Alameda County Public Works Agency
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Creek Care

A Guide for Residents in the San Lorenzo Creek Watershed

Acknowledgments

Creek Care Guide for Residents in the San Lorenzo Creek Watershed *was adapted from several fine publications. We thank these agencies for the permission to excerpt from their excellent guides.*

They are:

- *Creek Care* by the Marin County Stormwater Pollution Prevention Program
- *Stream Care* by the Santa Cruz County Planning Department
- *Stream and Hillside* by the Napa County Conservation Information Group
- *Streamside Savvy* by the King County Department of Public Works
- *Creek Care Guide* by the Rivers, Trails and Conservation Assistance Program

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LANDSCAPING, GARDENING, AND YARD WORK

Alameda County Clean Water Program (510) 670 - 5543
Additional information is available at the website: www.cleanwaterprogram.org.
ACCWP has many free, helpful publications including:

- *Grow It! The Less Toxic Garden Guide*
- *Clean It! Safer Housecleaning Methods*
- *Control It! The Less Toxic Pest Control Guide*

U.C. Cooperative Extension
(510) 567 - 6812
The Alameda County Master Gardener program can provide gardening advice and assistance. Additional information is available at their website: acmg.ucdavis.edu

The California Native Plant Society (510) 464 - 4977
The East Bay Chapter of CNPS can provide advice on gardening with native plants. CNPS also operates the Native Here Nursery where they propogate and sell native plants. Visit www.ebcnps.org or call for more information.

Yerba Buena Nursery
(650) 851-1668
Specializes in native plants of the San Francisco Bay area. Also visit www.yerbabuenanursery.com

CA Department of Forestry and Fire Protection (831) 335 - 5353
Has information on fire safe landscaping and home maintenance. www.fire.ca.gov

Check with your local nursery to see if they carry native plants or can order them for you. Some parks, such as Tilden Regional Park in Berkeley, offer periodic native plant sales.

CREEK RESTORATION

Restoring your creek can be a rewarding project. Even the simplest repairs, however, will require permits, planning, and design. The following agencies can assist you with your potential project:

The Alameda County Conservation Partnership
(925) 371 - 0154
A partnership of the Alameda County Resource Conservation District (ACRCD) and the Natural Resources Conservation Service (NRCS). Offers information and support on permitting, planning, design, and implementation of erosion control and creek restoration projects.

Alameda County Flood Control District (510) 670 - 5480
Information on permits and planning.

CA Department of Fish and Game (916) 445 - 0411
A CDFG Streambed Alteration permit is required before beginning any creek restoration project.

Enjoy Your Watershed!

After investing yourself in the preservation of your watershed, get out and enjoy it! Participate in creek friendly activities and join local organizations to learn more about what your community is doing for water quality. Here are some places where you can enjoy the creeks in your watershed.

CASTRO VALLEY

Bay Trees Park: Play a game of tennis or have a shady picnic next to Cull Creek. *19855 Cull Canyon Road*

Cull Canyon Regional Recreation Area: Dip in the swim lagoon, fish the 1.5-acre lake or take a hike on the Bay Area Ridge Trail. *18627 Cull Canyon Road*

Earl Warren Park: Enjoy the open lawn, play area, and dog park next to Crow Creek. *4660 Crow Canyon Road*

HAYWARD

Carlos Bee Park: This shady nook along Chabot Creek is a great place for a picnic or stroll. *1905 Grove Street*

Don Castro Regional Recreation Area: Enjoy swimming, fishing, and hiking around this lake on San Lorenzo Creek. *22400 Woodroe Avenue*

Hayward Regional Shoreline: Explore the salt marsh and mudflats where San Lorenzo Creek flows into the Bay. Bike or walk the shoreline trail to the Interpretive Center or take the San Francisco Bay Trail to the mouth of San Lorenzo Creek. *3010 W. Winton Avenue*

Hayward Shoreline Interpretive Center: Delve into the interactive exhibits to learn about this unique habitat. *4901 Breakwater Avenue*

Japanese Gardens: Stroll through these refreshing gardens tucked between Castro Valley Creek and San Lorenzo Creek. *22373 N. Third Street*

Sulphur Creek Nature Center: See local wildlife up close and walk around the native plant restoration sites along quiet Sulphur Creek. *1801 D Street*

BAY AREA

Bay Model Visitors Center: Learn about SF Bay ecology with interactive programs and exhibits. *2100 Bridgeway in Sausalito*

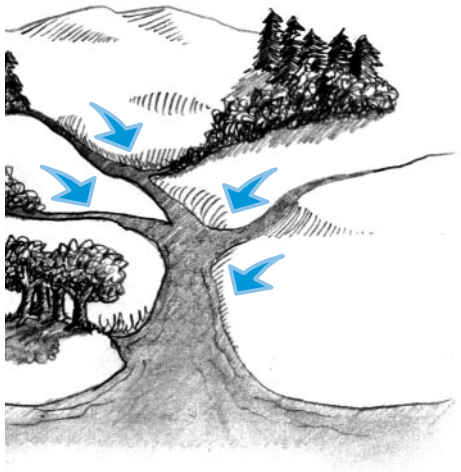
SF Bay National Wildlife Refuge: Explore the trails and discover this bird watching paradise. *9800 Thornton Avenue in Fremont*

Look inside at the watershed map to find these and other points of interest.

