



TREE RINGS

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THE IMPORTANCE OF WATER

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Front and Back Cover Art *by Kelly Patton*

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EDITORS' NOTE

by Daniel Nicholson and Corinne Munger

The fall weather has reached the San Juan Ridge as we write this. A couple of significant frosts have occurred, a few good rains have fallen, and the sandhill cranes have flown over. We are experiencing changes at the Yuba Watershed Institute as well. Our highly-esteemed, long-term president, Bob Erickson, has stepped down from his position, with the post filled by Nevada City naturalist Tom Van Wagner. Congratulations, Tom! Our community is also facing the proposed re-opening of a large mine that poses significant threats to our ground and surface water, wildlife habitat, and other valuable environmental and social resources. We have turned this page of transition and are looking closely at how our organization can serve, support, and collaborate within the place we call home.

This theme, "The Importance of Water," seemed so very clear for this edition of *Tree Rings*. The San Juan Gold Corporation's proposed pumping of up to millions of gallons of water per day from the Ridge's groundwater system and the fragile state of sensitive species of amphibians in our streams cries out for information and discussion.

Water is a resource that many Yuba watershed residents hold dear. It nourishes us physically and spiritually. It is literally the basis of all life and civilization. It inspires us and sustains us.

Water is also a resource we often take for granted. As groundwater tables diminish both locally and globally, we continue to treat water as an infinite commodity, tapping

deeper into the mountain, creek, spring, and forest. The idea that our growing local populations can endlessly clear forest, drill wells, dig ponds, tractor meadows, and bring in livestock in the way of the western pioneer spirit is the very definition of unsustainability. It is time to learn from our past environmental mistakes and move forward with a thoughtful, informed, and deliberate perspective.

The passive days are over for watershed organizations. We now need to be pro-active in supporting forest and meadow restoration, sediment control, careful fertilization for *all* agriculture, modest use of ground water, and a sincere commitment to reach out to our neighbors as proponents of watershed stewardship. Let us teach our children about the cycles of water and its slow percolation. Let us cultivate personal connection and gratefulness for the gift of rain and snow that the Sierra Nevada receives annually.

In the following contributions, we hope you enjoy the various reflections upon the importance of water—ranging from the significance of local aquatic and riparian systems that support unique, endemic organisms and provide habitat for our fellow forest-dwelling creatures; to the economic profit obtained through the use of water for resource extraction and landscape exploitation; to the deep appreciation of the beauty and exaltation that we can derive from simply slowing down and taking in the Yuba River. May the following pieces help you contemplate our place within the water and amongst the rain drops.

INTO THE FUTURE

A note from the new YWI President

by Tom Van Wagner

How do we live in the Yuba River watershed? For the Yuba Watershed Institute that is an important question. What will the watershed be like in a hundred years? We can only reflect upon its past and present, but intuitively we wish to leave a functioning biologically and culturally rich legacy for those in the future. Why? For me personally it's in no small measure related to a deep love for the nature of this unique place.

During the first twenty years of its existence, the YWI has striven to express this deeply-held value. Many talented, dedicated, and skillful individuals have spent countless hours providing its members with educational lectures, activities, and publications. From scientific presentations on natural history and biology, to community events like the widely-acclaimed Fungus Foray, to twenty-five editions of *Tree Rings*, with contributions from local literary, scientific, and artistic talents, the YWI has made significant accomplishments over the years.

And let's not forget perhaps the signature undertaking of YWI—the conception of the 'Inimim Forest collaborative management agreement. This partnership among San Juan Ridge community members and the Bureau of Land Management in the cooperative management of 1,813 acres of federal forest land was formed in the early 1990's and continues to develop and evolve to this day. Furthermore, it has become a model for this type of private-public collaboration, as more and more similar community-agency arrangements are forming throughout the U.S.

Climate change, conservation, sustainable agriculture, resource development, and population growth will provide the future context for the Yuba River watershed. As we consider the future of our watershed, with its uncertainties and challenges, the YWI aspires to continue bringing the public relevant, innovative, and timely programs and actions. We need your help accomplish this goal. Please join us.

JOIN YWI TODAY!

The YWI welcomes new members and volunteers. We need your support and involvement. Members receive *Tree Rings* and discounts to YWI events and activities. While donations of any size are welcome, annual membership dues are:

\$100 Forest Steward or Business
Membership
\$50 Families
\$35 Individuals
\$20 Low Income and Students

Become a member on-line at
www.yubawatershedinstitute.org
or send your check, made payable to the
YWI, to P.O. Box 2198
Nevada City, CA 95959.
All donations and dues are tax deductible.



Photo by Crystal Highline

19TH CENTURY WATER USE ON THE SAN JUAN RIDGE

by Hank Meals



Hydraulic mine pit near French Corral

Water has been dammed and transported in ditches for thousands of years. Traditionally most of that water was used for irrigation and drinking, but here on the San Juan Ridge water was delivered to destroy the morphology and integrity of landforms in order to obtain gold by hydraulic mining. Once crystal-clear, the water, after it had performed its “duty” was returned to the rivers as mud and gravelly sludge. It was a vast and expensive undertaking with long-lasting repercussions.

Placer gold in the Yuba River watershed was created over 40 million years ago in the Eocene, the earliest of the geologic Epochs of the Tertiary Period. In the late Cenozoic, a tectonically induced uplift of the Sierra Nevada caused rivers to flow westward, eroding the ancient rivers and redistributing the gold. Down-cutting rivers also exposed older alluvial deposits on the canyon slopes. For example, the hydraulic mines of Moores Flat, Orleans Flat, and Snow Point are situated at mid-slope in the Middle Yuba canyon, while Relief Hill and North Bloomfield, also at mid-slope, are in the South Yuba canyon. The center of the San Juan Ridge is covered by a lava flow east of North Columbia, but to the west the lava cap has eroded away, leaving all of the Tertiary gravel, as far west as French Corral, easily accessible for mining. By 1851 all the surface placers of the San Juan Ridge had been located. The first ditch originated on Shady Creek and ran twelve miles to the long toms and sluices of French Corral, followed by a ditch from Bloody Run to Cherokee.

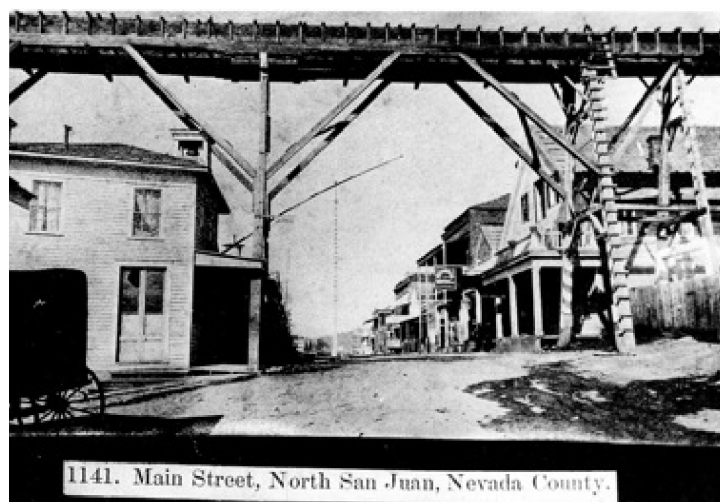
In 1853 hydraulic mining was invented in nearby Nevada City, where pressurized water was directed at a gravel deposit with a hose and nozzle. The idea was to

disintegrate the soil structure and release the gold that it contained. Then the whole slurry of mud, sand, gravel, and cobbles was channeled through a sluice where the gold was captured by gravity separation. With this technique, huge volumes of low-yield auriferous gravel could be mined at a profit – but first an infrastructure of dams, ditches, flumes, and reservoirs was required.

