

# The Colgan Creek **CARE GUIDE**

A Watershed Community  
Handbook for Restoring Colgan Creek

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For the Redwood Empire Chapter of Trout Unlimited  
The California Department of Water Resources and the City of Santa Rosa, 2015

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### Our Watershed Community

Under just the right conditions, a fish hatches or a seedling sprouts—hurray! Nature triumphant!

But Nature doesn't succeed every time. Instead, she makes many small attempts, waiting for the right conditions. An oak may produce 10,000 acorns, from which only two trees may result. And of 2,500 salmon eggs from a spawning female, only two lucky fish may survive to leave the ocean and migrate back to their home creeks to spawn.

Whether acorns become oaks or fry become spawning salmon depends on countless conditions being just right. Nature faces daunting odds, but she never stops trying. We follow Nature's example as we restore Colgan Creek—possibly the most polluted and channelized creek in Sonoma County. What a great opportunity for us!



*A healthy stretch of Santa Rosa Creek*

Colgan Creek's biggest challenge is water too warm to support the life cycle of trout, salmon and many other native species. Our creek needs many more trees and shrubs to produce cooling shade, food and cover.

### Learning Together

We all know something about creeks, but no one—not even an expert creek scientist—knows it all. So all kinds of people need to work together and share their knowledge. Even if we don't all meet face to face, we comprise a watershed community whose members learn together. As a member of the Colgan Watershed Community, you might be a student one minute, a teacher the next—always embracing Nature's motto: **“Keep on Trying!”**

To help trees, birds, fish and other organisms (including people) to

flourish, we make many small attempts to better conditions for them. This includes every job from picking up trash to propagating native plants. If you propagate a plant, you and your seed or seedlings are going to face imperfect conditions. Failures will happen. But following Nature's example, you keep trying one thing or another—planting more, watering less, staying attentive.

When your small attempts meet just the right conditions—hurray! Colgan Creek Triumphant! And all because you helped.

Go to <http://www.colgancreek.org/>



*Doug Gore with Coho salmon he caught in the Jenner estuary, 1960*

## Students and Teachers at These Schools

Amarosa Academy  
 Bellevue School  
 Elsie Allen High School  
 Kawana School  
 Meadow View School  
 Sonoma Academy

## Nature Advocates

Redwood Empire Chapter of Trout Unlimited  
 Laguna Foundation  
 Russian Riverkeeper  
 Salmonid Restoration Federation  
 California Native Plant Society  
 STRAW (Students and Teachers Restoring a Watershed)

## Local Government

City of Santa Rosa  
 Sonoma County Water Agency  
 Sonoma County Parks  
 Sonoma County Agricultural and Open Space District  
 Sotoyome Resource Conservation District

## State Government

North Coast Regional Water Quality Control Board (for water pollution)  
 California Department of Water Resources  
 California Department of Fish and Wildlife  
 California Natural Resources Agency

## CHECKLIST OF CREEK-HELPING GROUPS



## COLGAN CREEK WATERSHED TOUR

Wherever you are, you're in a watershed—a bowl-like function of landscape catching rainwater—where rainwater flows into a creek or river. The Colgan Creek watershed is almost 5,000 acres of drainage, and 9 miles of stream—one of many watersheds encompassed by the Russian River watershed. Colgan Creek's headwaters are on Taylor Mountain, the County's newest regional park. From here, water travels southwest across Santa Rosa and pours into the 30,000-acre Laguna de Santa Rosa, which joins Mark West Creek to enter the Russian River at Mirabel, and flows into the sea at Jenner.

coaxed lush green grass from the mountain. We pay our park-use fee and approach the trail. Right away we are in the shadows of two tanks, six stories high and impounded by fencing topped with barbed wire. These Kawana water tanks hold 20 million gallons of Russian River water, including water from the Colgan Creek



*Kawana water tank, Taylor Mountain*

## Taylor Mountain Headwaters Hike

We begin our tour on Taylor Mountain early spring, when the rains have

that flowed to the Russian River and was pumped back to the tanks.

Near the water tanks is the entrance gate where a sign instructs us to share this park with cattle. These gentle animals, if not managed properly, can harm the watershed, each one drinking up to 30 gallons a day, depositing waste on land and in the waterways, and trampling delicate habitat areas. Boldly, we enter the park and climb the mountain to explore the place where Colgan Creek begins.





*Above, left to right: Indian lettuce (Claytonia perfoliata), soap plant (Chlorogalum pomeridianum), California buttercup (Ranunculus Californicus). Left: wild turkey prints..*



still is gathered and eaten by modern-day foragers. We also find soap plant—named for one of its uses—and the California mugwort, which Pomos used for purposes including pain relief

**Native Plants**

Mt. Taylor is a healthy, oak woodland habitat. As we climb it, we find native wildflowers and plants that were useful to California Indians, and plants such as Indian lettuce, which

and religious rituals. In the damp earth we also notice small animal prints and the deep hoof prints of cattle.

**Erosion**

Rainwater has also cut into the mountainside. Shallow cuts run into deeper cuts that release sediment into the creek. This sediment loss on Taylor Mountain has impacts that begin here and build up all the way to the ocean.

Excessive sediment releases degrade the water clarity needed by migratory fish, for spawning. The erosion we can see on a small scale here joins sediment erosion from other places, travelling to mouth of the Russian River at Jenner where, after a storm, it appears as a large brown plume stretching out to sea.

Sediment not reaching Jenner builds up in flat stream reaches, filling in gravel beds needed by spawning salmon and aquatic insects.



*Above: Eroding head-cut on Mt. Taylor. Below: Oak tree in eroding head cut, losing stability as soils are washed away.*



**Cows in the Watershed**



Weighing on average well over 1,000 pounds at maturity, cows compress the soil where they walk. When their hooves make cuts in damp ground, rain washes the soil out, deepening the cuts. Over time, these cuts become gullies that continue to erode and deepen, presenting danger to the cows. Cuts and gullies can trip and injure a heavy bovine, and steep ravines can trap and kill one. Riparian fencing and rotational grazing techniques can be used to mitigate destructive impacts from cows and prevent over grazing in the watershed.

Riparian fencing and rotational grazing techniques can be used to mitigate destructive impacts from cows and prevent over grazing in the watershed.



*Cattle hoof marks*



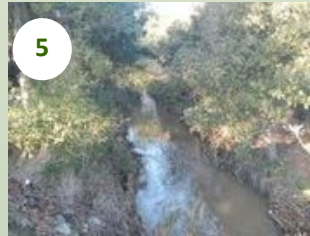
*Riparian cattle fencing*

## COLGAN CREEK

### 8 Water Quality Monitoring Checkpoints (at 7 locations)



Kawana Terrace Road



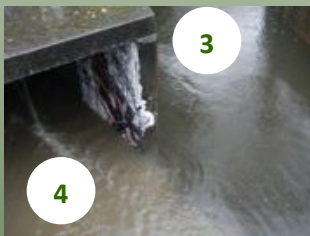
Hearn Avenue



Petaluma Hill Road



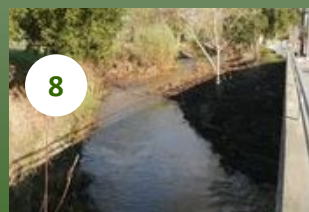
Victoria Drive



Kawana Springs Creek (3)  
Coglan Avenue Box Culvert (4)



Dutton Meadow



Bellevue Avenue

Once we leave the mountain, we face urban Santa Rosa. Development and private property make it impossible to walk Colgan Creek, so the remainder of our tour will be by car, to seven stops— sites where water samples are collected for testing.