What is a Watershed?

A watershed is the land area that water flows across or through on its way to a creek, river, bay, or ocean. Rain that falls in the San Lorenzo Creek Watershed makes its way to one of nine major creeks. Bolinas, Castro Valley, Chabot, Cull, Crow, Eden Canyon, Hollis Canyon, Norris, and Palomares Creeks all empty into San Lorenzo Creek. San Lorenzo Creek flows through Castro Valley, Hayward, San Leandro, and San Lorenzo before emptying into San Francisco Bay. Larger watersheds like San Francisco Bay are made up of smaller watersheds like San Lorenzo Creek.

Water travels down hills, across farm fields and ranchland, suburban lawns, construction areas, and city streets on its way to the nearest creek. Water flowing over the surface of land is referred to as *runoff*. As runoff crosses the land, it picks up materials. Some of these materials are deposited in the creeks and eventually carried downstream into the San Francisco Bay. Some of these materials travel with the water underground and become part of the groundwater system.



A watershed is the land area that water flows over or through on its way to a creek, river, bay, or ocean. Because all the land *drains* to a common outlet, watersheds are sometimes referred to as drainage areas.

We All Live Downstream

No matter where you live in Alameda County, you live in a watershed. If you live in Castro Valley, north Hayward, or San Lorenzo, you live in the San Lorenzo Creek Watershed. Our daily activities like driving to work, gardening, and washing our cars influence the health of the watershed. Water from garden hoses and rain can wash motor oil, paint products, soaps, chemicals, and fertilizers off streets, yards, and parking lots into gutters and storm drains. Unlike sanitary sewers, **storm drains do not connect to a wastewater treatment plant**. Instead, storm drains flow untreated directly into creeks and the Bay.

Both human activities and natural processes in a watershed will determine the health of a creek. Downstream areas (such as the San Francisco Bay) are affected by upstream actions. For example, dumping at an upstream location may cause erosion or deposit debris at a downstream site. Since San Lorenzo Creek flows into the Bay, all watershed activities affect the Bay's water quality.

A healthy watershed has clean creeks, productive riparian corridors, and stable, well-vegetated land. These components help keep water quality high, provide fish and wildlife habitat, control erosion, reduce flash flooding, and maintain dry season creek flows. In a healthy watershed, resources are maintained for all users.

We all live downstream.

Managing Woody Debris

Natural debris in the creek -- branches, logs, and root wads -- creates food and shelter for fish and wildlife. Woody debris may need to be repositioned, removed or partially removed if it threatens life or property. Because removing woody debris can degrade fish habitat, it is important to observe a situation before taking action. It is often best to take small, incremental steps toward resolving a problem.

- Woody debris should be left in the creek, unless it causes flooding or erosion that threatens life or property (a house, utility pole, or other structure), or speeds up natural erosion processes.

- Woody debris may have to be repositioned or removed if it obstructs creek flow and causes upstream flooding, or if it causes streambank erosion by redirecting flow.

- If fallen trees or branches are causing bank erosion, trim the portion of the woody debris that is above the water. Try to leave the main stem or root wad intact.

- Most fish can swim through or around debris barriers. If you know that fish cannot swim through a barrier, contact the California Department of Fish and Game. Removing barriers requires a Section 1603 Streambed Alteration Agreement. For more information, see the Resources directory in the back of this guide.

- Brush, grass clippings, or other materials must not be thrown into a creek or stored near creek banks to be carried downstream by wind or rain. The brush may create a debris jam downstream on someone else's property or block a culvert.

If you are unsure about managing woody debris, contact the Natural Resources Conservation Service at (925) 371-0154.

Use Water Legally

Water diversions from creeks are only legal 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. Storage beyond 30 days is not allowed. With an **Appropriative Water Right**, the land does not need to be next to a creek. 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 visit them online at www.waterrights.ca.gov/WRINFO/

For your irrigation needs, hook up to the East Bay Municipal Utilities District. If you have a water right, screen all diversion pipes with 1/8 inch hardware cloth. Unscreened diversions suck up fish and other critters.

