Bodega Land Trust Summer 1998 Volume III, Number 1

Newsletter

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*

The California Freshwater Shrimp

A ghost-like crustacean we can't afford to lose

By Larry Serpa

Why should we be concerned about a crusteacean that is less than 2.5 inches long, and will never be abundant enough to serve on the top of a pizza? Even if you took the trouble to stick your head beneath the surface of the water, you probably wouldn't be able to see one, as these creatures are elusive and hard to find. Would it really matter if they just disappeared?

Yes it would. Ecologically, the California freshwater shrimp occupy a role as detritus feeders that no other stream animal could fill. When you rip an important strand out of a food web, there's no way to know how much damage will be done. The shrimp's presence, or absence, can also tell us a lot about the streams. Flowing water is their home, and they are mute witnesses to the condition and history of the streams they inhabit. Continually bathed by the water, they must face whatever flows toward them. Pollution, siltation, introduced species, and other factors will all affect them to some extent. If they disappear, we can be sure that something detrimental has happened to the stream. We will have lost much more than just the shrimp.

California freshwater shrimp (*Syncaris pacifica*) live in lowland perennial streams in Sonoma, Marin and Napa counties. None have ever been found higher than 380 feet above sea level. Before human impacts, the shrimp were probably common in many streams within the three county area. However, a catastrophe which greatly reduces their population can now easily lead to their disappearance from a stream. Channelization, introduced predators, pollution, and water withdrawal have subsequently eliminated them from most of the original habitat, and made recolonization of streams difficult.

By the time biologists began to study the crustacean, they were only known to occur in nine streams. In 1964, the shrimp were eliminated from Santa Rosa Creek, when the stream was channelized and lined with concrete for flood control purposes. By 1975, shrimp were

(Continued on p. 2)

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thought to have disappeared from five more streams, apparently leaving populations only in East Austin and Salmon Creeks in Sonoma County, and Lagunitas Creek in Marin County.

The closely related Pasadena Freshwater Shrimp (Syncaris pasadenae), a native to southern California, disappeared forever in the 1930s. Extinction now also threatened the only remaining species in the genus! Recognizing this danger, California freshwater shrimp were listed as endangered by the California Fish & Game Commission in 1980. Fortunately, new populations were discovered in Sonoma Creek in Sonoma County and Huichica Creek in Napa County in 1981. During a subsequent distribution study of the species in the early 1980s, I sampled 146 sites in 53 streams, and found the shrimp in six additional streams: Big Austin, Green Valley, Jonive, Yulupa, and Blucher creeks in Sonoma County, and Stemple and Walker creeks in Marin County.

However, the populations in many of these streams are small and could disappear even without any additional impacts. For example, only one shrimp was found in Walker Creek, even though several miles of the stream had been waded and sampled with nets. In 1988 the US Fish & Wildlife Service listed the shrimp as endangered. Since that time, shrimp have been found surviving in the Napa River and its Garnett Creek tributary, Keys Creek (a tributary of Walker), and Redwood Creek (a tributary of Jonive). A total of eleven separate stream systems (sixteen streams) are inhabited, but the future of the species is still uncertain. Thousands of shrimp live in Lagunitas, Salmon, and Blucher Creeks, but even in these streams, a single toxic spill could wipe out the bulk of the population.

The shrimp are found within stream pools, in areas away from the main current, where there are often undercut banks, exposed root systems, and vegetation hanging into the water. Shrimp need all of these habitat components for survival. The best habitats have a mixture of willow and alder trees. Some of the shrimp streams are completely enclosed with streamside vegetation, while others have just a few scattered trees along the banks. In the latter case, dark, shaded water is necessary to help protect them from predators. Too little or too much water in the stream can present a problem. Most shrimp are found in areas that are one to three feet deep. For the most part, only the sides of the pools are utilized by shrimp.

California freshwater shrimp are detritus feeders, feeding a the buffet of small, diverse particles brought downstream to their pools by the current. As the water slows, the exposed roots and other vegetation filter out the particles. The shrimp simply brush up the food with tufts at the ends of their small claws, and lift the collected morsels to their mouths. Much of this material is picked up indiscriminately, and contains indigestible material along with the more edible items. To get enough useful food, the shrimp have to eat a lot of this detritus. Larger pieces of detritus are picked up or manipulated with the claws. Colonized by algae, bacteria, fungi, and microscopic animals, the particles are more nutritious than they seem. Most of the shrimp are translucent, almost ghost-like, with colored flecks scattered across their bodies. This semi-transparent nature provides ideal camouflage from most native predators, such as salmonid fish. When startled by a potential predator, the shrimp remain motionless.