A group of French miners and San Francisco businessmen claimed water rights to the headwaters of Canyon Creek in 1855. Here they built two dams, doubling the capacity of Eureka (French) Lake and Lake Faucherie. Within three years other investors created the 12-square mile English (Rudyard) Dam at the head of the Middle Yuba. It was during this era that San Juan became the business and cultural center of the San Juan Ridge.

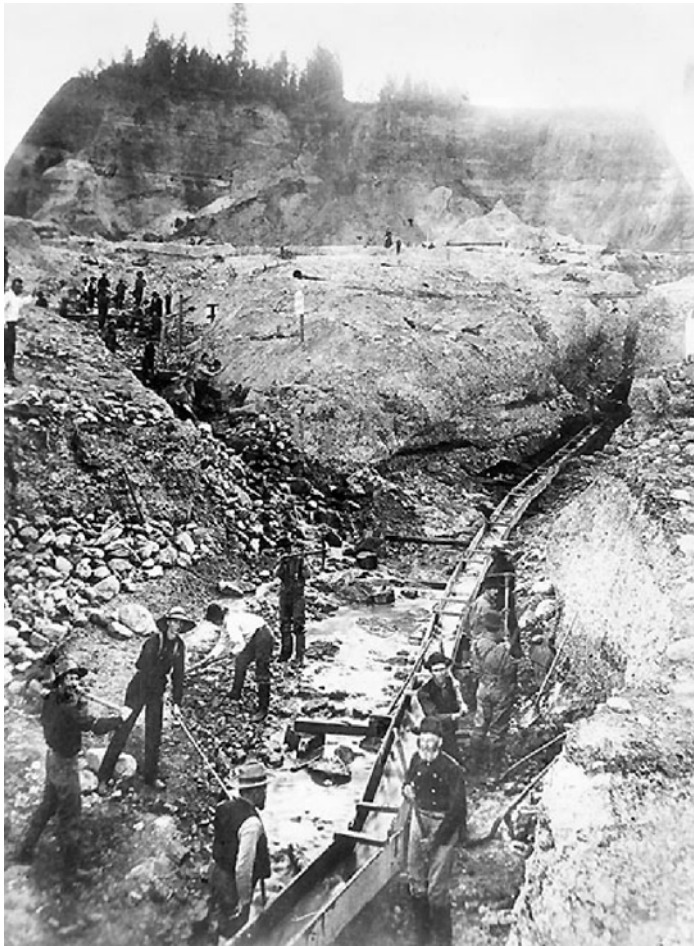
Congress sweetened the speculative atmosphere by passing an act that reaffirmed the regulations and customs of existing miners’ laws in July of 1866. It further recognized existing water rights, provided rights-of-way for ditches, and created a procedure to patent mining ground. With clear title to water rights investors began buying up claims in the French Corral, Sweetland, Cherokee, and North Bloomfield areas.

After much consolidation, three San Juan Ridge water companies, each with their own hydraulic mines, emerged in the mid-1860s. Water, the power source for the mines, was sold by the miner’s inch (16,158 gallons per day). The Milton Mining and Water Company delivered 2,500 miner’s inches daily, while the North Bloomfield’s capacity was 3,000 miner’s inches. The Eureka Lake Company, with an aggregate capacity of 8,800 miner’s inches was the



Flume in downtown North San Juan

largest water supplier, but the North Bloomfield Company was the most ambitious, innovative, and professionally-operated of all the hydraulic mines. They received a lot of press because of their engineering accomplishments and became the face of hydraulic mining to the general public. Peak years for hydraulic mining on the ridge were 1875 to 1883.



Original Columbia Hill Sluice

Hydraulic mine waste in the form of mud, sand, and gravel (also called tailings or debris) presented serious problems in the Sacramento Valley by hampering boat navigation, covering cropland, increasing the probability of flooding, and decimating fisheries. Debris was first observed in the flood of 1862 and it became progressively worse. In Marysville and Yuba City they tried to cope by building levees, but Marysville suffered enormous damage in the flood of 1875. Valley farmers had no choice but to organize and seek legal relief.

Eight years of litigation culminated in the Sawyer Decision of 1884. Even though the North Bloomfield Company was the defendant, the ruling had implications for all the Sierra Nevada hydraulic mines. The Federal Circuit Court ruling prevented the dumping of mine waste in streams. Unable to effectively impound tailings, investors retreated, most of the hydraulic mines closed, and mining engineers relocated to far-flung regions where there were no such restrictions.

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The extreme winter of 1890 effectively put an end to large-scale hydraulic mining by destroying most of the remaining flumes.

Hydraulic mining made a come-back in 1893 with the passage of the Caminetti Act, which allowed for the resumption of hydraulic mining above approved debris dams. Most of the dams failed to function adequately, but proposals kept reappearing nevertheless. Englebright Dam (1941) was the last debris dam constructed on the Yuba. Debris dams are clearly not a solution – debris cannot be stored behind a dam without eventually defeating the purpose for which it was built.

On the San Juan Ridge it's easy to see that much of the landscape has been shaped and modified by hydraulic mining. That legacy includes huge excavations, devastated landscapes with no topsoil, accumulations of tailings, raised streambeds, changed channel configurations, water quality issues, loss of animal habitat, and continued erosion. What isn't visible is the unknown amount of mercury in the watershed that was used in sluices to catch the smaller particles of gold. The mines tried to recapture and reuse it, but between 1876 and 1882 the North Bloomfield Company admitted losing 21,512 pounds of mercury.

Potable water is precious – it cannot be squandered. The hydraulic mining industry saw it differently. The *1882 State Mineralogist's Report* revealed that the North Bloomfield Company used 18.5 billion gallons of water to wash 4.77 million cubic yards of gravel for a yield of 5.6 cents per cubic yard. That's 69,250 gallons of water for each dollar in gold retrieved. We don't want to make a mistake like that again.



Magenta Flume, near the area now known as Graniteville

All historic mining photos, with the exception of the Columbia Hill photo, which has no recorded photographer or date, are from the Lawrence and Houseworth Collection, taken between 1862 and 1867.