When in Doubt, Check it Out

Be sure to consult with the Alameda County planning department and the Alameda County Conservation Partnership (see Resources) before beginning any stream improvement project! No matter how well-intentioned the project, local regulations and permits will apply. Professionals can help you with the planning and permitting process and may be able to provide cost-share.

Our Changing Watershed

At one time many pristine creeks flowed through the San Lorenzo Creek Watershed. Cool, clear water cascaded over boulders through deep pools and meandered freely from the hills to the Bay. Creek banks were thick with bay, willow, buckeye, blackberries and huckleberries. The surrounding land and hills were covered with high stands of native grasses and thick oak-bay woodlands. Elk, wolves, and grizzly bears roamed the land and countless land and shore birds inhabited the hills and the Bay. Native Americans, called the Ohlone Indians, lived along the creeks and hunted and fished in this vast watershed. They lived in harmony with their environment and maintained a balanced community for many centuries.

When the Spanish settlers introduced livestock to the area in the late 1700's, the landscape began to change. The animals grazed the hills and gathered along creeks for shade and water. Trampling and over grazing destroyed streambeds and caused the creek banks to erode. As native grasses disappeared, the Spanish settlers introduced European species of grasses, which upset the balance of the natural ecosystem even more.

As the population in the area grew so did the pressure to develop the land. With more people, came the construction of more homes, businesses, paved streets, and widespread urban development. Storm drain systems carried increased runoff into creeks causing periodic flooding. Many people regarded creeks as a threat to their property. As a result, creeks were lined with concrete and culverted to provide flood protection. Creeks became little more than dumping grounds for garbage and waste. In addition, storm drains carried untreated grime and toxics from streets, homes and businesses directly into creeks and the Bay. These once pristine creeks were trashed and forgotten.

Since the days of the Ohlone Indians, our attitudes about creeks have changed. We no longer regard creeks as essential to our communities. We have lost sight of their aesthetic and ecological value. As a consequence, the creeks are dirty and polluted, threatening local wildlife and our quality of life as well. It is important to remember that the health of a creek is connected to the health of the watershed. With a little knowledge and common sense we can restore our creeks and improve the health of the Bay.

Getting to Know Your Creek

When looking at land in your watershed, you can easily identify a creek by its *riparian corridor*. The **riparian corridor** is the vegetated area adjacent to (and including) the creek. In urban areas, some buildings, recreational facilities, and parking lots may also exist within the riparian corridor. A healthy riparian corridor includes an intact floodplain and well established, year-round vegetation.

The **upland zone** extends away from the wetter riparian area and offers habitat for deer, coyote, and other terrestrial (land-based) wildlife. This plant community typically includes drought tolerant plants and oak woodlands.

Habitat provides food, water, shelter, and space for wildlife and fish. All terrestrial and aquatic wildlife depend upon healthy habitats to live, eat, hide, and raise young. Clean gravel, abundant food sources, a variety of pools and riffles, plenty of places to hide, and clean, cool water are all important elements of good creekside habitat.

The sloping area between the water's edge and level ground is referred to as the **creek banks**, or stream banks. Roots and vegetation stabilize the banks, filter sediments, and reduce soil erosion.

Repairing Streambank Erosion

Not all streambank erosion is harmful. Undercut banks and fallen trees provide important habitat for fish and other aquatic animals. Intervention may be necessary if the erosion threatens property, structures, or roads, or if it threatens prime riparian habitat. Consult an erosion expert, such as the NRCS (see Resources), to see if your erosion is severe. Creek bank erosion that is extremely active should be monitored. Bare, vertical, and actively eroding banks are likely to need repair. Less severe problems may not require immediate attention, but treating a problem early may prevent costly fixes later.

Creek systems are complex. Stabilizing creek banks requires knowledge of the creek process and history of the site. When considering repairs:

- Check your creek regularly, especially during storm events, and learn to spot problems. Some sediment and foam is natural. Excessive sediment or colored or oily foam indicate problems such as erosion or pollution upstream.
- Try to identify the cause of the trouble. If the source of a particular problem occurs upstream, your restoration efforts may be defeated unless that problem is addressed.
- Consider least invasive options first; creeks are resilient and may not need extensive (or expensive) restoration techniques.
- Consider techniques that use living materials, such as willows and native vegetation. Hard structures such as rock and concrete-lined channels provide no fish or wildlife habitat and tend to increase the flow speed.
- Never use tires, concrete rubble, or appliances to repair erosion problems. These items can be washed away by water and cause further damage. These items may also contain materials that are toxic to creek life.
- Most creek repairs need to be engineered or designed. All creek repair will require a 1603 Streambed Alteration Agreement from the California Department of Fish and Game and permits from Alameda County Public Works Agency, U.S. Army Corps of Engineers, and the Regional Water Quality Control Board. Contact the Alameda Countywide Clean Water Program or the Alameda County Conservation Partnership (see Resources) for assistance.

