CREEK CARE GUIDE

FOR RESIDENTS AND BUSINESSES

PUBLISHED BY

Rivers, Trails and Conservation Assistance Program

National Park Service

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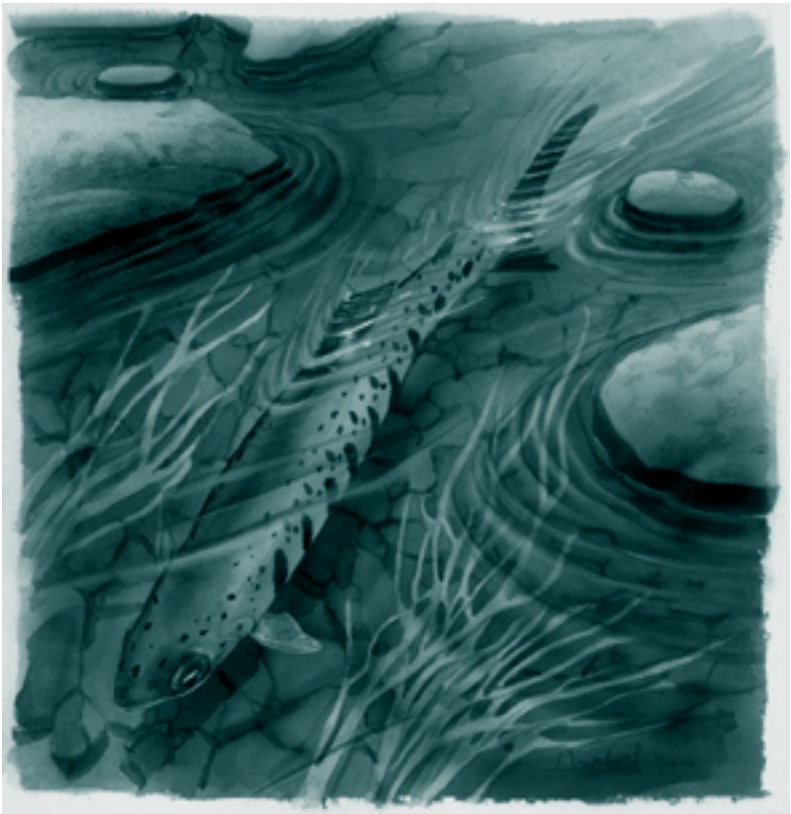

ACKNOWLEDGEMENTS

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Rivers, Trails and Conservation Assistance Program, National Park Service

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1994

PRACTICAL CREEK CARE

Proper creek care and management is crucial, whether the creek adjacent to your property is healthy or shows signs of degradation. The recommendations in this booklet are organized under four general categories:

Caring for the Creek You Share...

A creek flowing along your property is a valuable amenity. You and your creekside neighbors share responsibility for keeping the creek and its corridor healthy, both for people's enjoyment and for the wildlife that depend upon this fragile waterway.

In urban areas, a creek is an irreplaceable natural resource. Whether it flows year-round or seasonally, your creek provides water supply and groundwater recharge, wildlife habitat, a conduit for flood waters, and a host of aesthetic values. A creek is a part of the lives of all the people and animals who live within its watershed. The watershed is the land area which drains into the creek, including storm drain systems that carry rainwater and runoff from streets and property to the creek.

Since so much creekside property is in private ownership, much of the responsibility for the health of the creek and the survival of creek-dependent wildlife lies with you, the creekside resident or business. While a property along a healthy creek has many benefits, a degraded creek causes problems for all its neighbors.

Make the most of your location next to a creek by helping to keep it healthy. Through proper care of stream banks and riparian vegetation, you can enhance your property, prevent erosion problems, avoid flood losses, preserve water quality, and contribute to the survival of fish and wildlife.

This Creek Care Guide provides practical information about day-to-day activities which are creek-friendly. Please take a look through th is booklet to find out how to:

- Practice proper creek care and preventive maintenance;
- Start to solve existing problems in degraded creeks; and
- Seek out more information about creeks.

Before beginning any landscaping, stream enhancement, or bank stabilization project, remember to check with your local planning department or flood control agency for guidance. Many cities and counties have a local creek ordinance and may require permits. Your local representative can also direct you to state and federal agencies with creek-related regulations. These agencies work to protect creek habitats and water flows and provide guidance to property owners to ensure the condition of the creek is not worsened.

A healthy creek can help you make the most of your property. If you and all your creekside neighbors do your part to preserve and improve the creek you share, the whole community will benefit!

How Healthy .....

