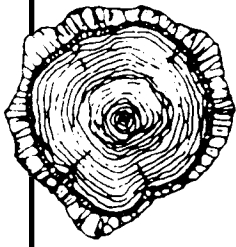




TREE RINGS

THE JOURNAL
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YUBA WATERSHED INSTITUTE

Number twenty-three Fall 2011



TREE RINGS

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IN THIS ISSUE

- | | |
|---|--|
| THE HERITAGE OF PLACE ... 2
<i>by Maria Ryan</i> | INTO THE LENS...9
CAMERA TRAPPING IN THE WATERSHED
<i>by John Warden</i> |
| RED-SHOULDERED HAWK ... 3
<i>by David Lukas</i> | FROG-EE FROG-EE ...13
<i>by Narayan</i> |
| THE WORK OF THE YWI...4
<i>by Bob Erickson</i> | WHAT KILLED THIS RINGTAIL? ...15
<i>by Len Brackett</i> |
| ALTERNATIVE LIVING IN THE
UNDERSTORY ... 5
<i>by Nicole Hynson</i> | MANZANITA ON THE RIDGE...17
<i>by Wendy Boes</i> |
| GABBRO...7
A SAFE HAVEN FOR COAST HORNED LIZARDS
<i>by Jackson D. Shedd</i> | SIGHTINGS...20
<i>by Bob Erickson</i> |

YWI, BLM and the 'Inimim Forest

The YWI is dedicated to the ecologically sustainable management of the Yuba River watershed on the west slope of the Sierra Nevada. Since 1990 we have worked with the Bureau of Land Management on joint management of the 'Inimim Forest, 1,813 acres of federal land on 10 parcels on the San Juan Ridge.

Our agreement calls for restoration of the forest to an old-growth condition; management of its timber on an ecologically sustainable yield basis; and protection of its wildlife, cultural, historical, recreational, educational and scenic values.

Many thanks to all the thoughtful and informed writers and the poet who have filled these pages with insider information about the plants and animals of the Sierra Nevada foothills. And many more thanks to all the artists and photographers who contributed their exceptional work to this issue: *Marsha Stone*, who allowed me to lift images from her sketchbook; *Maria Ryan*, who drew a manzanita flower cluster for the story on page 17, and all the YWI monitors of the camera trap project who have been turning out exciting photos of our wild four-legged and two-winged neighbors.

Special thanks must go to Randy Griffis, who not only offered us the use of his life's work of drawings and illustrations depicting the natural world of the Yuba watershed, but also created two new pieces especially for this issue: the magnificent chorus of moonlit frogs on page 13 and the regal red-shouldered hawk on page 3. *Liese Greensfelder*, editor & designer

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Cover: *Dos Pines*, by *Randy Griffis*

THE HERITAGE OF PLACE

BY MARIA RYAN

I know the sounds, scents, and patterns of light that pass along the southwest crest of Clear Creek Hill on the San Juan Ridge as well as I know my own breath. Whether conceived or geographical, this place grants me a feeling of security and purpose. I know the seasons and how to prepare for them. I know the plants and how to harvest them. I know the animals and how to live with them. I have inherited, from having lived a life intertwined with the natural world, at this precise location, in this watershed, a sense of place. This makes a forest a home.

It is with the knowledge that the nature of this place is precious to us and to our home, that the Yuba Watershed Institute is honored to announce that our place-based educational field studies program has received a prestigious Teichert Grant. We thank our partner, the Twin Ridges Elementary School District. And we look forward to the programs we have in store this fall and spring for the kindergarten through eighth grade classes that will explore forest ecology through wild foods, primitive skills, and wild-life tracking, as well as other locally inspired lessons. Our hope is that field studies like these will continue to educate and encourage community that celebrates place and stewards the land.

As autumn sets in, the sun hangs lower in the sky, the evenings bring a chill to the parched land, and I stack wood in preparation for winter. As I stack each

log, my gloved hands noting buttery oak grain and dry bark, a sense of agreement overwhelms me. I know, for miles around, although silent, I am joined by many others stacking logs. The clarity of place and season is like waking to a bright landscape after a long slumber.

Autumn is a time for nestling, hunkering down, and working in the woods so the winter will pass smoothly. The Yuba Watershed Institute, too, is working in the woods, breaking ground on a new project that will link remnant old growth habitat.

A Resource Advisory Committee grant, awarded to YWI in proud partnership with the Tahoe National Forest, provides funding for our project. This year we will oversee maintenance in fuels reduction and restoration of eleven acres of forested lands in the 'Inimim Forest's Shields Camp parcel along the headwaters of Spring Creek. This project is a testament to our ability to shape the world and guide its resources with a conscientious and positive hand.

I would like to extend wholehearted gratitude to all the gifted contributors to this edition of *Tree Rings*; and to Liese Greensfelder, *Tree Rings* editor, for her enduring talent, patience, and dedication.

Maria Ryan is executive director of the YWI.



Yerba santa

Randy Griffis



Red-Shouldered Hawk

Buteo lineatus

by David Lukas

Several years ago neighbors of the 'Inimim Forest began noticing an unfamiliar hawk in the area. With their noisy cries, rufous color and striking black-and-white checkered patterns, the new residents were easy to identify as red-shouldered hawks. Tree Rings asked our favorite naturalist, David Lukas, to tell us more about these raptors and what is drawing them to our woods. Having recently written about red-shouldered hawks in his new book, *Sierra Nevada Birds*, Lukas has allowed us to offer the following lightly adapted passage from the book.

The red-shouldered hawk is a lowland species that is making a remarkable and recent incursion into the Sierra Nevada. Within one or two decades, the hawks have not only begun moving out of the Central Valley and up the west slope to previously unrecorded elevations, but they have become regular visitors and even breeders on the east side of the Sierra Nevada. It is not entirely clear whether this is the result of population increases or if it is a geographic shifting due to habitat loss in the Central Valley. Some have suggested that the development of small ranchettes in oak woodlands has opened up new nesting possibilities on the west slope. With their small stock ponds, these ranchettes provide water features that were formerly lacking in the dry woodlands.

On the west slope of the Sierra Nevada, the birds are mainly associated with dense riparian forests or adjacent upland slopes in the Foothill Oak Zone. And while oaks are nearly always a component of their territories, it's not clear whether this is a preference or a byproduct of the elevations where they nest. On the west slope they are rapidly expanding upslope into new habitats. In the central Sierra Nevada, for exam-

ple, they pushed their upper breeding limits from 1,500 feet elevation to 3,500 feet in as little as 15 years (1990-2005).



Red-shouldered hawk

Randy Griffis

On the east slope, starting with scattered records in the 1970s from Honey Lake, South Lake Tahoe, Reno and Owens Valley, this species has become increasingly common and is now a regular breeder around the Owens Valley. They are primarily restricted to cottonwood stands along larger rivers in valleys or flats along the

base of the Sierra Nevada slope.

Formerly restricted to nesting in wooded river bottoms and tracts of contiguous forest, red-shouldered hawks have adapted to nesting in the fragmented suburban and rural habitats created by humans, and readily nest near houses and farms. These colorful and noisy raptors are an increasingly visible and auditory part of the landscape as they expand their range in the Sierra Nevada year after year. These small, active hawks spend more time in forests than other buteos, and have a lot of behaviors in

common with the accipiter forest hawks. When hunting, their primary strategy is to perch in trees and watch for prey below, with small rodents, reptiles, amphibians and insects being favored food items.