Living with Your Creek

Residents living next to a creek have additional reasons to be concerned with creek health. A healthy creek can increase property value, provide flood protection, prevent property loss to erosion and provide an aesthetic and calming landscape. Make the most of your property by becoming involved in the stewardship of your creek.

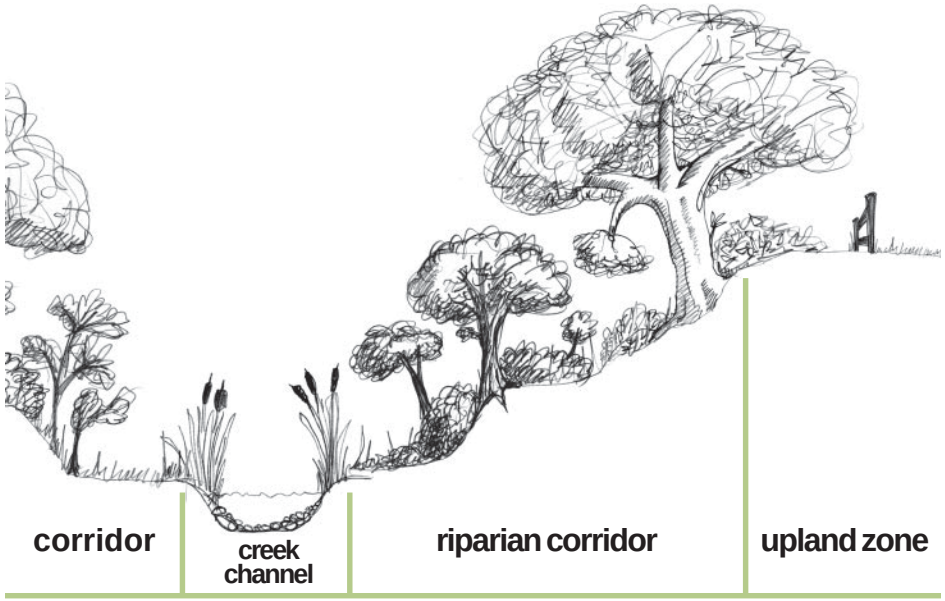
Minimizing Soil Erosion

Soil erosion is a natural process. Some sediment is needed to bring nutrients and mineral materials to aquatic ecosystems, but too much sediment causes problems. Sediment reduces the creek's ability to carry flood waters by filling in the creek bed. It also fills pools, eliminates shelter and fish spawning habitat, and diminishes food supplies for fish and aquatic insects.

Erosion occurs on creek banks, roads, driveways, bare garden areas, or other areas where soil is not protected from the forces of irrigation water, rainfall, and gravity. When water flows over bare ground, the exposed soil moves downhill and often ends up in a creek.

Common causes of bank failure include over-watering lawns, removal of vegetation, and on-site or upstream alteration of the creek channel. You can minimize erosion by:

- using alternatives to impervious paved surfaces for patios, walkways, and driveways. Gravel, brick, stone, and decking are permeable materials that allow water to infiltrate the soil.
- maintaining a vegetated buffer zone between the creek bank and your yard or sheds, patios and other structures on your property. A robust buffer zone will decrease property loss and damage from flooding and erosion. Check with the local building authority for permits and information on legal setback zones.
- replanting barren slopes on your property as quickly as possible. Even areas that are not located next to the creek can increase the sediment load to the creek. Don't use tires, concrete rubble, appliances, or other debris to cover these areas.
- diverting roof runoff to open landscaped areas (away from the creek).



The **creek channel** is the area of the riparian corridor that periodically or continually contains flowing water.

The **bed** of the creek is its bottom, which is usually composed of a mixture of gravel, sand, and silt.

Pools are deeper portions of the creek where sediments have been scoured and water flows slowly. Pools are important habitat components for trout and other native fish.

Riffles are shallower areas in the creek where water flows quickly, often over gravel or rocks.

Sediment is the soil particles in the creek. The sediment can be on the bottom of the creek or it can be suspended in the water. Water with a high sediment load (or **turbidity**) looks muddy or cloudy.

Woody debris includes trunks and large branches of trees that have fallen into or alongside the creek.

Values of Riparian Corridors

Although riparian corridors cover only a small portion of the watershed, these ecosystems are important to the plants, animals, and humans that depend on their unique functions. A healthy creek benefits everyone in the community.