INTO THE HEART OF THE BEAST

by Kurt Lorenz

From 1995 to 1997, during the Siskon Mine project, Kurt Lorenz was the "Community Liaison" to the three-person team authorized by Nevada County to determine if anyone nearby needed help with water problems under the terms of the "Remedial Water Supply Plan." As more than twelve local wells within the "two mile zone" failed, this became a very intense responsibility. When the mine was closing, Kurt got a chance to go down into the mine with the mine CEO, Tim Callaway. When he returned, he wrote this report for the "Mining Committee" of the San Juan Ridge Taxpayers Association.

June 19, 1997

Two weeks ago Tim Callaway took Tod Herman, from the Planning Department, and Curtis Zumwalt, from Environmental Health, for a look at the Siskon Mine as it is preparing to close. Today, Thursday, Tim called me and said that we could go and I jumped at the chance. I packed up some camera gear, found my hard hat (from the Zendo building project, no less), and a big flashlight.

The site was quiet and sort of dead after all the activity of the last few years. There was just a mangy old dog at the office, the watchman, and Tim in work clothes. There were no loaders roaring about or processing equipment running. No water slurry pipelines were gushing into the closed loop ponds. Even the pipelines coming out the decline tunnel to the infiltration ponds above Spring Creek were empty. Only the turbine pump installed in Sump #12 was still running, pumping into the pond beside Fire Access Road.

We met at the office and drove to the tunnel entrance in a service pickup truck with oil drums and some tools in the back. Since the truck was diesel fueled it could go below ground (mine safety rules). We drove to the decline tunnel portal, shifted into low, and started down and down.

The sets of steel I-beams and wood shoring made the decline look like it had ribs, and the image of being swallowed was all too obvious. As we went grinding down, I thought about the Kafka story about the train on the main line to Basel that enters a tunnel and then seems to inexplicably go ever more steeply downward until it is hurtling to some near vertical doom in the heart of the earth.

The decline bent to the right after perhaps 800 ft. and then continued along, shrinking in diameter and giving an eerie feeling of "It's closing in on

me." Fortunately, the decline leveled out somewhat, turned to the left, and we parked in a large muddy chamber near where the underground processing plant used to be. At this point we were about 380 ft. below the surface. There was a 25 to 30 story building worth of ancient river gravels over my head.

In most of the decline tunnel there were steel sets and timber shoring visible. When we complained about the pressure-treated wood, and they stopped using it, they began using rough sawn Douglas fir instead. The timbers were exposed to constant water and air blowing down the tunnel. There was a white fungus on some of the wood, here and there in the ceiling, and it looked to me like it would have weakened in another few years. When flooded, it may last much longer.

The steel sets ended as we left the decline and entered the mine itself. Beyond the decline, most areas I saw had been secured with wire, like chain link fencing, and big anchor bolts, and sometimes strips of soft steel plates with anchor bolts. The effect was random and very creepy looking. Almost everything visible was in shades of gray, with a basic elephant-colored clay coating most surfaces. No doubt diesel smoke and soot affected this mixture. The wire was rusting already.

In many places where anchor bolts in the ceiling were near the walls, the bolts had been used to hang chains, which in turn were used to hang pipelines and wiring conduit. As that infrastructure was removed, the chains were left dangling, perhaps 6 ft. from the ceiling, but ending 8 to 10 ft. off the floor. This gave the unfortunate impression of a dungeon where prisoners had just been cut down. It would be nice if my imagination about

the project was somewhat more positive, but it wasn't.

The very bottom of the decline ended in a sump that collected water and created a staging area for pumps. That was the main collecting/pumping point for all of the water that had been pumped out the tunnel pipeline for these past years. The main 440V pump was still there, but not in use. A forlorn submersible sump pump, lying on its side, hummed away in a muddy puddle below the big pump.

Tim left the truck running, with lights on in front and on the lumber rack, and we took hand lights and went walking. There was no installed lighting down there. There was a fan and air piping in the ceiling, but most of the air-handling gear had already been removed and the rest would go soon. I was surprised by how warm it was, not the cave-like 50 degrees I expected. This was due to a fan pumping surface air down the tunnel. Where we parked, the warm fan air and the cold wet mine air blended to form a misty fog. Light beams cut through it.

Perhaps 50 yards west of the truck, the tunnel in which we were walking started to slope downward, and we came to the edge of water that had been allowed to flood the west works completely. Our lights reflected off the water and showed the tunnel roof disappearing into the water further out. There were a few white paint marks sprayed on the wall showing different water heights from the last few weeks as the pump flow was adjusted. Ahead of us, and further down under water, the big turbine pump was busy pulling water out of the west area. The mine got most of its water inflow from this western portion. The famous "plug" on the F6 fault was near there, but it wasn't visible anymore because that tunnel, like most of the mine works, had been backfilled with processed rock and cobbles. According to Tim, about 80% of the mine has been filled with rock like this.

At this point, the pump was discharging about 675 gallons per minute, holding the water at that level. Tim thinks that the pump will be turned off in about two weeks. By then there will be a concrete seal in place in the decline, about 600 ft. down the tunnel, perhaps 150 ft. vertically below the surface. The stated purpose of this seal is to protect the

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works from intruders, and to provide a sanitary seal, if you will, between surface water and deep mine water. Most of the pressure-treated wood will be outside and uphill from the seal. The same firm that engineered the "plug" on the F6 fault will do the decline seal. Tim expects that mine water will rise to that new wall, and slightly above, but there will be little pressure on it. The decline above the seal will no doubt also flood gradually, once the aquifer recovers from all the dewatering.

I shined my light down into the water and onto the stones of the tunnel floor below the water line. The water looked quite clear. Just behind us a small cascade of water splashed on the floor, flowing out from the ceiling above and leaving an iron stain on the surrounding rocks. It had enough volume to flush away the gray clay muck underfoot and left the floor washed clean for a small distance. I would guess it was about 20 gallons per minute spilling out.

Do you remember the scene in the Hobbit where Bilbo steps in ice-cold water in the Orc tunnels, and first meets Gollum and has to play the riddle game to survive? I would not have been the least surprised to hear Gollum out there ahead of us in the water, on his little island, muttering "...my preciouszzz. Wherezz izz itzz, my preciouszzz...?" And as for Orcs, they have already been there, and left. Their tunnels go everywhere. Several paths we followed turned out to be a circle around some huge pillar left in place to support the ceiling. It would be very easy to get lost. Distance was deceiving and direction hard to guess. I could kick myself for not having taken a compass to see if it worked.

The chain link wire, bolts, chains, and similar materials would just be left down there. They're just iron, like background iron in the rocks they encompass. All wiring, pipelines, and valuable things would be removed. I saw tools left where a crew had quit for lunch, while taking apart an electrical substation. Tim made remarks about how slowly they were working since they knew they were working themselves out of a job.

We went into the room where the processing plant had been set up and since removed. There were three large pipes hanging out of the ceiling, running straight up to the jig surface plant where the gold

was extracted from the sands and slimes pumped up from that room. We walked from there to the east workings tunnels, which also headed downhill, but hadn't been allowed to flood yet. When the turbine pump is turned off the water will rise over the "divide" in the rooms we were in, and run down into the east works, filling it up. Tim expects that it will only take two to three days for the mine to completely flood some distance up the decline, once the pump is off.

