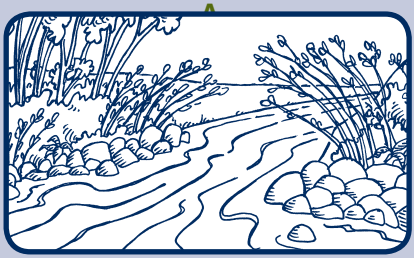
Creek Care



A Guide for Marin Residents

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For more information on protecting local creeks:

City of Belvedere	435-3838
Town of Corte Madera	927-5057
County DPW/MCSTOPPP	473-6528
City of Larkspur	927-5017
City of Mill Valley	388-4033
City of Novato	899-8246
Town of Ross	453-1453 ext. 163
Town of San Anselmo	258-4600
City of San Rafael	485-3355
City of Sausalito	289-4100 ext. 106
Town of Tiburon	435-7399

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Preface

No matter where you live in Marin County, your actions influence our watershed and creeks. In Marin County, all storm drains flow directly to local creeks or the Bay without treatment. Washing your car, watering your lawn, and walking your dog can contribute to water pollution–or be done in a creek friendly way.

This Creek Care Guide is designed to encourage and support the ongoing stewardship of creeks in Marin County. This guide is divided into three sections. The first section defines healthy creeks, riparian corridors, fish habitat needs, the storm drain connection, and how to identify a potential creek problem. Guidelines for improving creek health are outlined in the second section. A resource directory is provided in the last section.

Taking A Watershed Approach

A watershed is the entire area that drains into a distinct creek or river system. It includes major and minor creeks, seasonal drainages, storm drains, the riparian corridor, flood plains, and land that water flows over or under on its way to a creek or bay.

Watersheds catch and store rain. Natural factors such as climate, elevation, soil and vegetation type, steepness of slope, and size of the watershed affect the rate at which stored water is released from the watershed into creeks.