Water Quality Protection Riparian vegetation prevents the sediments and nutrients in surface runoff (from sprinklers or rain) from entering creeks. Roots and surface litter (mulch) in a riparian zone can serve as an effective filter to improve and protect water quality by removing much of the nitrogen and other potential pollutants dissolved in surface and ground waters before it reaches the creek. These dense roots also stabilize creek banks and reduce the sediment load to the creek by minimizing soil erosion.

Flood Control Riparian corridors and floodplains act as a sponge by absorbing floodwaters. The water is then slowly released over a period of time, keeping creeks flowing into the late summer months. Trees and shrubs help reduce the loss of land to the creek during flooding.

Water Temperature Trees and shrubs also provide a canopy, which shades the water. Lower water temperatures are necessary for a diversity of aquatic life. Low temperature also decreases the potential for algae to form.

A Home for Wildlife Healthy riparian corridors are among the most productive wildlife habitats, providing dense vegetation and a high diversity of plant species. In addition to aquatic species such as fish and amphibians, many water foul and terrestrial species rely on the food and shelter found in the riparian corridor. Long, connected riparian corridors allow wildlife to travel safely between habitats.

Natural Beauty The abundant vegetation and wildlife in healthy creek habitats provide exceptional opportunities to enjoy natural beauty.

Native Plants of Alameda County

These are just some of the native plants that commonly grow in the San Lorenzo Creek watershed. For more information on native plants and identification of plant species, contact the East Bay chapter of the California Native Plant Society (**http://www.ebcnps.org**). See Resources for additional native plant specialists.

Upland Natives

Ground Cover: California poppy, California wild rose, yarrow
Shrubs: buckwheat, coyote bush, quailbush, milkweed, common monkey flower, California sage, Cleveland sage, California fushia, coffeeberry, flowering currant, California lilac (ceanothus)
Trees: coast live oak, buckeye

Riparian Natives

Ground Cover: wood mint, miner's lettuce, western sword fern, California strawberry, California wild rose, cow parsnip, California bedstraw.
Shrubs: California blackberry, sticky monkey flower, California hazelnut, snowberry, twinberry, coffeeberry, thimbleberry, blue elderberry, toyon
Trees: California bay, California box elder, willow, dogwood, white alder, cottonwood, California sycamore, big leaf maple, buckeye

Non-Natives (Exotics)

AVOID THESE PLANTS. They are invasive species that outcompete native plants, often creating a monoculture (an area dominated by only one plant species). They offer little or no habitat value to wildlife and no erosion protection.

Ground Cover: Cape Ivy, German or English Ivy, Ice Plant, Periwinkle (Vinca major)
Shrubs: Giant reed (Arundo donax), Himalayan blackberry, Pampas grass, Bermuda grass, Bamboo, French, Scotch or Spanish broom
Trees: Eucalyptus, Acacia

Going Native

Native plants offer an attractive landscaping alternative to traditional ornamentals. They are also best adapted to local conditions. Native plants often require less water and are more resilient to insects and disease than many non-native plants. Many are also good for erosion control. For example, oak trees that grow in flood prone areas are better adapted to saturated soil conditions than oaks from drier upland areas. Local plants form the base of the food chain and are part of the complex web between insects, birds, fish, and other species.

In addition to the many benefits that native plants provide, they offer superior habitat for native wildlife. With a little research, you can create hummingbird, butterfly, beneficial insect and many other specialty wildlife gardens. These colorful oases can attract a variety of native birds and insects and require less maintenance than traditional ornamental gardens. For more information on backyard conservation and gardening for native wildlife, contact the Alameda County Conservation Partnership at (925) 371-0154 (see Resources).

Tips on Planting Natives

- Observe the nearby native vegetation to identify what to plant. Natives that occur naturally in your area along a creek are adapted to specific local conditions and will be the easiest to grow. Native species that do not naturally occur in your area will require extra care and maintenance to become established.
- Visit a native plant nursery to help select species that will thrive in your garden or on your creek banks. See the Resources section of this guide for some local nurseries and organizations.
- Consult "Grow It!: The Less Toxic Garden" for ideas on native, deer resistant, fire resistant, and drought tolerant plants, as well as those suitable for erosion control. Call Alameda Countywide Clean Water Program at (510) 670 - 5543 for a free copy.
- Care for your new plants during the first few years to help them become established. Dry season watering, regular weeding, and installing deer browse protectors will increase survival rates. Be sure to replant those plants that do not "take." **Native plants do not need fertilizers and pesticides.**

Values of Riparian Corridors

Other Benefits Creeks are a cornerstone of California's natural heritage. Their healthy, functioning riparian areas provide natural beauty and enhance property values. The economic value of these benefits is not always recognized or appreciated. Healthy streams and riparian areas are naturally resilient, which allows recovery from natural disturbances such as flooding or drought. A degraded and unhealthy creek and riparian system are not able to recover as quickly, if at all, from natural or human-caused disturbances.