#### 1: Kawana Terrace Road

Directly from Taylor Mountain flows Kawana Springs Creek, which runs down to Colgan Avenue, where it becomes the waterway we know as Colgan Creek. Our first stop is on Kawana Springs Creek, just off



Kawana Terrace Road, near the entrance to Taylor Mountain Park.

Here, the stream has rock cobble, washed down from Taylor Mountain . A healthy trout stream would have such clean cobble, and the spaces between the rocks are necessary to aquatic insects and to salmonid eggs. When sediment fills such spaces, neither fish nor cold-water insects can use the cobble.



*Buckeye at Kawana Terrace site*

Kawana Terrace has healthy riparian vegetation, including a magnificent buckeye, newly planted valley oaks and an Oregon ash. The native arroyo willow growing in the channel can block stream flow with its multiple trunks. Single-trunked willows would work willows would be preferable. Non-natives here include Himalayan blackberry, a tasty but invasive legacy of Luther Burbank. This shrub can out-compete natives and impair stream health.



*Valley oak beside Kawana Springs Creek*

Between here and our next stop, Kawana Terrace Road has fairly decent habitat conditions; good city planning calls for setbacks here, on the north bank, which prevented development from getting too close to creek habitat. There is plenty of room to plant more native trees on the north bank, where more shade and habitat would improve the reach.

## 2. Petaluma Hill Road

Just north of where Petaluma Hill Road meets Kawana Springs Road, Kawana Springs Creek flows through a cement channel below Petaluma Hill Road. The undercrossing is a classic box culvert which can block fish passage, particularly juvenile fish. Long stretches of flat concrete with water sheeting across it are difficult for a fish to negotiate. This lack of "connectivity" in a stream habitat reach has a detrimental effect on a fish population's ability to move up and down the channel freely to seek food or shelter. We also see a large storm drain entering the box culvert from the north. This drain can introduce pollutants into the creek if upstream

residents are not careful with what enters their storm drain intakes. Here the native live oaks provide shade, but more tree canopy would benefit the creek, here and also downstream.



*Stream channel at Petaluma Hill Road*

Parts of this reach are being restored, yet more native trees are needed. Their shade would not only lower ambient air and water temperatures, but also reduce the channel-clogging vegetation that thrives in sunlight. The stream bed does have some good cobble, but this reach of stream channel is especially vulnerable to becoming filled with fine sediment.

Better erosion control upstream would help protect the cobble from filling in and discourage growth of arroyo willow in the channel, which can impair flood flows.

## 3. Kawana Springs Creek

Kawana Springs Creek continues along a natural channel below Petaluma Hill Road, including a stretch by Colgan Creek Park. Here, where the stream bed flattens out, we can see where a great deal of sediment has been deposited.

Native trees here include live oak, valley oak, black walnut, Oregon ash, red willow and arroyo willow. The creek stretch by the Costco loading dock is identified as a "native oak regeneration" area. But few oaks are regenerating here, and many more trees—perhaps a mixture of other



native species—are needed to shade and cool air and water temperatures.

Behind the nearby Costco store, an underground concrete channel crosses the parking lot and brings Colgan Creek to merge with Kawana Springs Creek at Colgan Avenue.



*This creek stretch behind Costco (also pictured above) needs shade from more native trees.*

#### 4. Colgan Avenue Box Culvert

The Colgan Avenue box culvert is important to look at, because it discharges both creek water and storm drain runoff. Another creek might carry fresh rainwater from wooded hillsides and marshes, but Colgan Creek conveys mostly urban runoff.

Some of that runoff originates at the storm drains of the Sonoma County Fairgrounds, where concentrations of animal waste have been a source of pollution in the past.

This area of Santa Rosa also has a large number of abandoned, underground fuel storage tanks that can leak and cause pollution if not properly managed.

When it emerges from the box culvert, Colgan Creek travels via channels and culverts, flowing under Santa Rosa Avenue and Highway 101. On the bottom of the concrete channel (seen at right) willows and reeds grow in the sediments deposits, and will likely be removed because they can block high stream flows during a winter rain storm.



*Colgan Creek, emerging on Colgan Avenue*

An underground fuel tank at the southwest corner of Colgan and Santa Rosa avenues was the site of a groundwater cleanup project, now completed.

When Colgan Creek crosses under Corby Avenue, it finally reaches a natural channel, and from there flows freely to our next water quality test site at Hearn Avenue.



*Colgan Creek along Colgan Avenue*

#### 5. Hearn Avenue

Just upstream of Hearn Avenue is our next testing site. A Sonoma County Water Agency service road runs along this reach, and the Smart Train tracks parallel the waterway upstream of Hearn Avenue where a new railroad bridge crosses Colgan Creek. (The old bridge often got clogged with debris in heavy rains, which backed up floodwaters to Corby Avenue and caused flooding of homes built too close to the creek.)

Here in the creek we see an excess of channel-blocking reeds, which thrive in lots of sun. A canopy of diverse native trees here would discourage growth of invasive plants and benefit this reach in many ways.



*Colgan Creek, upstream from Hearn Avenue*

Downstream from Hearn Avenue is a storm drain depositing runoff from parking lots, supply yards, auto sales yards and other businesses. Pollution from these areas will enter Colgan Creek, unless safe storm water practices are used.



*Urban rain garden slows, sinks and filters pollutants from storm water*

## 6. Victoria Drive

The Victoria Drive water testing site contains a concrete channel that brings to mind a cinematic image of the Los Angeles River, as it appeared in the 1954 sci-fi thriller: "Them!"



*L.A. River film shot in movie, "Them!"*

Sheet flow of water across concrete channel bottoms can be impossible for steelhead or salmon to negotiate without periodic resting places. These concrete aprons are part of a legacy of "flood channel" engineering solutions dating back half a century. Current science calls for riparian setbacks to keep concrete a healthy distance from the waterway, a wider channel that curves, and a natural stream bottom.

The concrete in the Victoria Drive channel prevents tree growth and shade, so too much sunlight is hitting the water, encouraging reed growth that can block water flow. More trees and shade will discourage unwanted plants and contribute to a healthier creek ecosystem. The planned



*Victoria Drive site, with concrete aprons*

restoration project will restore the creek from here to Bellevue Avenue.