The gray clay material on the floor was partially from the gravels, and partially the "fines" in the crushed mine rock hauled into the mine to build roads after the floor was mined out. They discovered that their own rock wouldn't work for this, and they had to have quarry rock delivered! Talk about carrying coals to Newcastle! As we walked toward the east works tunnels, the gray muck became deeper and we sloshed into it over our work boots and onto pants cuffs. Tim pointed down a tunnel that he said had two ceiling cave-ins last week. We didn't go further that direction.

All in all, we probably looked at perhaps a 1/2 acre of territory, less than 10% of what's down there, much of it already backfilled or flooded anyway. Everything I saw led me to believe that what I didn't see probably looked just like what I did see, only more so. The minimal amount of wood, iron, and clays that are left will just rot, rust, and settle, respectively. After a few more weeks probably no one will ever see that space again.

The whole thing strikes me as an amazing monument to human folly, and it's interesting how it stays there as a literal "dark unconscious" in our midst. I'm reminded of that dark sunken monument that fascinates us, the Titanic. But this is not a lump in a void. This is a void in a very solid lump. That people have been there makes it more interesting than the consolidated river stones 20 ft. beyond the tunnel wall, but in the end it is just another void, another crack, another fissure in the earth, flooded with water, like so many.

I took some photos, but couldn't see much of what I was doing so I don't know what I got. I would have loved to leave some little shrine or talisman of human contact down there, but there was no chance for that. I wish I'd thought of something I could have casually dropped in the water, for all

eternity, or for (what's the Buddhist phrase?) "...hundreds of thousands of millions of kalpas..." As we drove back up the tunnel, the open entrance in the distance was bright blue, neatly framed with two pine trunks—a great sight.

When the pump is turned off the water will rise in the west. Right where we had parked water will begin to run across the floor, both down to the foot of the decline and off through the labyrinth of tunnels to the east. After a short time it will have washed out the gray muck we were wading around in, and the rocks on the floor will be clean, but not sparkling, in that absolute blackness. Trapped air will be forced out various boreholes. Some bubbles will undoubtedly remain, pressurized in domed ceilings. The gray clays will mostly end up in the low ends of the east workings, settling out into a viscous soup to gradually solidify. Initially the water will be opaque to the east, but already it is clearing where the mine has been allowed to flood. Soon it will have nothing to do, but go about the business of being rock and water.

We got back to the office just as Bob Pease, Siskon geologist, was arriving. Tim handed him a quartz rock sample from a small pile in the back of the same truck we had just ridden down in. It was obviously not from the diggins here.

"Where's that from?" I asked.

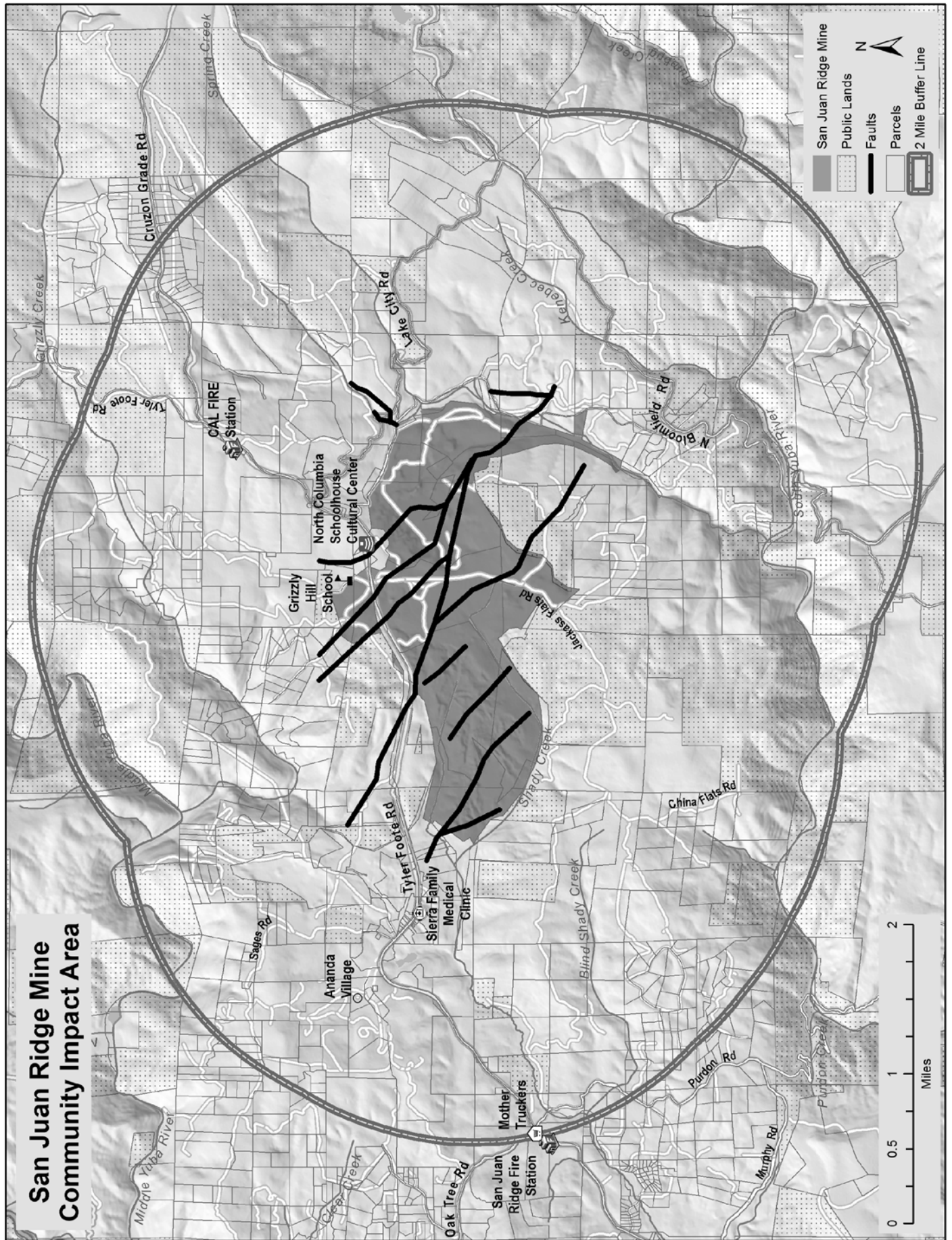
"Oh, from some place we're prospecting," said Tim.

Bob and I looked through his 20x loupe lens at the little flecks of gold in the black vein running through the quartz. Some might have been pencil point size. Others were smaller.

There wasn't the slightest sign that they equated that new excitement with the partial ruin of our landscape, loss of our water, and endless worry and upset.

The golden haired whore lifts her skirts and the boys are off and running.