Where Have All the Steelhead Gone?

Steelhead trout are anadromous salmonids - meaning they spawn in fresh water and mature at sea. Steelhead spend their first one or two years in freshwater creeks, migrate out to sea where they mature in one to four years, and return to their native creek to spawn as many as four times. Historically, these fish swam deep into the tributaries of San Lorenzo Creek. However, the number of native steelhead has dropped dramatically in the past 30 years. The historic runs of steelhead in Alameda County are gone on San Lorenzo Creek. Steelhead cannot swim beyond the dam at Don Castro Reservoir.

Good riparian habitat is essential for preserving steelhead and other aquatic species. They need:

- *a year-round supply of cool, high quality water;*
- *diverse habitat with deep, quiet pools and shallow riffles;*
- *clean creek bed of cobble and gravels without fine sediment;*
- *relatively stable creek banks;*
- *dense shade canopy from creekside vegetation - to cool water, provide insect habitat, and contribute nutrients;*
- *lots of woody debris from fallen trees and branches;*
- *adequate food supply - primarily from insects; and*
- *abundance of cover- undercut banks, rocks, tree roots, overhanging vegetation, deep pools, and woody debris - for refuge from predators and heavy storm flows.*

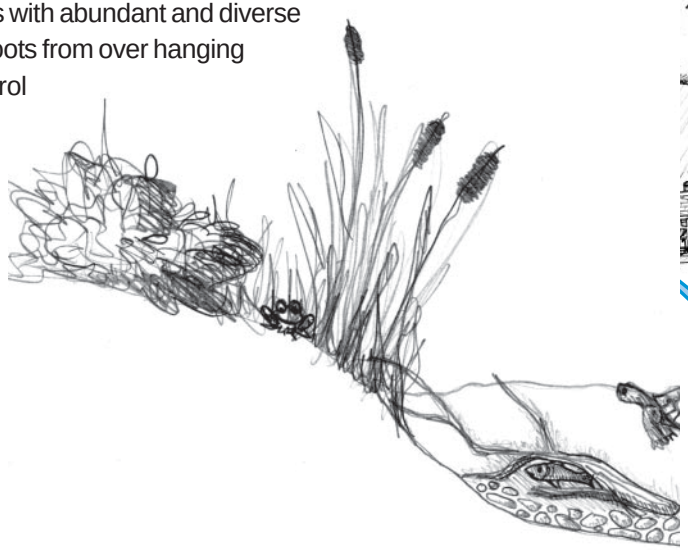
This same habitat benefits other aquatic species found in Alameda County, such as sticklebacks, suckers, and California roach and many other native wildlife species, such as frogs, egrets, dragonflies, mallards, and raccoons.

A Healthy Creek...

A creek's health reflects what is happening on the surrounding land. All creeks are important whether they flow year-round (perennial), part of the year (intermittent), or just during storms (ephemeral). Even the small ditches are important because they carry water, soil, and nutrients into larger creeks.

Signs of a healthy creek:

- Cool water. Critical for aquatic life, cool water also helps reduce toxic levels of ammonia, which come from decomposing waste and organic debris.
- Clean, clear water. Low turbidity (less sediment or level of cloudiness) means higher oxygen concentrations for aquatic plants and animals.
- A variety of pools and riffles. Varying flow conditions add oxygen to the water and provide important habitat nooks for fish and insects.
- Rocky creek bed. Cobble and gravel reduce erosion of the creek bed and provide spawning grounds for fish.
- Thriving native fish, amphibian, and aquatic insect populations.
- Stable, sloping banks with abundant and diverse native vegetation. Roots from over hanging vegetation help control erosion and provide habitat.
- Woody debris along creek banks. Natural debris from vegetation supports the aquatic food chain and provides habitat for fish and invertebrates.

