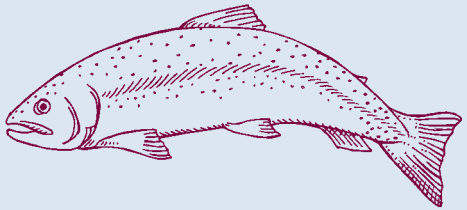
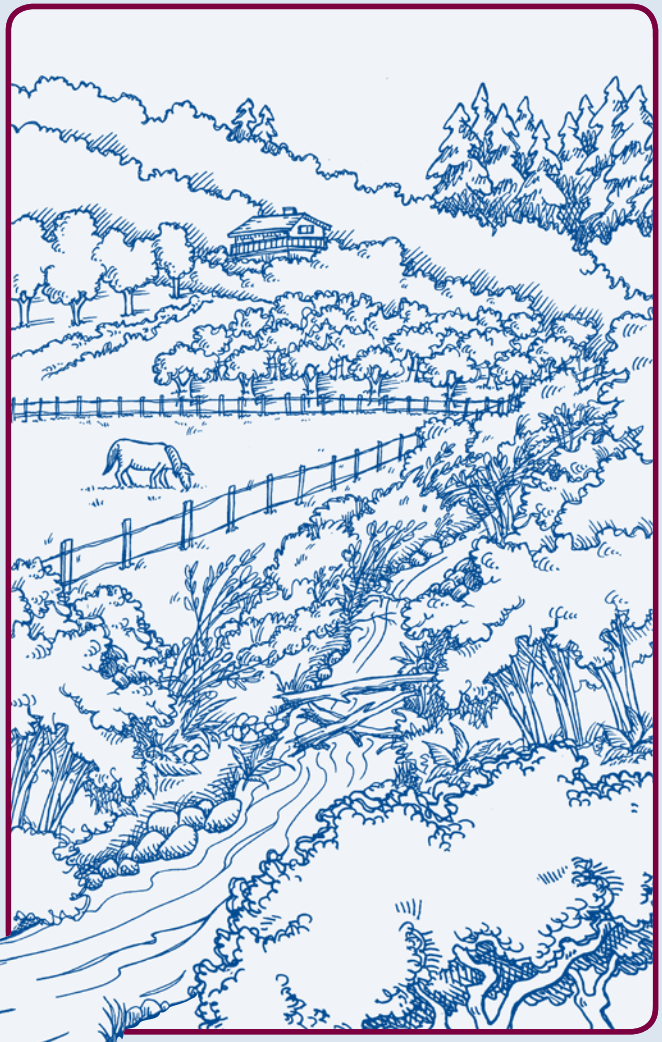


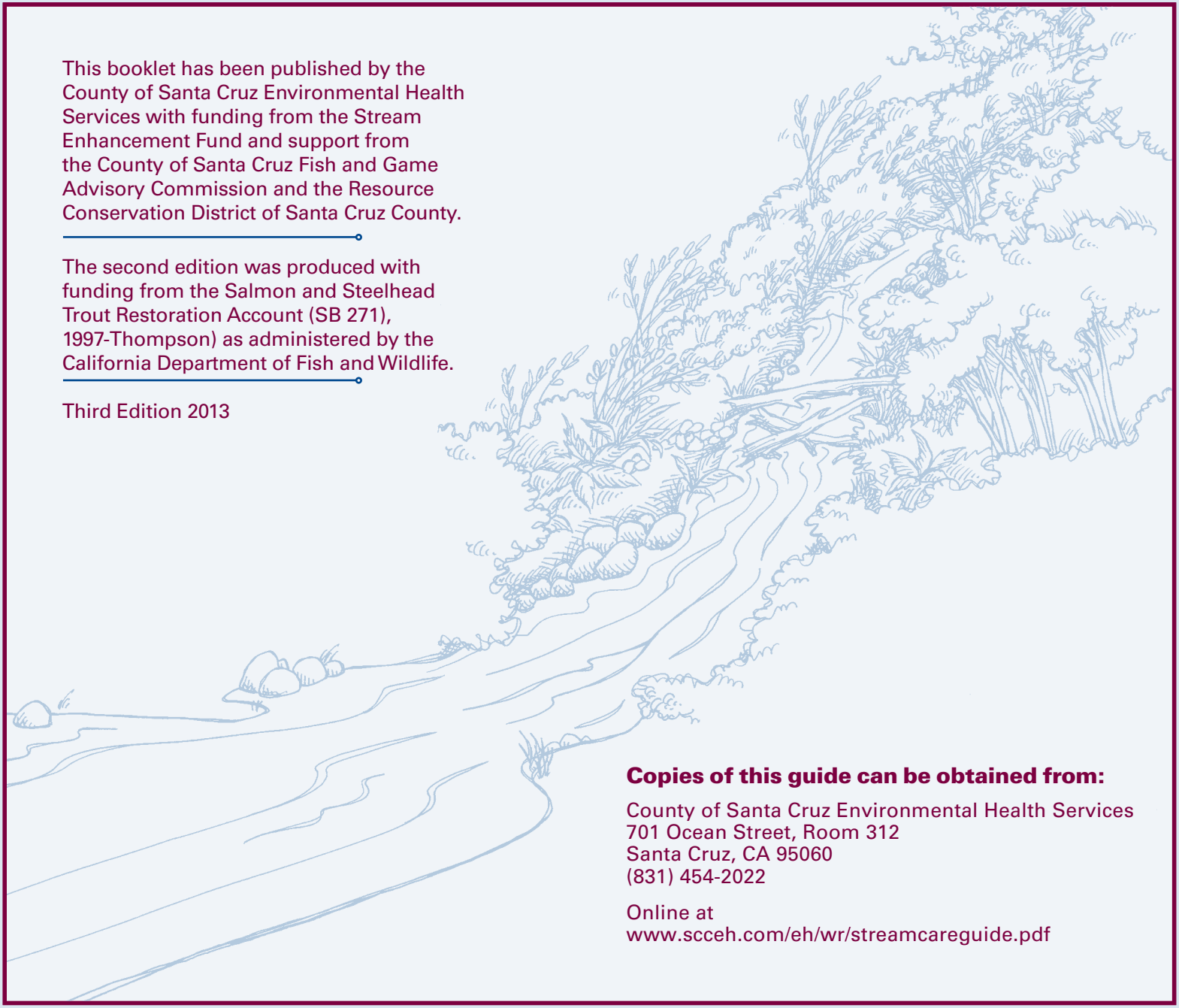
Santa Cruz County Stream Care Guide



This booklet has been published by the County of Santa Cruz Environmental Health Services with funding from the Stream Enhancement Fund and support from the County of Santa Cruz Fish and Game Advisory Commission and the Resource Conservation District of Santa Cruz County.

The second edition was produced with funding from the Salmon and Steelhead Trout Restoration Account (SB 271), 1997-Thompson) as administered by the California Department of Fish and Wildlife.

Third Edition 2013



Copies of this guide can be obtained from:

County of Santa Cruz Environmental Health Services
701 Ocean Street, Room 312
Santa Cruz, CA 95060
(831) 454-2022

Online at
www.scceh.com/eh/wr/streamcareguide.pdf

Introduction

Streams, from large rivers to small creeks, touch the lives of every Santa Cruz County resident. More than 770 miles of waterways flow through the County, so no one lives very far from a creek, stream, or river. By providing water supply, wildlife habitat, flood capacity, and aesthetic and recreation values, our waterways comprise an invaluable resource–but one that can be easily damaged by careless actions or improper land use.

Since most streamside acreage is in private ownership, much of the responsibility for the life and health of our streams lies with you, the streamside resident or property owner. Proper management of your stream bank and its vegetation can prevent or minimize erosion, preserve water quality, contribute to the survival of the area's fish and wildlife, help avoid flood losses, and protect property values.

The principles of proper stream care are simple, but they require your active participation. This booklet seeks to stimulate that participation and to guide you in your stream stewardship. With a little care, you can preserve and enhance your streamside environment and protect Santa Cruz County's heritage of productive streams.