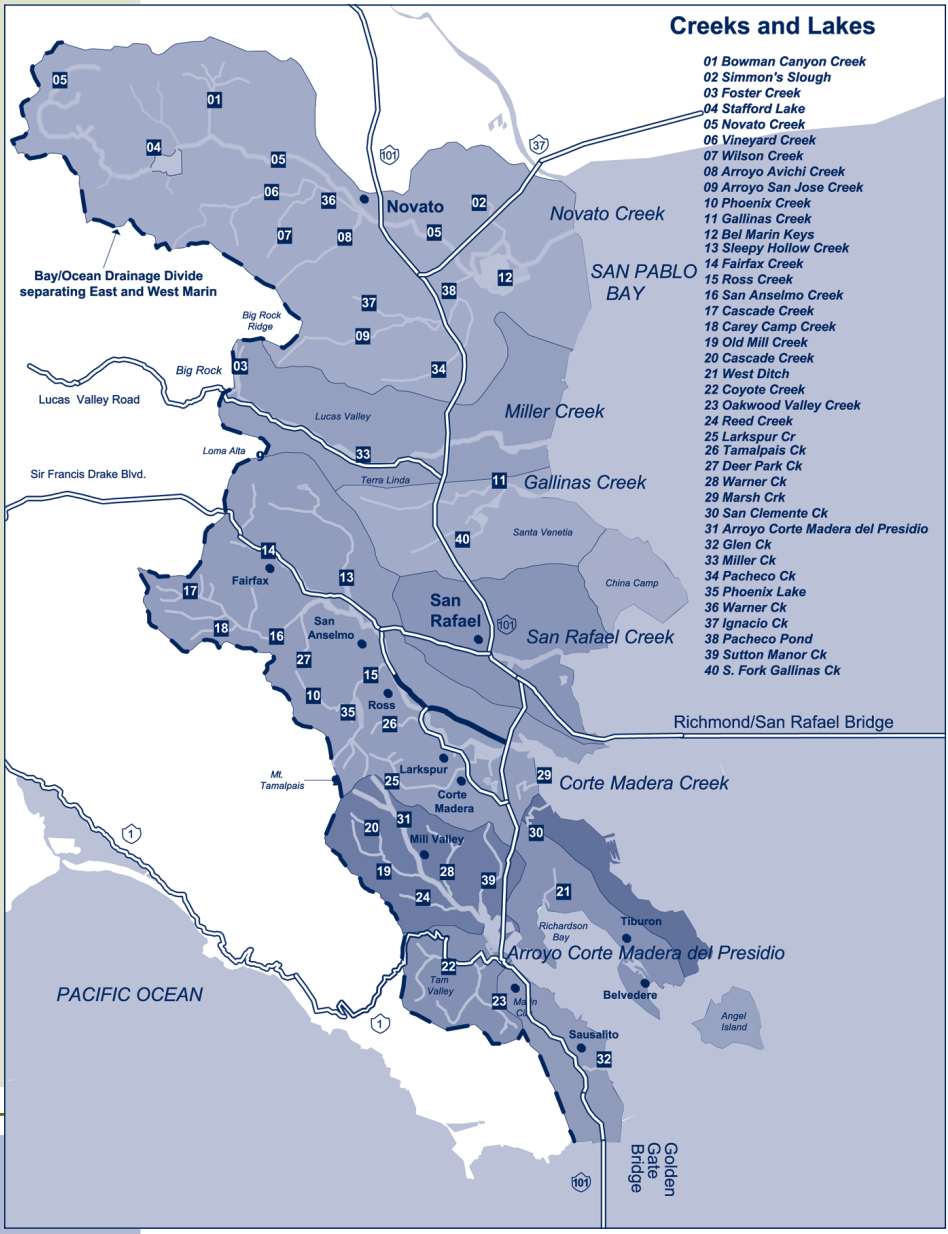
A healthy watershed will have clean creeks with cool water, a thriving riparian corridor, and stable, well-vegetated land. These components help keep water quality high, provide fish and wildlife habitat, control erosion, maintain dry season creek flows and, reduce flash flooding. In a healthy watershed,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

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

Coastal creeks are important for the tidally-influenced areas in the lower watersheds. As creek flows reach the bay, freshwater mixes with salt water forming brackish water and marsh habitats. These highly productive ecosystems (or estuaries) depend on high quality freshwater and regular stream flows.

Healthy local creeks and tidal areas help keep San Francisco Bay and Estuary clean. The estuary provides valuable nursery habitat for many fish. Clean water is also important for other uses including commercial and sport fishing industries and recreational activities.

Natural conditions and human activities within a watershed influence the condition of a creek. What takes place in the upper watershed will affect the downstream area. Changes may happen suddenly as the result of a storm event (such as new streambank erosion), or accumulated problems in

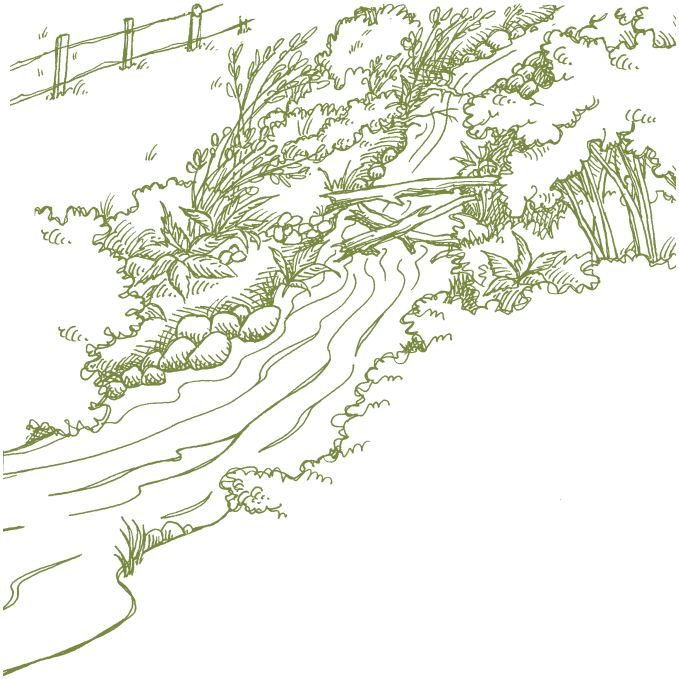


For more maps, look under Residents/Publications and Resources/Creek Care at www.mcstoppp.org