**To view a full-scale, color version of
the following map, please visit
www.yubawatershedinstitute.org**



UNEXPECTED

by Annette Dunklin

Deer Creek at Dipper Camp,
No sun yet on rock, moss, fern, Alder, Oak.
Trillium colony close, flowers maroon.

Bend down to wash hands,
early morning summer cold,
sloppy muffled snorts!
Attention drawn to dark creek
water
finds one slick smooth shape,
curving a ripple
fluid and fast.
Dark eyes, small
bobbing head.

Otter plunges,
surfaces.
Color of creek,
swims upstream,
circles back.

Another joins:
Small brown
shimmering body
Mother and pup
crisscross,
exhale loud wet snorts,
play among branches,
wrestle water.

Third small whiskered face,
still another.

Three babies and mama
approach, retreat, dive, roll
clamber wet mossy bank,
slide on granite,
splash!

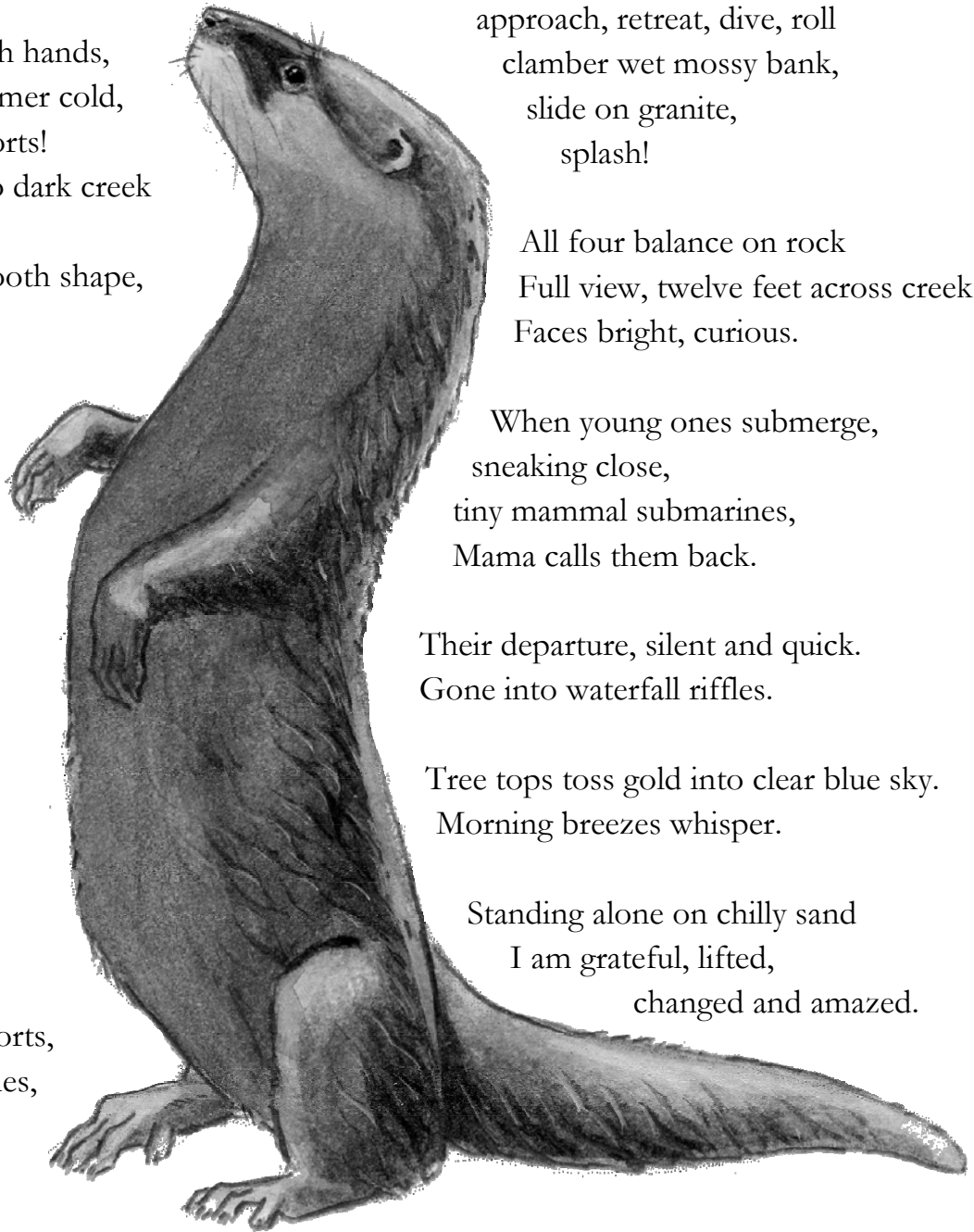
All four balance on rock
Full view, twelve feet across creek.
Faces bright, curious.

When young ones submerge,
sneaking close,
tiny mammal submarines,
Mama calls them back.

Their departure, silent and quick.
Gone into waterfall ripples.

Tree tops toss gold into clear blue sky.
Morning breezes whisper.

Standing alone on chilly sand
I am grateful, lifted,
changed and amazed.



*River otter drawing by John Muir Laws from
The Laws Field Guide to the Sierra Nevada*

CONFLUENCE

A Bit of Eco-Erotica

by Sarah Rabkin

Sarah Rabkin (www.sarahrabkin.com) leads a High Country Writing Retreat every summer at San Francisco State University's Sierra Nevada Field Campus on the North Yuba River. Many sojourns with friends in Nevada City and on the San Juan Ridge have brought her under the spell of the South and Middle Yuba as well. A teacher of writing and environmental studies at the University of California, Santa Cruz, Sarah lives in the Central Coast's Soquel Creek watershed with her husband, poet Charles Atkinson. Earlier versions of this piece appeared in the Lavender Reader (Summer 1991) and in Rabkin's book What I Learned at Bug Camp: Essays on Finding a Home in the World (Juniper Lake Press, 2011).

High on a Southwestern plateau, two rivers plow converging canyons. From headwaters two hundred miles apart, they slide and tumble toward each other, carving out of the red earth between them a great thrusting wedge of desert. At the southern apex of this tapered mound, they meet.

The waters come together as strangers, each carrying the memory of its own braided journey. Flowing from the northwest, the Green River meanders through languid bends, looping extravagantly on itself like a sated snake. It laps at heat-bleached gravel bars and cottonwood banks; it eddies in the shade of spring-fed grottoes cushioned with wet moss. Electric-blue damselflies needle its oily currents. The Green reaches its rendezvous perfumed with sunshine and the watery scents of willow and butterscotch weed.

From the northeast, the swollen Colorado rides heavily, engorged with red-brown silt of calving sandstone cliffs. Rounding the mesa, it collides in a surge of tidal confusion with the Green. Shuddering together over a shallow bed, the two rivers spill into a single waterway. Beneath the surface, jade rivulets meet clay-smooth tongues thick with iron sediment. Contrasting temperatures mingle; alien currents merge.

The new partners move tentatively onward, their tranquil pace almost stilled, suspending time. Yet rising up the canyon, from some distant point downstream, echoes the thunder of a great falling. There is no turning back.