*M*any creeks in our cities and towns have been altered, channelized, or piped underground. Others have become victims of excessive sedimentation, sewage, reduced water flows, and dumped debris. While intact creek ecosystems continue to thrive in some places, few if any of California's urban creeks have survived in a pristine, natural state. Still, creeks are resilient. With care and stewardship, the health of a creek can rebound.

SIGNS OF A HEALTHY CREEK.....

WATER QUALITY AND FLOW

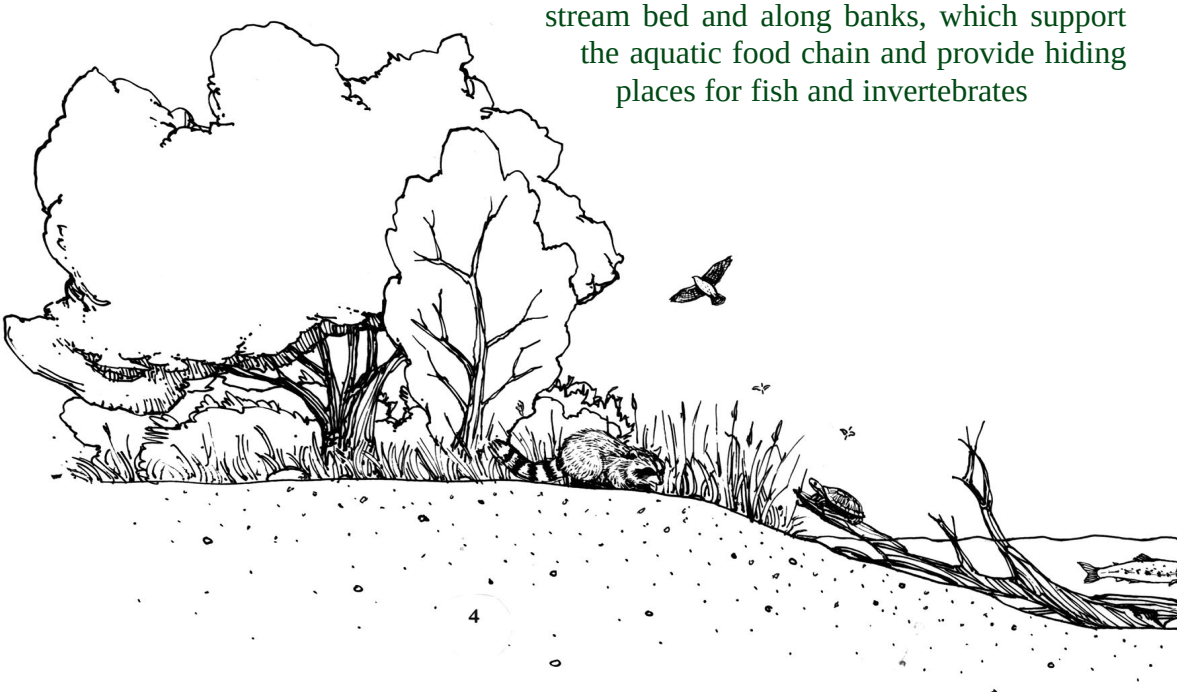
- Cool, clear water free of contaminants and excess algae
- Varied flow cycles

CREEK BEDS AND BANKS

- Stable vegetated banks with minimal erosion
- Presence of both slow pools and fast water running over shallow, rocky stretches
- Abundant rock and clean gravel of various sizes (critical for fish spawning)

PLANTS AND WILD LIFE

- Native riparian tree canopy, which stabilizes banks, provides habitat for birds and small mammals, and keeps water temperature cool for fish populations
- Abundance of native riparian vegetation, providing cover for wildlife and root systems which stabilize banks (riparian refers to the land adjacent to creeks and rivers, where the vegetation is influenced by the presence of water)
- Thriving fish, amphibian, and aquatic insect populations
- Leaves, small branches, fallen logs and other natural vegetative debris within the stream bed and along banks, which support the aquatic food chain and provide hiding places for fish and invertebrates



Of course, stream characteristics vary depending upon where you live. In many parts of California, a healthy creek may be an intermittent stream that does not flow year-round. Water flow and characteristics of the creek banks, stream bed, vegetation and wildlife also vary naturally along the length of each creek. A thriving creek ecosystem is a diverse habitat where you will encounter a range of conditions. You need to understand how your stretch of the creek and your property fit into the overall ecosystem.