The breeding season is announced with piercing, clear *kee-ah* calls that peak from January to April. Red-shouldered hawks are without doubt our noisiest hawks, and anyone who has a pair nesting near their house may soon wish there was an “off” switch for these raptors.

Their distinctive nests are located amid the main forks of large tree trunks in groves of trees. Though smaller than those of red-tailed hawks, their nests are still substantial and completely fill the tree crotches they are built in. Unlike accipiter nests, those of red-shouldered hawks are lined with many fine pieces of inner bark, lichens or moss, as well as with many

sprigs of greenery.

In March or April both sexes share in the building of new nests or the relining of old nests, and both help incubate the 2-3 eggs (though the male’s duties are restricted to procuring food then warming the eggs while the female feeds away from the nest). Young birds leave the nest at six weeks of age and are soon proficient at catching their own small food items.

From late summer through the winter, wandering individual red-shouldered hawks are regularly observed in the high mountains or crossing over the Sierra Nevada crest.

David Lukas is a professional naturalist and the author of six books and hundreds of articles on the natural history of the western United States and beyond. His book Sierra Nevada Birds was published in 2011 by Lukasguides.com.



The Work of the Yuba Watershed Institute

As a small organization run almost entirely by volunteers (the single exception is our part-time executive director), the YWI does not have much time to reflect on its accomplishments. It was our good fortune then, that just before heading off to her new home in Berkeley last summer, former executive director Tania Carlone did some reflecting for us and compiled the list below.

Tania’s list showed us just how much our hard-working members and board have to be proud of, and it provides motivation for us to continue our work here in the watershed of the Yuba River. Over the past four years, Tania found, we have successfully accomplished the following:

Reached the 200 mark for number of community-based natural science and history education programs produced, including the 13th Annual Fungus Foray;

Developed field studies programs for public school children in Downieville and Grizzly Hill Schools;

Published four issues of our periodic journal *Tree Rings*, including issues focusing on fire ecology, mountain meadows and our beloved goshawk ‘Iris’;

Published a book, *The Nature of This Place*, a compilation of select writings and poetry covering 20 years of exploration in the Yuba Watershed, now in its second printing;

Maintained our 20-year collaboration with the Bureau of Land Management on the cooperative management of the ‘Inimim Forest;

Established a fire ecology study area called *The Changing Way* in Long Ravine;

Organized two ‘Save the Big Trees’ volunteer work days to remove fuel loads in the remnant old forests of the ‘Inimim;

Begun collaborating with the Forest Service on the management of lands adjacent to the ‘Inimim and received a \$10,000 grant award for that purpose to work in the headwaters of Spring Creek;

Entered into cooperative agreements with private landowners for the sustainable management of their lands;

Initiated a volunteer, citizen-based wildlife monitoring program with the use of remote cameras;

And continued our stewardship of the ‘Inimim Forest in the face of emerging natural resources issues and potential impacts.

If you find inspiration in these accomplishments, please turn to page 21 and check out the many ways you can support your local watershed. Thank you! —Bob Erickson, president, YWI

❧

Alternative Living in the Understory

Mycoheterotrophic plants and the importance of underground networking

❧

by Nicole Hynson

If you open any plant biology textbook there will be at least one chapter dedicated to photosynthesis. As you probably remember from science class, this is the process that chlorophyll-containing organisms use to convert carbon dioxide from the atmosphere into organic compounds, which are the foundation of life on Earth. But though the majority of plants rely on photosynthesis, thousands of species have figured out numerous other strategies for survival.

One of these alternative lifestyles is mycoheterotrophy, a complex relationship between a plant (called a “mycoheterotroph”), fungi, and other plants. Mycoheterotrophs are relatively common in the Sierra Nevada. You may have stopped to take notice of some of these intriguing plants, such as the red-stemmed pine drop with its urn-shaped flowers (*Pterospora andromedea*), which grows in shady mixed or coniferous forests, or snow plant (*Sarcodes sanguinea*) when it emerges from the forest soil as a red flowering stalk in early spring.

Until fairly recently, mycoheterotrophic plants were considered to be saprophytes, plants that made a living by feeding off of decaying leaf litter. But in the past 15 years, this postulate has been shown to be far from the truth.

In the Sierra Nevada the most studied mycoheterotrophs are in two botanical families, the orchid family and the heath (*Ericaceae*) family.



*Research by the author has provided tantalizing evidence that the leafy green plant *Pyrola picta* or white-veined wintergreen (above) obtains some of its nutrients from neighboring plants through a multi-species relationship called partial mycoheterotrophy.* photo Nicole Hynson

Many mycoheterotrophs have completely lost the ability to photosynthesize and are involved in multi-partner relationships with fungi and surrounding photosynthetic trees. In these associations, mycoheterotrophs are actually cheating another relationship: the symbiotic, “mycorrhizal” association between tree roots and soil fungi. Generally, the mycorrhizal association is mutualistic, where fungi gain access to carbohydrates that the tree produces through photosynthesis, and in exchange, they boost the tree’s capacity to absorb water and minerals.

Enter the mycoheterotroph—pine drops, snow plants, coral root orchids, and others. By establishing underground root associations with mycorrhizal fungi which are, in turn, associated with trees, these plants gain access to carbon (the building block of plant tissue) which is provided via fungi by the trees.

In the Tahoe National Forest near Nevada City where I’ve conducted research, I’ve found such species as tan oak, white fir, and the mycoheterotrophic leafless wintergreen to be connected via false truffle and milky cap fungi. However, the exact identity of

the “host” tree for both mycoheterotrophic plants and their associated mycorrhizal fungi are often location specific and difficult to determine with any amount of certainty.

The selective forces in nature that cause a plant to evolve from having the ability to provide its own nutrition through photosynthesis (autotrophy) to being dependent on nutrition provided by another species (in this case mycoheterotrophy) are unclear,



Because snowplant (Sarcodes sanguinea, above) lacks chlorophyll and the ability to photosynthesize, it is considered a fully mycoheterotrophic plant, obtaining all of its nutrients from neighboring species. photo Nicole Hynson

but the lack of light in the forest understory where many mycoheterotrophs reside may have something to do with it. Mycoheterotrophy may have evolved as an adaptation in plants to bypass the intense competition for light in the understory.

My own work in California along with that of re-

We now know that many plants that we once thought of as saprophytes are actually the very best examples known to date of underground networks in which unrelated plants are connected by mycorrhizal fungi.

searchers in Europe has revealed that some understory plants that have previously been considered autotrophs (due to the fact that they have green leaves), are actually mycoheterotrophs in disguise. These include species of terrestrial orchids along with some species in the Pyroleae tribe of the heath family, which retain the ability to photosynthesize, but are meeting part of

their carbon demands through mycorrhizal networks. Scientists call this lifestyle “partial mycoheterotrophy.” Recent research has led to the discovery of more and more partially mycoheterotrophic species throughout the plant kingdom, and in many different habitats including tropical and temperate forests. An example that can be found in lower to mid-elevation Nevada County forests is the white-veined wintergreen (*Pyrola picta*).

As researchers delve deeper into the physiology of plants, we’ve learned that while photosynthesis is certainly the most common way that plants make a living, it represents only one end of a very broad spectrum of plant lifestyles. We now know that in addition to photosynthesis, there are relationships such as cooperation, cheating, and parasitism among unrelated organisms (eg. plants and fungi) that play critical roles in supporting the diversity of plants on Earth. We are only beginning to scratch the surface of the importance of below-ground networking in plant ecology, and due to their obligate dependency on multi-partner networks for survival, mycoheterotrophic plants have been leading the way for discovery.