## 7. Dutton Meadow

Colgan Creek flows under a bridge at Dutton Meadow, near Bellevue Avenue in a natural stream bed, which presents no barrier to fish passage. At this site, restoration work is transforming this section of "flood control channel" into a healthy riparian ecosystem. Among the many benefits of the improved site will be the opportunity for student riparian biology studies, done on site.

Downstream the channel has been widened and curved, with natural stream features added to create pools for fish habitat, and riffles with clean gravels to support healthy aquatic insect populations—a key food source for cold water fish.

Large-growing tree species will be planted here to create cooling shade and to discourage the growth of invasives. Native specimens have been planted in this reach, including both red and yellow willows, and some of the native sedges used in Pomo basket making. The high school at this site is named for Pomo basket artist and teacher, Elsie Allen.

Comparing the water quality here with the downstream end of the restoration reach will provide an indication, in the coming years, of



*View downstream from Dutton Meadow*



*View upstream towards Dutton Meadow after stream widening and re-contouring*

how effective the restoration has been. Native trees along this reach include black walnut and live oak. There are also non-native cork oaks, of which wine corks are made.



*Sprigged willows at the Bellevue Avenue site*

## 8. Bellevue Avenue

The Bellevue Avenue site is the downstream end of the phase I restoration reach.

In early November of 2014, after completion of the restoration work, native willows were seen sprouting in the waterway which was still dry during record drought—benefitting from the high water table here.



## WATER QUALITY

Colgan Creek's main problem is thermal pollution. When water is too warm or polluted, the wildlife either dies or moves away to find a better home. Our goal is to make the water of Colgan Creek cool, clear and clean enough to support all riparian life forms, particularly trout—indicators of a healthy stream.

### A Watershed Hero

To manage, you must measure. By measuring water quality in Colgan Creek, we provide valuable data for managing our resource. Water testing can make us into watershed heroes, as well. For example, in 2007, a Santa Rosa resident took water quality measurements in Colgan Creek and found that conductivity was too high. He reported it to the clean water authorities and investigators found that excessive amounts of animal waste were coming from the vicinity of the Santa Rosa Fairgrounds, entering storm drains and reaching the creek. Soon after that, the storm water system received long overdue upgrades— all because a watershed community member cared enough to monitor water quality. As Jack

Williams, of Trout Unlimited said, **“Citizen science is powerful.”** As we monitor water quality, we collect data which we can use to manage and protect Colgan Creek.

### Watershed Heroes at Home

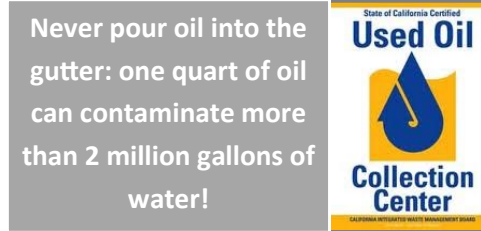
We can be watershed heroes by protecting water quality at home and around town when we keep toxins where they can't reach the creek.

### Store toxins properly

When stored in damaged containers, toxins can leak and get carried into the storm drain. If put in the garbage, toxins can leak into the landfill and contaminate the water table. Make certain toxin containers are intact, and stored above the ground. Sonoma County has toxin pick-up services (not the regular garbage service) and drop-off facilities: [www.recyclenow.org/toxics/house\\_tox\\_facility.asp](http://www.recyclenow.org/toxics/house_tox_facility.asp)

### Creek-Friendly Car Care

To keep car-dirt runoff out of storm drains, use a commercial car wash. And since oil leaks can reach waterways via storm drains, keep a well-maintained engine, and get car oil changed professionally.



Used oil goes only to a certified oil collection site.



### Heroic Dog Care

Always carry a plastic bag when you walk your dog. Keep dog poop out of the creek and off the

creek banks (where it gets washed into the water by rain). Dog waste can release dangerously high levels of nitrogen pollution. And perhaps we all prefer nature walks without smelling, seeing or stepping on dog droppings.

### No Pet Dumping, Please!

Never dump your aquarium water into the creek. And do not release animals from the pet store—fish, turtles, mice, rats, snakes, birds or other non-native animals—into the watershed. These species can transmit disease to wild fish and other native animals.

[www.habitattitude.net](http://www.habitattitude.net)

## REPORT

### WATER PROBLEMS

Report spills and dumping in Santa Rosa storm drains and creeks.

Emergency hazards, call 911

Non-emergency hazards — within city limits:

Santa Rosa Public Works  
(707) 543-3800

outside city limits:

Sonoma Co. Environmental Health  
(707) 565-6565

In flood control channels:

Sonoma Co. Water Agency  
(707) 523-1070

storm drains within city limits:  
(707) 543-3800

outside city limits: (707) 524-7280.

## HELP OUT

Santa Rosa Creek Stewards  
Alistair Bleifuss [ableifuss@srcity.org](mailto:ableifuss@srcity.org)

Sonoma County Water Agency  
Stream Maintenance Program  
Jon Niehaus (707) 521-1845

Storm drain stenciling  
within city limits: (707) 543-3800  
outside city limits: (707) 547-1908