Although you can play a key role in creek care, a creek's health is also affected by activities far beyond the boundary of your property. Within the watershed, as natural surfaces are paved and developed, less rainfall percolates into the ground and more water flows directly into the creek system from streets and storm drains. Storm drains generally receive no wastewater treatment. Almost always, this urban runoff carries debris and pollutants that pose significant dangers to creeks. While you may have little control over the entire watershed, your diligence and cooperation with other creekside neighbors can prevent and reduce activities which harm your creek.

SYMPTOMS OF AN AILING CREEK

WATER QUALITY AND FLOW

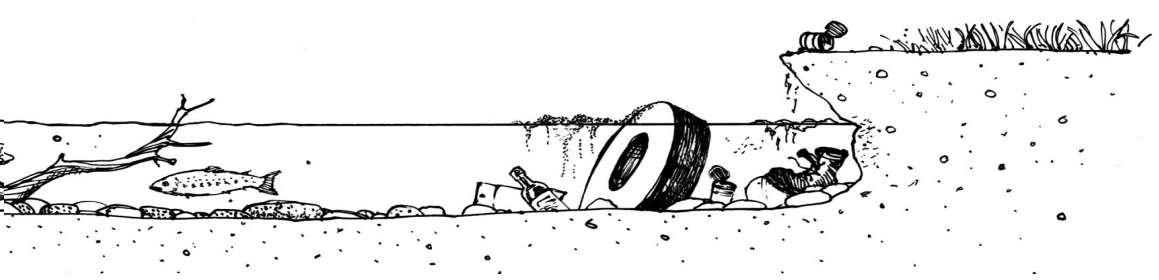
- Poor water quality, including problems such as excessive algae, suspended sediments, contamination from animal waste or sewage, or presence of metals or other toxics
- High water temperature
- Reduced water flow

CREEK BED AND BANKS

- Loss of natural creek channel
- Excessive erosion along creek banks or deeply incised stream bed and high rates of sedimentation impeding stream flow
- Still water, an absence of pools, riffles, or clean gravel (which may be covered by sediment)
- Litter, yard clippings, trash, and other dumped debris

PLANTS AND WILDLIFE

- Lack of diversity in flora and fauna
- Barren creek banks
- Invading non-native plants which compete with native species in the riparian corridor
- Diminished or non-existent fish, amphibian and aquatic insect populations



KNOW WHAT'S HARMFUL TO CREEKS AND DISPOSE OF WASTES PROPERLY

As a first step, learn what products become pollutants when they enter a storm drain or creek. If proper disposal of a particular product is inconvenient, consider using an alternative product.

REMEMBER

Storm drains flow into creeks, and in many places creeks flow to the bay and ocean with no wastewater treatment!

- **Motor oil and antifreeze**

Even in low concentrations, automotive products are extremely toxic to fish and other aquatic wildlife.
Never dump gasoline, motor oil, antifreeze, battery acid, or other automotive fluids into a creek or storm drain. Place used motor oil or antifreeze in sturdy, sealed containers, caps taped down, and recycle through your local collection program or recycling depot. Many communities have curbside oil recycling collection -- some have antifreeze collection services. Check with your local agency for more information about container restrictions.

- **Paints, thinners, and other solvents**

Improperly disposed paint products also cause harm to fish, wildlife, and people. Use up leftover paints, or share with a friend or neighbor. Dispose of unusable paints and paint products at your local household hazardous waste facility. Do not clean brushes in a gutter or near a storm drain or creek. Use water-based latex paints whenever possible; they are less toxic than oil-based paints, turpentine and thinners -- and they can be recycled. Small amounts of leftover paints may be air-dried in cans and discarded in the garbage. Paint thinners should be filtered and reused. Dispose of residue at a household hazardous waste collection facility or event.

- **Never dump water from carpet cleaning into a creek or storm drain.**

Carpet cleaning chemicals are detrimental to creeks; dispose of these solutions down a sink or toilet. If you use the services of a carpet cleaning company, make sure they do not dispose of the water into a creek or storm drain.

- **Avoid hosing down paved surfaces or washing your car in the driveway or street.**

Even "biodegradable" soaps are toxic to fish and wildlife. Wash cars on a lawn or unpaved area, or use a commercial car wash.

- **Clean automotive spills using "dry" cleanup methods.**

Use cat litter or other absorbent materials to remove spills from paved surfaces. Depending on the substance spilled, dispose of absorbent materials in the garbage can or at a hazardous waste collection site. If you must use water in a final cleanup step, direct flow to a lawn area -- not the street, gutter, or storm drain.

FOR RESIDENTS

- **Practice creek-safe swimming pool and spa maintenance techniques.**

Chlorine and copper algicides used in swimming pools and spas are toxic to aquatic organisms and other wildlife. Swimming pool and spa water should never be drained to the street, gutter, or storm drain. Contact your local waste water treatment plant before discharging pool or spa water into the sewer line. Different cities have varying regulations.

