I was also happy with the variety of topics we talked about."

"It enhanced my understanding of ecology because it linked everything/concepts together with the work that is being done in relation to ecological functions."

*Would you recommend this field course to others?*

"Definitely. The small size of the students alongside in the field study made for incredibly effective learning."

"Yes! Great opportunity to gain field experience and relate literature to the actual, physical practice of restoration."

*Did this course inspire you to pursue further education and/or a career in ecological restoration or another environmental field?*

"Yes! It definitely solidified my interest in pursuing this field. It really seems like people are doing great things here and I want to be a part of it."

*How well did this field course complement your on-campus, classroom-based education?*

"This class gave me the chance to see and touch something."

*What advice would you give to the leaders of the Mattole restoration community:*

"Keep doing what you do. You really inspire me to stay on the road of restoration."



*Clockwise from top left: Mattole Field Institute students, with Richard Gienger, Flora Brain, and BLM King Range Fisheries Biologist A.J. Donnell, at the base of a majestic redwood near the confluence of Baker Creek and the Mattole River; Donnell considers a question about groundwater recharge at the Baker Creek project site; students explore a large oak tree with Pete Marshall and NRCS Forester Mathew Cocking; Gienger shares the history of holding adult salmon in the ferrous cement tank on Arcanum Creek with HSU Fisheries graduate students; damselfly nymph case; students sampling aquatic macroinvertebrates in the Mattole River; Tasha McKee of Sanctuary Forest shares lessons in community water storage in Whitethorn. Photographs by Flora Brain*

# The Whitethorn Grove Project

By Marisa Formosa, Sanctuary Forest, Inc.

*Shady, cool and green, Mill Creek happily gurgles, babbles and flows into the Mattole River. Perhaps it's the moss and fern the high banks on either side. Or the thick gathering of deciduous trees overhead, creating a dappled and shimmering water. Maybe it's that sound—a soft, continuous, soothing song of water on rock—that makes this place so vibrant character. Every creek and forest in this valley has a story—one that began before us and will end after us. What will we do in the short time that we are here?*



Driving along the Briceland-Thorn Road, just before you reach the old “town” of Whitethorn, you pass through a grove of redwood, mixed-hardwood and conifer forest. On your right, posted at the end of a dirt road, a sign announces “Whitethorn Grove: Restorative Forestry Demonstration, starting 2015”. After four years of planning, Sanctuary Forest and partners will break ground this summer on this selective thinning project.

The grove is a 40-acre parcel located in downtown Whitethorn, approximately two miles from Whitethorn Elementary School. The county road divides the property, with a few very small acres on one side and the rest gently sloping down to the Mill River and Upper Mill Creek on the other. The parcel is 73% redwood (which is rare in the watershed’s post-logging era,) and is a second-growth forest, though scattered old growth can be found throughout, especially on the uphill slope. On a recent San Francisco radio show on KMUD, restoration forester Tim Metz described the property as an “incredible resource of residual old-growth redwood and Douglas-fir.” Sanctuary Forest acquired Whitethorn Grove in 2001 with grant funding from the Wildlife Conservation Board. Whitethorn Grove, like 90% of Mattole headwaters, was heavily logged between the 1940s and 1970s. Now, decades later, the forest has regenerated, and since it was logged all at once it has grown back all at once, leaving Whitethorn Grove and the watershed forested in crowded, 40-50 year-old trees.

Scientists, conservationists and foresters are all in agreement: young, even-aged forests have measurable and important impacts on a watershed. Water quantity, wood content in streams and stream susceptibility are among the factors affected. Immature forests have more stems per acre and aren’t able to regulate and store their water use in times of drought as effectively as old-growth forests. Young forests contribute less wood to streams and what does fall in is often too small to have a significant impact on much-needed habitat for fish. In addition, fire danger increases when trees are crowded and underbrush thick. So how can we, as the human race, participate in the natural process, and help to maintain and steward the forests?