Although the shrimp breed in September, the females retain the 50-120 fertilized eggs on their abdominal swimming legs throughout the winter. This adaptation insures that the juveniles do not have to face the heavy stream flows of the rainy season. Instead, the females protect the delicate eggs with their own bodies during this perilous period. The young shrimp are finally released as miniature adults in late spring, after the rainy season is almost over, and the streams are carrying much less water. In this more hospitable environment, the young grow rapidly. California's prolonged summer drought cuts the stream flow even more, and some shrimp streams are reduced to isolated pools in late summer and fall. As long as some water remains in the pools, the shrimp can survive. The following winter these young shrimp will have to get through a rainy season on their own. They must be about a year and a half old before they are mature enough to breed.

The shrimp are not alone in their fight for survival. Dr. Joel Hedgpeth, who studied the shrimp when they were still abundant, has always been a strong and vocal champion of the species. The Marin Municipal Water District regulates the flows in Lagunitas Creek from an upstream dam, insuring that the shrimp have the water they need. Lagunitas is the only shrimp stream on federal and state land; all others are in private ownership. However, private owners have already done a lot for the shrimp. *(Mr. Serpa is an Area Ecologist with the Nature Conservancy. This article is reprinted here in a slightly reduced version by permission.)*

Mr. Serpa hopes to monitor shrimp in Salmon Creek this fall and may be willing to lead a BLT Creek Walk. For further information call 876-1806 or 876-3422.

Watch for flyers!

State Plows Ahead with Effort to Ensure Farming's Future

Farmland Protection Program Could Receive an Extra $10 Million

With California's economic turnaround and resultant population growth, state officials today announced a stepped-up emphasis on programs designed to protect farm land from premature or leapfrog development and to enhance the state's $24.5 billion agricultural economy.

The California Department of Conservation renamed it land conservation office the Division of Land Resource Protection to raise its visibility and undertake increased responsibility for the state's voluntary farmland protection programs. This action is coupled with a $1.9 million increase in land resource protection funding in Governor Wilson's proposed budget and a proposed bond measure that would provide another $10 million of agricultural land protection projects.

"People are once again coming to California," said Larry Goldzband, director of the Department of Conservation. "Our analysis indicates we must act now to increase awareness of the importance of agricultural land conservation and plan for the future. We need to crate new interest and partnerships for developing and funding voluntary land protection efforts."

Just-released state Department of Finance data show California grew by 574,000 in 1997, or 1.77 percent. These new statistics, along with previous reports from researchers at the American Farmland Trust, the University of California, and Cornell University have demonstrated the state's susceptibility to agriculture-threatening growth patterns. State and federal officials agree that California, with a current population of more than 32 million, will see its population grow to 50 million by 2025.

California's Central Valley is by far its richest agricultural area, but certainly not alone in efforts to preserve its agricultural underpinnings. Issues arising at the local level which pit agricultural production against the need to provide housing and economic development stretch from the north San Francisco Bay area, down the central and south coast, and into the agricultural regions of San Bernardino, Riverside, Orange, San Diego and Imperial counties. Development pressure is felt in smaller rural communities throughout the state, as well, communities whose economy survives on agriculture.

The state's greater emphasis on land conservation programs will receive a considerable boost if the voluntary land conservation and environmental measures contained in Governor Wilson's proposed 1998-99 budget are enacted. In addition to the 85 percent budget increase for farmland protection, the governor proposed at least $750,000 for local resource conservation district programs in his Watershed Initiative. "The time is right for California to put the benefits of its booming economy back to work rebuilding the natural resources infrastructure and stabilizing it for the future," Goldzband said. "We have the No. 1 farm economy in the US, and farming is the No. 1 contributor to the economy of our state. These initiatives give farmland protection the priority it deserves."

Salmon Creek Steelhead 2/11/95

Elizabeth Herron

He was coming down when I heard the splash
and saw him dance over the cobble, spinning into a crescent
at the curve of the creek where the roots of the alder
held the bank to make a pool,

before he dropped back to the water, appearing
moments later downstream, holding in the current
facing into it. Letting himself slide
backward then, fast and away.