Nicole Hynson received a Ph.D. from University of California, Berkeley, with her dissertation “The ecophysiology & evolution of mycoheterotrophic plants in the tribe Pyroleae.” She is now a postdoctoral associate in the field of plant and fungal communities at University of California, Irvine.

G A B B R O

A SAFE HAVEN FOR COAST HORNED LIZARDS IN THE SIERRA NEVADA

BY JACKSON D. SHEDD



Coast horned lizard and creeping sage on gabbro soil. Jackson D. Shedd

Have a look at a range map in any given field guide that covers reptile distributions in California and you'll likely find solid colored or shaded areas illustrating where a species occurs. Most often these are generalized depictions of broader zones within which species actually occur in spottier distributions, and they rarely account for the specific habitat or microhabitat types that are prerequisites for certain species.

This is especially true for more specialized species with particular adaptations or specific habitat requirements. Most range maps give the impression that such species are more common or widespread than current populations actually are. The coast horned lizard (*Phrynosoma blainvillii*) is an ideal example; distribution maps for the lizard are produced from a combination of information that accompanies both old and more current museum specimens, from scientific literature, and from sight records. But the sad fact is that these lizards have fallen victim to ur-

ban and agricultural development, extensive oil drilling, Argentine ant (*Linepithema humile*) invasions, and invasions of prime habitat by any number of aggressive European annual plant species that have choked out native plants and altered California's landscape to such a degree that the lizards and various other species simply cannot cope. Yet even now, range maps of coast horned lizards in most field guides remain unchanged and represent many populations that have been extirpated.

Horned lizards require expansive areas of bare ground within their habitat. With short limbs and tank-like bodies, the lizards cannot move through thick stands of vegetation. (Results of one study showed that cheat grass [*Bromus tectorum*] impedes the locomotion of desert horned lizards [*P. platyrhinos*] by up to 70 percent!) Introduced both deliberately and inadvertently by European settlers, invasive plants such as medusahead (*Taeniatherum caput-medusae*), yellow star-thistle (*Centaurea solstitialis*), and

various other exotic annuals in such genera as *Avena*, *Bromus*, *Hordeum* and *Vulpia* have colonized the Sierra foothills and other regions of California.

These exotics adapted readily and spread throughout the state, thriving in our Mediterranean climate, which is not unlike that of the regions where many of these species originated. Aside from the obvious changes that cities, agriculture, highways and other developments have made to California's grasslands and foothills, it's hard to say what the state's natural landscape actually looked like prior to European settlement, but it certainly didn't look like it does today. Many areas that still remain undeveloped that were once home to coast horned lizards are now choked with weeds, and the lizards are gone.

However, there are still some thriving populations of this remarkable lizard in Northern California, some of which occur in Yuba and Nevada counties. Much of the Yuba River watershed is composed of woodlands, coniferous forests and meadows, with riparian habitat along river corridors and associated tributaries. An array of plants and animals that are found throughout the greater Sierra Nevada region at this elevation zone can be observed in these areas as well, such as incense cedar, California black oak, ensatina salamanders, Western tangers and black bear.

Other areas within the Yuba watershed, however, harbor more specialized communities that include a number of organisms that are not widespread in the Sierra. Bald Mountain in the Inimim Forest is one such place. Sitting at an elevation of about 3,000 feet within the South Yuba River Recreation Area, this curiously rounded hillock supports an isolated chaparral community thriving on an unusual type of soil derived from the gabbro that underlies it.

Gabbro is a dark, igneous rock with the same chemical composition as basalt but with larger mineral grains. Weathered, exposed gabbro soils are typically reddish in color, rich in metals like iron and magnesium, and mildly acidic. So Bald Mountain is one place where native species still have the upper hand.

Fortunately for coast horned lizards, most invasive annuals that have prolifically colonized other areas of the Sierra Nevada foothills are not adapted to the acidity and metal content of gabbro soils.

Chaparral plant communities growing on gabbro and a few other unusual soil types have afforded many rare plants and coast horned lizards a safe haven in the Sierra Nevada foothills. Coast horned lizards in Northern California now occur in highly disjunct (non-contiguous) populations, typically confined to areas where these low-nutrient and/or highly acidic soil types restrict plant growth to those few species that are adapted to their unusual chemistry. Conspicuous plants of chaparral communities growing on gabbro soils in the foothills of the northern Sierra Nevada include MacNab cypress (*Hesperocyparis macnabiana*), creeping sage (*Salvia sonomensis*), and manzanita (various species in the genus *Arctostaphylos*), all of which are found on Bald Mountain.

Coast horned lizards don't pop up in very many places within the Yuba River watershed, so Bald Mountain is a truly special ecosystem. However, the lizards do not appear to be common at this site. If you happen upon one, please notify the author or the Yuba Watershed Institute. Other areas where these lizards still occur in Yuba and Nevada counties are mostly other chaparral communities growing on gabbro and serpentine soils. Although these enclaves are a safe haven for the time being, barbed goatgrass (*Aegilops triuncialis*) has been starting to expand into gabbro chaparral in recent years. We can only hope that this exotic species is not capable of completely taking over the open ground that horned lizards need to survive.

Horned lizards are fascinating reptiles. They should be left exactly where they are found since they not only do poorly in captivity, but may even die if picked up then released even a short distance away. In addition, the coast horned lizard is protected by the State of California as a species of special concern and collection or removal of this lizard from its natural habitat is illegal without proper permits.

Jackson Shedd is a native Northern Californian and a biologist with a strong interest in herpetology. He is the author & illustrator of Amphibians and Reptiles of Bidwell Park. Shedd currently works for The Nature Conservancy and can be contacted at jshedd@tnc.org.

Into the Lens

Camera trapping in the watershed



by John Warden

The birthday present of a trail camera from Liese Greensfelder to her husband Bob Erickson in 2009 set in motion YWI's project to monitor wildlife in the Yuba watershed. Making striking images and observing animal behavior are enjoyed by many trail camera owners, but as YWI's long-time board president, Erickson also understood that biologists use camera traps systematically to monitor wildlife.

After a few weeks of playing with his new toy to capture images of skunks and raccoons frequenting such critical habitat as his compost pile and driveway, Erickson set up the camera on an 'Inimim Forest trail that, he suspected, served as an important movement corridor for many species.

Most camera traps consist of a camera—housed in a sturdy, weatherproof case and equipped with an infrared sensor—that snaps a photo whenever it detects a moving object warmer or cooler than the am-

bient temperature. In the fall of 2010, after Erickson's trap had captured hundreds of shots of more than two dozen species from the 'Inimim trail site, YWI mounted a display of his photos at the North Columbia Schoolhouse.

The strong community response to the exhibition prompted us to invite anyone interested in wildlife monitoring to donate cameras to the YWI and participate in an emerging monitoring project. The response was overwhelming and the YWI was able to acquire eight new cameras.



Donors met at Bob's house in December to pick up a camera and discuss how to select a monitoring site, set up the cameras for the first time, download data, and record at least the date, time, temperature, species, sex, and numbers of animals observed. Each camera monitor was asked to enter all this information onto Excel spreadsheets. Cynthia Erickson, a neuroscientist in Colorado who happens to be Bob's niece as well as an expert statistician, willingly assumed the burden of aggregating the spreadsheets and, more importantly, is providing expert guidance on what can and cannot be inferred from the aggregate data.

Some cameras were up and running on New Year's Day 2011, and others came online during the spring. As of August 28, the cameras had made 1,352 mammal and bird observations. Deer account for over one-third of the sightings and squirrels, foxes, dogs, rabbits, and turkeys have also been observed in significant numbers. Other less frequently photographed species include bear, mountain lion, bobcat and ringtail cat.