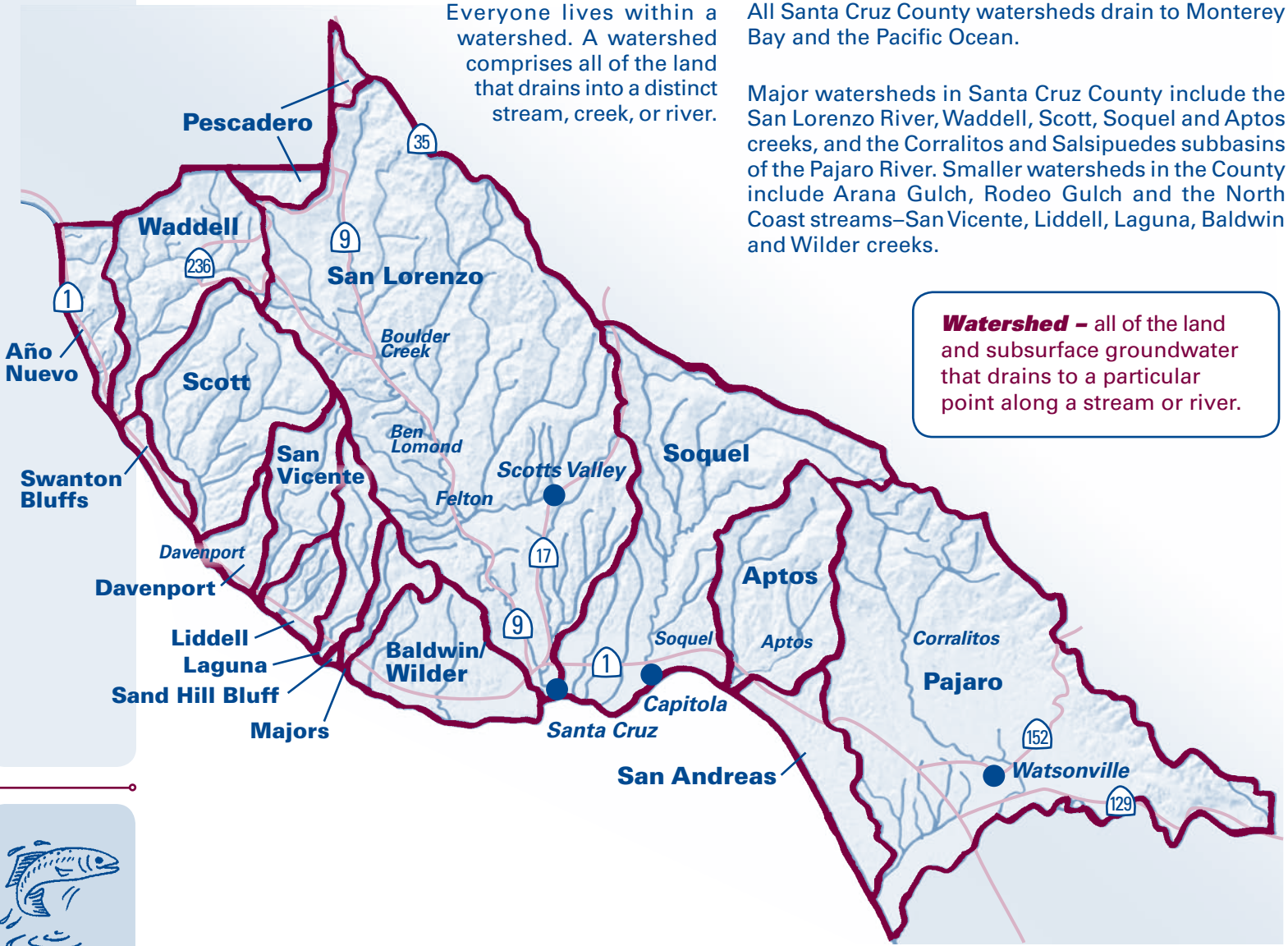
Santa Cruz County Watersheds

Everyone lives within a watershed. A watershed comprises all of the land that drains into a distinct stream, creek, or river.

All Santa Cruz County watersheds drain to Monterey Bay and the Pacific Ocean.

Major watersheds in Santa Cruz County include the San Lorenzo River, Waddell, Scott, Soquel and Aptos creeks, and the Corralitos and Salsipuedes subbasins of the Pajaro River. Smaller watersheds in the County include Arana Gulch, Rodeo Gulch and the North Coast streams–San Vicente, Liddell, Laguna, Baldwin and Wilder creeks.

Watershed – all of the land and subsurface groundwater that drains to a particular point along a stream or river.



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The Living Stream

Riparian habitat – the area adjacent to and influenced by a stream together with the plant and animal community it supports.

A stream is more than just a channel for rainwater in its passage to the ocean. It is a complex, living system where the characteristics of the stream bed–its composition, shape, and elevation drop–interact with the dissolved nutrients and organic matter in flowing water to create a dynamic environment rich with plant and animal life. Stream corridors should not be viewed as static or stable environments but areas of constant change over time and space.

Streams reflect what is happening on the surrounding land. Healthy streams (from their headwaters to their valley bottoms), require space where the interactions between water, land, and the biota can occur over time.

A healthy stream will have:

- cool, clear oxygen-rich water free of pollutants and excess algae
- gravel and cobble without too much sand and silt for aquatic insect production and fish spawning
- a balance of fast water riffles for aquatic insects, fish spawning and feeding, and pool habitats as cover and refuge from high flows
- abundant large stream wood to provide habitat and cover for aquatic and riparian species, and to scour pools
- adequate summer streamflow
- lush streamside vegetation to stabilize banks and provide shade and food for wildlife

The health of the stream environment depends on several physical factors: water quality; water temperature; the amount of sunlight reaching the stream; the character of the stream bottom (whether bedrock, boulder, gravel, sand, or fine silt); and the volume and timing of water flowing through the stream. Human activities can influence all of these.

Riparian habitats cover only about 1 percent of the County's watersheds, but provide food and shelter for a great variety of wildlife. This zone is also critical as a migration corridor for many animals, especially where nearby upland development can be a barrier to overland travel.

Coastal streams are also important for the tidally-influenced lagoons in the lower portions of the watershed. These highly productive ecosystems depend on high quality freshwater and adequate stream flows. In turn, healthy streams and lagoons benefit the health of our coastal marine waters including the Monterey Bay National Marine Sanctuary, one of the most biologically diverse marine ecosystems in the world.

Our Local Streams

Santa Cruz County streams are home to a wide variety of native fish, plants and wildlife. Our local streams support native fishes that include steelhead, coho salmon, Pacific lamprey, Sacramento sucker, prickly sculpin, three-spine stickleback, and California roach. Santa Cruz County streams also support sensitive wildlife species such as the California red-legged frog, foothill yellow-legged frog, and western pond turtle.

Steelhead are found in the San Lorenzo, Arana, Soquel, Aptos and Pajaro River watersheds, and several north coast streams including Waddell, Scott and San Vicente creeks. Coho salmon were once widespread in Santa Cruz County but are now restricted to small remnant runs in Waddell, Scott and San Vicente creeks.

Both steelhead and coho salmon populations have declined from historical levels due to many reasons including past and current water diversions, road building, urbanization, channelization, poor forestry and hatchery practices, removal of large wood and degradation of lagoon and riparian areas. In Santa Cruz County, steelhead populations are threatened, but can be improved with good stream care. Coho salmon are critically endangered and may become locally extinct without serious efforts to improve stream habitat. Steelhead are protected under the Federal Endangered Species Act (ESA) and coho salmon are protected under both the State and Federal ESA.

Reduced streamflows and fine sediments, especially sand, are the greatest threats to Santa Cruz County streams. Reduced streamflows from both surface diversions and groundwater extraction reduce the quantity and quality of instream habitat. Fine sediments from accelerated erosion clog spawning gravels and fill rearing habitats for steelhead and coho salmon.

Common Stream Concerns

- **Excessive soil erosion** reduces drinking water quality, diminishes fish habitat by filling in pools, reduces insect abundance, smothers fish eggs in the gravel, and reduces a stream's ability to carry flood waters.
- **Stream diversions** reduce flows thereby lowering the quality and quantity of summer rearing habitat for steelhead and other native fishes.
- **Removal of stream wood** decreases cover habitat for fish and other wildlife and can alter pool development.
- **Loss of habitat** can occur from the removal of native plants or the construction of wooden or concrete walls along stream banks.
- **Impervious surfaces** such as roofs and roads reduce the amount of water that could naturally soak into the soil for groundwater recharge. These impervious surfaces also increase the volume of stormwater runoff, which can cause flooding, erosion and other stream impacts.
- **Bare, unstable stream banks** with little or no plants contribute to bank erosion and do not provide shade or wildlife habitat.
- **Excess nutrients** from manure, fertilizer, or septic systems can cause algae to grow at a high rate. Too much algae can use up oxygen in the water–stressing or killing fish.
- **Pollutants** such as metals, pesticides, sewage, oil, yard waste, trash, and construction debris harm drinking water supplies, fish and wildlife. Excess landscape irrigation, household greywater, and swimming pool or spa water are also considered to be pollutants.
- **Warm water** (>60° F) without adequate food sources can stress fish. Water over 75° F can kill both steelhead and coho salmon.

Although most local streams have been degraded by human impacts to some degree, many residents, community groups, and agencies have come together to reverse this trend. Your stewardship of creek habitats on your property will aid in these efforts.

Fish Facts

Steelhead and Coho Salmon Life Cycles

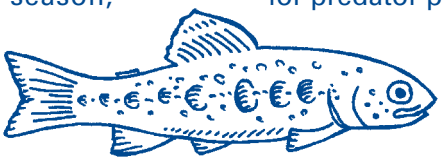
Steelhead and Salmon Habitat Requirements

- Access to spawning areas.
- Clean spawning cobble and gravels without fine sediments.
- A year-round supply of cool, well-oxygenated water.
- Diverse habitat with deep, quiet pools and shallow rocky areas (riffles).
- Relatively stable creek banks.
- Shade canopy from streamside vegetation to cool water, provide insect habitat, and contribute nutrients.
- Lots of large stream wood from fallen trees, rootwads and large branches.
- Adequate food supply–mostly insects.
- Lots of cover–undercut banks, rocks, tree roots, surface turbulence, overhanging creekside vegetation, deep quiet pools, and large stream wood–for refuge from predators and fast storm flows.

Steelhead and coho salmon are anadromous fish–they spawn in freshwater and mature in the ocean. Steelhead that never enter the ocean and remain in freshwater streams are called rainbow trout.

Adult steelhead migrate upstream from the ocean during the rainy season, and spawn anytime from November to June. Steelhead and coho salmon enter local streams only when sufficient streamflow has opened coastal lagoons through which the stream drains to the ocean. Steelhead spawn (mate and lay eggs) typically at the downstream edge of pools where cover habitat exists nearby for predator protection. Eggs are laid in a depression called a redd dug into cobble or gravel substrate. Unlike salmon, steelhead can migrate out to the ocean after spawning and return in subsequent years to spawn again. Eggs hatch in 30-60 days, depending on stream temperatures. The newly hatched fish–called alevins–stay in the gravel for a few additional weeks, until their yolk sac is absorbed. When they emerge, they seek slow-water areas, often at stream edges. As they grow bigger, the young fish–called juveniles–move into faster water to feed on drifting insects.