Gradually, the canyon narrows and deepens and the entwined rivers quicken in a tightening embrace. Standing waves vibrate the walls in a rhythm that resonates more deeply than sound. Twigs and other

bits of floating debris ride the surface, pausing atop each glassy swell before twitching off to slide into the trough and over the next rise. Protruding rocks create chutes and rills; whirlpools gather spiral strength, sucking in counterpoint to the current's momentum.

Accelerating in their conjugal bed, the rivers cry out, their thin resistance overwhelmed by a rumbling hunger for sea level. The canyon floor drops more steeply. The water surges forward, bucking and writhing, a white madness now. From the riverine chorus emerge high splashing plaintive notes, guttural gurgles, moans and roars that swell and recede and swell again. The torrent has become a single thrashing beast that speaks to itself—crooning, urging, commanding. A bouncing current slaps against slickrock walls, glazing the thirsty stone with a shining film. Boulders toss the water wildly upward as it storms through its confining channel.

Then the walls burst outward and the bottom falls away. The river explodes into sky and pauses, airborne, for a frozen instant. Fizzing mist curtains shatter sunlight into colored splinters. Freightloads of water drop over the precipice to the rocky shelf a hundred feet below, churning white with impact. The cataracts slam and recoil, leaping and diving through a series of frothing cascades.

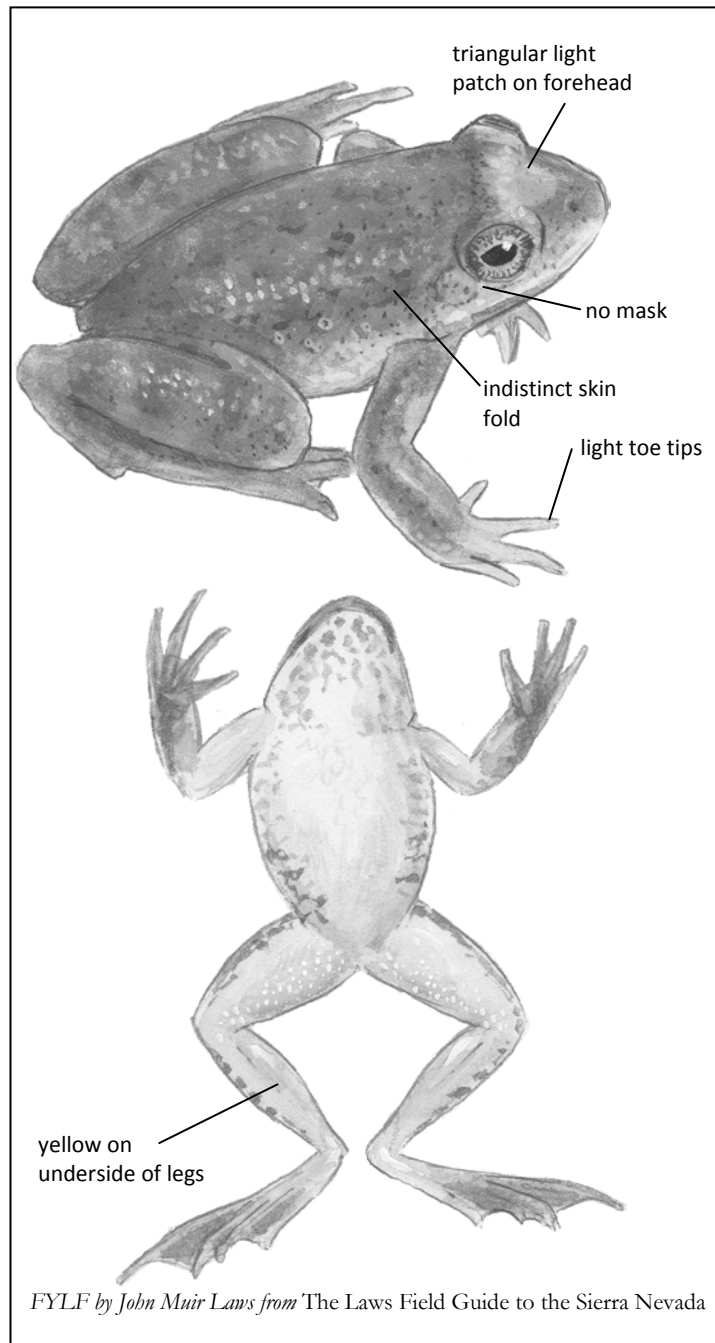
Finally, these gather into one narrow waterfall, the last. As if poured from a high-held pitcher, it plummets, chortling, into a deep hollow, and pools in green shadow. Bubbles rise as the wild crashing above recedes into sleepy memory. Murmuring quietly, the waters slip further downstream, past the brink of their resting place, toward the untasted twists and drops of a thousand more riverbed miles.

FOOTHILL YELLOW-LEGGED FROGS IN SPRING AND SHADY CREEKS

by Tom Van Wagner

The view from Jackass Flats Road reveals one of many gold mining scars familiar to San Juan Ridge residents. The road follows a ridge here; to the east surface water drains to Spring Creek and to the west Shady Creek. Both creeks are a patchwork of relatively natural looking reaches and highly disturbed ones. Along the ridge, stunted pines and manzanita dot this rather bleak landscape. A new drumbeat for gold extraction from the old diggins is heard these days as yet another mining entrepreneur sees dollar signs in the dirt. The San Juan Ridge Mine is the latest iteration, picking up where the failed Siskon Mine enterprise ground to a halt after draining local residents' water wells and running out of money. Locals are still smarting from the Siskon fiasco and, so now, are steeling themselves for yet another battle.

Among the vast array of potential environmental impacts that could result from the re-opening of the mine, which includes surface and ground water contamination and depletion, is the effect that discharge of mine water into Spring and Shady creeks could have on local populations of the foothill yellow-legged frog (FYLF; *Rana boylei*).



Two species of yellow-legged frogs are found in the Yuba River watershed: the Sierra Nevada yellow-legged frog (SNYLF; *Rana sierrae*), which typically lives above 4,500 feet in elevation, and the closely-related, lower elevation counterpart,

FYLF. The FYLF is considered a Species of Special Concern by the California Department of Fish and Wildlife. Additionally, a petition to list the FYLF as endangered under the U.S. Endangered Species Act was filed by the Center for Biological Diversity in 2012. The range and abundance of both FYLF and SNYLF have declined markedly over the last several decades due to numerous insults, including habitat destruction and modification and pollution.