What has the monitoring project contributed to our knowledge of wildlife in the Yuba River watershed? Eight cameras at different locations have photographed virtually all the large and midsized animals that inhabit the watershed, yet they provide a very limited coverage of a very large area, and we have not yet been able to establish that these eight sites capture a representative sample. At this point, extrapolation from

our data to estimate the total population, or even the relative prevalence of different species in the area would be questionable. Also, we do not yet have enough data to explain the wide variations in our tallies of individuals of particular species that have been observed at different sites. For example, foxes were the third most photographed species in the aggregate, but one site accounted for almost half of all fox observations. We have also not yet evaluated what site-specific conditions influence the number of sightings of particular species.

The monitoring data reveal wide variations in the total number of animals photographed at different locations. At the extremes, over 500 animal observations were made at one site versus fewer than a couple of dozen at another. Factors such as the presence of food and water or nearby houses, dogs, noise, and traffic likely influence the number of animal sightings. However, to understand the differences we need to examine conditions at the sites, hypothesize explanations for the variations, and then test the hypotheses.

Future monitoring at different sites with different habitat characteristics could shed light on what habitat is important for different species and whether movement corridors exist. An understanding of what habitats or corridors are used by different species might provide useful guidance in resource management in the 'Inimim Forest.

A more distant goal for the monitoring project might be to evaluate whether different species have stable, advancing or declining populations in the area. Records for the same site over many years could



shed light on this issue, at least for a specific locality. Biologists and ecologists have developed mathematical models to reliably estimate area animal populations based on camera trap data. Those models require well-designed arrays of camera traps and an expertise in monitoring that the YWI is only now beginning to develop.

In September, the YWI submitted a grant proposal to the Fund for Wild Nature that, if successful, would

allow us to buy two additional cameras. While we may never be able to answer all the questions we have about wildlife in the 'Inimim Forest, an expanded camera project will certainly be able to provide insights that we could only dream about a year or two ago.

John Warden is a member of the board of directors of the YWI.

What impresses me most is that the lions were using the trail at all times of the day and night. . . . A lion passes, then dogs, fox, human, lion, dog, bear, human, lion, human. It is amazing that we are all seemingly sharing this trail without bumping into each other. Or more likely, as the humans walk by, the animals quietly hide and wait for us to pass.
—*Theo Killigrew des Tombe*



Having a wildlife camera has allowed me the opportunity to observe and deeply connect with the habits of our local animals. There is an intimacy that occurs when watching a bear nestle itself into a small gray pine or seeing a mountain lion track a deer. —*Alicia Funk*





Of this I am certain. I cannot observe or collect data about any living thing without having some effect on the subjects. ... I am excited and fascinated by what I am seeing, and it is fun. But it also makes me part of the endless surveillance that tracks our every trip to the ATM or the London subway. Maybe I would really rather just fantasize about the animals in my neighborhood, based on the occasional sounds or random sighting. —Kurt Lorenz

The camera trap has enabled us to penetrate the wall of nighttime darkness and catch glimpses of the creatures we previously had only been able to hear, if that. Usually their passing is so quiet, it's only a paw print or a pile of scat we find the next day that tells us they've been around. —Marilyn Mociun



When we photographed a gorgeous mountain lion strolling through the yard, I thought the neighbors would be thrilled and sent them emails of the photograph. But the universal response was 'What are we going to do about this?' —Ralph Cutter



Photos

pg 9 Black bear sow w/ cubs and **pg 11** Merriam's turkeys: San Juan Ridge, 2,950'

pg 10 Black-tailed deer: San Juan Ridge, 2,200'

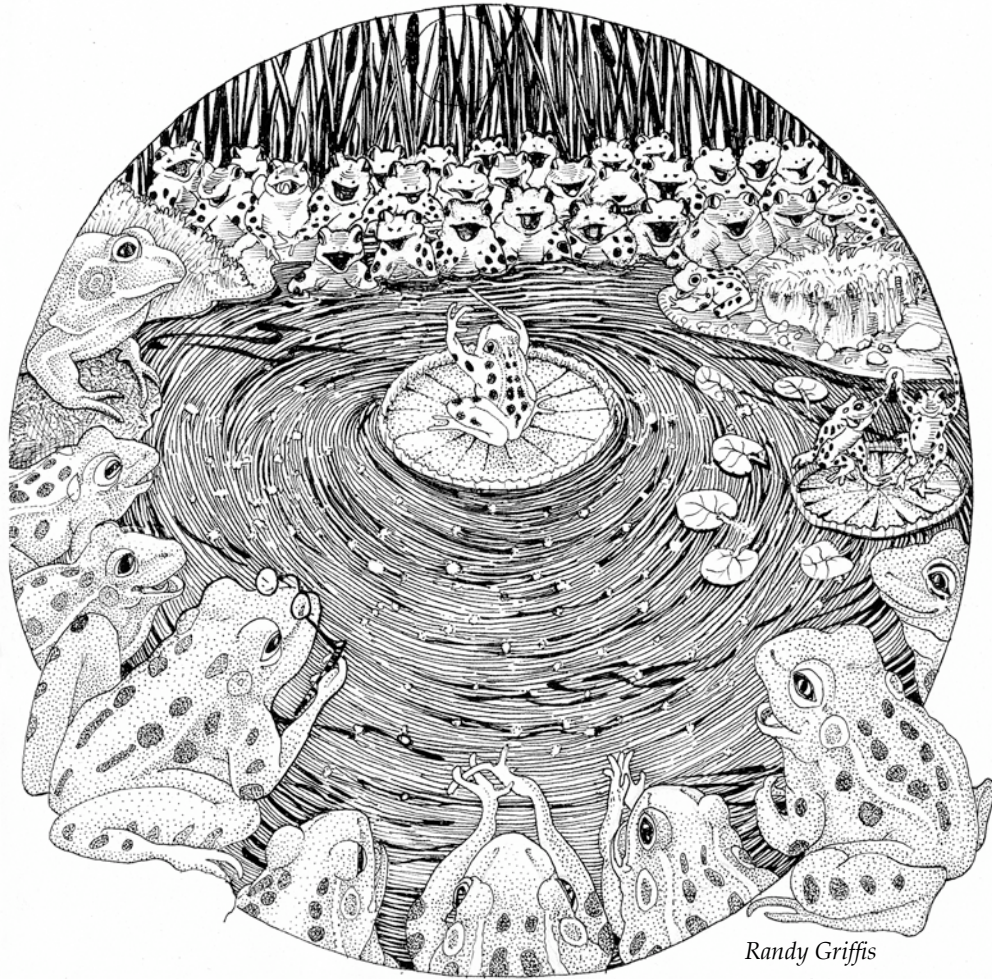
pg 10 Red-shouldered hawk confronting black-tailed jackrabbit

and **pg 12** Coyote: Mixed oak & conifer forest w/ pond, 2,600', Rush Creek drainage

pg 11 Gray fox kits and. Gray fox adult—parent of the kits heading to their den carrying mountain quail and jackrabbit Douglas-fir forest, San Juan Ridge, 2,700'

pg 11 Stalking lion: San Juan Ridge, 3,000'

pg 12 Black bear and Pair of mountain lions: Oak and ponderosa pine forest, San Juan Ridge, 2,600'



Frog-ee Frog-ee

Low and slow frog-ee frog-ee
starts up one, then another, just as Sri Sun
splashes down diving far off in waters west—
hush! It's an hour till dark.