## OIL RECYCLING

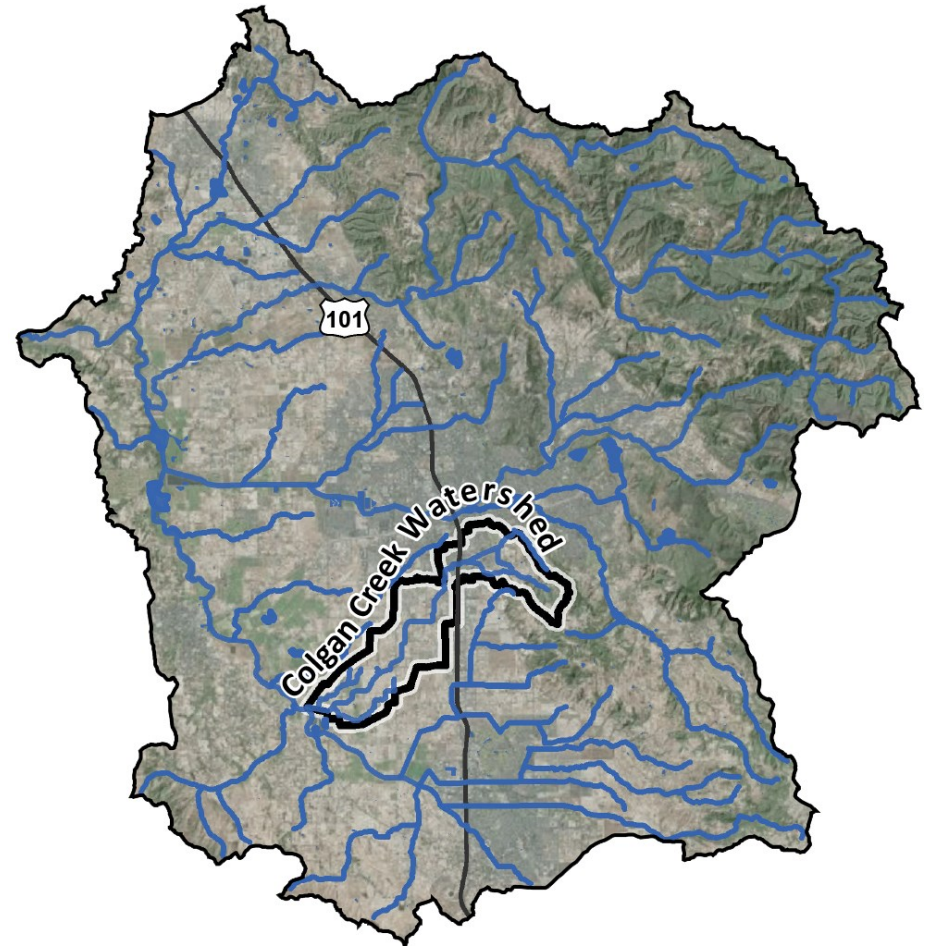
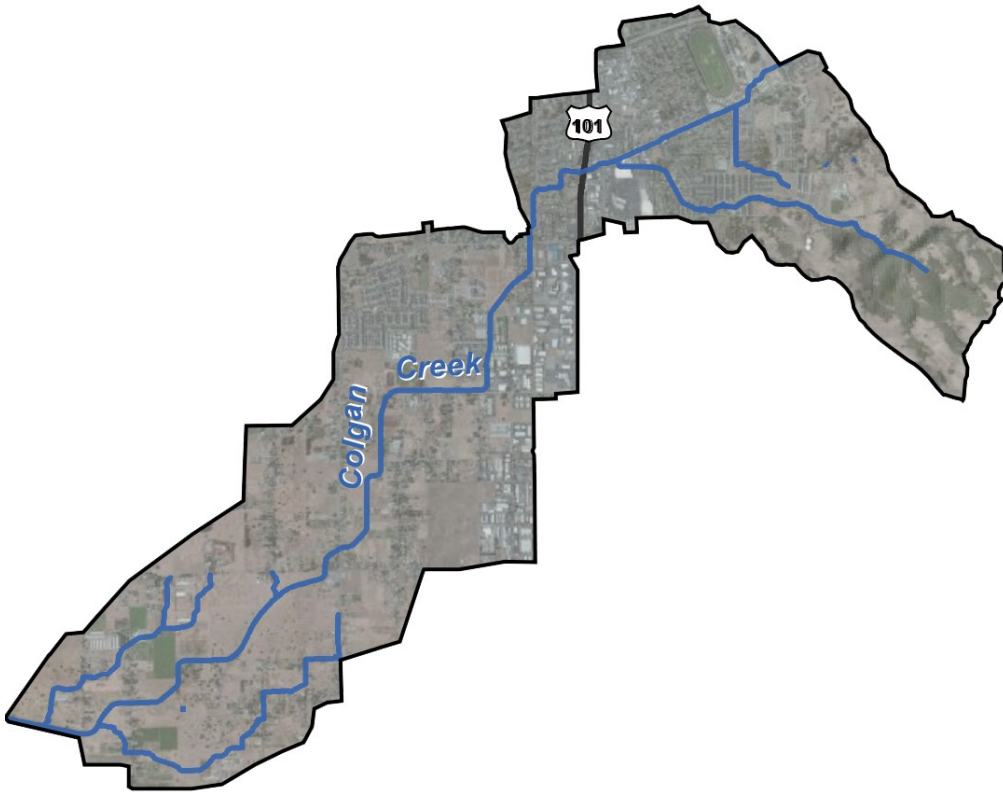
ECO-DESK (707) 565-3375

## COLGAN CREEK WATERSHED

7.8 square miles

*A highly urbanized watershed, Colgan Creek is now being restored.*

*According the California Department of Fish and Wildlife, this watershed should be managed as an anadromous fishery.*



## LAGUNA DE SANTA ROSA WATERSHED

254 square miles

*The Russian River's largest tributary and home to both Steelhead Trout and Coho Salmon.*

*Notice how the Colgan Creek Watershed is encompassed by the greater, Laguna de Santa Rosa Watershed, at the southern reach. On the following page (10), see how both of these watersheds are enfolded by the greater Russian River Watershed.*