Juvenile steelhead remain in freshwater streams from 1 to 3 years, depending on their rate of growth. Rearing juveniles have many habitat requirements. Most importantly they need sufficient, cool streamflow to transport drifting insects for feeding, and cover habitat such as undercut banks, large stream wood, boulders, and deep pools to hide from predators and have refuge during high flows. When juveniles are large enough, they migrate out to the ocean as "smolts". During this out-migration, steelhead and salmon need adequate streamflow to swim past barriers, and cover for predator protection.



Coho salmon have a similar, but more rigid lifecycle, than steelhead. Coho salmon spend their first year in freshwater streams, migrate out to sea where they mature for two years, and return to their native freshwater streams to spawn and die. Because all non-hatchery females are three years old, coho salmon develop three consecutive "year classes" in each stream. Since coho salmon are at the southern distribution of their range in Santa Cruz County, they are vulnerable to extreme environmental conditions such as droughts, floods, and the timing of winter storms, which affects when the sandbar opens for upstream migration and affects the survival of redds and juveniles.

Large climatic cycles affect not only the timing and intensity of winter storms, but also influence the survival and return of adult steelhead and coho salmon. While humans cannot control the weather or natural ocean conditions, we can protect and enhance the freshwater environment where these fish spawn and rear.

The Riparian Corridor

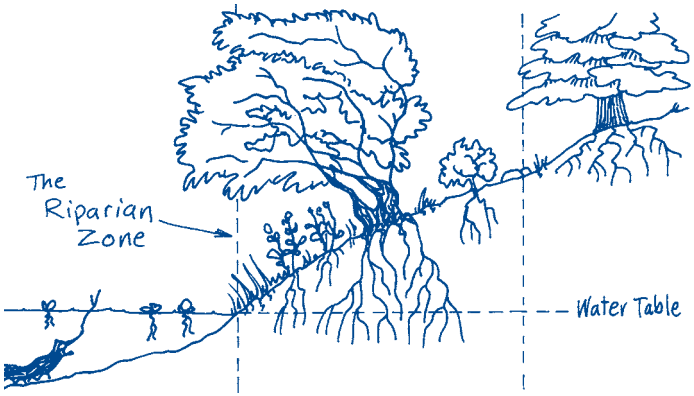
The riparian corridor is the area adjacent to the stream that supports a plant and animal community adapted to flooding or wet conditions. Willow, alder, big leaf maple and cottonwood are common riparian tree species. Redwood and Douglas-fir often inhabit the riparian corridor, particularly in the upper reaches of the watersheds. All of these tree species contribute to bank stability, shade, undercut banks, and woody material within the stream. Understory plants, such as ferns and native blackberry, are also important components of the riparian ecosystem.

In the County of Santa Cruz, the riparian corridor is a protected habitat as defined by the Riparian Corridor and Wetlands Protection Ordinance. For many properties, the protected riparian corridor is 50' from the bankfull flowline or the extent of riparian woodland. However, the extent of the riparian corridor varies depending on the type of stream and whether the property is urban or rural (see page 22).

Healthy streams need banks with undisturbed native vegetation. Riparian plants not only provide critical wildlife habitat, they also directly affect living conditions in the stream itself. Leaves and insects dropping from nearby trees and shrubs supply food for many aquatic animals, while plant roots stabilize the bank, preventing erosion.

Some streambank erosion is natural. Small areas of erosion can provide open areas for new tree seedlings to colonize. However, large areas of erosion can significantly degrade the habitat quality within the stream. Whenever possible, you should avoid "improving" your creekside area by mowing, clearing, or stripping vegetation. If you are considering altering your streambank vegetation, you should first consult with the County, as a permit may be required (see page 22, the Riparian Corridor and Wetlands Protection Ordinance, for details).

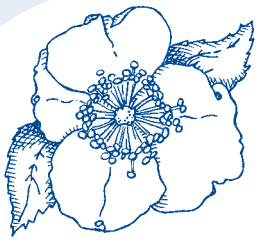
In times of flooding, a well-vegetated streambank is your property's best protection from bank erosion. The plants growing there are uniquely adapted to surviving flood conditions, providing erosion protection at high flows, and recovering quickly when flood waters subside. The roots of riparian trees, especially willows, stabilize streambanks by holding the soil together with their strong roots.



Riparian vegetation can also act as a sediment and nutrient filter, trapping sediment from adjacent properties and absorbing most of the nutrients released by animals, fertilizers, and septic systems (60–95%). To be an effective filter, this zone of vegetation must be sufficiently wide, and the shrubs, vines, and grasses of the understory, not just the trees, must be present.

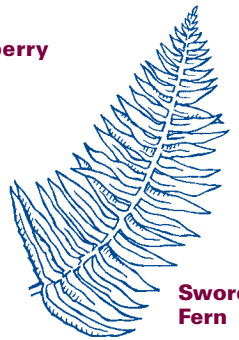
Use Native Riparian Plants

Only native species should be planted in a riparian corridor. These plants provide low maintenance, attractive landscaping as well as habitat for native wildlife. Local plants form the base of the food chain and are part of the complex web among insects, birds, fish, and other wildlife species. Native plants often require less water and are more resilient to insects and disease than many non-native ornamentals. When planted properly, native plants can also help prevent soil erosion.



California Rose

Coffeeberry



Sword Fern

Plants that occur naturally along a specific creek are adapted to local conditions and will be the easiest to grow. Contact your local native plant nursery to assist you in determining which plants are best suited for your area (see page 24). Your plants will have an increased chance of survival if you water them regularly during the dry season for the first 3 to 5 years, and weed regularly. Native trees and shrubs do not require fertilizers and pesticides.

When selecting plants for your riparian corridor, choose a variety of species including ground covers, shrubs, and trees. By planting a diversity of riparian plants you will create a more natural setting, which will benefit both aquatic and terrestrial species.

Common Riparian Plants in Santa Cruz County

Ground Covers:

- Sword Fern *(Polystichum mumitum)*
- Chain Fern *(Woodwardia fimbriata)*
- California Blackberry *(Rubus ursinus)*
- Mugwort *(Artemisia douglasiana)*
- Alum Root *(Heuchera micrantha)*

Shrubs:

- Blue Elderberry *(Sambucus mexicana)*
- California Rose *(Rosa californica)*
- California Huckleberry *(Vaccinium ovatum)*
- Thimbleberry *(Rubus parviflorus)*
- Coffeeberry *(Frangula californica)*
- Oregon Grape *(Mahonia aquifolium)*
- Pink Flowering Currant *(Ribes sanguineum and R. californicum)*
- Snow Berry *(Symphoricarpos albus)*
- Hazelnut *(Corylus cornuta)*

Trees:

- Big Leaf Maple (*Acer macrophyllum*)
- California Bay Laurel (*Umbellularia californica*)
- Coast Redwood (*Sequoia sempervirens*)
- Douglas-Fir (*Pseudotsuga menziesii*)
- Red Willow (*Salix laevigata*)
- Red Alder (*Alnus rubra*)
- Arroyo Willow *(Salix lasiolepis)*
- Box Elder *(Acer negundo)*
- Black Cottonwood *(Populus balsamifera ssp. trichocarpa)*
- Red Dogwood *(Cornus sericea)*
- Coast Live Oak *(Quercus agrifolia)*

Avoid Non-Native Plants in the Riparian Corridor

Homeowners should avoid planting non-native plants within the riparian corridor. Non-native plants do not provide the same wildlife habitat or food value as native plants.

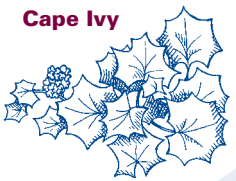
While many non-native plant species occur in the riparian areas of the County, there are a few that are particularly detrimental to the riparian ecosystem. Due to their vigorous growth, these plants often form dense monocultures, crowding out native species, and reducing the overall plant diversity of the habitat. The following list of species are those considered to be the most detrimental to riparian habitats and should be avoided.

If these species occur within the riparian habitat on your property, you are encouraged to remove and/or control their spread. Most species can be removed or controlled by hand or mechanical methods. If possible, the entire plant should be removed, including the roots (shrubs, groundcovers, and vines). Tree trunks and roots should be retained to prevent bank disturbances. Tree trunks and roots can be spot-treated with an herbicide to reduce re-sprouting and suckering. Contact the UC Cooperative Extension for advice (see page 23) and follow herbicide labels exactly.