There are known populations of FYLF in Spring and Shady creeks, downstream of the San Juan Ridge Mine. These creeks contain the essential habitat elements needed for FYLF breeding, which include partly-shaded, shallow reaches with riffles and rocky bottoms. They need at least some cobble-sized substrate for egg laying. One of the most critical elements of the reproductive cycle of the FYLF is the timing of

creek discharge. Historically, it is during the spring dry-down period after most of the rain has fallen in the foothills that FYLF spawning and egg mass deposition occurs in very shallow areas with low velocity currents. The egg masses, shaped like a cluster of grapes and some the

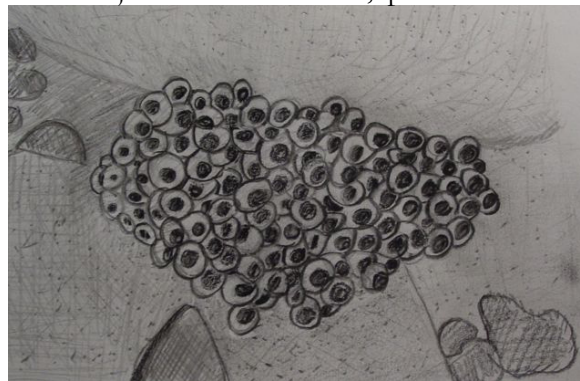
size of a grapefruit, are easily stripped from their attachment to the substrate when flows increase suddenly. This detachment and loss of egg masses has been documented a number of times in other streams and rivers in California when unusually high flows occur, both naturally and through artificially released regimes from irrigation and water impoundments.

FLYFs deposit only one egg mass per female per season. Therefore, discharge of mine water into the creeks and the resulting dislodging of FYLF egg masses could have profound consequences on population dynamics and maintenance. In light of this potentially devastating impact to breeding populations of FYLF in Spring and Shady creeks, **we must insist that any future mine water discharges into these creeks conform to the seasonal demands of frog spawning.**

The diversity of frogs and toads in California is relatively low. As a comparison, one surveyed hectare (2.5 acres) of Ecuadorian tropical forest revealed 81 different species, the majority frogs. Here in the

northern Sierra Nevada we find only six species, one of these the non-native bullfrog (*Rana catesbeiana*). Not only is anuran diversity low, but interestingly, California is home to the only two frog species that are obligate stream frogs in the US—the tailed frog (*Ascaphus truei*) and FYLF. Ponds, lakes, and other lentic water bodies will not sustain these species; they require moving water. The point: we must maintain vigilance to protect the precious few species we have.

In response to the many potential environmental impacts of the reopening of the mine, several local groups are collaborating to gather baseline chemical, physical, and biological data in Spring and Shady creeks. Recently, discharge gauges have been installed on both creeks. In conjunction with these, periodic



FYLF egg mass sketch by Tom Van Wagner

water sampling for multiple water quality variables, including heavy metals, especially mercury, will provide a chemical fingerprint before the mine reopens, and beyond that during its operation. Methyl mercury, the most toxic of the various compounds mercury forms in aquatic systems, is a well documented neurotoxin that biomagnifies up food chains.

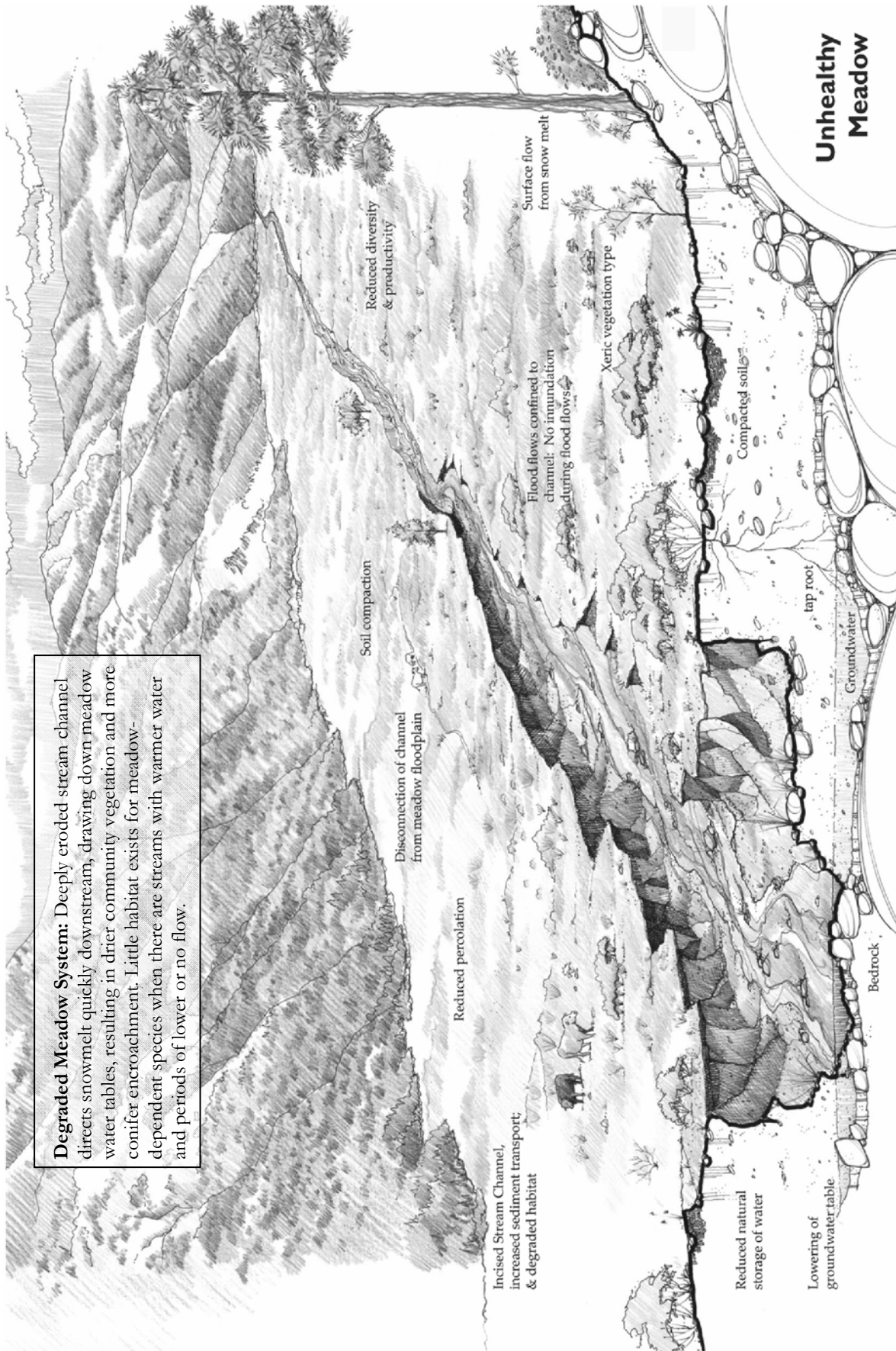
Additionally, South Yuba River Citizen's League (SYRCL) conducted FYLF surveys during the spring and summer of 2013 along a one mile reach of Shady Creek upstream of the Purdon Road crossing. The surveys provided a census of egg masses deposited during the entire 2013 spawning season, as well as an overall count of FYLF individuals. Despite the relatively degraded stream conditions due