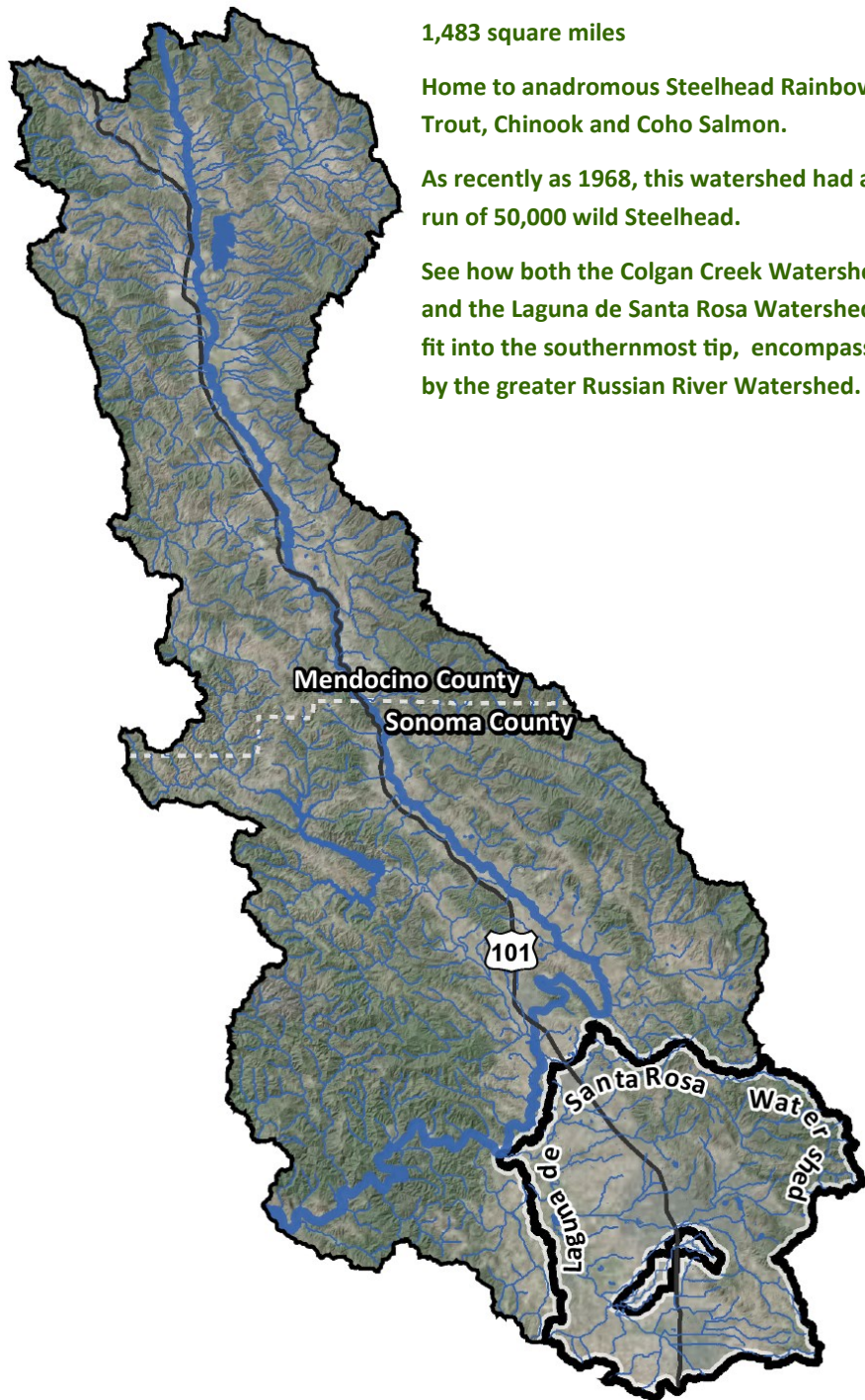
## RUSSIAN RIVER WATERSHED

1,483 square miles

Home to anadromous Steelhead Rainbow Trout, Chinook and Coho Salmon.

As recently as 1968, this watershed had a run of 50,000 wild Steelhead.

See how both the Colgan Creek Watershed and the Laguna de Santa Rosa Watershed fit into the southernmost tip, encompassed by the greater Russian River Watershed.



## HISTORY

The Colgan Creek watershed wasn't always unhealthy and inaccessible. Where Colgan Creek now flows, the Pomo Indians once lived in balance with the natural resources they managed. The Pomo liked Taylor Mountain, where traces of their daily lives have been found by archeologists. Evidence suggests the Pomo maintained the ecosystem for over 10,000 years, giving thanks for food and never taking all. They pruned and groomed plants on an established schedule—for example, once in two or three years for sedge roots—in order to keep plants healthy and harvest the most robust materials for basket making plants.

### Sustainability Experts

Each family had their own sourcing area for collecting basket-making plants, and cultivated plants to produce what they needed. They



*Pomo Indian, early 1900s*

also used pruning, controlled burnings and other sustainable techniques. So when the Europeans saw the beautiful area of Sonoma County, they had no idea they were seeing a garden, well-tended by Pomo—the original sustainability experts.

### Paradise Lost

Sustainability was disturbed when outsiders brought in foreign germs and disease, land-seizing and aggressive development. The Pomo people were severed from their ancestral lands and from the practices that sustained their inner and outer lives.



Beginning when the Pomo could no longer practice the sustainable land management that had at once made the landscape both beautiful and productive, the

watersheds including those now known as Colgan Creek, Laguna de Santa Rosa and Russian River, entered a period of development and gradual ecological decline.

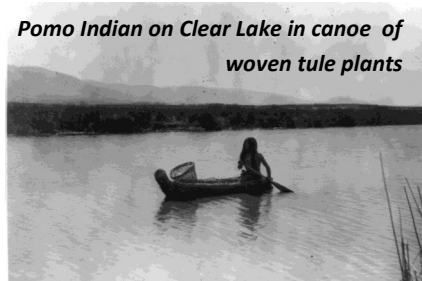
*The Pomo "acknowledged that they had been given a bounteous world and they worked to keep it balanced and unchanged from their Creator's design.*

*Imagine their astonishment at the ways of the Spanish, Russians and soon-to-be-Americans."*

*-K.C. Patrick,  
The Pomo of Lake County*

### Headwaters History

In 1848, the area that includes the Colgan Creek watershed became American land. In the 1850s, Santa



*Pomo Indian on Clear Lake in canoe of woven tule plants*



*Taylor Mountain, 2013*



*Taylor's White Sulphur Springs*

Rosa's population was 400 and its economy was based on the sales of cattle and potatoes.

not producing anymore, water was trucked in. This venture was short-lived.

John Shakelford Taylor was then homesteading 1,400 acres at the foot of what is now Taylor Mountain.

When the springs business ended, renters took the property and were caught producing over 1,000 gallons of moonshine per day—the largest bootlegging operation ever found in Northern California during prohibition. The property was afterward used as a stocked game preserve.

Around 1862, Taylor noticed a mineral springs on his property and built a resort to lure wealthy San Franciscans. They came by stagecoach to stay at Taylor's White Sulphur Springs.

Although the 1969 earthquake caused the mineral spring to start producing again, the flow did not last. All that remains of the former resort are a few old buildings and some landscaping features.

When the 1906 earthquake shifted the rock formations, the spring stopped and business dried up with it. In 1910 the resort was reopened by local businessmen under the faux-Indian place name: Kawana. Since the springs were

## Elsie Allen's Courage



Pomo basket artist Elsie Allen left a legacy that crosses cultural boundaries, a gift both long lasting and profound. The high school named for her is reached by crossing a bridge over Colgan Creek, where extensive restoration work is now underway.

Elsie was a world-class basket artist in the Pomo tradition. She and her ancestors in Sonoma County achieved an artistry surpassing that of all the world's basket-making cultures. This is a phenomenal achievement, and in part attributed to the variety and quality of the materials they could choose from, among the plants they tended for use.

We remember Elsie not only for her skills but her courage. Pomo baskets were traditionally buried in the

graves of those who created them. But Elsie's mother, Annie Burke, asked her daughter to break tradition. Elsie not only kept her mother's baskets from getting buried in her grave, but helped keep the techniques of Pomo basket-making from getting buried in obscurity. Elsie reached across cultures to teach basket making. When she died, Elsie's baskets were not buried, either. You can see her baskets and those made by other Pomo artists at the Grace Hudson Museum in Ukiah.



*Above: Annie Burke, teaching the lattice basket weave technique*

## What Would Elsie Do?

It takes courage to keep trying. Even after all Elsie's advocacy work, fewer and fewer Pomo baskets are being made today because the materials are so scarce. Pesticides harm native plants, most of the undeveloped riparian land is private, and Pomo families can no longer harvest from their plant-gathering sites. Many sites are buried under the waters of Lake Sonoma, an engineered lake.

Yet some basket makers persevere. The most basic aspect of basket art work was rooted in the same kind of tasks you might do for Colgan Creek—tending plants. You might even grow a few that Elsie and her ancestors used for baskets: willows and sedges. Anything you do to help restore the health of Colgan Creek contributes to the possible resurgence of a great art form, on the land from which it first emerged.

Ask a Pomo basket maker how long it takes to make a basket and the answer will frequently be, "At least a year!"

There is so much preparatory work required, that making the basket



*Top: Pomo basket (artist unknown). Above: Bracken fern used in Pomo basket making, growing in the Colgan Creek watershed*

itself can be the easiest part. But making a Pomo basket is not easy. Could you tie ten thousand perfect knots with dry plant cuttings? That's how many perfect knots make up some Pomo baskets. And these baskets were not just for looks, but performed many chores, including holding water without leaking a drop, storing grains, catching fish and transporting infants. Yet these baskets are as beautiful as they are functional—thus earning the world's admiration.