Out of this question the Whitethorn Grove project was born. The grove is now the planned site for a light-touch demonstration harvest, using a PTHP (Program Timber Harvest Plan) and Mattole PTEIR (Program Timberland Environmental Impact Report) which was finalized by the Mattole Restoration Council (MRC) and approved by CALFIRE in 2011. The Mattole PTEIR is a water

*Clockwise from top left: Forester Tim Metz in Whitethorn Grove; the Mattole River flowing through Whitethorn Grove; informational sign about the project; old growth redwood in Whitethorn Grove.*

*All photographs by Marisa Formosa except top left by Richard Gienger*

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wide permit that gives landowners streamlined approval for their logging plans, provided their harvest meets significant light-touch standards. This touches on an important part of the Whitethorn Grove project. In recent years, the cost of obtaining THP permits has grown exponentially, making it very difficult to perform thinning or selective harvests without losing money. Economic pressure pushes landowners to either log intensively or leave overgrown properties unmanaged. The Mattole PTEIR aims to make sustainable forestry possible on an economic level: reducing permitting costs to allow for smaller harvests.

With the Whitethorn Grove Project, Sanctuary Forest is taking multiple stewardship actions and approaching the grove as a complex ecosystem. In addition to the PTHP, Sanctuary Forest received funding from the federal Natural Resources Conservation Service (NRCS) and the California Department of Fish & Wildlife (DFW) for complimentary restoration efforts in the grove. The basic principle of the Whitethorn Grove PTHP is to thin the forest by taking the weakest trees and leaving the strongest, turning conventional logging on its head. This selective thinning aims to reduce dense second-growth conditions and allow for the gradual return of old-growth habitat. The additional work funded by NRCS and DFW will support and expand on the PTHP—taking the project to an ecosystem level by addressing, among other things, stream health and fuels reduction. The overall goals for the Whitethorn Grove Project include forest stand improvement, fuel reduction to improve forest fire resilience and reduce potential fire intensity, stream habitat improvement in the Mattole River and Upper Mill Creek, Scotch broom removal and road erosion control.

To improve stream health, the restoration work will aim to increase channel complexity by addressing the “recruitment gap:” the present extreme lack of big wood in the water. Heavy logging in the riparian zone combined with the systematic removal of wood from the watershed in the 1980s has led to a lack of winter and summer instream habitat, incised channels, disconnected floodplains and little to no cover or velocity refuge for juvenile salmonids. In a nutshell: no big wood in the river equals very poor habitat for fish. The project includes the placement of ten instream wood structures: eight in the Mattole River mainstem and two in Mill Creek.

The Whitethorn Grove project aims to accelerate the forest to ecological maturity, but it also aims to demonstrate how landowners can actively manage their property. We hope the



project will serve as a model for landowners interested in using ecologically sound land management practices. Sanctuary Forest, with our partners, would like to make sustainable and light-touch forestry a more affordable and accessible option. Whitethorn Grove is a small gem of a parcel in the heart of the community, and Sanctuary Forest is in a position to show exemplary stewardship of this beautiful resource—to show how humans can actively participate with and heal the land.

We'd like to acknowledge our partners in the Whitethorn Grove project, without whom this would not be possible! Thank you to the Mattole Salmon Group, California Department of Fish & Wildlife, National Resources Conservation Service, Mattole Restoration Council and Restoration Forestry. 🐟

# Where are the Carrots?

## It will take more than Sticks to Save the Salmon

By Sungnome Madrone, Mattole Salmon Group

Lately there has been much discussion about regulating the marijuana industry. The explosion of marijuana cultivation, throughout the U.S. and especially in the West, has led to many environmental problems. These environmental impacts have been particularly intense in the area called The Emerald Triangle. This three-county area is composed of Humboldt, Trinity, and Mendocino Counties, and according to many is one center of the marijuana cultivation world.

It is also an area of incredible beauty. It is home to Pacific salmon—Chinook and coho salmon, as well as steelhead trout, make their home in The Emerald Triangle's rivers. Unfortunately, these salmon are imperiled and destructive land use is further threatening these iconic fish. We must act to save these fish, and in doing so we can benefit ourselves and the land. So what can be done?

As you read this article, the gears of government are turning and new regulatory sticks are emerging. The agencies responsible for ensuring the continued survival of wild salmon have a regulatory approach to marijuana growers that consists mostly of sticks, with the only carrot being that those who get registered as growers and water diverters will be able to stay in the marijuana cultivation business legally. Other non-governmental groups are working on various forms of licensing and regulation, but again these are mostly stick approaches with little to no carrots for good land stewardship.

I believe that the most effective way to regulate any industry is to have an effective combination of sticks and carrots. Sticks say, "do this or else." Carrots say, "do this and you will be rewarded." We cannot save the salmon with sticks alone.