But he was apples in a fog.
He was fire in the rain. He was a god's glancing blow,
leaving me with that breathless gratitude,
That stunned delirium, that grace.

BLT's Geology Walk

By Laura Gildart Sauter

It is a brisk morning in November. The sun is warm, but the breeze is cool and damp and clouds scud overhead. A group of us meet at the Bodega post office with our lunches and day packs. We are here to meet Dr. Terry Wright of Sonoma State University, a noted expert on local geology. The Bodega Land Trust has organized this field trip as part of its effort to promote awareness of the land and the way it shapes our lives.

When Dr. Wright arrives he extracts himself from a car that seems far too small to hold him. From the back he produces a large map of Sonoma County mottled with color, and begins to point out the different sorts of geologic formations. Each blotch represents a different kind of rock, a different period of geological time.

He begins by talking about the San Andreas fault. In coastal California, almost everything – rocks, soil, water, vegetation -- is affected in one way or another by the fact that this area is the dividing line between two continental plates. The San Andreas fault travels through the middle of Bodega Bay and comes inshore just south of Fort Ross; the Pacific Plate dives under the North American plate about 100 kilometers under our feet. The most prevalent rock formation in the area, the Franciscan Complex, is a mixture of numerous different kinds of rock, jumbled together by the collision of two continents. Here, in the West County, we find several characteristic geologic formations, and today we will visit most of them. First we will travel down Salmon Creek Road to look at a large outcropping of chert, and then stop briefly across from the graveyard to visit a wall of *greywacke* sandstone. We will then make our way to Cheney Gulch and Hagamann's Quarry to view the Franciscan Complex, and end up at Windmill Cove on Bodega Head where we will, essentially, cross to another continent.

We pile in several cars and drive down Salmon Creek Road to Fitzpatrick Lane, where we park and walk back. The creek here is lined with alder and box elder. The rock formation we have come to see lies about twenty yards up the hill, through ferns and pepperwood, a huge brooding outcrop, brown and folded and seamed like an old man's face. Up next to the outcrop one can see how it was formed in layers, hundreds upon hundreds of them – an ancient sea floor. Water drips out of the rock in places; it is quite moist here, under the trees. We work our way along the rockface till we get clear of the trees and can climb higher. The chert is like a nose on the end of this long ridge of land; the rock must cover a couple of acres. "This is great!" Terry enthuses, "This is the best outcrop of chert in Sonoma County!" He disappears over the top of the jumbled pile. Soon he is back with some rock samples for us to take a look at. He licks one of the rocks and holds it under a pocket magnifying glass. "See this, this is the proof that this stuff came from the ocean." Under the lens are hundreds of tiny black dots –*radelleira*—minute pelagic animals trapped in the stone; sea creatures lifted high on this dry hillside by time and the workings of the continental plates. As the Pacific plate moves under the North American plate the surface – the sea floor, the chert—is scraped off onto the North American like one might scrape the icing off a cake. Terry shows us another piece of chert, this one split and divided by dozens of radiating white lines. "This white stuff is quartz. Water dissolves the quartz, flows across the rocks and deposits the quartz in the cracks."

Back at the Bodega graveyard we find other evidence of the sea's presence. In a wall of gray sandstone is a large protuberance of darker gray rock about the size of a football. Dr. Wright explains that this is a lump of calcium carbonate, formed as water seeps through long-buried deposits of ancient sea shells, dissolving the calcium in the shells, carrying it to a spot where the calcium-charged water soaks into the porous sandstone and evaporates-- the mixture of calcium and sandstone forming the nodules like the one we see here. Nodules like these, called silt stone, are evidence of the presence of fossil shells, and, indeed, we see several bits and pieces of fossilized shells scattered through the sandstone like white lumps of chalk.