## NATIVE PLANTS

Plants, unless tossed about by wind or humans, don't move much. We can walk right by them, as if blind to their existence. *Plant blindness* is a term coined in 1998 by scientists James Wandersee and Elizabeth Schussler to describe the human trait to not notice vegetation.

When people can't even see a plant, they are less likely to understand what role it has in the ecosystem. Creek helpers might remind others that plants work hard. They filter water, prevent erosion, provide food, and sequester carbon dioxide, along with many other jobs. Trees create shade that cools the air and water for fish, and roots that filter water and keep the creek banks from washing away in storms. Trees bring birds back to the creek, and give cooling shade for people and other life forms escaping hot sun.

Right now Colgan Creek needs more trees and shrubs to create cooling shade and cover. We know that jays and other small animals stash acorns in the ground for eating later, and these acorns often sprout and become trees.



Western scrub jay with acorn

But we want to plant more trees by intention than jays or squirrels can propagate accidentally.

### Tree-Farming Amateurs

Growing more trees is up to us amateurs. *Amateur* is French, from the Latin word for someone who loves—in this case someone who loves trees and wants to help them thrive. Sometimes amateurs can have superb results growing trees because they have their heart in their work, tending the plants that will one day become trees. A few healthy oaks can provide living space for well over 5,000 other species!

The simplest way to grow more trees and shrubs is to buy them. Less easy is propagation, which can be tricky, according to experts. When you succeed, do share your processes with others. We are all learning here!

### Valley Oak (*Quercus lobata*)

California boasts 20 species of oak tree, but Colgan Creek has the right conditions for only a few, including blue oak, red oak, valley oak and the non-native cork oak. Valley oaks are the ones we want, since they thrive near creeks—and can live 600 years! You can purchase a seedling (see chart below) or plant acorns you gather from the tree or the ground.

### Seedlings or Acorns

If you buy your seedling, care for it until it's time to plant it in the ground. If you want to propagate a tree, start from an acorn. Take valley oak acorns from the tree in early fall, if they are turning brown and the cap twists off easily in your fingers.

*"There's a reason why native plants are so hard to grow—there are so many variables. It's hard work and takes constant attention because the plants have idiosyncratic needs."*

*-- Phil Van Soelen,  
California Flora Nursery*

Or, pick acorns off the ground—only fresh-looking valley oak acorns, without cracks, mold or insect holes.

Twist off the caps and drop the acorns in a bucket of water, keeping the ones that sink. First put the keepers on a flat surface to dry, about half an hour, then place in a plastic bag in the fridge for a month. (Acorns that sprout in the fridge should be planted right away.)

Local Places to Purchase Native Plants and Seeds			
<b>Buckeye</b> Petaluma 559-7081 <a href="http://buckeyenursery.com">buckeyenursery.com</a>	<b>CSES</b> Windsor 838-6641 ext. 401 <a href="http://cses.org">cses.org</a> (appt. only)	<b>Larner Seeds</b> Bolinas (415) 868-9407 <a href="http://larnerseeds.com">larnerseeds.com</a>	<b>Mostly Natives</b> Tomales 878-2009 <a href="http://mostlynatives.com">mostlynatives.com</a>
<b>California Flora</b> Fulton 528-8813 <a href="http://calfloranursery.com">calfloranursery.com</a>	<b>Jail Industries</b> Santa Rosa 525-8310 <a href="http://sonoma-county.org/jailindustries">sonoma-county.org/jailindustries</a> by appt. or scheduled sales only	<b>Le Ballister's</b> Santa Rosa 526-6733 <a href="http://Lebalisterseed.com">Lebalisterseed.com</a>	<b>North Coast Native</b> Petaluma 769-1213 <a href="http://northcoastnativenursery.com">northcoastnativenursery.com</a>

## PROPAGATING PLANTS



### Planting & Transplanting

You can plant acorns November through March, but ideally in November. To plant in the ground, dig a hole deeper than you need, refilling the hole with loosened soil to make it easier for roots to spread. Place the acorn on its side and cover with ½ - 1 inch of soil. Or, in a container of potting mix, place acorn on its side and cover with ½ - 1 inch of soil.

Transplant seedlings December through February, in damp but not frozen ground. Dig a hole deeper than your container, loosening the soil. Make sure the potting mix remains clinging to the roots, and that the top of the potting mix is exactly level with the ground.

### Protect Them

Your seedlings are vulnerable. To

guard them from hungry predators, try cages, closed on the top. In a 2 - 3 feet radius around the seedling, remove all weeds. Also, put down mulch so invading plants won't take up all the available nutrients and moisture your tree needs to grow. Be sure to water, if necessary. Tend and guard your seedlings for at least 2 years. Does that seem like forever? If you can't commit for that long, find someone who can, until the seedling is strong enough to fend for itself.



Valley oak seedling

Adapted from: [www.ucanr.edu](http://www.ucanr.edu)

### California Mugwort

(*Artemisia douglasiana*)

This plant was used by the Pomo Indians for medicines and ritual practices. Mugwort grows up to 6 feet high and smells a bit like sage. Mugwort plants grow in close clumps resembling a shrub. The easiest way

to propagate this plant is by dividing the roots or by separating the rooted rhizomes and transplanting them.

### Pacific Rush (*Juncus effusus*)

Rushes grow close to the water in thick clumps suggestive of wire-thick grass. Like Mugwort, the Pacific Rush can be propagated by dividing mature plants or by transplanting rhizomes.

### Buckeye (*Aesculus californica*)

Collect buckeye seeds in the fall, but **use gloves**, since the tree and seeds are toxic. Remove the fruit and drop seeds into a bucket of water to soak overnight, then drain. Saturate a mixture of 3 parts potting soil and 1 part sand, then drain half an hour. Plant one seed (per container) leaving half the seed exposed and the pale part of the seed under soil. Cover with a fine layer of soil. Water infrequently, soaking as you did when planting the seeds. Buckeyes will germinate in about 3 weeks. Transplant in spring, spacing 20 feet or more apart. Tend buckeyes as you would oak seedlings, using cages with wire tops.

Adapted from: [homeguides.sfgate.com/germinate-buckeye-43042.html](http://homeguides.sfgate.com/germinate-buckeye-43042.html)



Left to right: Red Willow (*Salix laevigata*)  
Yellow Willow (*Salix lutea*)

### Willows

Willows "sprig" from cuttings. On Colgan Creek, red and yellow willow trees are wanted. Between October and December, choose straight branches between ¾ inch to 1 ½ inches in diameter. Cut to the main stem or to a bud which will later sprout. Cut at an angle and trim the top for a 3-foot cutting length (shorter will work also). Place angled cut 2 ½ feet into the ground, burying 2/3 of the cutting. Buds should point up.