Control of Ivies (English, Algerian, and Cape)

These three ivy species grow rapidly by underground runners and are found along most streams in the County. For small infestations among native plants, the vines can be removed by hand, although repeated efforts will be necessary. Where the vines grow into the tree canopy, they can be pulled down or cut away from the tree trunk, leaving the cut vines to die and decompose. If you have a large infestation with few native plants, you can hand-grub the ground to remove the above-ground plant and underground runners. Seed the grubbed areas with native perennial grasses to control erosion, and then re-plant with native riparian shrubs and trees. Due to their persistence, repeated efforts, including herbicides, may be required to successfully remove these species. ***Since cape ivy and periwinkle can root from small pieces, all plant parts should be put in plastic garbage bags and taken to the sanitary landfill. Other removed plants can be sent to the yard waste recycling program.***

English Ivy



Cape Ivy

Algerian Ivy

Plant Species to Avoid:

Trees:

- Black Locust (*Robinia pseudoacacia*)
- Acacia, all species (*Acacia* sp.)
- Monterey Pine (*Pinus radiata*)
- Blue Gum Eucalyptus (*Eucalyptus globulus*)
- Tree-of-heaven (*Ailanthus altissima)*

Shrubs:

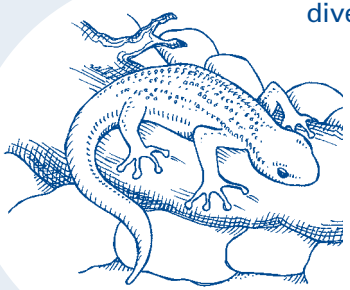
- French Broom (*Genista monspessulana*)
- Scotch Broom (*Cytisus scoparius)*
- Portuguese Broom (*Cytisus striatus)*
- Spanish Broom (*Spartium junceum)*
- Giant Reed (*Arundo donax)*
- Pampas Grass (*Cortederia jubata* and *C. selloana)*

Groundcovers and Vines:

- Periwinkle (*Vinca major*)
- Poison Hemlock (*Conium maculatum*)
- Cape Ivy (*Delaireia odorata*) (previously known as German Ivy, *Senecio mikanoides)*
- English Ivy (*Hedera helix*)
- Algerian Ivy (*Hedera* sp.)
- Iceplant (*Carpobrotus edulis)*
- Italian Thistle (*Carduus pynocephalus*)
- Harding Grass (*Phalaris* spp.)
- Mexican Eupatorium (*Ageratina adenophora)*
- Bull Thistle (*Cirsium vulgare)*
- Himalaya Berry (*Rubus procerus),*
- Wandering Jew (*Tradescantia* sp.)
- Garden Nasturtium (*Tropaeolum majus)*
- Forget-me-not (*Myosotis latifolia)*
- Hedge Bindweed (*Calystegia sepium)*

Riparian Wildlife

In California, riparian forests support the greatest diversity and abundance of wildlife species. Because of the available water and the complex vegetation structure, insects, birds, reptiles, mammals, and amphibians use the riparian forest for nesting, food, shelter, and as corridors for movement. Protecting and restoring riparian habitat is one of the most effective ways you can help wildlife.



California Newt

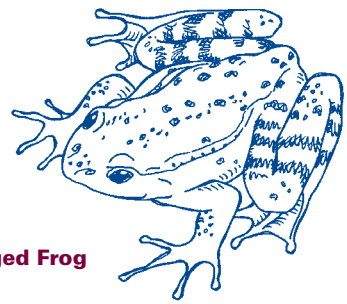
Riparian Habitat Protection Measures:

1. Protect and enhance the riparian vegetation on your property.
2. Avoid clearing dense native understory vegetation to create open park-like areas. Understory vegetation provides foraging sites and concealment of ground nests.
3. Unless there is a safety issue, keep your standing dead trees (snags) and dead limbs. Snags and dead limbs are important resources for cavity-nesting and roosting species, such as common wood ducks, mergansers, woodpeckers, chestnut-backed chickadees, bats, and other small mammals.
4. Removing trees and snags requires a Riparian Exception (see page 22). Tree removal is best done outside of the bird nesting season, generally outside the period February 1st to August 31st. Cut limbs should be left on the ground for at least a day to allow bats to wake up and escape.
5. Leave downed woody material on the streambank to provide cover and feeding areas for wildlife. If necessary, remove material during the non-breeding season (September 1 to January 31).
6. Direct security lighting away from the riparian corridor to minimize disturbances to roosting and nocturnal wildlife, such as bats and owls.

Local riparian wildlife species

- California newt
- Pacific giant salamander
- California red-legged frog
- Foothill yellow-legged frog
- Green heron
- Common merganser
- Wood duck
- Red-shouldered hawk
- Belted kingfisher
- Downy woodpecker
- Allen's hummingbird
- American dipper
- Pacific-slope flycatcher
- Warbling vireo
- Swainson's thrush
- Yellow warbler
- Wilson's warbler
- Song sparrow
- Spotted towhee
- Black-headed grosbeak
- San Francisco dusky-footed woodrat
- Bobcat
- Raccoon
- Yuma myotis bat
- Western red bat

7. Avoid planting invasive, non-native plant species, such as acacia, ivies, and periwinkle in your riparian area.
8. Do not release non-native wildlife, such as bullfrogs and exotic fish, into creeks. Avoid establishing non-native fish or wildlife populations in ponds.
9. To protect native birds and other wildlife, keep cats indoors whenever possible. Do not leave food outdoors that can attract feral animals.

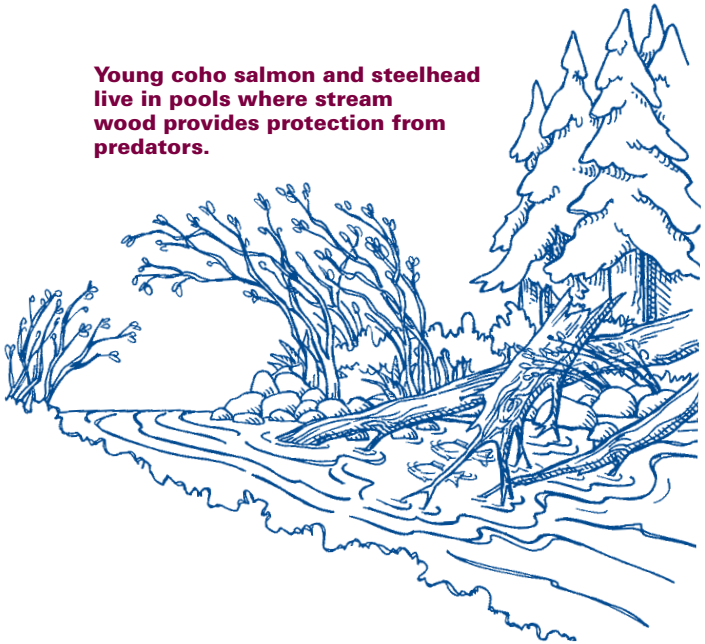


California Red-legged Frog

Stream Wood

Large stream wood from fallen trees, logs, root wads and large branches provides essential habitat for steelhead and coho salmon and helps maintain natural stream function. During high flows, stream wood helps form pools where young fish live and riffle areas where adult fish lay their eggs. Stream wood provides hiding places that protect young fish from predators and creates quiet areas that protect young fish from winter flows. Areas with lots of stream wood support the highest numbers of juvenile coho salmon and steelhead.

Wildlife such as the red-legged frog and western pond turtle prefer habitats with large wood. Stream wood also provides food and habitat for even smaller creatures like aquatic insects. In turn, these insects provide food for steelhead and coho salmon.



Young coho salmon and steelhead live in pools where stream wood provides protection from predators.

Can I cut up or remove stream wood?

Many people believe that large wood should be cut up or removed from the stream because it can cause localized flooding or bank erosion. While this is certainly a concern, wood can slow the flow of water, stabilize stream channels and banks and promote groundwater recharge. Large wood along a stream may actually reduce flooding by catching wood and debris that would otherwise wash downstream all at once and create larger logjams.

Unless it's causing flooding or erosion that threatens life or property, stream wood should be left in place. Steelhead and coho salmon and their habitat are protected under the federal Endangered Species Act, state and local laws. To cut up or remove large stream wood requires permission from the California Department of Fish and Wildlife (CDFW).

In an emergency, first trim smaller branches that catch other material. Otherwise, cut large trees by leaving as much of the trunk attached to the root wad as possible.

Pay close attention to large wood near bridges or drainage structures. Always keep brush, weeds, grass clippings, or other small material out of the stream and off the stream banks. This small material can wash downstream and create debris jams that cause flooding, erosion or culvert blockage.

Most fish can swim through, under, or around log clusters or debris jams, especially during high flows. If you are concerned about fish passage, contact the County of Santa Cruz or CDFW.

Concerned about stream wood on your property?

Contact the County of Santa Cruz Public Works Department at (831) 477-3999 for assistance with the assessment or modification of large wood.

Erosion Control

Erosion and the movement of sediment through watercourses are natural processes that shape a stream and deliver nutrients and beneficial substrates to aquatic ecosystems such as gravels used by salmon and steelhead for spawning. However, accelerated erosion, directly or indirectly caused by human disturbance, can overload a stream with sediment. Excessive sediment in the channel bed impairs water quality, reduces the stream's ability to carry flood waters, and causes or aggravates bank stability problems.

In local streams, excessive fine sediment, especially sand, is a primary factor limiting habitat for steelhead, coho salmon, and other aquatic species. Excess fine sediment degrades fish spawning and rearing habitat, and reduces aquatic insect habitat which diminishes food supplies for steelhead and coho salmon.

Erosion control efforts can prevent and minimize erosion and sedimentation in riparian corridors, upland areas and along streambanks. Your erosion control efforts should also focus on minimizing erosion from nearby roads, especially dirt roads.

Basic Strategies for Preventing Soil Erosion:

- **Protect bare soil surfaces**. Native trees, shrubs and grasses, cover crops, or mulch (gravel, sterile straw, wood chips) hold the soil in place and allow water to soak into the soil. During construction, use sterile straw or erosion control fabrics to help protect exposed soils.
- **Minimize disturbing existing plants.** If plants are disturbed, such as for the removal of invasive, non-native species, replant the area with native plants as quickly as possible.
- **Identify natural drainages and steep slopes.** Do not obstruct natural flows; allow water to flow in natural drainages or sheet flow over the surface.
- **Maintain undisturbed buffers around natural drainages**.
- **Avoid concentrating water flows, unless absolutely necessary**. Protect water or pipe outlets by using carefully placed rock or an energy dissipater.
- **Know areas of concern, such as landslides and fill slopes**. Do not concentrate flow into these areas.
- **Check and fix drainage concerns such as gutters, roads, driveways.** Make sure drainage is released onto non-erosive surfaces.