Most aren't ready yet,
most are napping or yawning late, must prepare
meticulous toilette, don starched-shirt attire,
most can't possibly perform yet.

The first two
awkwardly peter out, embarrassed choirboys
placed apart from their section, glancing around
for support. After dark it comes.

A baton
flashes downbeat—tho a conductor stands where?
or maybe the principals nod each to each,
then burst forth tutti. Five hundred strong! Hoot toot
full out blare blat fortissimo! Think kwank plunk
rollicks the pond bowl.

Grating grunt, gruff guffaw,
gravelly sol-fa, frenzied hullabaloo
strenuously storm the proud prodigious peaks
of pure canto.

Meanwhile, uphill, ringed in grass,
removed from sludge-sloppy edge, the mellow few
old stentorians profundo rumble ground
the nightlong choral din.

By consent, all pause,
all take a brief breather, recoup and regroup,
then bellow forth again.

Snore-like riffs that shake
each lily pad, trilling cadenza, stretto,
obligato, unison—the Great Throats, ho!
jubilant at their chords' earthquaking outpour
stomp and cheer like an opera house gone crazed;
tumultuous bravos riot ricochet
off the cliffs and the stars.



Huh? Silence. Full stop
to adore the rising Sun, to contemplate
the Source, That, the all-illuminating Truth
just waking anointing the far jagged ridge—
pondside not one peep.

Twenty minutes, dead still,
the concert's ended? Yet, isn't there ample time
before sunray will strike shadowed forest shore
and shoo these intoxicants offstage?

One voice
starts up kronk quork plonk a poet's dithyramb,
dolce, then furioso— the tribal tale
of varied fortunes, past sorrows, deeds well done,
multiple desires, dearth, cycles of delight,
doubt, despair, and offered those who brave the leap—
an alternative quest.

Hear the great matter!
one unending tale endlessly retold. Now,
solo, one heart-wrung hour. Full stop. The night's voice
rests content; impatient birds get set to chirp
tweet the new day.

Of course, some music-averse,
unsociable types don't share the singalong;
for quite sufficient reasons, the water snake
swims head up. Mute.

Narayan



Marsha Stone

What Killed This Ringtail?

by Len Brackett

My husband and I were walking in the Douglas-fir forest below our house near the border of the 'Inimim Forest's Big Parcel last year when we came across the fur and skin of a freshly-killed ringtail. These little creatures are rare in our area, so this was a sad sight.

The pelt, which was draped across a fallen log, looked perfectly flayed with the inside surface clean of wounds and flesh. The animal's stunning tail with its alternating black and white rings was intact and still attached to the pelt. Hanging from the skin were red, raw bones of one leg, part of the pelvis and an entire backbone.

Curious to know what had killed the animal, we scoured the area for clues, but found only a few bird droppings splattered on the log and a few dozen tufts of fur nearby on the ground. Bob took photos and we emailed them to our neighbor Len Brackett, a falconer and long-time observer of owl and raptor behavior. From the evidence, we asked, could he tell us what killed the ringtail? –Liese Greensfelder



Omnivorous, nocturnal and solitary, ringtails are members of the raccoon family (Procyonidae). This carcass was found as shown, draped across a log under tall Douglas-fir and incense cedar trees. *photo Bob Erickson*

I think it was a bird of prey that killed this thing.

The clean skin is a good sign of that. Basically, birds are eating with tweezers. Quadrupeds come in with their molars and canines and chew everything up and make a big mess. Raptors, and birds in general, are eating with a beak and are very precise. They take little tiny bites, and they take lots of them, and they take them quickly. They strip the bones. When I found Zephyr dead in the snow last winter, he was cleaned right down to the bone. No flesh left,

feathers and skin intact. I'm sure it was a great-horned owl that killed him. [Zephyr was a goshawk raised by Brackett.]

I suppose it could have been a Cooper's hawk that did in your ringtail. But a ringtail would be a formidable prey for a Coops, and a Coops would be lucky not to become lunch. A red-tail, though, with its terrifying feet could easily kill a ringtail once it got a hold on it. And most full-grown goshawks would be able to, too.



When the carcass was flipped over, it revealed that the flesh had been cleanly plucked from hide and bones.

photo Bob Erickson

Hawks—particularly accipiters*, less so red-tails—are careful about their table manners; they will spend quite a while depluming or de-furring their kills. But owls don't usually deplume their prey. They just start eating and eat it all. What they can't digest, they cast up in a pellet. Hawks have a better digestive system. While they can't digest keratinous materials like nails, fur, feathers and claws, their digestive tract dissolves all the bones: even the femur of a jackrabbit, which is quite large and solid.

If you found this skin on the log as pictured in the photo, then it seems likely that the killer was an accipiter, probably a goshawk, and maybe a Cooper's hawk, since both species like to fly with their meal to a "plucking post," usually a log or something at least slightly elevated from the ground. Red-tails, in my experience, are quite happy to stay on the ground with their prey.

About the mutes [raptor droppings] you see on the log: I think that goshawk or red-tail mutes would be more distant from the kill than that, and bigger. (You should have seen the windows in my interior garden before I cleaned them up after I turned Iris loose!***) I'd bet the ones in your photo are from a raven, a crow, or maybe a vulture.

I don't know how great-horned owls mute. The only owl experience I have is with a screech owl I

*All three accipiters inhabit the 'Inimim Forest: sharp-shinned hawks, Cooper's hawks and goshawks.

**See *Tree Rings* 22 for Brackett's story about raising his male goshawk, Iris, from egg to adult.

rehabbed who didn't eject mutes at all. Straight down, like a falcon, wherever he happened to be. Red-tails and accipiters are much more careful not to foul their nests.

So here are the things I would look for to identify a kill:

- Mutes three to six feet from the prey are an indication of a hawk, either a red-tail or an accipiter, because these birds eject their mutes horizontally and forcefully.
- Clean, thorough plucking of feathers or fur, with a clear circular pattern of plucked materials all around the prey, would indicate an accipiter.
- Prey found on an elevated post, a log, a stump, or a rock, a few feet or more above the ground, would indicate an accipiter.

Iris, having killed mallards, would return for about three days to the plucking site and keep feeding. So I would keep an eye out where you found the ringtail for a day or two.

Iris never left the skin, incidentally. He loved it for its fat, a rare commodity in nature, unless you're corn-feeding cows. By the way, do you know why the mutes are white? It's uric acid, which is so concentrated that it forms crystals, which are white—yet another example that shoots to Hell the idea that man is the crown of creation! Ha! Raptors are the crown of creation, and don't let anyone ever tell you anything different. I know, I know—I am a bit cracked. Keep having fun!

A founding member of the YWI, Len Brackett is one of only a handful of North American timber framers who designs and builds traditional Japanese houses. As a falconer, Brackett has raised kestrels, red-tailed hawks and goshawks.



Bob Erickson's trail camera captured this shot of a ringtail less than 300 yards from where he found a ringtail carcass several months later.