The best way to drain your pool or spa is to let the chlorine dissipate by allowing the water to sit for up to two weeks and then drain onto landscaping. If you cannot allow the pool water to sit, add sodium bisulfate in the amounts suggested on the label. Do not use copper-based algicides. Proper chlorination should take care of algae problems.

If you use a pool service, discuss safe pool cleaning methods with them.

- **Check your rain gutters and other pipes to see where they drain.**
  Make sure they do not carry water directly into the creek.

Runoff from roof surfaces contributes to the decline of creek health. Pipes projecting directly into a creek bank or flexible pipes allowed to drape down a bank cause erosion. Consider using cisterns, on-site filtration or gray water systems to capture roof runoff.

- **Control pet access to creeks and riparian vegetation.**

Dog and cat feces add excessive nutrients and bacterial pollution to water, which decreases water quality, causes unpleasant odors, and can also cause human health problems. Horse and livestock manure also harms water quality.

Livestock and pets trample vegetation within the creek corridor. Livestock should be restricted from grazing within the riparian corridor. Pets also terrorize wildlife. People often believe a cat collar bell will alert birds to danger, but research has shown by the time a bell rings, it is often too late. A declawed cat can still kill wildlife.

Keep pets leashed in your yard, or fence pets out of the creek corridor. Pick up animal waste in your yard and when walking your pet and dispose of the waste in the garbage.

Horse paddock and pasture land should be established at least 50 feet from the creek.
To minimize the runoff, keep the area between the pasture and water course well vegetated. Exclude horses and livestock from the creek by using barriers or fences which still allow for wildlife movement.

- **Carefully remove trash, litter, and other dumped debris from the creek.**

Unfortunately, some people think of creeks as garbage dumps. You don't have to look far to find old shopping carts, used appliances, mattresses, car parts, bottles, cans, plastic, styrofoam and paper litter. This debris can become a hazard during floods. It can also be a potential threat to groundwater quality and provide breeding places for rodents and mosquitoes.

Remove old tires, garbage, and litter from your property. Never store these materials within the flood zone. They may be carried away during storm events. Do not dump yard clippings down creek banks or within a flood zone. If you need assistance cleaning up the creek, contact some of the organizations listed at the end of this booklet for ideas and assistance.

- **Keep an eye on the creek and the storm drains in your neighborhood.**

Report any spill or discharge other than rainwater to appropriate authorities for immediate cleanup.

KNOW WHAT'S HARMFUL TO CREEKS AND DISPOSE OF ALL WASTES PROPERLY.

Operate your business responsibly to eliminate discharges into storm drains. Never store waste materials in the street or near the creek.

- **Never pour oil or grease down a storm drain or sanitary sewer.**

Food service businesses produce pollutants such as oil, grease, detergents, and food scraps. Grease and oil discharged into storm drains can enter the creek and decrease the oxygen content of the water, coat fish gills, and smother bottom dwelling organisms. Food scraps can cause excessive nutrient loading in the creek, which uses up oxygen needed by fish and other organisms.

Fats, oils, grease, and food particles should be placed in sealed containers and recycled. Most municipalities and garbage companies prohibit disposal of oil and grease in the garbage.

- **Be a zero-discharger.**

When you reuse and recycle fluids and other products, they never become wastes. Purchase reusable or recyclable materials whenever you can. If your business routinely uses chemicals or cleaning compounds, consider "closed loop" processes that recycle these materials.

- **Cover and maintain dumpsters.**

Open or leaking dumpsters are common causes of water pollution. Close dumpster lids, place dumpsters under roofs, or cover them with plastic sheeting at the end of each work day and during rainy weather. Inspect dumpsters regularly for leaks, and repair or replace any dumpster that is not water-tight. Return dumpsters to trash haulers for cleaning. Do not hose them down or clean them on site.

- **Clean up leaks, drips and other spills without water whenever possible.**

Use rags for small spills, a damp mop for general clean-up, and absorbent materials (such as cat litter) for larger spills. Clean up spills immediately. Avoid hosing or wet-mopping outdoor work areas. Dispose of clean-up materials properly. Do not dump them outside or in the creek. When cleaning inside, collect mop water and discharge into a sink or toilet.

- **Label storm drain inlets so employees do not dispose of waste there.**

- **Use creek-friendly washing methods for vehicles and equipment.**

Do not wash cars, trucks, or other equipment in a paved parking lot or street where soap and wash water can flow into the creek or storm drain.