Adapted from *Groundwork*, by Liza Prunuske



California buckeye seeds

This common yellowthroat will thrive in a restored Colgan Creek



## WILDLIFE

### Enhancing Habitat

Habitat equals home; if you enhance the natural habitat on Colgan Creek, you'll invite foxes, flies, butterflies, lizards, frogs, egrets, owls, trout, salmon, shooting star flowers and happier people. Often one key species moves in, prompting more species show up. The much-maligned beavers is such a species, a native to the Russian River watershed. To learn how citizen science turned beavers in Martinez from villains to watershed heroes, see: [www.martinezbeavers.org/wordpress/](http://www.martinezbeavers.org/wordpress/)



Above: osprey. Below: tiger salamander



Beaver - a watershed hero

### Wild Residents

When a lush tree canopy has been restored to Colgan Creek, you can look for the presence of many birds. In the lowest part of the trees, called the **understory**, look for a songbird called common yellowthroat; in the **midstory**, where foliage is thickest, look for the belted kingfisher; in a tree-trunk cavity, for a pair of nesting Nuttalls woodpeckers; and in the topmost branches, the **canopy**, for osprey and red-shouldered hawk.



Above: red-shouldered hawk

Center: Nuttalls woodpeckers, belted kingfisher

Below: California freshwater shrimp



### Creek = Corridor

Animals need the creek to walk, feed, drink, flee or migrate. A creek should provide connectivity for animals—a safe and unbroken habitat pathway from one place to another. For animals, lush creeks are a corridor connecting them to food, water and cover as they hunt, hide and protect their off-spring. A fox would have a hard time hiding, hunting or raising kits along Santa Rosa Avenue.

### Habitat Extra Credit: TBC3

Learn how land use and climate change are shifting the distribution of plants and other organisms in our region: Terrestrial Biodiversity and Climate Change Collaborative (TBC3) for the San Francisco Bay Area at [http://www.tbc3.org/projects/vegetation\\_impacts/](http://www.tbc3.org/projects/vegetation_impacts/)



California red-legged frog

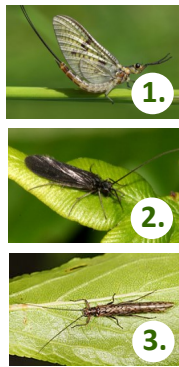
When Mark Twain wrote "The Celebrated Jumping Frog of Calaveras County" in 1867, his animal subject was this handsome swimmer at left, which also makes its home in Sonoma County. The species is endangered.



## HELPING NATIVE FISH

Colgan Creek needs lower water temperature. As we restore the trees and plants that provide shade, we can expect water to gradually cool and to provide better habitat for fish such as steelhead trout.

Most fish now in Colgan Creek are non-natives that can survive in the worst warm water conditions. Improving water quality in Colgan Creek—which flows into the Laguna de Santa Rosa—will benefit salmon and trout in the Laguna and Russian River.



When 3 key aquatic insects appear, then conditions are right for fish and other species whose life cycle depends on them: 1. **mayflies**, 2. **caddisflies**, and 3. **stoneflies**.

Where we find these indicators species of insects thriving in Colgan Creek, we will also find good water quality and food for trout.

	Water temperatures required for life stages of <b>Steelhead, Coho and Chinook</b>	Maximum Water Temp. (F)
<b>Eggs to Newborn</b> <i>Spawning, egg incubation and fry emergence</i>		<b>55</b>
<b>Lots of Kids</b> <i>"Core" juvenile rearing (core = high-density population)</i>		<b>60</b>
<b>Smaller Fish Families</b> <i>Adult + "non-core" juvenile rearing (low-density population)</i>		<b>64.4</b>
<b>Grown Fish on a Journey</b> <i>Adult migration</i>		<b>68</b>

*"Water is the key: if we do right by fish, we can do right by most other things."  
—Rich Walker*

## Fish and Gardening?

You may not think of fish when you slip on your gardening gloves, but your yard work habits can have a big impact on aquatic life. For healthier creeks, replace chemical pesticides with insects that will work hard for you, helping you create an organic garden—healthier for you, too!

<b>Green Lacewing</b>  <i>aphid wolf</i> <i>aphid lion</i>  <b>How it Helps</b> Eats aphids, thrips, scale, mealybugs, spider mites, leaf hoppers	<b>Ladybeetle</b>  <i>Ladybug,</i> <i>ladybird beetle,</i> <i>7-spotted ladybeetle</i>  <b>How it Helps</b> Eats aphids, thrips, scale, mealybugs, spider mites  	<b>Dragonfly</b>  <i>darner</i> <i>mosquito,</i> <i>hawk</i>  <b>How it Helps</b> Eats flies, midges + mosquitos	<b>Bee</b>  <i>European honey bee,</i> <i>bumble bee</i>  <b>How it Helps</b> Pollinates plants  	<b>Syrphid Fly</b>  <i>hover fly,</i> <i>flower fly</i>  <b>How it Helps</b> Pollinates plants, eats mealybugs + others
<b>Ground Beetle</b>  <i>Predacious ground beetle,</i> <i>carabids, etc.</i>  <b>How it Helps</b> Eats soil-dwellers: slugs, snails, cutworms, root maggots	<b>Parasitic Wasp</b>  <i>trichogramma,</i> <i>others</i>  <b>How it Helps</b> Attacks eggs of cutworms, white flies, cabbage loopers, codling moths, tomato horn-worms, aphids, scales	<b>Spider</b>  <i>funnel weavers, crab,</i> <i>golden orb,</i> <i>others</i>  <b>How it Helps</b> Traps, eats pest insects  	<b>Soldier Beetle</b>  <i>Leatherwings</i>  <b>How it Helps</b> Attacks + feeds on aphids + other soft-bodied insects	<b>Tachinid Fly</b>  <i>diptera</i>  <b>How it Helps</b> Consumes caterpillars + beetles



*Steelhead trout*

## WATER QUALITY TESTS

Keeping records of water quality data enables us to sound the alarm when pollution has entered the creek. Thanks to Elsie Allen High School biology teacher Jenny Fleisher, students perform all seven of these water quality tests in Colgan Creek. View data on the website — (<http://map.colgancreek.org/>).

**Report suspicious water test data (Use chart on page 8)**



*Water thermometer*

### 1. Temperature

Colgan Creek water is generally too warm to support trout, salmon or other cold-water dependent species. When the newly planted native trees and shrubs begin to mature and shade begins to cool the water, conditions will get better.



*Test strip for Ph reading*

### 2. pH

Creek organisms need water with a balanced pH. In Colgan Creek, the lucky number is 7. Each pH value < 7 indicates 10 times greater acidic. And for each number >7, the base is 10 times greater. If you find pH spikes in either direction, report it!

### 3. Dissolved oxygen

Aquatic animals rely on breathing oxygen that is dissolved in water. When the oxygen gets too low, these organisms die. In fact the entire creek can die. Cold water that travels swiftly contains more oxygen than warm, still water, so a healthy creek needs movement. Stagnant water has the lowest levels, and summer is the season when dissolved oxygen levels are predictably low.