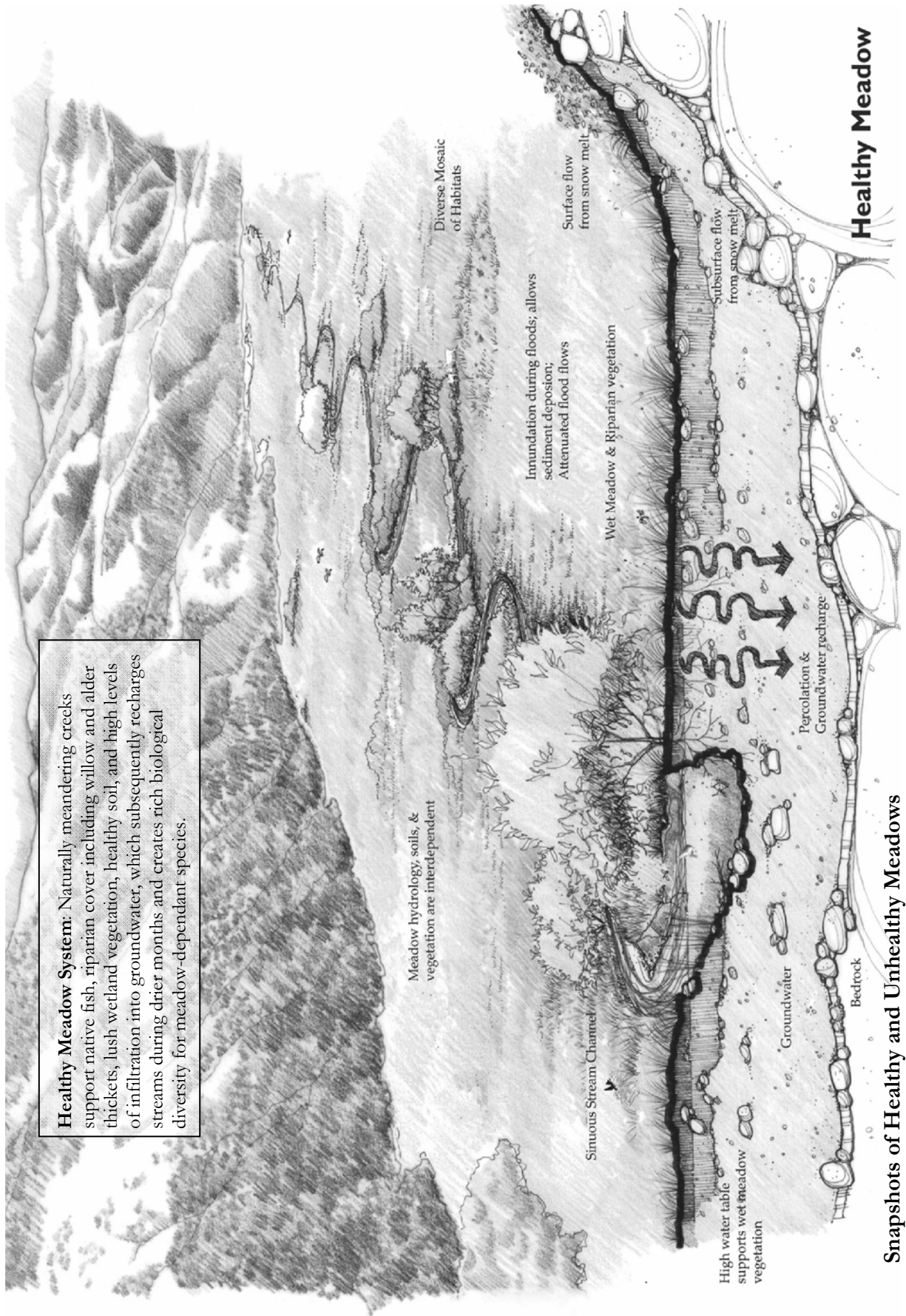
to historic gold mining on the survey reach, a robust density of adult FYLFs was documented. As the San Juan Gold Corporation's proposal to reopen the mine moves forward, it is essential that we collaborate to ensure the protection of the FYLF and their habitat in Spring and Shady creeks.

SHADOW PEARLS

by Corey Hitchcock, Summer 2013

Living water, at play, winding through a nest of boulders. Alder leaves animate magnetically toward clefts in stones. Descending they vanish in sparkling eddies. The river's throaty song makes the blood coo, the body effortlessly attuned. Strings of dark orbs move with the current. Oil? No, pearls of shadow, gliding over pebbles, drifting magically beneath the surface. Fluid penumbras with radiant halos; secret collaborations of water and sunlight, floating, viscous, pulsing; each sourced in microscopic flotsam. Traces of current seeking and finding its own dark matter: Insect wings, seeds, cosmic dust and corpuscles, all mesmerized by the flow.





Snapshots of Healthy and Unhealthy Meadows

Used with permission from the National Fish and Wildlife Foundation's Sierra Nevada Meadow Restoration Business Plan, March 2010. www.nfwf.org/sierranevada

Running Water Music

FROM *No Nature*

BY GARY SNYDER

Clear running stream

clear running stream

Your water is light

to my mouth

And a light to my body

your flowing

Music

in my ears, free,

Flowing free!

With you

in me



Photo by Crystal Highline

IN MEMORY OF FARRELL CUNNINGHAM

1976-2013

by Daniel Nicholson



Photo and rendering by the Editors

Early this August, Farrell Cunningham passed at his home in Susanville. Many were surprised and saddened by this loss due to his extensive connections as a Northern Maidu language teacher, story teller, writer, activist, and artist.

Farrell's contribution to *Tree Rings* in 2008, "Papam," was my first introduction to his work. It was the most inspiring writing I had read for years from the Sierra Nevada. Coming from the place of indigenous Maidu connection to the land, he shared his inner process of appreciation, nourishment, sustainability, and awareness in this article. We met at an art gathering soon after and talked at length of growing and propagating elderberry. We were bound to become friends.

One spring day while walking together, the black oak (homsin cham) catkins were hanging down below the new leaves. Farrell pointed out that the hanging tassels were the closest thing that the Maidu Nation has to a national flag. I could see the pride and satisfaction he felt in his knowing this to be true.

Farrell was a man of many talents who carried a potent vision of the future. The chairman of the Maidu Summit Consortium and founding member of the Maidu Cultural and Development Group, he participated in the effort to create the first Maidu National Park on ancestral lands in Tásmam Koyóm, or Humbug Valley, which would be a demonstration of indigenous land use and cultural values. He was also deeply involved in the effort of recording and documenting his elders' language, the rarely-spoken Mountain Maidu dialect.

I feel the weight of his efforts. It reminds me much of the Tibetan cultural struggle, where a small group of people carry the responsibility of the perpetuation of their entire cultural heritage and are under constant pressure to conform to a larger society that is not their own. He balanced the worlds well sometimes, yet he faced an uphill struggle in his bold dreams to have the language of this place spoken by thousands again, to burn the backyard plants because it is good for them, and to honor the acorn and manzanita seasons with weeklong celebrations. Hukinudom hukoi (remembering still) Farrell Cunningham; we will carry your dreams on.



TREE RINGS

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