Install a "wash pad" to capture, pretreat and discharge the wash water to the sanitary sewer or consider using a commercial car wash.

For Businesses

- **Keep pollutants off exposed surfaces.**

Place trash cans around your business site to minimize litter. Dispose of wastes appropriately in covered dumpsters or recycling receptacles.

- **Control parking lot and site drainage.**

Strategic grading of parking lots and other outdoor spaces can prevent runoff from contacting potentially contaminated areas and reaching creeks and sensitive areas. When building or grading parking areas, consider installation of oil-water separators equipment in catch basins.

Clean parking lots regularly using street sweepers and dry clean up methods.

- **Check rain gutters and other pipes to see where they drain. Make sure they do not carry water directly into the creek.**

Runoff from roof surfaces contributes to the decline of creek health. Pipes projecting directly into a creek bank or flexible pipes allowed to drape down a bank cause erosion. Consider using cisterns, on-site filtration or gray water systems to capture roof runoff.

- **Train employees and keep customers informed.**

If employees misunderstand how to handle waste, costly pollution incidents can occur. Make sure that all your employees understand and implement appropriate practices. Educate your customers, as well, and prevent them from disposing of wastes improperly on your site.

- **Carefully remove trash, litter, and other dumped debris from the creek.**

Unfortunately, some people think of creeks as garbage dumps. You don't have to look far to find old shopping carts, used appliances, mattresses, car parts, bottles, cans, plastic, styrofoam and paper litter. This debris can become a hazard during floods. It can also be a potential threat to our groundwater quality and provide breeding places for rodents and mosquitoes. Styrofoam packing material is especially harmful to wildlife because it can be mistaken for food.

Remove old tires, garbage, and litter from your property. Never store these materials within the flood zone. They may be carried away during storm events. If you need assistance cleaning up the creek, contact some of the organizations listed on the back page for ideas and assistance.

Use Creek-Friendly Gardening and Landscaping Practices

Limit use of gardening chemicals. Avoid using chemicals entirely in wet weather.

Pesticides, herbicides, and fertilizers can run off into the creek. Fertilizers add excess nutrients to natural waters that lead to algae bloom, bad odors, and even fish kills.

- **Consider using compost and organic soil amendments instead of chemical fertilizers.**

Pull weeds before they flower to reduce the need for herbicides. Introduce natural predators such as toads, spiders, garter snakes, and ladybugs, which reduce insect pests.

- **Dispose of yard and lawn clippings properly . Never dispose of lawn clippings in a creek.**

Soil and lawn clippings disposed in creeks become unsightly, destroy aquatic habitats, and may also worsen flooding problems. While they are biodegradable, organic wastes use the oxygen that fish, aquatic insects, and native plants need for survival.

Do not rake, sweep, or blow leaves or lawn clippings into the street or storm drain. Add them to a compost pile to make fertilizer for your property. If composting isn't possible, rake or sweep up clippings and dispose of at municipal composting programs or use curbside yard waste collection services.

Require your gardener or landscape service to haul away pruning debris, leaves, lawn clippings, and other yard debris for composting.

- **Landscape with native plant species.**

Native riparian vegetation is uniquely adapted to survive flood conditions. Native plants provide erosion protection during high flows and generally recover quickly when flood waters subside. Native species also require less water and fewer chemicals than most exotic plants.

Seek expert technical advice before revegetating a creek bank. Consult your local nursery, native plant organization, garden club, agricultural extension office, or a good reference book to find out which plants are best suited to your location and how to care for them. Some cities and counties have local creek ordinances which include landscaping requirements. Check with your local planning department.

NATIVE PLANT SPECIES

We've listed some of the many native plants that grow within riparian corridors in California. We recommend that you consult an expert for help in choosing the most suitable plants for your creek, local climate, and specific conditions.

RIPARIAN - *LOWER TERRACE AND WATER EDGE*

GROUND COVER AND VINES

Red columbine *(Aquilegia formosa)*
Crevice heuchera *(Heuchera micrantha)*
Common monkeyflower *(Milmulus guttatus)*
Red-flowering currant *(Ribes sanguineum)*
California wild rose *(Rosa californica)*