the watershed may take many decades to develop (such as pools in the creek becoming filled with sediment). Excessive sediment coming from the upper watershed smothers valuable spawning gravel, diminishes the functioning of tidal areas and causes navigational problems in the bay. Aquatic life is highly susceptible to pollutants from human activities.

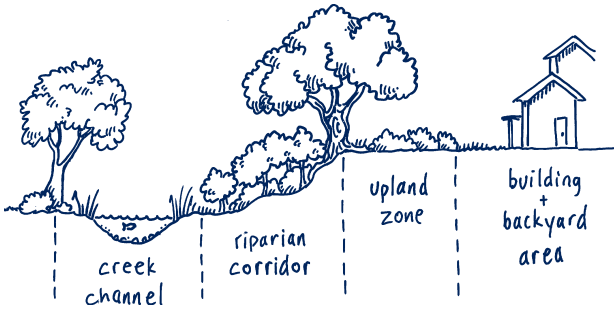
Taking a watershed approach means looking carefully at the watershed's components–the creek and tidal areas, the streambanks and the adjacent lands–and how they work together. This can be done with an overall watershed management plan, or on an individual piece of property.

Taking care of each section of a creek will ultimately benefit the entire watershed. This creek care guide focuses on the freshwater portions of the creek system and its riparian corridor.



Up A Creek

Creek channels are constantly being reshaped through natural processes. 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 swales that look like ditches are important because they carry water, soil, and nutrients into larger creeks.



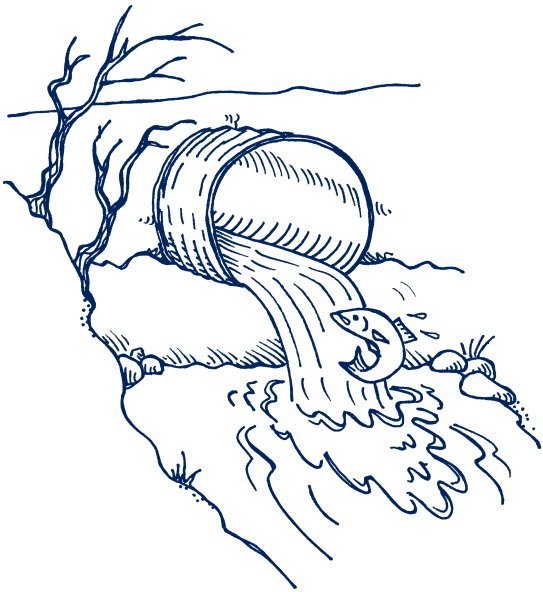
Healthy creeks will have:

- Cool water. Critical for aquatic life, cool water also helps reduce toxic levels of ammonia, which come from decomposing waste and organic debris. Steelhead and salmon, found in local creeks and San Francisco Bay, require water temperatures between 40° and 60° F.
- Clean, clear water. This means plenty of dissolved oxygen. Suspended and fine sediments, nutrients from fertilizers, sewage, and toxics (such as metals, pesticides, oil, and grease) degrade water quality and reduce the amount of oxygen available.
- A high water table with abundant underground water flows.
- Thriving fish, amphibian, and aquatic insect populations.
- A variety of pools and riffles, with abundant cobble and gravel for spawning and young fish.
- A healthy riparian area with dense, overhanging native vegetation, minimal erosion, and some undercut banks for aquatic habitat.