There is also the issue of piecemeal approaches to solving our problems. It seems we constantly come up with narrow solutions that fix only one problem rather than being integrated into a more comprehensive approach. It should not matter whether we are growing marijuana, grapes, cattle, or trees, or live in an urban or rural area. What should matter is whether or not we are being good land stewards. How can we solve many problems all at once and create a financial rewards system that saves society money while encouraging and rewarding responsible behavior?

Imagine with me for a minute that we had a way to do just that. Imagine we had a comprehensive set of permit and tax incentives to reward good stewardship. And what if that system helped in urban and rural areas, no matter what type of land use activity you were involved in? What would that look like?

Here is one idea. It involves actions at the federal, state, and local level and is integrated to achieve a maximum effect. It all starts with the counties doing their General Plan updates. Once the plans are complete, then land use ordinances get crafted. This is an opportunity. I recommend that counties adopt a Stewardship Overlay Zone (SOZ) that qualifies landowners for tax and permit incentives. Everyone maintains their existing zoning, be it residential, commercial, agricultural or Timber Production Zone. If you want the

benefits of a Stewardship Overlay Zone, then you get a regular audit by an appropriate team of experts depending on the type of land use.

For instance, rural landowners might have a team of auditors that would include a representative from the federal Natural Resources Conservation Service, one representative from the local Resource Conservation District, and one representative from a local watershed group. The audit team would make a scheduled site visit to see if the landowner is using Best Management Practices (BMPs) and if they are implementing 80% or more of all the possible site-appropriate BMPs, then they qualify for the SOZ. This audit team can also provide educational materials and advise on improving compliance with and receiving grant funds for implementing BMPs.

*"Stewardship Overlay Zones combined with tax and permit incentives can help us save the salmon, protect our water, soil, air, fish and wildlife and ourselves in the process."*

In an urban area, BMPs might include zero discharge of surface waters from a parcel to the street, a reduction of impervious surfaces, and rainwater collection for landscape irrigation. Depending on the parcel location and type of land use, there could be agreed-upon sets of BMPs with manuals made available to the public and technical assistance programs to help.

Landowners who qualify for Stewardship Overlay Zoning would then receive federal, state, and local tax and permit breaks. Imagine if you could write off your expenses for doing the BMPs to protect the public trust resources of water, air, fish, wildlife, and soil. This could be a write-off similar to the solar credits that come right off our taxes. Imagine that your SOZ status would qualify you for streamlined permitting and reduced permit fees because the government would know you are a stewardship landowner.

If the incentives were significant, then many landowners would seek out this qualification because it would make financial sense. We as a society could then use the sticks on those that choose to wreak havoc on our environment. Incentives can separate the good actors from the bad, help the uninformed and uneducated, and thus increase enforcement where it is needed. Now the stick can be an effective tool. It takes carrots to get there.

Stewardship Overlay Zones combined with tax and permit incentives can help us save the salmon, protect our water, soil, air, fish and wildlife and ourselves in the process. It makes sense to stop piece-mealing our approaches. This approach is comprehensive and would have a positive effect on many land use issues. 🐟

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# Managing Mattole's Forests for the Future

By Ali Freedlund, Mattole Restoration Council

There are many ways that Mattole landowners are engaging in forest management (see pages 8-9 for one exciting example in Whitethorn). Since the majority of our forests were clearcut prior to 1985, much of the dense forest that has grown back could use some attention, especially now with the continuation of drought and the increasing risk of wildfire. Reducing surface fuels and incorporating spaces in the forest canopy are part of a strategy to build resilience within forest stands. Whether a single tree dies from drought or wildfire depends on the severity of each, but also on the vigor of the tree. Vigor increases with opportunity, be it sunlight or water.

## A Forest's Resilience to Fire in Times of Drought

Retaining older trees on the landscape is increasingly important because of their role in the capture of fog drip (adding moisture), the essential shade they provide the creatures of the forest, and their ability to survive both drought and wildfire. In addition, they are more resistant to wildfire mortality because of their thick bark. Older trees survive better because they can regulate their water use more efficiently according to Andrew Stubblefield, a Humboldt State University professor studying water use in trees in the Mattole and elsewhere. They survive wildfire better because their thick bark is more fire resistant and guards the living tissue within. Stubblefield's research has found that a 40 year-old forest stand uses 3.3 times more water than a 450 year-old stand. He suggests that reducing the numbers of young to mid-sized trees can help decrease the water demands of the forest—so long as management does not encourage the establishment of younger trees again, as a clearcut would.