RIPARIAN - *MID-TERRACE TO TOP OF BANK*

GROUND COVER AND VINES

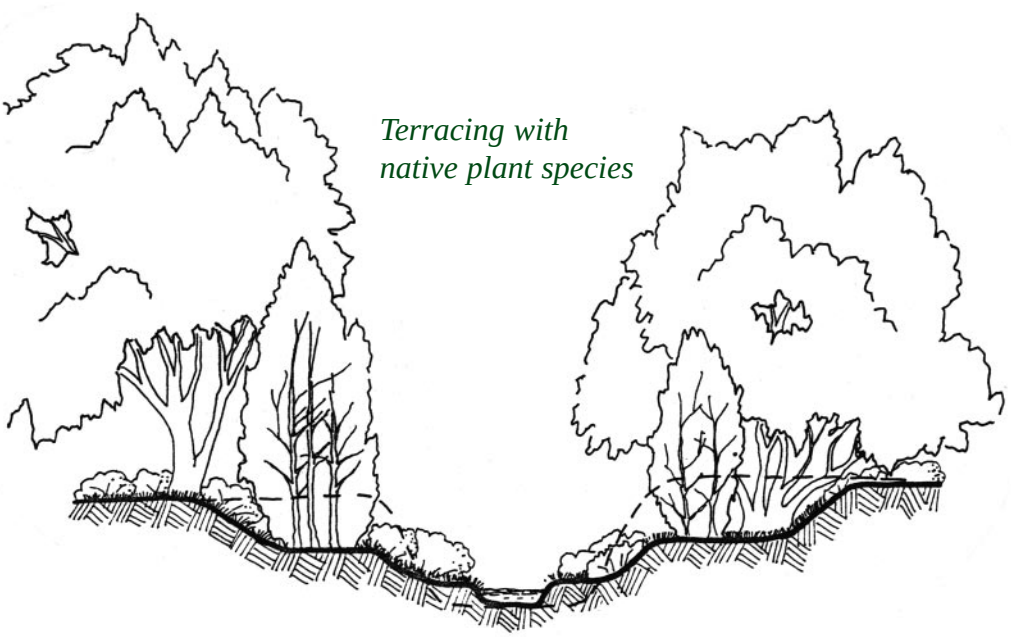
Long-tailed ginger *(Asarum caudatum)*
Virgins bower *(Clematis ligusticifolia)*
California strawberry *(Frageria californica)*
Salal *(Gaultheria shallon)*
Trailing snowberry *(Symphoricarpos mollis)*

SHRUBS

Coyote bush *(Baccharis pilularis)*
Smooth dogwood *(Cornus glabrata)*
Toyon *(Heteromeles arbutifolia)*
Red-flowering current *(Ribes sanguineum)*
Coffeeberry *(Rhamnus californica)*
California wild rose *(Rosa californica)*
Snowberry *(Symphoricarpos rivularis)*

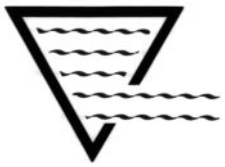
TREES

Alder *(Alnus sp.)*
Buckeye *(Aesculus california)*
Big leaf maple *(Acer macrophyllum)*
Box elder *(Acer negundo)*
California black walnut *(Juglans hindsii)*
Sycamore *(Platanus racemosa)*
Coast live oak *(Quercus agrifolia)*
California bay *(Umbellularia californica)*
Blue elderberry *(Sambucus mexicana)*
Willow *(Salix sp.)*



Terracing with native plant species

PROTECT CREEK FLOW



Avoid locating structures and storage containers near the creek bank.
Any structure built within reach of flood waters is subject to damage or loss and may decrease the creek's ability to accommodate flood flows safely. Structures such as storage sheds, patios, and decks require removal of the creek's natural protective vegetation and often decrease the stability of vulnerable slopes. Construction disturbs the soil and vegetation, adding to sediment buildup in the creek.

The best way to accommodate flood waters is to avoid constructing improvements in the flood zone and maintain the area in its natural state. Some communities have creek setbacks which require that structures be kept a certain minimum distance from the creek.

- **Avoid diverting water or damming the creek**

Water diversions and dams significantly affect the life of a creek by reducing water flow.

Avoid taking water directly from creeks, especially during the dry season when natural flows are low. The safest approach to good creek care is to avoid altering the watercourse unless the modification is needed to resolve an existing bank problem. Seek advice from the appropriate local agency and the California Department of Fish and Game.

- **Encourage infiltration.**

Pave only where necessary. Paved surfaces increase runoff during storms and peak flows in creeks, adding to flooding and erosion problems. Paving also results in lower creek flows during the dry season.

If you are planning to construct walkways, patios, driveways, or stormwater drains, consider alternatives that maximize permeable surface area. This allows more rain water to soak into the ground on site.