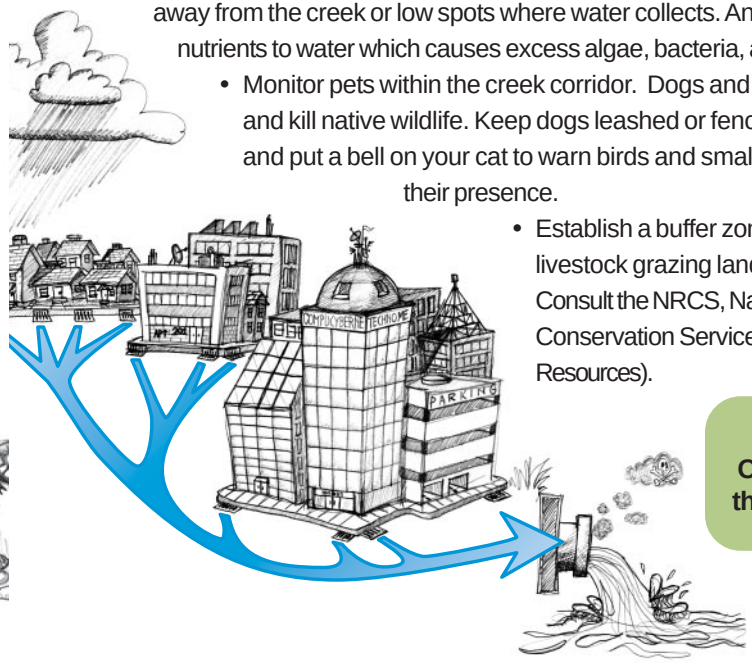


Landscaping and Yard Maintenance

- Avoid using fertilizer or pesticides during the rainy season or while you are watering your property. If you do use them, never exceed the recommended amount. Do not apply on windy days.
- Consider chemical-free lawn and garden care. Make use of compost and natural predators (such as spiders and ladybugs) instead of fertilizers and pesticides. See the Alameda County Clean Water Program's (ACCWP) *Grow It!* guide for less toxic alternatives.
- Remove old tires, garbage, and litter from your property. Storm events can carry these materials to a storm drain or creek.
- Compost yard and lawn clippings away from the creek (or storm drain). Never dump any waste in the street or creek. Although leaves and organic waste are biodegradable, they use up oxygen as they decompose.
- Practice water conservation. Use a meter or timer to control water use. Overwatering (and overspray) increases runoff to the creek and often causes erosion.
- Use household water for irrigation. Never pump water directly from the creek! See "Use Water Legally" on page 22 for information on water rights.

Animal Access

- Dispose of pet waste in the toilet or by burial. Store horse or cattle manure away from the creek or low spots where water collects. Animal waste adds nutrients to water which causes excess algae, bacteria, and odor.
- Monitor pets within the creek corridor. Dogs and cats often harass and kill native wildlife. Keep dogs leashed or fenced from the creek and put a bell on your cat to warn birds and small mammals of their presence.
- Establish a buffer zone between livestock grazing land and the creek. Consult the NRCS, Natural Resources Conservation Service, for help (see Resources).



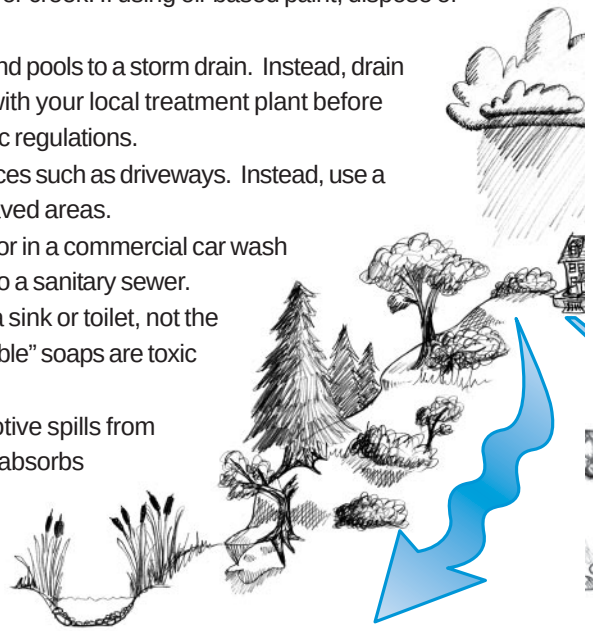
Remember: Only rain down the storm drain!

Stewardship: Keeping Pollution Out of Our Creeks

Good stewardship is essential for healthy waterways and fish and wildlife habitat. Whether or not you live right next to a creek, you can be a good watershed steward. These guidelines are a starting point for keeping creeks, watersheds, and the Bay healthy.