Decreasing the water demands of the forest should help increase stand vigor while decreasing the risk of intense wildfire. Some Mattole landowners are manually thinning their forest stands on their own or hiring others, whether as a strategy to improve the stand, reduce the wildfire threat, decrease groundwater consumption or all of the above. Of note, a forest stand will naturally thin itself over time with the aid of heavy winds, canopy suppression, wildfire, insects or disease. But, can we wait? When you add together the predictions of continuing drought, disease and/or infestations, and more stand-replacing wildfire events, with an increasing density of human habitation within our forests, then it is reasonable to conclude that if you own dense forest stands, there is likely work to be done.

## Assistance Available!

Managing our forests can be expensive. Agencies like CAL-FIRE and the Natural Resources Conservation Service offer assistance for individual landowners wanting to develop projects and plans for their forests. Fire Safe Councils and the Mattole Restoration Council (MRC) can also apply for grant funding for fuels reduction projects where multiple landowners are involved. Some landowners choose the timber harvest process to manage their forests and the MRC encourages the use of the Mattole PTEIR timber harvest permit if you are considering this avenue.



*Above: Post-PTHP photo on Wilder Ridge, 2015. Can you spot the person?  
Bottom left: Sam Epperson defies the laws of physics on a recent fuels reduction project. Photographs by Ali Freedlund*

## Mattole PTEIR

The MRC successfully developed the Mattole PTEIR (Program Timberland Environmental Impact Report), a timber permit process available for landowners that live within the Mattole watershed, in 2011. Rather than a standard Timber Harvest Plan (THP), one could now have the option of submitting a Mattole Program THP (PTHP). One of the reasons for creating this permit was to offer landowners choosing harvest an alternative that was less costly, so that they would not be pressured to harvest more than they wanted in order to pay for the permit. In addition, the Mattole PTEIR ensures a higher standard of watershed protections over a standard THP.

In 2014, two of the approved PTHPs were implemented. We are still finding that it is very difficult to make a small timber harvest economical for Mattole landowners whether using a THP or PTHP process. Because of our remote area, hauling costs are still a major expense. Both PTHPs had a 6-hour haul and constituted between 1/3 and 1/4 of the entire cost of harvesting their property. That said, the forest that remained in both cases should be far more resilient to fire and drought. A third PTHP will be implemented this summer. See the accompanying article about Whitethorn Grove on page 8.

## Regular Timber Harvest Plans

Currently in the watershed, there is one 32-acre Timber Harvest Plan (THP) known as the Panther Gap THP. The plan is likely to be approved by the time you read this. The landowner did not choose to use the PTEIR though he is doing a group selection plan.

Other Mattole plans include three THPs on property managed by Humboldt Redwood Company (HRC) where protests occurred in the spring and summer of 2014. At issue were forest stands in these plans that were not previously harvested. All three plans were put on hold until HRC could develop a long-term strategy for forest stands in the Mattole that are known as primary forests—or 'unentered' stands not easily fitting into HRC's Old Growth definition. HRC has promised to give three months' notice on these plans before resuming operations. Two plans in the Lower North Fork that involve most of the acreage of 'unentered' stands will not be activated this calendar year, according to Mike Miles of HRC. For the third, in the Upper North Fork area, HRC did give notice on June 1st that they will be activating that plan, but not in the unit that could have a primary or 'unentered' forest stand.

Managing our forest for future objectives that include developing resilience to drought and wildfire is increasingly important as the impacts from both affect the watershed and all of its inhabitants. If you choose to commercially harvest your stands, please consider using the Mattole PTEIR and by all means, protect those older forest stands! 🐟

# Water Rights in the Mattole

- continued from page 3

Annual water use in recent years: With the drought, most people are using less water. Use this section to show maximum water use in years with adequate water.

Water Conservation: Briefly describe water conservation in household or garden, etc. However, the SWRCB only requests this information for water conservation under pre-1914 water rights. Perhaps we can encourage more widespread water conservation by filling in this box under our riparian water rights.