Getting Help

The Resource Conservation District (RCD) is a non-regulatory, public entity that provides technical and financial assistance to landowners and land managers in Santa Cruz County. If you have a resource concern related to erosion, rural roads or home drainage, contact the RCD or their partner agency, the Natural Resources Conservation Service (see Resources, page 23) or visit the RCD's website for additional publications and information (www.rcdsantacruz.org).

Addressing large-scale erosion can be complicated, and mistakes can further aggravate the problems. Many common attempts to stop erosion such as dumping broken concrete or woody vegetation into a gully, or lining a channel with plastic can be ineffective. It's important to identify the appropriate solution that addresses the source of the problem. For large erosion problems, you are encouraged to contact the local Natural Resources Conservation Service office, the County Planning Office, or a Certified Erosion and Sediment Control Specialist (see pages 23-24).

Home Drainage

Did you know that one inch of rain falling on the roof of your home can generate 1,000 gallons of runoff? That can add up to 20,000 to 60,000 gallons per year in Santa Cruz County, depending on where you live! Roofs and other impervious surfaces increase the volume of stormwater runoff which can decrease aquifer recharge, increase stream flows, and stress roads and other infrastructure. For more information or ideas to put your runoff to better use, visit the RCD's website for a copy of Slow it. Spread it. Sink it! A Homeowner's Guide to Greening Stormwater Runoff.

Seeding and Planting for Erosion Control

Seeding and Mulching

Seeding and mulching is a simple, inexpensive way to help protect the soil surface from the erosive force of storm water runoff. Native seeds can be easily applied to eroding surfaces by following the few steps outlined in "Seeding Tips".

Seeding Tips

1) Lightly aerate compacted soils.
2) Apply a fertilizer approved for use near streams.
3) Broadcast seed by hand or with a seed broadcaster.
4) Lightly bury seed about 1/2" deep by passing over it with a rake.
5) Plant between September 15th and October 15th (supplemental irrigation will be needed if you plant before September 15th or if winter rains are delayed).

Mulching, alone or after seeding, is also a common way to protect bare soil, unprotected slopes, cutbanks, and other disturbed areas that have a high potential for erosion. Mulch is any material spread on the soil surface to 1) reduce runoff and erosion, 2) conserve moisture, 3) buffer temperature, 4) control weed growth, 5) protect seed, and 6) prevent compaction or crusting. Common mulches include sterile barley straw, weed free rice straw (1 bale per 1,000 square feet), wood chips or shavings ($2\frac{1}{2}$–$4\frac{1}{2}$ tons per square 10,000 feet), and pine needles ($\frac{1}{2}$ ton per 10,000 square feet). It is important to use weed-free or sterile straw to prevent the introduction of non-native plants. Remember if your layer of mulch is too thick, the seeds will not be able to germinate. Avoid using erosion control blankets with plastic mesh which can entangle wildlife.

Native Plantings

Please see the Use Native Riparian Plants and Planting Willows sections of this guide for tips on how to use native plants to control for erosion.

Rural Road Maintenance

Many of the 1,600 miles of rural roads in Santa Cruz County are located either close to streams or are connected to streams through drainage networks. Since rural roads can be a source of fine sediments and increased runoff, properly maintained roads will protect stream habitat and reduce flooding. In addition, effective road maintenance will protect access to your home, improve home and property values and minimize the frequency and cost of maintenance. Installation of properly sized and located culverts, energy dissipaters at culvert outfalls, cross-drains such as waterbars and rolling dips, and proper disposal of soils from construction and maintenance of road surfaces contribute to proper road maintenance. For additional information, visit the Resource Conservation District's website for a copy of Private Roads Maintenance Guide for Santa Cruz County (www.rcdsantacruz.org).

Rolling Dips and Waterbars

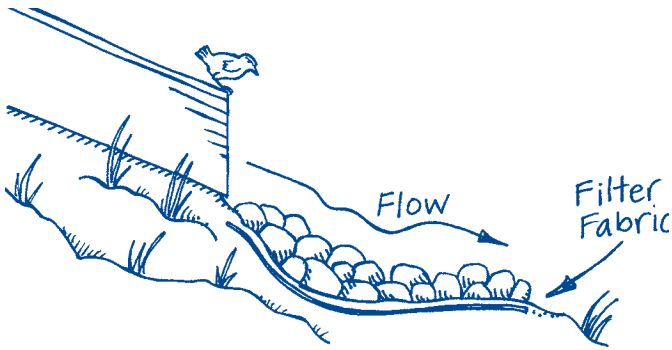
Appropriately installed, designed, and constructed cross drains, including waterbars and rolling dips, can improve access and reduce road maintenance costs. Properly spaced and located, a series of these structures decrease water velocity by directing small amounts of road runoff to stable areas. Waterbars, also known, as waterbreaks, can be earthen or paved and are basically speed bumps constructed diagonally across the road at pre-designed intervals to divert runoff to non-erosive locations. Rolling dips are similar to waterbars, but are wide, flat bottom, earthen swales constructed diagonally across the road. If done correctly, a rolling dip is hardly noticeable to the eye, are much easier to traverse, and require less maintenance than waterbars. *Note: incorrectly placed cross-drains can weaken unstable slopes and create a threat to neighboring properties. Seek assistance from local experts.*

Roadside Ditches

When roadside ditches are steep, undersized, not maintained properly, or filled with debris and rock, erosion and gullying can occur. To minimize erosion problems, line the ditch with low growing vegetation or rock, install more frequent cross drains and culverts, and perform regular maintenance. Regular maintenance would include clearing cross drains, mowing and cutting vegetation, and addressing initial erosion.

Energy Dissipaters

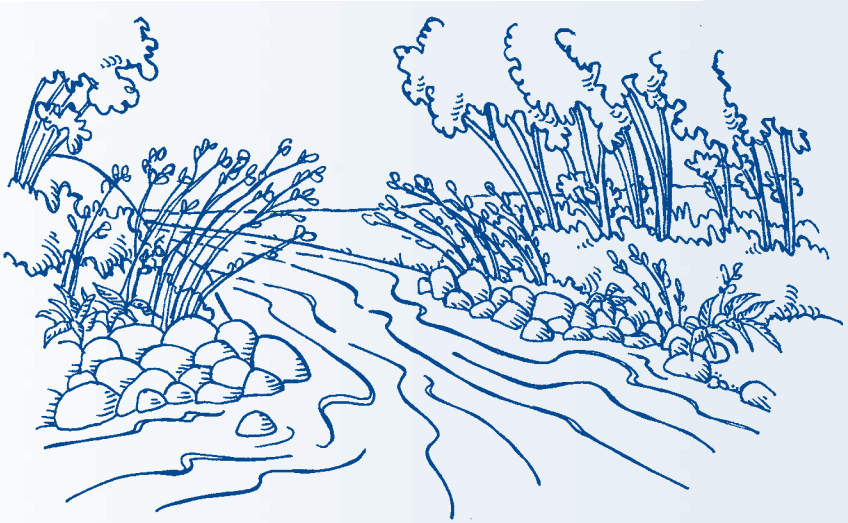
Energy dissipaters are simple structures consisting of rock riprap, rock-filled containers, gabion mattresses, or other non-erosive materials, which prevent scouring at the outlet of a channel, drain, or other conduits by reducing the water velocity. The rock should be large and heavy enough that water cannot dislodge it and be underlain by filter fabric to prevent erosion beneath it.



Energy Dissipater

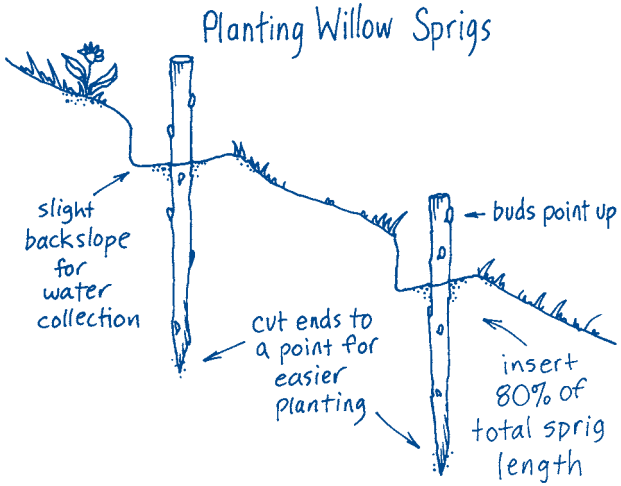
Streambank Erosion Prevention and Solutions

- Protect and enhance existing native vegetation.
- Plant native riparian vegetation, including hardwoods.
- Remove debris and yard clippings dumped on the streambank. Loose brush and debris can kill existing bank-stabilizing vegetation, inhibit growth of vegetation and contribute to bank instability.
- Control over-bank flow, especially concentrated water runoff.
- Work with your neighbors. Bank protection can cause bank erosion downstream and upstream.
- Consider biotechnical solutions first. These use plant material to stabilize banks.
- As a last resort, protect banks with structural devices such as rock slope protection interplanted with willow trees and other riparian species.



Vegetated Bank Protection

These solutions require an engineered design and County permit. Request your engineer to incorporate habitat enhancement features.