### 4. Conductivity

This test measures how well water conducts electricity. High conductivity readings may indicate an oil spill in the creek or possible storm water contamination.



*Above, conductivity meter  
Below, nephelometer*

### 5. Turbidity

Turbid water contains suspended particles that, in excess, can harm riparian habitat. Turbidity can be observed with the eye, but for scientific purposes is measured in turbidity units via nephelometer (NTUs).

### 6. Phosphorus

Phosphorus boosts plant growth, making water green and cloudy. When this extra plant life dies, it loads up the creek with rotting vegetation—reducing oxygen levels in the water. Phosphorus is measured in parts per million.



### 7. Nitrogen

Nitrogen is a naturally occurring nutrient which, in excess amounts, causes a host of problems for water bodies, including algae blooms which harm aquatic environments and are extremely difficult to control. Nitrogen levels in water are measured in parts per million.

## TREE LIST

Tree species used in restoration of Colgan Creek

Photos left to right:  
Oregon ash  
Big leaf maple  
Coastal redwood  
California buckeye



Common Name	Scientific Name	Planting Zone (area where species is well adapted)	Characteristics, Suitability for Flood Control Channels
<b>Big leaf maple</b>	<i>Acer macrophyllum</i>	Mid to Upper Bank	Preferred. Relatively upright growth, wide spreading.
<b>Box elder</b>	<i>Acer nugundo</i>	Mid to Upper Bank	Spreading, well-adapted to heavy soils
<b>California buckeye</b>	<i>Aesculus californica</i>	Upper Bank	Adds diversity, and beautiful white blossoms in spring
<b>White alder</b>	<i>Alnus rhombifolia</i>	Toe to Mid Bank	Preferred. Relatively upright growth, wide spreading, fast growth
<b>Oregon ash</b>	<i>Fraxinus latifolia</i>	Toe to Mid Bank	Preferred. Relatively upright growth, wide spreading
<b>N. California black walnut</b>	<i>Juglans californica</i>	Mid to Upper Bank	Adds diversity, hardy growth
<b>Fremont cottonwood</b>	<i>Populus fremontii fremontii</i>	Toe to Mid Bank	Relatively upright growth, wide spreading
<b>Coast live oak</b>	<i>Quercus agrifolia</i>	Upper Bank	Relatively upright growth, wide spreading
<b>Valley oak</b>	<i>Quercus lobata</i>	Upper Bank	Relatively upright growth, wide spreading
<b>Red willow</b>	<i>Salix laevigata</i>	Toe to Mid Bank	Preferred. Relatively upright growth, wide spreading
<b>Arroyo willow</b>	<i>Salix lasiolepis (not preferred)</i>	Toe to Mid Bank	Fast growth, spreading. <b>Only for upper banks, to offset vigorous branching</b>
<b>Shining willow</b>	<i>Salix lucida lasiandra</i>	Toe to Mid Bank	Preferred. Relatively upright growth, wide spreading
<b>Coast redwood</b>	<i>Sequoia sempervirens</i>	Mid to Upper Bank	Plant only where this redwood species can be found naturally
<b>California bay laurel</b>	<i>Umbellularia californica</i>	Upper Bank	Preferred. Relatively upright growth, wide spreading

## APPENDIX

### Resources

*A Bay-Friendly Guide to Mulch*, by the Bay-Friendly Landscaping and Gardening Coalition, 2011.

*Biodiversity Action Plan for Sonoma County (Draft, 2009)*.

*California's Salmon and Trout: Our Valuable Natural Heritage (Rev.)* by Diane Higgins, CACST and U.S. Fish and Wildlife Service, 1999.

*Enhancing and Caring for the Laguna (vol. 1): Restoring and Managing the Laguna de Santa Rosa*, by Joseph Honton and Anna Warwick Sears. Laguna de Santa Rosa Foundation, 2006.

*Field Guide to the Laguna de Santa Rosa: A Manual for Identifying Common Animals and Plants*. Ed. Catherine Cumberland. Laguna de Santa Rosa Foundation, 2009.

*Field Guide to the Vernal Pool Plants of the Santa Rosa Plain: A Manual for Identifying Common Vernal Pool Plants*, by Hattie Brown. The Laguna de Santa Rosa Foundation and the California Native Plant Society, 2012.

*Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California* (2<sup>nd</sup> ed.) by Liza Prunuske. Marin Resource Conservation District and Marin County Stormwater Pollution Prevention Program, 1987.

*A Guide to Restoring Native Riparian Habitat in the Russian River Watershed*, by Sonoma County Water Agency and Circuit Rider Productions, 1998.

*The Habitat Garden Book: Wildlife Landscaping for the San Francisco Bay Region* (2<sup>nd</sup> ed.), by Nancy Bauer. Coyote Ridge Press, 2008.

*My Healthy Stream: A Handbook for Streamside Owners* (2<sup>nd</sup> ed.), by Jack E. Williams, Michael P. Dombeck, Christopher E. Wood. Trout Unlimited, Aldo Leopold Foundation, 2014.

*Slow It, Sink It, Spread It: A Homeowner's and Landowner's Guide to Beneficial Stormwater Management*. Southern Sonoma County Resource Conservation Dist. and the Resource Conservation District of Santa Cruz County, 2010.

### Credits

(p.1) Santa Rosa Creek, *Sonoma County Gazette*; Boy, Gore family, 1960; great egret, Susan E. Newman. (p.2) Juliane Poirier. (p.3) J. Poirier, except cow, unknown. (p.4) Chart photos, Brian Hines; others, J. Poirier. (p.5) B. Hines. (p.6) Top, B. Hines; lower left, J. Poirier; lower right, Sandy Metzger. (p.7) Far left, unknown; others, B. Hines. (p.8) John Dittes, 2008. (p.9) Maps, Ashlee Llewellyn; trees, J. Poirier; Pomo woman, E. Curtis. (pg. 10) Trees, J. Poirier; Pomo, unknown; resort, Sonoma County Historical Society Collection. (pg. 11) Elsie Allen, Annie Burke, Pomo basket, unknown; fern, J. Poirier. (pg. 12) Western scrub jay, Joyce Gross, 2003. (pg. 13) Valley acorns, Neil Kramer, 2007; seedling, Nick De Croce; California buckeye seeds, Charles E. Jones, 2002; Willows, USDA. (pg. 14) Common yellowthroat, Christopher Christie, 2008; Osprey, Gerald & Buff Corsi, 1999, CAL ACAD; salamander, Bill Stagnaro, 2008; beaver, John White, 2003; red-legged frog, Robert Wanat, 2007; red-shouldered hawk, Nutalls woodpecker, Ron Wolf, 2008; belted kingfisher, Steve Zamek, 2009; shrimp, fox, unknown.

(pg. 15) Insects, unknown; illustrations of trout, coho and Chinook, Sonoma County Water Agency; steelhead trout, NOAA. (pg. 16) J. Poirier. (pg. 17) Oregon ash, big leaf maple, and coastal redwood, unknown; California buckeye, J. Poirier.

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