Wastewater reclamation and conjunctive use: Usually these do not apply.

## Appropriative Water Rights and Applications for Small Domestic Registrations

Determine if you need an appropriative right. If you cannot divert water under a riparian right, you will need to establish an appropriative water right through the State Water Resources Control Board's Registrations Program. Additionally if you store winter water for use in the summer, you will need to establish a storage right. If you don't register your water storage you may receive an enforcement letter requiring registration, and in the worst case, be asked to remove your water storage system.

A relatively simple way to secure an appropriative right is to apply for a Registration of Small Domestic Use. The cost is \$250 for a five-year registration. The California Department of Fish and Wildlife (CDFW) may conduct a site visit to provide protective terms for fish and wildlife resources based on site conditions.

## How to Register for a Small Domestic Use Registration:

Download the small domestic use registration form at [http://www.waterboards.ca.gov/waterrights/water\\_issues/programs/registrations/](http://www.waterboards.ca.gov/waterrights/water_issues/programs/registrations/) or visit the SWRCB or SRF website. During Governor Brown's Drought Emergency Declaration, a streamlined water tank registration process was put in place for landowners that meet certain criteria. When filling out the Small Domestic Use Registration Form, you can self-certify that you meet the criteria to receive a 5-year registration without a site inspection or 1600 Agreement from the CA Department of Fish and Wildlife.

The main criteria for being eligible for the Emergency Tank Registration Program are as follows:

- You must agree to pump or divert water at a rate of no more than 10 gallons per minute
- Your water storage must be in rigid tanks (no bladders or ponds)
- You must agree not to divert water for at least 60 days during the summer (the precise dates are determined by a schedule listed in the SDU instructions)

If you do not meet the criteria for the Emergency Tank Storage Registration Program, you will use the same form to apply for your Small Domestic Use registration. Your application will follow the standard process and be sent to CDFW for terms and conditions and a 1600 agreement. There is more information on CDFW 1600 agreements at the end of this article. Although your registration may take more than a year, submission of your application is recognized as a step toward compliance.

## Important Considerations

If you have riparian water rights, file your statement of use and diversion prior to, or simultaneously with, submitting an application for a Small Domestic Use registration! Otherwise you will have shown no valid basis of water right for your present and past water use. If you want to streamline future reporting, then fill out the Small Domestic Use registration so that it covers all your water use – both your direct diversion (daily use) during the diversion season and your diversion to storage. Then you can report all of your water use under your Small Domestic Use registration (once you receive your certificate). Otherwise, you will need to comply with both riparian and small domestic reporting which will increase your reporting burden and increase the complexity of tracking your water use.

Plan for the future while filling out the amount of storage you are requesting. If you are planning on installing additional tanks and/or a pond in the next five years, indicate that on the application. If you are unable to build the storage by the end of 5 years, you can indicate your status and completion plan on your renewal application. If, instead, you do not include planned storage on your application, you will be unable to increase the amount of storage on your water right and will need to apply for a new registration and revoke the old one.

## Helpful Tips for Small Domestic Registration Forms

Project description: Check both "existing" and "proposed," unless you are sure you will not be increasing your storage in future. The detailed description can be very simple, such as "modification of existing diversion with addition of fish protection screen, plus diversion by pump from channel to existing    gallons capacity storage tanks. Additional proposed storage of    gallons in tanks or pond. Maintain existing direct diversion to places of use." Attach a sketch showing the tanks and/or pond. If the SWRCB needs more detail, they will let you know.

Purposes of Use, Amount, Season and Diversion Works and Justification of Amount: Prepare the justification of amount first with the number of residences, number of people and estimated use per person, etc. Perform the calculations for water use per day. Then perform calculations to determine amounts for direct diversion and diversion to storage. See sample calculations below.

## Sample Calculations for Small Domestic Use Registration Application

**Direct Diversion Season:** Because the low flow months vary each year, we recommend calculating your household's direct diversion for 10 months (Nov 1 – Aug 31) and assume use of stored water for 2 months (Sept 1 – Oct 31). For irrigation direct diversion, assume a maximum of 6 months (March 1 – August 31.)