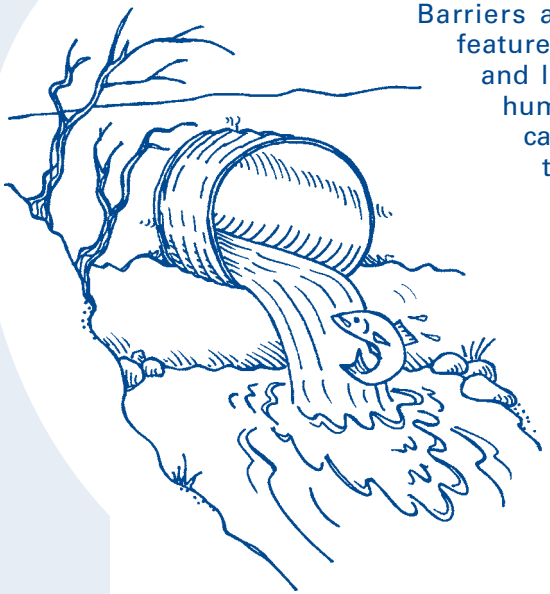


Planting Willows for Bank Protection

Willows are an important component of a healthy riparian community. Historically, willows grew along most streams in California, and they still do. When planted properly, willows are an effective and inexpensive way to repair eroding streambanks and to provide important wildlife habitat.

Revegetating with willows is the easiest way to establish woody vegetation on a denuded creek bank. Willows need only sunshine and a year-round water supply; even if surface flows evaporate, groundwater may be close enough to the surface to support willows. Willows spread easily and respond well to heavy pruning. For more information, see the Resource Conservation District's website www.rcdsantacruz.org.

Fish Passage Barriers



A fish barrier is an obstacle that prevents or inhibits the natural migration of salmon, steelhead, and other native fish. These barriers typically include culverts, dams and weirs. Barriers also include natural features such as waterfalls and logjams. Natural and human-made structures can create barriers when there is no pool at the downstream side for fish to jump from, the height is too high for fish to jump over, water velocities are too high, or the water depth is too shallow to swim through. These barriers can also cause behavior changes in fish. Barriers can have a significant impact on native fish by restricting migration during spawning. As fish congregate at barriers, over-crowding increases the likelihood of stress, injury, and predation. Barriers also lead to the under-use of the habitat isolated by the barriers. Removal of human-made barriers will allow fish and other aquatic creatures to fully use the stream and swim freely throughout the watershed.

The removal of passage barriers is a priority for fishery restoration. Contact the California Department of Fish and Wildlife or Santa Cruz County Resource Conservation District for technical assistance.

Keep Lagoons Closed!

Breaching and draining a closed lagoon is illegal and can kill juvenile steelhead by flushing them out to the ocean before they are ready. Summer lagoons provide high quality habitat for juvenile steelhead to grow fast before migrating out to the ocean. Research shows that most of the adult steelhead returning to local watersheds spent time in coastal lagoons. The endangered tidewater goby and other sensitive species also rely on lagoon habitats.

If you see someone attempting to breach a lagoon, call the California Department of Fish and Wildlife (888) 334-2258.

Temporary or "Flashboard" Dams

Each year, some streamside residents erect small, seasonal dams to create temporary ponds or lakes for recreation, water diversion, or aesthetic purposes during the summer months. Most of these structures are "flashboard" dams, consisting of separate wooden boards set in a supporting frame.

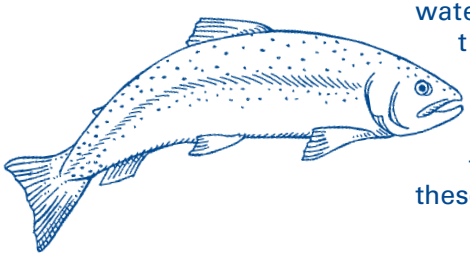
The construction and use of a flashboard dam requires a permit from the California Department of Fish and Wildlife and the Army Corps of Engineers.

These dams can interfere with the downstream migration of steelhead and coho salmon smolts, fall-winter migration of adults, and summer movement of juveniles.

Flashboards should not be set in place before June 15th and should be removed by October 15th. In addition, flashboard dams should be assembled and removed slowly–one board at a time–to lessen their impact on the stream below the dam.

Water Resources

All water resources in Santa Cruz County come from our local streams and groundwater aquifers. Groundwater provides 55-60% of public water agency supply for most of Santa Cruz County, with the remainder coming from local surface water sources. Most of the groundwater basins are being pumped in excess of sustainable yield and the major water supply agencies do not have sufficient sustainable supplies to meet current and future demand. Since groundwater and surface water are connected, excessive groundwater pumping reduces streamflows. When more groundwater is used than is recharged during the rainy season, seawater can seep into the freshwater aquifer. Since the region's water supply is local, there is both the opportunity and responsibility for our communities to find solutions to these challenges.



Water Diversions

Pumping water from streams and wells reduces streamflow and affects the life of your stream in the most fundamental of ways. In fact, without adequate water flows, especially in the summer, your stream can't support much life at all. Low stream flows are one of the greatest causes of fish habitat loss and consequent fish declines.

Small streams may be heavily impacted by even a small water diversion during the summer when streamflow is at its lowest. Diversions and wells located near creeks decrease the underground streamflows, which are critical for summer pools.

Ways to Minimize Diversion Impacts

- Practice water conservation
- Use low volume pumps and pump to storage tanks
- When flows are low, your diversion should have no visible impact on the stream. If it does, install a flow constrictor on your pump
- Pump at night when natural stream flows are higher
- Use wells instead of direct pumping from streams

Use Water Legally

Water diversions from streams are legal only if you have a Riparian Right, an Appropriative Water Right permit, or a Small Domestic Registration. A Riparian Right is limited to parcels adjacent to creeks and stays with the property, unless deleted from the title. Diverted water can be used only on riparian land. You are required to file a Statement of Water Diversion and Use with the Division of Water Rights. Storage of water beyond 30 days requires a water right permit. With an Appropriative Water Right, use of diverted water is not restricted to land next to a stream. A permit is required and water can be stored over 30 days.

A Small Domestic Registration is for landowners who use less than 4,500 gallons per day and store less than 10 acre-feet of water.

For more information, contact the State Water Resources Control Board, Division of Water Rights at (916) 341-5300 or www.waterrights.ca.gov. Any stream modification (e.g. rock-dam) requires a permit from California Department of Fish and Wildlife. Pump intakes must also be screened according to National Marine Fisheries Service guidelines to keep from drawing up aquatic life. Legally, you must leave enough water to fulfill the needs of legitimate downstream water users. In any case, it is illegal to pump a stream dry.

Horse Keeping for Healthy Streams

Many Santa Cruz County residents enjoy keeping horses. By following these guidelines, horse owners can make sure their creeks are as healthy as their horses.

Protect Sensitive Areas

- Maintain a vegetated buffer between all horse-keeping activities–including pastures, barnyards, paddocks, manure storage areas–and the stream. Riparian corridors and wetland areas naturally filter contaminants, absorb nutrients, and reduce erosion.
- Locate paddock areas as far as possible from streams and sloping areas to reduce erosion and protect water quality.
- Limit horse use in pasture areas, especially during the wet season, to prevent trampling and compaction of wet soils.
- Install fences to keep animals out of the Riparian Corridor protected by County ordinance.
- When crossing a stream, ride straight across and avoid trampling streambanks. Avoid crossing at shallow riffles in spring and early summer to protect steelhead and coho salmon redds (nests).

Prevent Animal Waste From Polluting Rainwater Runoff and Streams

- Collect manure from uncovered paddocks daily, particularly during winter, and store in sheltered stockpile areas.
- Locate manure stockpiles on an impervious surface (concrete pad or plastic tarp) and cover them to prevent leaching of contaminants into surface and ground water.
- Prevent chemicals from horse grooming and health products from draining directly into streams.

Maintain Proper Site Drainage

- Install roof gutters and downspouts to divert clean runoff away from paddocks, pastures, and manure storage areas.
- Use grassed ditches, berms, or subsurface drains to divert contaminated runoff away from waterways to low-gradient buffer areas.
- Construct and repair trails, arenas, roads, parking areas, drainage ditches, and culverts to drain water in a non-erosive manner.
- Grade and baserock paddock areas to minimize water logging.

Manage Manure Piles

- Remove stockpiled manure on a regular basis.
- Manure can be composted for use in the garden.
- During the dry season, moisten paddock areas after manure clean-up to facilitate decomposition of residual waste.

Manage Grazing

- Maintain pasture productivity by controlling the number of horses and amount of time they spend on a pasture.
- Prevent bare areas by allowing time for re-growth and use cross-fencing for pasture rotation.
- Use fencing to exclude grazing in riparian corridors.