Manzanita on the Ridge

by Wendy Boes

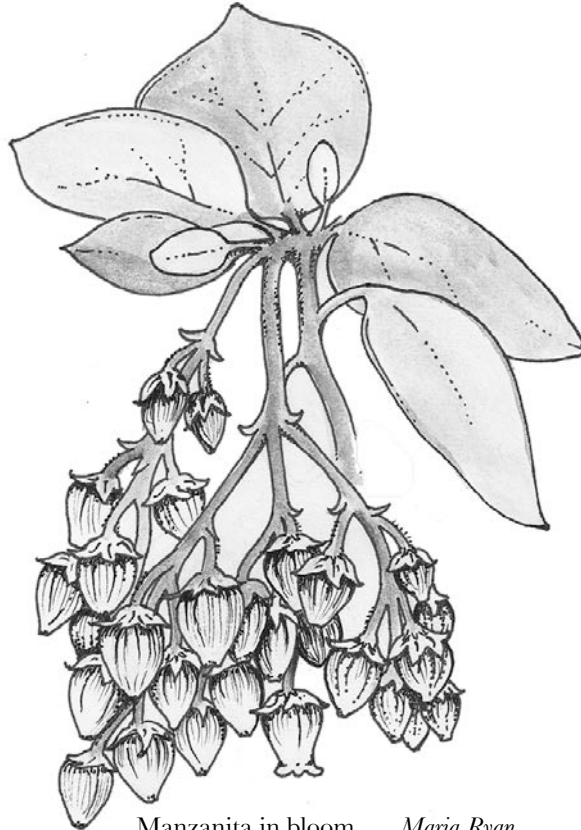
Some say that diversity

is the spice of life, but I say it's a pain in the derriere if you are a biologist who studies manzanita ... unless, of course, you enjoy looking for minute differences among species by examining bracts, flowers, root burls, little berries, and nearly microscopic hairs growing on the underside of leaves.

California is the hub of the manzanita genus (*Arctostaphylos*). Of the 105 species and subspecies, 95 occur in the state, growing in a multitude of habitats stretching from the coast to the high mountains. These promiscuous plants are notoriously difficult to identify. Many species can cross-pollinate to create hybrid offspring, which are neither one species nor another: a plant taxonomist's nightmare.

The good news is that here in the lower elevations of the San Juan Ridge, when you cross paths with a manzanita bush you can pretty much exclaim with confidence (no botanical training required) that what you are looking at is whiteleaf manzanita (*A. viscida*). You'd be having a pretty bad day to be making such a pronouncement in front of the rare-at-these-elevations Indian or greenleaf manzanitas (*A. mewukka* and *A. patula*), because whiteleaf is the Ridge's good old, brush-field forming dominant species.

My interest in the pollination strategies of these plants started this past February when I hiked from Cruzon Grade down towards Shields Camp (one of the 'Inimim Forest parcels) and noticed that whiteleaf



Manzanita in bloom *Maria Ryan*

manzanita was in bloom. We subsequently received several snowstorms, which got me to thinking, why on earth would a plant growing at 4,000' elevation bloom in the middle of winter? I wanted to start watching this plant and chose a manzanita field growing along a quiet road behind my office in Nevada City as a study area. I have long been obsessed with the ecology and natural history of shrubs in Southern California, but have not looked closely at the beauty in my own backyard. So I decided to observe what I could, and consider what the presence and function of manzanita and other native shrubs mean here on the Ridge.

Pollinators & freeloaders

In February, I could see that some of the plants were beginning to flower. And over the ensuing months I was astounded to see flowers on many of the bushes all the way into May.

I observed various spiders and many insects on the flowers, including robberflies, ants, butterflies, moths and bumblebees. My observations confirmed what I also read about these insects: that many of them are basically freeloaders, feeding on the abundant nectar produced by the flowers but not performing any pollination service in return. This was particularly evident in the case of robberflies, which use their proboscis to perforate the urn-shaped flowers and extract the nectar. By entering from the side like this instead of through the flower opening, they left behind tiny visible holes, but avoided contact with the pollen.

From my reading in the great reference book *The Natural History of Pollination*, I learned that our native

bumblebees and many other native bees (though not the honeybee!) employ an interesting strategy known as “buzz pollination” to release pollen from the stamens of whiteleaf manzanita. While clasping a flower, the bees vibrate their thorax muscles at just the right frequency to energize the anthers (pollen-containing sacs at the end of each stamen) to a level that causes a rapid flow of pollen out of pores located at the tips of each anther. (Check out YouTube to watch a video of a person “buzz pollinating” a tomato flower with an electric toothbrush!)

So what about the early blooming mystery of the whiteleaf’s flowers? One of my colleagues, Jon Keeley, a leading authority on *Arctostaphylos* and a research ecologist with the U.S. Geological Service’s Western Ecological Research Center in Three Rivers, Calif., suggested that like the snow plant, the bell-shaped manzanita flowers may provide shelter from the cold that attracts insects, including potential pollinators. I have also read that manzanita became a prominent shrub in California during a cycle of global warming. So maybe its early blooming is a vestigial trait from that hotter time, which may come in handy if projections for a warming California hold.

Berry quirks

In late summer and early fall most people who spend time outdoors in Nevada County begin to notice many different kinds of animal scats heavily laden with manzanita berries. These berries are a very important food for birds and mammals. When I went out to observe fruit set at my study site, I noticed that unlike last year, there were almost no berries on the bushes. While I found conflicting references in the literature, it has been my observation and Jon Keeley’s, that whiteleaf manzanita generally has a strong fruit set every other year. And here’s an odd thing: Keeley has published a study showing that in years when whiteleaf manzanita has a heavy bloom, it produces a light crop of berries, while in light bloom years, it produces a heavy crop.

Another observation of Keeley’s is that where whiteleaf manzanita grows next to a site where the ground is continually disturbed (a road, for example),

My observations confirmed what I also read about these insects: that many of them are basically freeloading, feeding on the abundant nectar produced by the flowers but not performing any pollination service in return.

the bushes will sometimes set fruit every year. This certainly makes a lot of sense from a seed bank replenishment perspective, as the plants keep producing seed to replace progeny destroyed by the disturbing factor. But what triggers the plant to do this?

Seeds, burls and fire

In an effort to reduce the risk of wild-fire, local land managers masticated most of the brush at my observation site about 10 years ago. If I were a thousand feet higher in the Sierra Ne-

vada where greenleaf manzanita is the common species, following mastication I would likely be seeing regeneration from the burls that grow at the base of greenleaf trunks. But I am sure many of you have noticed that when you cut down our local whiteleaf manzanita—which does not form burls—there is no such regeneration.

Whiteleaf manzanita is what is called an “obligate seeder,” that is, it is entirely dependent on seed for regeneration. Greenleaf, on the other hand, is an “obligate sprouter.” Until their energy stores are exhausted, obligate sprouters can regenerate from basal burls following multiple sequential disturbances to the top part of the plant. However, this regeneration strategy reduces a plant’s opportunity for sexual reproduction. Studies of some obligate sprouting *Ceanothus* and manzanita species (including greenleaf) have found that these plants tend to hybridize less with other species and that evolution to new species and subspecies occurs more slowly than it does in plants that reproduce by seed only.

(A third reproductive strategy in chaparral ecosystems is exemplified by chamise, a “facultative seeder.” When cut, burned or otherwise disturbed, it will regenerate both from seeds and sprouts.)

Whiteleaf manzanita usually requires fire to stimulate its seeds to germinate. It has also been shown that germination is actually chemically cued by constituents in charcoal that leach into the soil after a fire.

My many years of working in Southern California have resulted in a deep appreciation for shrubs, not only as individual species, but as constituents of chaparral ecosystems. It is alarming to me and other

biologists that down there in the southlands where fires are now burning through the landscape with increased frequency, vast swaths of native chaparral ecosystems are unable to regenerate after such disturbances, resulting in their conversion to annual grasslands.

I'm currently partnering in a study extending from the Santa Monica Mountains to southern San Diego county that is investigating how fire management techniques (eg. mastication) impact native chaparral ecosystems. Two study factors that interest me most are whether these techniques affect native understory plants and invasive non-natives differently, and how they affect regeneration and composition of chaparral. I'm hoping to start a similar collaboration to study these same issues in Northern California.