Home Maintenance

- Take hazardous items to the proper recycling or disposal facility. This includes paint, batteries, solvents, oil, automobile fluids, etc. Call Alameda County Waste Management Authority for information on household hazardous waste (HHW) collection events. Never pour chemicals down a storm drain! Also, do not put chemicals down the sink, toilet, or bathtub. These products may damage your septic system or may not be removed at the WWTP.
- Minimize the amount of chemicals that you use in your home. Refer to the Alameda County Clean Water Program's *Clean It!* guide for information on a less toxic cleaning products, and *Control It!* guide for less toxic pest control.
- Use water-based paints and thinners. Clean paintbrushes in the sink, not in the gutter or near a storm drain or creek. If using oil-based paint, dispose of waste at HHW events.
- Never drain waterbeds, spas, and pools to a storm drain. Instead, drain them to your bathtub. Check with your local treatment plant before doing so, they may have specific regulations.
- Avoid hosing down paved surfaces such as driveways. Instead, use a broom to sweep debris off of paved areas.
- Wash your vehicle on the lawn or in a commercial car wash where the water is discharged to a sanitary sewer. Dispose of soapy water down a sink or toilet, not the storm drain. Even "biodegradable" soaps are toxic to fish and wildlife.
- Use cat litter to remove automotive spills from paved surfaces. After the litter absorbs the spill, sweep it up and discard in the trash.



...or an Ailing Creek

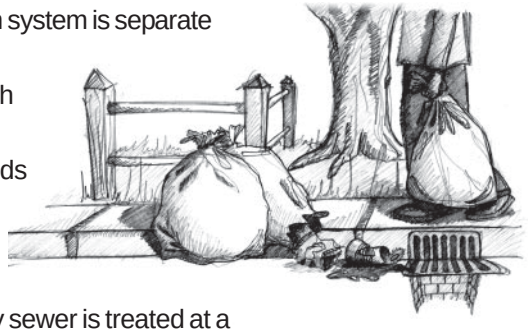
Signs of an unhealthy creek:

- Creek bed filled with fine sediment (such as silt and sand). Fine sediments bury aquatic insects and fish eggs, fill in pool habitat, and create turbidity.
- Warm water or water stagnant with algae. Algae thrive in warmer temperatures and deprive aquatic life of sunlight and oxygen.
- Cloudy water. High turbidity can be from algae, sediment, animal waste, chemicals, or sewage. Even yard waste (such as leaves and lawn clippings) will contribute to cloudiness and use up oxygen as it decomposes.
- Lack or absence of fish and aquatic organisms.
- Steep eroding banks with little or no vegetation. With no plants to soak up runoff water and no roots to help stabilize the soil, banks can erode excessively.
- Little or no shade from overhanging vegetation.
- A riparian corridor with many non-native species. Non-native species, such as eucalyptus trees, ivy, periwinkle, and arundo, can have a negative effect on water quality, out-compete natives, and contribute to soil erosion.
- Yard waste, trash, tires, metal, concrete rubble, or other dumped debris in the creek channel. This debris is not only unsightly, it contaminates the water, reduces channel capacity, and can attract pests.
- Creek banks lined with concrete retaining walls or concrete rubble.

The Storm Drain Connection

Water running off lawns, gardens, roofs, and paved areas such as streets, sidewalks, driveways, and parking lots empties into the storm drain system. The **storm drain system** consists of street gutters, catch basins, underground pipes, open channels, culverts (drains that cross under roads and driveways), and creeks. The storm drain system in the San Lorenzo Creek Watershed is designed to carry this runoff directly into local creeks or the San Francisco Bay without treatment to remove pollutants.

The storm drain system is separate from the **sanitary sewer system,** which collects wastewater from most households and commercial sources through indoor plumbing. Water in the sanitary sewer is treated at a wastewater treatment plant before being discharged into the Bay.



Homes in the more rural canyons of the watershed are often connected to septic systems, instead of sanitary sewers. These systems should be inspected annually to be sure they are operating properly and not leaking.

Sanitary Sewers vs. Storm Drains

What's the difference? Sanitary sewers transport water from the drains inside your house (for example sinks, toilets, bathtubs, and washing machines) to a wastewater treatment plant (WWTP). At the WWTP, this water gets cleaned before it is released to the Bay. Storm drains transport rainwater from the land (including roads, roofs, parking lots, and yards) and release it to a local creek *without any treatment*.

Impervious surfaces are paved or hard areas where water will not seep into the soil. Because these types of surfaces cover more than half of urban areas, less water soaks into the ground during heavy rains. This increases the runoff to the storm drain system. which intensifies peak stream flows and contributes to flooding problems.

Storm water runoff is a major source of water pollution in California. **Water entering the storm drain system -- whether it is rainwater or water from sprinklers or garden hoses -- can first pick up soil, heavy metals, chemicals, garbage, and other debris**. For example, oil or grease found on parking lots and roads, garden pesticides, and nutrients from fertilizers can all be washed down a storm drain which connects to a local creek or the Bay. Of course, individuals living on or near the water can also contribute pollutants directly to local creeks or the Bay. Overwatering a garden that is located near a creek, for example, will result in fertilizers and pesticides being washed directly into that creek.

Water passing through the storm drain system receives no treatment before entering creeks and the Bay.