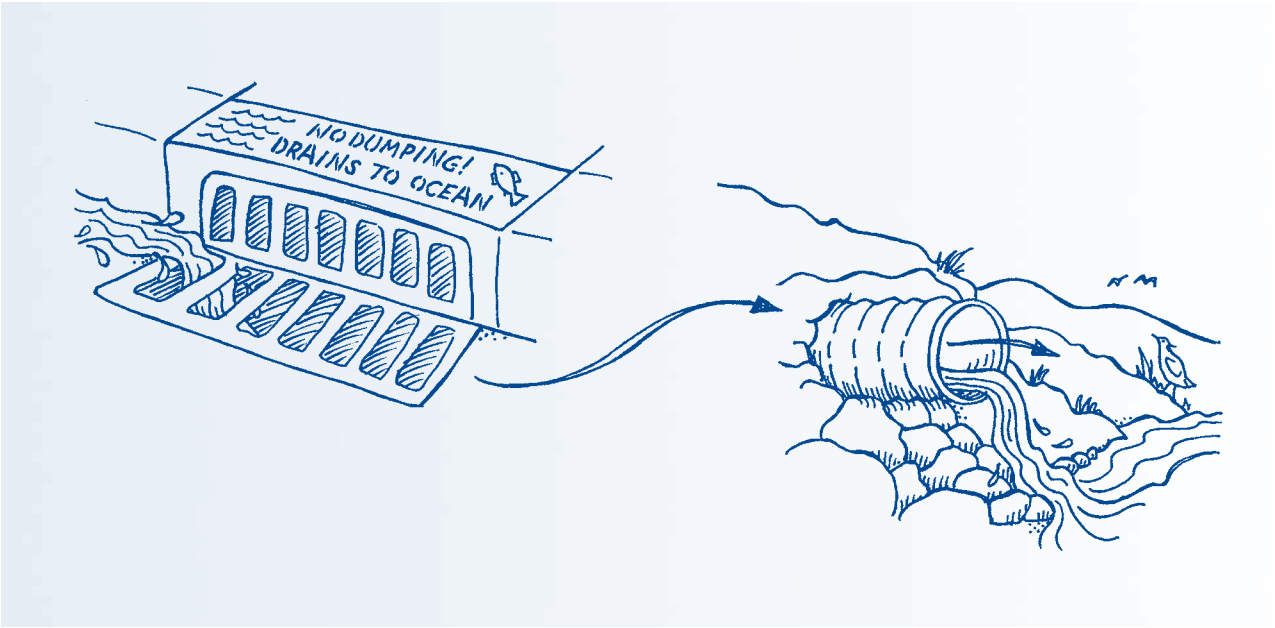
Contact the Resource Conservation District of Santa Cruz County for more information on Horse Keeping Practices (see Resources, page 23), or visit livestockandland.org/resources/.

These guidelines apply to all livestock including goats and chickens.

The Storm Drain Connection

Within urbanized areas of the County, water running off lawns, gardens, roofs, and paved areas such as streets, sidewalks, driveways, and parking lots empties into a storm drain system. Water passing through the storm drain system receives no treatment before entering local creeks and the Monterey Bay. Many storm drains are marked with a "No dumping! Drains to Ocean" stencil. The storm drain system is separate from the sanitary sewer system that collects wastewater from households and commercial sources through indoor plumbing. Water in the sanitary sewer is treated at a wastewater treatment plant before being discharged into the ocean.

Storm water runoff is a major source of water pollution in California. Water entering the storm drain system—whether rainwater or water from a hose—can pick up soil, bacteria, viruses, pet waste, chemicals, garbage, and other pollutants. Some pollutants—such as oil, grease, car washing soaps, and heavy metals on parking lots and roads—enter streams primarily through storm drain inlets. Do not put pollutants into storm drains or in areas where they can wash into them.



Home Maintenance Tips

Check your septic system frequently and pump it regularly

If you live by a stream and use a septic system, you have a special responsibility to make sure it is functioning efficiently. Rural areas in the county contain a high density of septic systems. Human waste leaking from faulty septic systems can be a source of water pollution. Replacement of failing septic systems and regular pumping of all systems (every 3 to 7 years) can help keep this substantial source of stream contamination in check.

Dispose of wastes properly, not in or near a stream or stormdrain

Keep trash out of the creek, off the street and out of storm drains. Remove trash that may have piled up alongside or in the creek.

Do not dump motor oil, gasoline, antifreeze, battery acid, transmission fluid, brake fluid, paint, solvents, pesticides, insecticides and herbicides, or household cleaners into a storm drain, stream, or riparian area. Even in small amounts, these hazardous materials will degrade the drinking water supply and harm fish and wildlife. These materials can also be transported and affect stream health downstream.

Take all hazardous items (used automotive fluids, batteries, paint, solvent, and pesticides) to a free household hazardous waste facility. For all County residents, including city residents, call (831) 454-2606 for drop-off information.

Heavy metals are used in many household and automotive products. Excessive levels of metals can harm aquatic life by causing mortality, changes in behavior, growth and development, or an inability to reproduce. Metals also accumulate in the food chain. For this reason, avoid hosing down paved surfaces like driveways. Use a broom instead and put debris in a trash can.

Don't let greywater from your washing machine run into a storm drain or stream. Greywater contains detergents, bacteria, and pathogens and must be discharged into a sewer, septic, or underground system. Properly dispose of pet waste in your garbage receptacle, sewer system, or by burying it. Do not leave it where it will wash into a stream or storm drain.

Exercise care when using any pesticides, herbicides or fertilizers

Many yard and garden chemicals are extremely toxic to aquatic organisms and other inhabitants of the riparian corridor, such as birds. Even small amounts of these compounds entering streams directly or from airborne droplets can affect stream life. Avoid using herbicides or pesticides within the riparian corridor and exercise caution when applying them on adjacent areas as well, taking care to minimize any possible wind drift. If garden chemicals must be used, check your local nursery for products that have been registered for use near water.

Use less-toxic or non-toxic products in your home and garden

Use mechanical methods to clean drains that are blocked by roots. Avoid copper-based root control products. Use water-based paint and paint removers when possible. If using oil-based paint, clean brushes at a sink that drains to the sewer or septic system and properly dispose of cleaning products, such as thinner or turpentine. Do not dump into a sewer or septic system. Use of native vegetation adjacent to the stream corridor will eliminate the need for fertilizers and pesticides.

Keep yard clippings and debris off the streambank and out of the creek

Yard clippings dumped on streambanks will kill vegetation underneath and can lead to bank erosion. Yard clippings can wash downstream and plug culverts, leading to flooding and property damage.

If you own a pool or spa, drain water into the sanitary sewer system—not to a creek, street, or storm drain

Chlorine and algaecides used in pools and spas are toxic to plants and aquatic life. Try non-chlorine alternatives for pool maintenance. Use diatomaceous earth (DE) cautiously.

Wash cars and boats away from the stream or at a commercial carwash

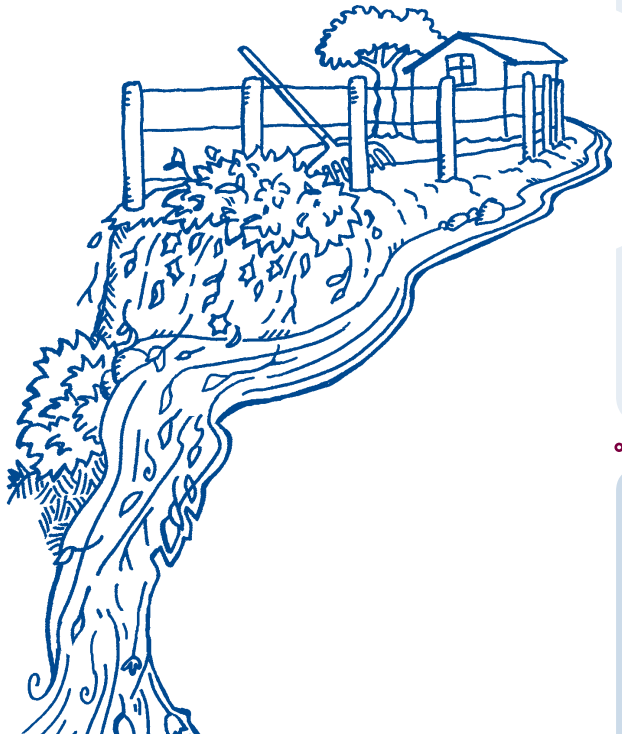
Don't use soap if it will drain into a storm drain or creek. Detergents cause foaming and prevent oxygen from dissolving in the water.

Minimize impervious surfaces on your property

Impervious surfaces such as your home, paved driveways and patios, reduce the amount of rain that soaks into the soil. In turn, impervious surfaces increase stream runoff, often resulting in increased gully and bank erosion and flooding problems downstream. In some areas of the County, impervious surfaces also reduce the amount of groundwater recharge, impacting our local water supply. Hard packed or compacted soils and denuded areas can increase surface runoff similar to impervious surfaces.

Practice water conservation to protect groundwater aquifers, surface water supplies and stream habitat

Water conservation is crucial for our local water supplies. Since many property owners use most of their water outside, landscape water conservation can be the best way to reduce the amount of water you use. Native or drought tolerant plantings, drip irrigation and even just using a shut off nozzle on your hose can all reduce water use in the garden. Alternative sources of landscape water can come from either a rainwater catchment cistern that captures roof runoff or a greywater system that re-uses laundry water. In the home, conserve water by installing high efficiency toilets, showerheads, and other appliances, fixing leaks promptly and not wasting water. For more information, see pages 13, 17, and 23 or visit watersavingtips.org and centralcoastgreywater.org.



Regulations

County of Santa Cruz

Several County ordinances govern activities to protect riparian and stream habitats. One of the most important is the Riparian Corridor and Wetlands Protection Ordinance which was adopted to protect wildlife and aquatic habitat, reduce flooding, and safeguard water quality and cultural and aesthetic values.

Under the Riparian Corridor and Wetlands Protection Ordinance, the protected riparian corridor is defined as:

- Lands extending 50 feet (measured horizontally) out from each side of a perennial stream. Distance is measured from the mean rainy season (bankfull) flowline.
- Lands extending 30 feet (measured horizontally) out from each side of an intermittent stream. Distance is measured from the mean rainy season (bankfull) flowline.
- Lands extending 100 feet (measured horizontally) out from each side of a lake, wetland, estuary, lagoon or natural body of standing water.
- Lands within an arroyo located within the Urban Services Line or the Rural Services Line.
- Lands containing riparian woodland (cottonwood, sycamore, alder, box elder, etc.)