Next, we drive to Hagemann's Quarry. Standing in a group alongside the road we look up at the looming cliff formed, not by the workings of geologic processes, but by man and machine. The dismantled hillside is starkly beautiful in its way; and here one of the most common geologic structures of the West County is revealed. Across the top of the cliff runs a thick layer of tawny ocher and below this are vertical stripes of pale and dark blue-gray. The tawny band is a mixture of soil and sandstone, known as the Wilson Grove Formation, and the stripes below are an example of the jumble of rocks that is the Franciscan Complex – here, alternating bands of greywacke sandstone and blue shale. The Wilson Grove Formation was laid down by the eruption of volcanoes far inland -- drifting ash falling like dry rain into the waters of an ancient sea; the layers of silt forming what are now layers of topsoil. The vertical bands were part of the floor of an even more ancient sea, heaved upright by some age-old cataclysm. For someone who knows rock, Hagemann's Quarry reads like the pages of an open textbook of geologic history.

The last stop on our field trip is Windmill Cove at Bodega Head. The San Andreas runs up the middle of Bodega Bay; on this side of the Bay we stand on the Pacific Plate – in crossing the fault line we have crossed to a different world. Here Terry points out to us boulders of diorite carried here from somewhere to the south—the first rocks like this east of the fault line occur somewhere in the Tehachapies. Here the underworld reveals itself. These boulders are plutonic rocks formed deep beneath the surface of our planet by the melting and cooling of crystal. Dr. Wright shows us gneiss and marble and a seam of granite , running for yards through the diorite, that is itself a fault –radiating in what is called a "flower structure" from the San Andreas. He has us poke the granite with our fingernails--along the top of the seam is a layer of soft clay. The clay is formed as the rocks shift along the fault line, grinding against each other, wearing each other down. More than anything I have seen today, I am awestruck by this clay. For a moment, I am clearly aware that the very bedrock of the planet is in flux and motion, moving in a rhythm so much slower than my own that I can only comprehend the dance by the evidence it leaves behind. After the lecture is over I realize that today's lessons have changed the way I look at the world. The waves wash the beach, the gulls cry over head, children run along the margin of the sea. Our lives are lived on the surface, while underneath, forces whose strength we barely comprehend are silently at work. We chatter and laugh; below us, the continents meet and merge and part. *(This article originally appeared in the Bodega Bay Navigator.)*

Fay Creek Project Receives Full Funding – Volunteers Needed!

In our last issue we told you about our plans to stabilize the lower east bank of Fay Creek and plant the two meadows there with separated groups of local native trees and shrubs, creating a botanical garden. We have now received 3 grants – one federal and one from Sonoma County – to go ahead with the project.

This Fall and Winter, we will install irrigation and about 4000 seedlings and cuttings. These will include as a centerpiece a group of the extremely rare Western Leatherwood. Appleton Nurseries will direct the work. When completed, the garden will provide delightful habitats for many creatures including the northern spotted owl.

The work will progress in 4 phases. First, the main irrigation lines will go in during August. Second, a major bank repair will be made in October. Third, the trees and shrubs will be planted and the spaghetti hose installed in November and December. Finally in January, a willow thicket 12 feet wide will be planted along the bank.

Obviously this is going to take a lot of work! We hope many of you will want to volunteer some time to this marvelous garden project. For more information, call 876-3422 or 876-1806. If you get the machine, leave your name and we will get back to you.

Look for flyers. We will be posting them as specific work days are set.

This is going to be a lot of fun. Hope to see you there!

Salmon Creek Watershed Day

On the only sunny Saturday in May over 300 people enjoyed music, dance, poetry and art, with a touch of education, at Salmon Creek Watershed Day in Occidental. The free, all day event brought together neighbors to celebrate the wonderful area in which we live.

School classes displayed their watershed projects, posters and poetry. Numerous booths provided educational materials. Lectures ranged from Ed Pozzi's captivating recollections of Salmon Creek in the old days to Michael Banks, of Bodega Bay Marine Lab, explaining the complexity of native salmon genetics.

Entertainment included music by children of the Orff School of Music, the Santa Rosa Scottish Dancers, singing by Copper Women and poetry by Elizabeth Herron and Laura Sauter.

Kids navigated the "Salmon Obstacle Course," wrestled with a live firehose and learned about hydrology and watershed runoff though hands-on displays.

An art exhibit by such local artists as Nancy Conkle, Mike Eschenbach, Serge and Field Etienne Joy Fibben, Darren Jekel, Pieter Myers and Bill Wheeler captured the beauty of the surrounding countryside. Mike Jensen hosted a "living mural" of the watershed to which people added their own drawings and photographs. Add your own personal touch as the mural continues to evolve at Bodega's Big Event on August 23.

Burritos, barbecued oysters, hotdogs and smoothies sustained everyone's energies.