**Sample calculation** for 5-person household and irrigated area of 1/2 acre (maximum allowed under small domestic registration) using SWRCB suggested water duty and water conservation efficiency factor of 50% for irrigation:

Household rate gallons/day (gpd): 5 people x 55 gpd = 275 gpd

Total direct diversion days/year = 10 months x 30.5 days/month = 305 days

Total direct diversion gallons/year = 275 gpd x 305 days = 83,875 gallons

Convert to acre feet = 83,875 gallons/325,851 gallons per acre-feet = 0.26 acre -feet

Irrigation rate gpd: 21,780 sq ft x 0.185 gallons/sq ft x 0.5 = 2015 gpd

Total direct diversion irrigation days/year = 6 months x 30.5 days/month = 183

Total direct diversion irrigation gallons/year = 2015 gpd x 183 days = 368,745

Convert to acre feet = 368,745 gallons/ 325,851 gallons per acre-feet = 1.1 acre-feet

**Diversion to Storage Amount:** Include existing and proposed storage and consider the number of fillings per year. With the erratic weather patterns in recent years, there may be two forbearance periods per year requiring two fillings. Fire or catastrophic loss could result in a third filling. Therefore we recommend multiplying the sum of existing and proposed storage by three fillings. For example, if you have 30,000 gallons of storage and are planning to install another 70,000 gallons in tanks or a pond, then the total diversion to storage would be 3 x 100,000 or 300,000 gallons equal to 0.9 acre feet. Include an explanation with your application regarding the number of fillings and why the "diversion to storage" amount is three times the storage capacity.

**Diversion to Storage Collection Season:** We recommend using the maximum number of months that flows might be sufficient to divert water to storage. If you have used direct diversion for household use as 10 months, then we recommend doing the same for diversion to storage with the same dates.

### Additional Information and Contact Info:

### Sample Calculations for Riparian Reporting: Initial Statement of Use

Suggested water duty for Domestic Use (SWRCB)

- Domestic (persons served): 55 gallons per day (gpd) per person
- Irrigation: 0.185 gallons per square foot per day
- Fire Protection water reserve: 2500 gallons

Sample calculation for 5-person household and irrigated area of 1 acre during high flow months and 3,000 sq ft during low flow months:

- Household use: 5 people x 55 gpd = 275 gpd or 8388 gallons/month
- Irrigation use high flow months: 43,560 sq ft x 0.185 gallons/sq ft x 0.5 (efficiency factor) = 4029 gpd or 122,894 gallons/month during high flow months
- Irrigation use low flow months: 3,000 sq ft x 0.185 gallons/sq ft x 0.5 (efficiency factor) = 278 gpd or 8464 gallons/month during low flow months

To fill in the "quantity diverted each month," add the domestic, irrigation, and any other uses including stock watering, fire, etc. and enter the sum for each month in the boxes.

For the example above, the boxes for Jan - March and Nov - Dec would likely only show the household use of 8388 gallons/month. For the months with irrigation (April - October) the boxes would show the sum of the irrigation amount for that month plus the household. If you diverted a higher amount for irrigation in the high flow months, then the boxes for the months April - June would show a higher water use than July - October. The fire reserve water can be added to one of the months.

### Fish and Wildlife Protection and 1600 Agreements

Your diversion of water or other alteration of streams (construction or modification of culverts, etc.) may require special notification to CDFW, which has the job of managing California's fish and wildlife resources and their habitats for their ecological value and enjoyment by the public. CDFW issues Lake and Streambed Alteration permits ('1600 agreements') that may put limits on your diversion to ensure that public trust resources, including fish, are protected. From the CDFW website:

Notification is required by any person, business, state, or local government agency, or public utility that proposes an activity that will:

Substantially divert or obstruct the natural flow of any river, stream or lake

Substantially change or use any material from the bed, channel, or bank of any river, stream, or lake

Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

If your diversion matches any of these criteria, you may need a 1600 agreement. Contact CDFW for information on fees (which vary depending on the project) and how to get started.