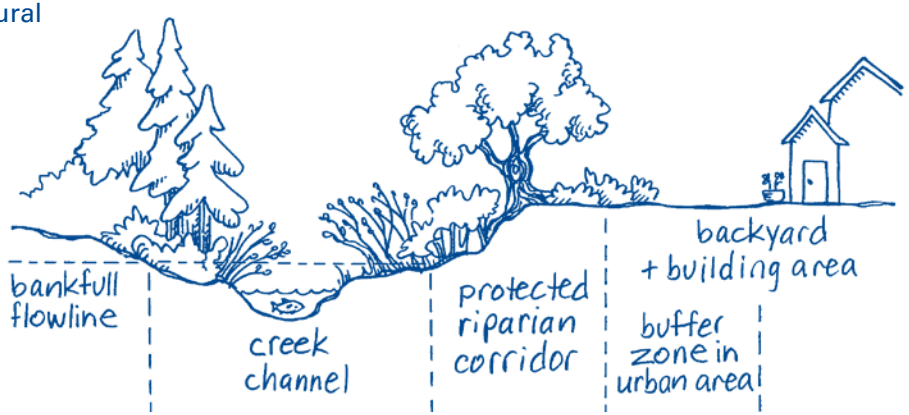
Within these defined areas, the ordinance prohibits any development, including tree cutting, vegetation removal, grading or construction, without a Riparian Exception permit from the Planning Department. Deposition of debris and use of pesticides are prohibited.

Most grading requires a permit and should be careful not to alter natural drainage patterns. Under the Erosion Control Ordinance, it is an owner's responsibility to control erosion on their property. For more information, contact the Planning Department (see Resources, page 23).

The *Runoff and Pollution Control Ordinance* prohibits the discharge of any pollutant into a stormdrain or body of water, including groundwater, and the modification of drainage channels (Chapter 7.79).

State and Federal Agencies

Several state and federal agencies have jurisdiction over certain activities in the riparian zone, including the stream, streambanks and riparian area. Most activities within the riparian zone require a Streambed Alteration Agreement from the California Department of Fish and Wildlife. Many projects within the riparian zone require a permit from the Regional Water Quality Control Board and the U.S. Army Corps of Engineers, which includes review by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.



Resources

Resource Conservation District of Santa Cruz County
820 Bay Ave., Suite 107, Capitola, CA 95010, (831) 464-2950
www.rcdsantacruz.org
(RCDSCC) is a non-regulatory, public entity that provides technical and financial assistance to landowners and land managers in Santa Cruz County. The RCD provides information and assistance related to natural resources including erosion, rural roads, home drainage, wildlife habitat, permitting, soil/water conservation on agricultural lands, and fire prevention.

USDA Natural Resources Conservation Service
820 Bay Ave., Suite 107, Capitola, CA 95010
(831) 475-1967, www.nrcs.usda.gov
A non-regulatory federal agency. Soils and vegetation information, conservation planning, erosion control, technical and financial assistance programs. All services free of charge.

County of Santa Cruz Environmental Health
701 Ocean Street, Santa Cruz, CA 95060, (831) 454-2022
www.scceh.com
Permits for new wells, water resources, water quality, water conservation and hazardous materials.

County of Santa Cruz Public Works
701 Ocean Street, Santa Cruz, CA 95060, (831) 454-2160
www.dpw.co.santa-cruz.ca.us
Large stream wood assessment and assistance, stormwater.

Coastal Watershed Council
345 Lake Ave., Suite F, Santa Cruz, CA 95062
(831) 464-9200, www.coastal-watershed.org
Community-based watershed stewardship programs, storm drain and water quality monitoring, education, and community outreach.

California Native Plant Society – Santa Cruz Chapter
www.cruzcnps.org

Recycling and Hazardous Waste Disposal
(831) 454-2333 (24 hour Recording)

California Environmental Hotline (Earth 911)
www.earth911.org
Recycling, low-waste lifestyle.

UC Cooperative Extension
1432 Freedom Boulevard, Watsonville, CA 95076, (831) 763-8040
Master gardeners and information on herbicides, non-native plant removal and sudden oak death.

Ecology Action
877 Cedar St., Suite 240, Santa Cruz, CA
(831) 426-5925, www.ecoact.org
Pollution prevention, water conservation, greywate

Check on-line and in your telephone directory yellow pages under the following headings, *Environmental and Ecological Services*, *Erosion Control* and *Nurseries* for listings of ecological consultants, erosion control supplies, seeds and plant sources.

Regulatory Agencies

County of Santa Cruz Planning Department
701 Ocean Street, Santa Cruz, CA 95060
(831) 454-2580, www.sccoplanning.com
Activities in riparian corridors and in streams must comply with local ordinances (see Regulations, page 22). Contact the Planning Department for current regulations and permit requirements.

California Department of Fish and Wildlife (CDFW)
7329 Silverado Trail, Napa, CA
(707) 944-5500, www.dfg.ca.gov
Any activity affecting the bed or bank of a stream requires a permit from CDFW.

Central Coast Region (3) – Regional Water Quality Control Board
895 Aerovista Place, Suite 101, San Luis Obispo, CA 93401
(805) 549-3147
The regional board is responsible for issuing water quality certificates for any project requiring a permit from the U.S. Army Corps of Engineers.

State Water Resources Control Board (SWRCB)
P.O. Box 100, Sacramento, CA 95812
(916) 341-5250, www.swrcb.ca.gov
The SWRCB provides information pertaining to water rights and water diversions.

U.S. Army Corps of Engineers (ACOE)
1455 Market Street, San Francisco, CA 94103
(415) 503-6773
The ACOE regulates the discharge of dredged or fill material in most creeks, rivers, and wetlands. A Nationwide Permit, from the ACOE, must be obtained prior to starting such projects.

National Marine Fisheries Service (NOAA Fisheries)
777 Sonoma Ave., #325, Santa Rosa, CA 95404
(707) 575-6050
NOAA Fisheries must be consulted when anadromous steelhead and salmon are potentially affected by an activity.

U.S. Fish and Wildlife Service
2493 Portola Road, Suite B, Ventura, CA 93003
(805) 644-1766, www.fws.gov/ventura
USFWS must be consulted when an activity could potentially impact listed species.

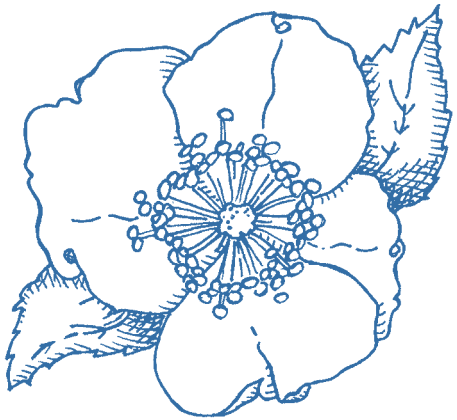
Native Plant Nurseries

Many nurseries carry native plants which are suitable for planting within your riparian area. The following nurseries specialize in native plants of local origin; these, and other nurseries, can provide you with assistance on what plants are best for your area:

Central Coast Wilds
336 Golf Club Drive, Santa Cruz
(831) 459-0656
www.centralcoastwilds.com

Elkhorn Native Plant Nursery
1957 Highway 1, Moss Landing
(831) 763-1207
www.elkhornnursery.com

Native Revival Nursery
2600 Mar Vista Drive, Aptos
(831) 684-1811
www.nativerevival.com



Local Watershed Efforts

If you are interested in getting involved with a local watershed effort, contact the Resource Conservation District of Santa Cruz County for information.

Erosion Control Supplies

Erosion Control Supplies are available at the Native Plant Nurseries and at:

Aptos Landscape Supply
5035 Freedom Blvd, Aptos
(831) 708-8902
drainage pipe, wattles, netting

Central Home Supply
Santa Cruz (831) 423-0763, Scotts Valley (831) 440-0763
mulch, gravel, rock, netting

Ewing
5550 Soquel Ave, Santa Cruz
(831) 464-6777
seed, wattles, blankets, netting

General Feed and Seed
1900 Commercial, Santa Cruz
(831) 476-5344
seed, straw

Graniterock
303 Coral Street
(831) 471-3400
blankets, wattles, netting, gravel, mulch

John Snow Seed Company
21855 Roseheart Way, Salinas
(831) 758-9869
seed

L.A. Hearne
8525 Prunedale N. Road, Prunedale
(831) 663-1572
seed, straw

ProBuild Garden Center
235 River Street, Santa Cruz
(831) 423-0223
seed, netting, native plants

Scotts Valley Sprinkler and Pipe Supply
Scotts Valley (831) 438-6450, Watsonville (831) 728-0446
seed, wattles, sandbags, netting, stakes, gabion baskets, drainage, irrigation

For a list of Certified Professionals in Erosion and Sediment Control, contact the Natural Resources Conservation Service or visit the County of Santa Cruz Planning Department's website at www.sccoplanning.com/PlanningHome/Environmental/ErosionStormwaterPollutionControl.aspx

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Many thanks to those who contributed to and reviewed this Stream Care Guide.

Portions of this Stream Care Guide appeared in:

Stream Care in Santa Cruz County: A Guide for Streamside Property Owners 1989 by the County of Santa Cruz Planning Department.

Creek Care: A Guide for Urban Marin Residents 1997 by Marin County Department of Public Works and Marin County Stormwater Pollution Prevention Program.

Creek Care: A Guide for Rural Landowners and Residents of Petaluma and Sonoma Creek Watersheds 2001 by the Southern Sonoma County Resource Conservation District.

Groundwork by Liza Prunuske 1987 by Marin County Resource Conservation District.

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