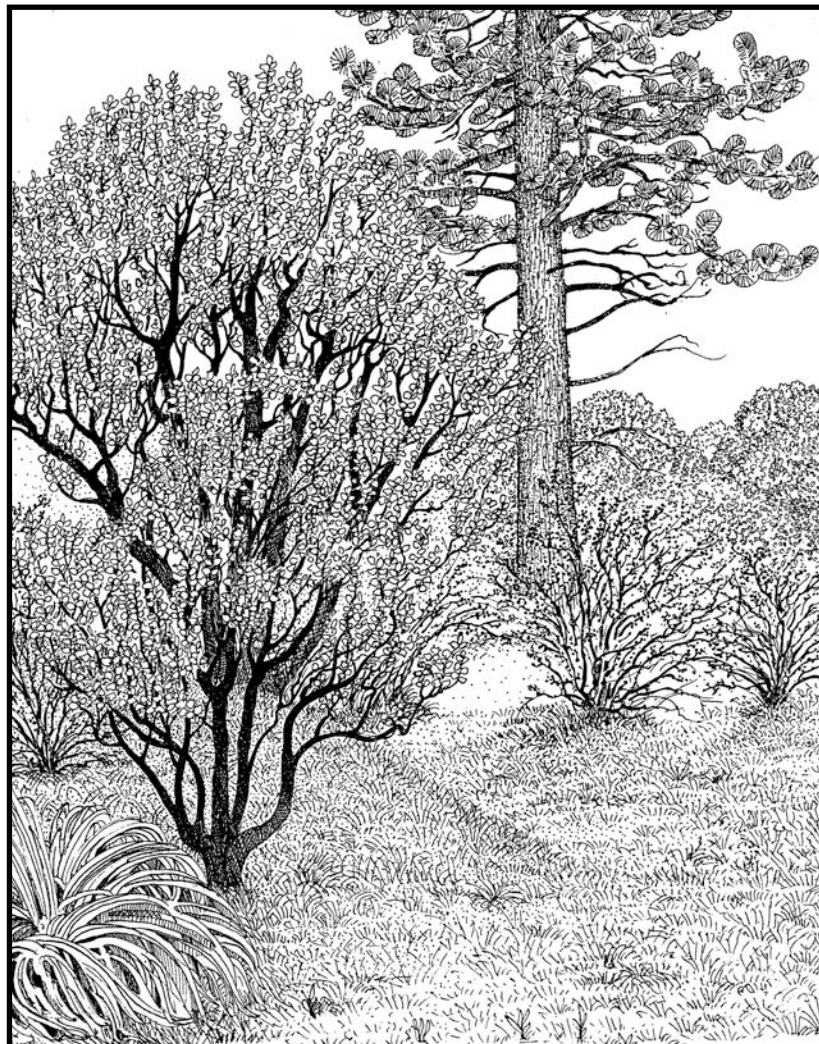
In defense of chaparral

My ultimate concern is that our fear of wildfire is turning us into a shrub-hating culture. When we lose

chaparral we lose a wonderful part of our biological heritage. Chaparral and our manzanita patches here on the Ridge provide unique ecosystem services such as habitat and food for insects, birds and other critters. Manzanita and other shrubs are early colonizers that can stabilize disturbed soil. They can occupy sites too scrappy for forests and they can create conditions that prevent the invasion of nonnative plant species.

The inherent beauty of manzanita provides a certain intrigue when we look at it up close or in a mosaic across the landscape. I am amazed by the ways these plants have adapted to the various challenges of the physical environment. And, honestly, as for me, lately I've been enthralled by the crazy and confusing variants produced by their hybridizing ways.

*YWI board member **Wendy Boes** is a botanist with the U.S. Forest Service who specializes in floristics, rare plant and invasive plant species ecology, and the land management issues that affect them.*



Middle Meadow
Randy Griffis

SIGHTINGS

BY BOB ERICKSON

This last year has seen a fond farewell to **Tania Carlone**, our dynamic and organized executive director, and an equally fond welcome to her successor, **Maria Ryan**, who is stepping in with new energy and vision and an artistic approach to her work.

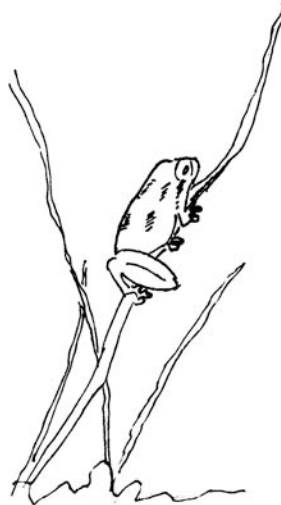
Other news includes a report emailed to me on Sept. 14 from **Amanda Shufelberger**, Sierra Pacific Industries' wildlife biologist, on the *male wolverine's* presence in the upper reaches of the Yuba. Amanda writes:

The last time I got the wolverine (affectionately known as **Buddy**) on camera was Memorial Day weekend. But he has been captured on camera by a fisherman and then just last week by a Department of Fish and Game camera, so he is still around that whole stretch between Highway 49 and I-80, which is kind of his roaming area, though he has also been seen north of 49 in the Sierra Buttes area. So he is still alive and kicking. In case you missed it, Buddy is the first confirmed wolverine in the state since 1922. He showed up in California in 2008 and subsequent DNA analysis suggests he made his way here from Idaho's Sawtooth Range.

An interesting article by **Tom Knudson** appeared in the Sacramento Bee on July 10 about the *great gray owls* of the northern Sierra. (You can find it by searching for "great gray" at sacbee.com.) **Walt Carnahan**, local birder and photographer, writes that there was a reliable sighting of a GGO across from Collins Lake (just a few miles north of Englebright) in February.

Rudy Darling tells me:

We found a spontaneously calling *flamulated owl* on Bear Trap Springs Road up Cruzon Grade on the San Juan Ridge on May 12 and again on May 20. One has been calling during May in the same area for the past four years. We have yet to find any others in the area—most curious, as they usually occur in clusters. Also, this summer a pair of *hooded orioles* hung out at feeders right on the Nevada/Yuba County line near Highway 20. They were also there the previous summer and were at that time Nevada County's first confirmed hooded oriole record.



Marsha Stone

Presumably they were breeding, but the homeowners couldn't confirm that.

The California *red-legged frogs* of Sailor Flat outside Nevada City are doing well, says **Peggy Cranston**, BLM wildlife biologist. She hopes that acquisition of these ponds can be secured for public ownership, which would ensure conservation of the site for the frogs, a federally threatened species. Only a few red-legged populations are still found in the Sierra Nevada, and the Sailor Flat frogs are the only known population in the Yuba watershed. A key element in the recovery plan for the species is the preservation of known

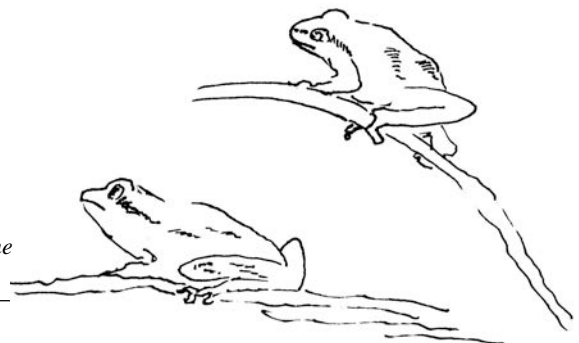
breeding populations and the habitat that sustains them, Cranston says, which makes acquisition of the Sailor Flat site especially important.