*Above: Community members, with Sanctuary Forest staff, learn strategies for adapting to water scarcity. Photograph courtesy Sanctuary Forest, Inc.*

### Contact Information:

#### Public Agencies:

State Water Resources Control Board: For questions about riparian reporting, small domestic use registrations and other water rights questions, visit the SWRCB website <http://www.waterboards.ca.gov> or call (916)341-5300

California Department of Fish and Wildlife: For questions about CDFW 1600 agreements, terms and conditions for small domestic registrations and fish screens, contact the Eureka office: (707) 445-6493

#### Local non-profit organizations

(water rights education and assistance with limited capacity):

Salmonid Restoration Federation: Visit the SRF website at <http://www.calsalmon.org/> or call 707 923-7501

SRF recently created a new technical assistance brochure listing many local consultants; find it here: [http://calsalmon.org/sites/default/files/files/Technical\\_Assistance\\_Brochure\\_2015.pdf](http://calsalmon.org/sites/default/files/files/Technical_Assistance_Brochure_2015.pdf)

Sanctuary Forest: Visit the Sanctuary Forest website at <http://www.sanctuaryforest.org/> or call (707) 986-1087

#### Consultants:

Several local organizations are now providing assistance with water rights reporting and applications. Below is a list of consultants whom we have contact information for:

Pacific Watershed Consultants: [www.pacificwatershed.com](http://www.pacificwatershed.com) or call (707) 839-5130

Manhard Consulting: [www.manhard.com](http://www.manhard.com) or call (707)-866-MANHARD

Watershed Resources Consulting, Hollie Hall & Associates, 707-502-4870 or [holliehall@gmail.com](mailto:holliehall@gmail.com)

Trout Unlimited: for complex water rights issues only, contact Matt Clifford 510-280-5392 or [mclifford@tu.org](mailto:mclifford@tu.org) 

<sup>1</sup>Vorpagel, J., California Department of Fish and Game, pers. comm., 2004.



## NEED A CHIPPER?



The Mattole Restoration Council owns and rents out a chipper for your fuels reduction and forest thinning needs!

Please call us at 629-3514 to reserve the chipper.

Chipper rental includes a trained 2-person operator crew and a truck to haul it, and is \$95 per hour.

Call the MRC at 629-3514 with any questions.

# WANTED:



## Oblong Spurge (*Euphorbia oblongata*)

This escaped ornamental contains a toxic sap that induces ill effects on livestock and wildlife. It also inhibits the growth of surrounding plants and can inhabit a broad range of ecotypes from riparian corridors to rangelands. Hay and seed crops are also considered less valuable when contaminated with spurge.

Currently, there are few known sites in the Mattole; therefore it is imperative for early detection and eradication to prevent an inundation of this aggressive weed in our watershed.

To report a sighting or for more information regarding this plant, PLEASE contact John at the MRC: 629-3514

May 29, 2015

Mattole Restoration Council  
Attn: Cassie Pinnell  
P.O. Box 160  
Petrolia, CA 95558

Dear Cassie:

Denny and I want to thank the Lower Mattole Fire Safe Council and Mattole Restoration Council for including us in the Title 3-Funded Defensible Space Project.

We appreciate the hard work by staff members Chris, Otter, Sam, Veronica and Bob. They were on the job at the scheduled time and except for a lunch break, worked non-stop every day. The work was done as planned and all the debris cleared and hauled away.

Thanks again for helping us make our property safe from possible fire danger. It was a job we could not have accomplished ourselves.

Sincerely,

*Denny* *Sandy*  
Denny and Sandy Burroughs



This page is dedicated to stuff for, about, and by kids only!

By Monica Scholey,  
Mattole Restoration Council

Thanks to all the students, teachers and parent volunteers for their participation in the Mattole Youth Environmental Stewards Program.

Students discovered and revealed their stewardship ethics through cleaning up marine debris, planting trees and shrubs in the estuary, propagating native plants and learning about their native habitat, the Mattole Watershed.

Thanks to support from the California Coastal Commission's Whale Tail program for supporting this program.



Above: Billy, Ocean and Walter from Honeydew School exploring the tide pools south of Sevenmile Beach on an Mattole Youth Environmental Stewards field trip. Photograph by Monica Scholey



## TRACKS AND SCAT MATCHING GAME!

TEST YOUR TRACKING SKILLS BY MATCHING UP THE ANIMAL WITH THE CORRECT SCAT AND TRACKS.

A large rectangular board for a matching game. It is organized into four rows. Each row contains a photograph of an animal, a set of tracks, and a piece of scat. The animals are a coyote, a bobcat, a raccoon, and a porcupine. The tracks and scat are shown in various orientations and sizes. At the bottom of the board is a measuring scale labeled "Measuring scale in millimeters &amp; centimeters" with markings from 0 to 15 centimeters.



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