The day's fun and success left everyone anticipating the next watershed day. As one mother exclaimed, "What a great day! I wasn't going to come but my daughter dragged me here early in the morning. And I am just amazed at all that is going on."

Bodega Land Trust was proud to be one of many sponsors of Salmon Creek Watershed Day.

Salmon Creek Watershed Potluck BBQ

There will be a follow up barbeque on Sunday, July 26th at Noon at the park in greater downtown Freestone. We will review the Watershed Day, discuss issues, and talk about what to do next. For more information, call Susan Kirk at 874-1916.

Geology Walk

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THANKS, Thanks, and more thanks!

The Bodega Land Trust Board of Directors would like to take this opportunity to express their heartfelt thanks to the following kind businesses and individuals whose generously donations made our Annual Dinner and Silent Auction such a great success.

Ann Cassidy, Anne Greenfield,Anna Keoloha, Auric Blends, Barbara Hoffmann, Bella Donna, Bicycle Factory, Bill Wheeler, Bodega Estero Bed & Breakfast, Bodega Goat Cheese, Bodega Landmark Studios, Bodega Pastures Sheep, Branscomb Gallery, California Academy of Sciences, Chanslor Riding Stables,Copperfield's Books, East-West Café, Feast, Fiesta Market, Galleria, Gerry Anderson, G-Wiz, Handgoods, Hazel Flett, Hearthsong, Howard'sStation, Jim Grant, Joshua Farm, Joy Fibben, Leapin' Lizards Fun Store, Local Color, Lorene Warwick Photo-graphy, Marine World, Maureen Lomasney, Meryl Clawson, Montmartre Artists Supplies, Nancy Conkle, Naturlich, Northern Light Surf Shop, Occidental Choir, Ocean Waves Styling Salon, Olde Ways Quilts,Pelican Plaza Grocery and Deli, People's Music, Real Goods, Roadhouse Coffee Shop, Rosemary's Garden,San Francisco Museum of Modern Art, Sandpiper Café, Santa Rosa Symphony, Sebastopol HardwareCenter, Something Special, Taylor Maid Organic Gardens, Terre Flemming, The Mermaid's Den, The Woolery, Traditional Medicinals, Trinity Herb, Village Bakery, Vintage Gardens, Vital Roots,Osmosis Enzyme Bath, Western Hills Nursery, Wild Things

Have you joined or rejoined B.L.T. in the last year? If not, here's your BIG CHANCE!

BODEGA LAND TRUST MEMBERSHIP FORM

I would like to become a member or continue my membership at ☐$10 ☐$20 ☐$50 ☐$100 ☐ Other
Please check your address on the other side of this form for accuracy and mail to:
B.L.T., PO Box 254, Bodega, CA 94922

Make checks payable to Bodega Land Trust **All donations are tax-deductible**

I am interested in being involved as:

☐ an interest group participant
☐ an advisor
☐ a Board member
☐ an occasional volunteer
☐ other

My special interests are:

My special skills are:

A project I would like to see the Bodega Land Trust consider is:

NANCY CONKLES' NOTECARDS FOR B.L.T. MAKE EXCELLENT GIFTS

One of eight drawings in the series **"Wild Plants of the Salmon Creek Watershed"**. They are available as sets of notecards, at the following stores:-

Bodega: Bodega Landmark Studio; Artisans' Co-op; Northern Light Surf Shop; Roadhouse Coffee
Bodega Bay: Tides Gift Shop
Occidental: Natural Connections
Sebastopol: Wild Things

Proceeds support B.L.T.

Yarrow (Achillea millefolium L.) — Native to Europe, but fully naturalized here, yarrow can be seen along most county roads. It is also a popular decorative garden plant, with its white or pink flowerheads that bloom throughout summer.

Called "allheal" in traditional medicines, yarrow's entire above-ground portion is useful as a tea for fevers, head colds, or urinary or menstrual problems; or as a poultice to stop bleeding.

Newsletter Staff: **Editors:** Sandy Sharp and Laura Gildart Sauter.
Design and Production: Mary Biggs and Sandy Sharp.

100%

INSIDE: Larry Serpa on *Syncaris pacifica*
Elizabeth Heron on steelhead in Salmon Creek
Darell Sukoviyzen on the redwoods
Laura Sauter on local geology; etc.

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