- **Practice water conservation**

Every drop of water you save, whether through landscaping with drought-tolerant plants, reducing personal consumption, installing drip irrigation, and avoiding other water-using activities, contributes to maintaining a healthy creek environment -- your creek or the creek/river from which your community gets it water supply.

Contact your local water supply agency for more information on water conservation practices.

PREVENT EROSION PROBLEMS

Preserve native creekside vegetation.
Native riparian plants growing within a creek corridor provide important habitat and help to stabilize banks. In times of flooding, a well-vegetated creek bank may be your property's best protection.

But beware! Invasive non-native species can choke out native plants. In some instances, these plants can actually impede creek flow and contribute to flooding. Invasive plants also have little or no habitat value for wildlife.

Yet mowing, clearing, or stripping away non-native vegetation can promote erosion. Seek professional advice before removing invasive species, and replace with native vegetation as soon as possible.

- **Avoid removing natural debris.**

Removing branches, boulders, and dead vegetation from a creek can harm fish and wildlife. Naturally occurring debris provides food and cover for fish, aquatic insects and other animals.

If debris poses a serious flooding or erosion hazard, however, careful removal may be necessary. Seek advice from your California Department of Fish and Game representative and your local government agency before removing debris.

- **Check for erosion regularly and correct problems promptly.**

When flowing water meets unprotected soil, erosion almost always results. Barren slopes on any portion of your property (not just creek banks) can lead to sedimentation problems in the creek. Too much sediment (soil, sand, and fine gravel) fills in the creek bed and reduces its ability to carry flood waters. Excessive sediment can also destroy pools, eliminate shelter and fish spawning habitat, and diminish food supplies for fish and aquatic insects.

Keep an eye on the bottom of the slope! A vegetated slope is the best defense against undercutting and slumping banks. Replant barren slopes or disturbed soils as quickly as possible. On slopes that are not too steep, a covering of straw over newly bared earth will prevent erosion until vegetation can grow back.

Putting tires or slabs of concrete over the bank will usually create more erosion, rather than lessen the problem. See the next section for more effective techniques for treating an unstable bank.

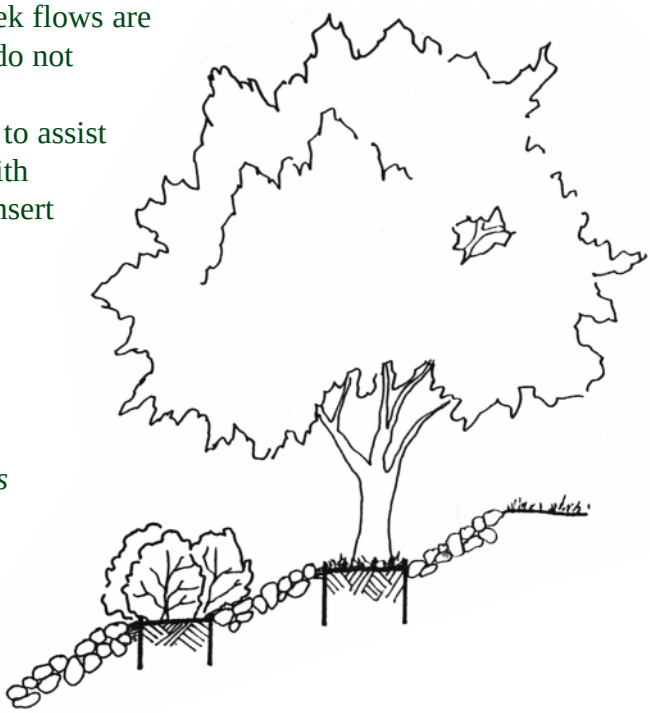
STABILIZING

Creeks are constantly reshaping their channels through natural processes -- scouring outside curves and depositing sediment inside bends in the waterway. A stream's natural tendency to meander can be aggravated by human activities throughout the watershed. Increased volumes of stormwater runoff into creeks, removal of natural vegetation, and upstream alteration of the creek channel may lead to erosion problems on banks that were once stable. Unstable banks can lead to extensive bank failures and add large volumes of sediment to the creek, resulting in property loss.

Creeks are complex systems. Stabilizing banks requires knowledge and expertise. Actions taken to protect your bank may have unforeseen consequences downstream. You may unintentionally pass your erosion problem on to your neighbor.

If you have a serious erosion problem, consult with a qualified professional in bank stabilization and repair. Check with your local representative from the California Department of Fish and Game -- you may need to obtain a Stream Alteration Agreement. The U. S. Army Corps of Engineers also requires permits for work done in waters under their jurisdiction. Municipalities and local flood control agencies also have local creek ordinances with which you must comply.