Large flocks of *evening grosbeaks* with their distinctive chatter and yellow and black markings were seen and heard by many neighbors this spring. Experts thought it had to do with the cool wet weather well into spring which may have kept the birds at a lower elevation than usual.

And finally a recipe for our region: In 1857 when **George Crook**, later the Army Commander of the Platte, was stationed in Northern California, he described how the Pit River Indians found nests of *yellow jackets* in the fall:

An Indian would take a single plume of duck down, the frailest sort of white fuzz attached to a tiny quill. To this he would tie a tiny bit of meat. One would seize the meat and start for the hive but the duck down offered just drag enough through the air to slow the yellow jacket and allow an Indian to follow it to its nest. A smokey fire would then deal with the yellow jackets and leave the larvae for the Indians' dinner. —From *The Killing of Crazy Horse* by Thomas Powers.

Bob Erickson is president of the board of directors of the YWI.



Marsha Stone



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Without volunteers and donors, the YWI could not keep afloat. So please consider helping out in any of the following ways.

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- * the YWI's remarkable book **The Nature of This Place**, \$20
- * a wonderful limited edition signed **broadside** by award-winning poet and essayist Gary Snyder, illustrated by acclaimed printmaker Tom Killion, only \$50
- * **pine cutting boards** from Yuba forests



NEW! The YWI TRADING POST

Donate: goods and services to the YWI and we'll sell them at a fixed price on the website's Trading Post page.

Buy: any item posted there, such as collectible books, professional services, a cord of firewood, half a day of brush clearing, or even a handmade chair.

Keep your eye on the YWI website for the launch of this exciting marketplace!

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Support the YWI through your business by underwriting our programs and publications, including:

- * **printing/ mailing** one issue of *Tree Rings*: \$1,000
- * **program or event underwriting**: \$75 to \$500
- * **update of the YWI website architecture**, allowing us to manage the website ourselves rather than paying for the service: \$1,500 (a discounted price for non-profits)



HELP OUT IN THE WOODS

Help us restore and protect our beloved 'Inimim Forest by **clearing brush and other fuels** away from the bases of our big trees. Help us **remove invasive scotch broom** from the few hotspots where it is now growing on 3 parcels. Next workday is Sat., Nov. 5! Call Bob Erickson at 292-3777 for more info about work in the woods.

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for an event or program

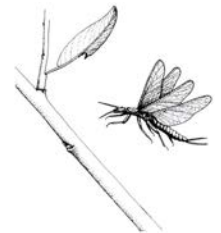
Help is always needed at our many events for set-up, clean-up, ticket-taking, refreshment sales, baking, etc. Even volunteering just once a year is a big help. Executive director Maria Ryan is working hard to build a volunteer list. Every little bit helps!



Contact Maria at (530) 362-8449, or by email at info@yubawatershedinstitute.org.

JOIN THE YWI!

Become a member and support our educational programs and stewardship initiatives. If you're already a member, we encourage you to keep your connection current and renew your membership today.



Why Your Support Counts

The help you provide allows us to pursue our dual mission of shepherding the ecologically sustainable management of the 'Inimim Forest, 1,813 acres of federal land on the San Juan Ridge, and of broadening the public's appreciation and understanding of the subtleties of the natural world.



Grasses *Marsha Stone* Stonefly *Lisa Cutter*

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The YWI welcomes new members and volunteers. We need your support and involvement.

Members receive Tree Rings, timely announcements of Institute events and activities, and discounts on most YWI events.

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Spotlight on favorites from the YWI store and a special sneak peak at our new Trading Post (coming online soon!)

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Published in 2010 by Comstock Bonanza Press, *The Nature of This Place* is now in its 2nd printing. A treasury of insight and observation about the Yuba watershed, the book has riveted readers from across the country and as far away as Italy who have told us they have been fascinated, charmed and informed by the diversity of thought and information contained within its pages. **\$20**

The light from these pages will color the world as fresh and pungent as if you had just engaged your senses for the first time. Actor and writer Peter Coyote

GARY SNYDER/TOM KILLION BROADSIDE

Poet Gary Snyder and printmaker Tom Killion collaborated to produce this stunning work, color printed on cotton fiber paper. Only a few of the 108 limited edition prints are still available. Dimensions: 10" x 15"

Poem: *No Shadow*, originally published in "Danger on Peaks," 2007

Print: *Vicente Canyon*, Tom Killion, copyright 2007

The poem is letterpress-printed by Full Circle Press.

The woodcut print is giclée-printed by Shannon Perry.

Broadsides are signed, dated and numbered by Gary Snyder. **\$50.**



CHERRY AND FIDDLEBACK MAPLE CHAIR

Furniture maker and YWI board president Bob Erickson is donating this chair as a fundraiser for the YWI. All proceeds from its sale will go to the institute.

For more photos and information, go to ericksonwoodworking.com and click on "sale items" in the right-hand menu.



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YWI Fall 2011 Calendar

Save the Big Trees 'Inimim Forest Volunteer Work Day at Shields Camp
Sat., Nov. 5, 9 am to 3 pm --Free--
Meet at North Columbia Schoolhouse Cultural Center at 9 to carpool to the worksite.
Make a difference with your own two hands. Come contribute to habitat restoration and protect old growth forest from wild fire at the headwaters of Spring Creek. Our special guest Len Brackett, falconer, will talk about his experience rearing accipiters in the area. In appreciation of your hard work, lunch is on us: an on-site picnic for volunteers at 2 pm. Please bring water, snacks, work gloves & hand tools (hand saws, loppers, etc.) **Rain or Shine**
To sign up, call Bob Erickson (530) 292-3777

Break Bread with the YWI at Soup Night
An Autumn Celebration of Place
Thurs., Nov. 17, 5 to 8 pm
At The Haven Underground, 226 Broad St., Nevada City
Bring your own bowl to fill with local & organic seasonal soup prepared by *In The Kitchen* and mingle with members of the YWI. Partake in conversations and view displays on homesteading, sustainability, wildlife monitoring and more! Kids table with coloring projects. Gifts for new members who join on-site, and a chance to win locally crafted goods in our raffle. All proceeds from soup sales directly benefit YWI.

14th Annual Fungus Foray
Collecting and Identifying: Sat., Dec. 10, 10 am to 4 pm
At North Columbia Schoolhouse Cultural Center
general \$20, YWI members \$18; half day \$12
Under 18 free
Our traditional Saturday morning wild mushroom hunt and identification will wrap up with an afternoon of displayed discoveries and educational identification workshops. Wild-crafted food concessions and mushroom merchandise available for sale. Bring a lunch and be prepared to walk in the woods. Also useful: collection basket, waxed paper bags, knife and hand lens. **Rain or Shine**

NEW! 1st Annual Nevada City Wild Mushroom Exposition
Sun., Dec. 11, 11 am to 5 pm, at the Miners Foundry
general \$10, YWI members \$8, students \$5,
under 13 Free

A new addition to our popular Fungus Foray! YWI is bringing the Foray to downtown Nevada City. The Sunday Exposition is packed with presentations, displays, and identification workshops based on our seasonal Sierra mushroom foray. Wild-crafted food concessions and mushroom merchandise available for sale. (This event is concurrent with the Victorian Christmas Street Fair.)
For more info about the mushroom events call Daniel Nicholson at 530.292.3589.

For more information on events, go to yubawatershedinstitute.org or call us at 530.362.8449 or email us at info@yubawatershedinstitute.org.