Local, state and federal permit processes help ensure that riparian habitats and creek flows are protected and that property owners do not inadvertently worsen the situation. Remember, these agencies are there to assist you! Organizations and agencies with more information are listed on the insert of this booklet.



Bank stabilization with planting collars

HERE ARE A FEW BANK STABILIZATION TECHNIQUES

- **Erosion control need not be costly.**
- **Consider low-tech, lower-cost, creek-friendly alternatives first.**
- **Be sure to seek professional advice before taking action.**

- If the native riparian vegetation has been depleted or removed, but severe bank erosion has not yet occurred, you may be able to re-establish or augment the remaining vegetation on your own. Find out what types of native vegetation to use on your particular site and how to plant and care for them.

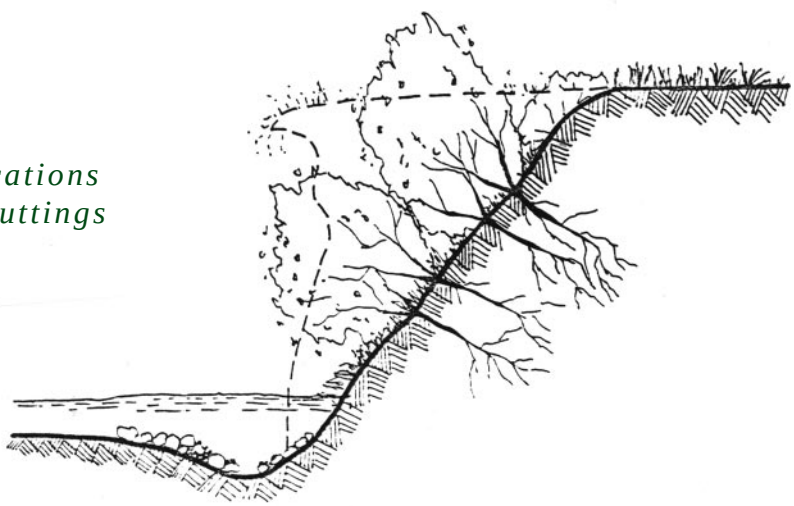
- Modify steep banks to shallow or moderate slopes and revegetate with native riparian species. (Live cuttings of willow driven into the bank or bundles of live cuttings secured to the banks can be effective stabilization techniques).

- Create terraces and plant with native species.

- Retrofit existing bank stabilization with planting collars.

- Stabilize the bottom of the slope with stone rip-rap, log-cribwalls, or gabions (large wire baskets filled with rock and wired together). Plant native vegetation into these structures.

Bank modifications and willow cuttings



REMEMBER

The best erosion control is proper creek care. Neighbors must cooperate in their efforts and share responsibility for maintaining a healthy creek.

A Few Reminders About Caring for the Creek You Share...

You and your neighbors can continue to enjoy your creek by:

- Keeping your creek healthy
- Using creek-friendly gardening and landscaping practices
- Protecting creek flow
- Preventing erosion problems

With care and stewardship
you creek will thrive,
enhance your property and
benefit the whole community.

GETTING HELP

In many cases, common sense -- as well as local guidelines and ordinances -- will help you care for your creek. Sound professional advice is always recommended. The agencies and organizations listed below may be able to assist you. Remember to check the front and back pockets of this guide for additional information about contacts and organizations in your area.

Local creek programs, regulations, ordinances, and permits:
- Call your local city or county public works department or planning department
- Call your local flood control agency

Reporting Spills and Illegal Discharges
- Call your local city or county public works department or planning department
- Call your local Regional Water Quality Control Board
- Office of Emergency Services 800-852-7550
- Fish and Game Cal Tips Hot Line 800-952-5400

Bank Stabilization/Creek Restoration
- Call your local Resource Conservation District
- California Department of Fish and Game 707-944-5500
- USDA Soil Conservation Service.....916-757-8200
- California Dept. of Water Resources - Urban Streams Restoration Program 916-323-9544
- Urban Creeks Council (non-profit organization) 510-540-6669

Plants and Landscaping
- Call your local city or county planning department
- California Native Plant Society - (non-profit organization) 916-447-2677
- Urban Creeks Council (non-profit organization).....510-540-6669

Recycling
- Call your local city public works department
- California Integrated Waste Management Board - Recycling Hot Line.....800-553-2962
- California Department of Conservation - Recycling Hot Line.....800-332-SAVE

More information
- U. S. Fish and Wildlife Service 916-978-4613
- U. S. Army Corps of Engineers 415-744-3276
- National Park Service - Rivers, Trails and Conservation Assistance Program 415-744-3975