Unhealthy creeks will have:

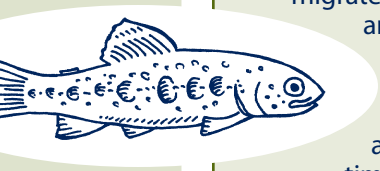
- Creek channels that cut wider (aggrade) or cut deeper (degrade). This lowers the water table.
- Warm water or water stagnant with algae.
- A creekbed, especially pools, filled with fine sediment.
- Vertical or actively eroding streambanks. Although streambank erosion is a natural process, active, or human-accelerated erosion (e.g. creating foot trails too close to the creek) may need attention.
- Bare, unvegetated streambanks.
- A stream channel with little or no shade from over-hanging trees.
- A riparian corridor with a majority of non-native vegetation.
- Creekbanks lined with wood or concrete retaining walls.
- Yard waste, trash, or other debris such as tires, shopping carts, or concrete rubble dumped on creek banks or into the creek.

Careful observation can help identify an ailing creek.



Fish Facts

Salmon and steelhead are anadromous salmonids—meaning they spawn in fresh water and mature at sea. The number of native coho salmon and steelhead has dropped dramatically in the past 30 years. Historic runs of coho salmon in eastern Marin County creeks are gone.



Coho salmon spend their first year in freshwater creeks, migrate out to sea where they mature for two years, and return to their native creek to spawn and die. Steelhead have a similar life cycle, but they live in freshwater for one or two years, spend one to four years at sea, and return to spawn as many as four times. Life cycle and migration timing make steelhead more resilient to change.

Good quality instream habitat is essential for the remaining steelhead and other aquatic species. Salmonids need:

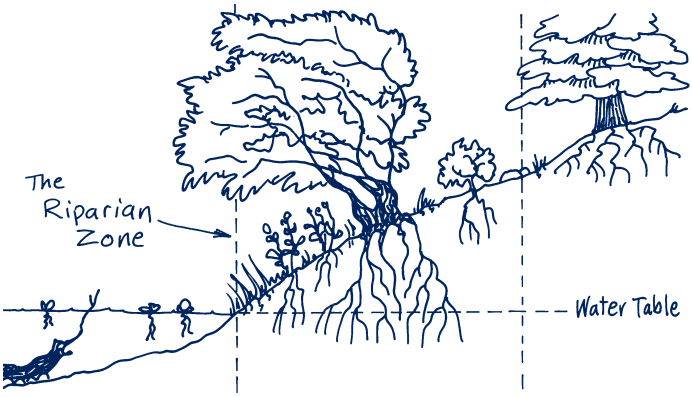
- a year-round supply of cool, high quality water;
- diverse habitat with deep, quiet pools and shallow rocky areas (riffles);
- clean spawning cobble and gravels without fine sediment;
- relatively stable creek banks;
- dense shade canopy from creekside vegetation—to cool water, provide insect habitat,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

This same habitat benefits other aquatic species in Marin such as sticklebacks, sculpin, suckers, CA roach, lampreys, and the CA freshwater shrimp. Many other native wildlife species - e.g. herons, egrets, kingfishers, dragonflies, weasels, muskrats, and raccoons - rely on healthy creek habitat.

Into The Riparian Corridor

A riparian corridor is the vegetated area next to a creek channel. Healthy, diverse riparian corridors are a key part of creek health and aquatic habitat.

Dense roots and vegetation stabilize creek banks, help reduce soil loss, filter sediment, and slow flood waters. Trees and shrubs help raise the water table, and their canopies cool the water. The leaves, fallen branches and logs, and other vegetative debris form the base of the food chain. Riparian corridors provide food, shelter, and shade for fish, amphibians, and other wildlife. A healthy riparian habitat is used by more species of wildlife than any other type of habitat.



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 Marin County is designed to carry this runoff directly into local creeks or 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.

Because impervious surfaces cover more than half of urban areas, less water soaks into the soil during heavy rains. This increases 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 your 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.

Identifying Creek Pollution

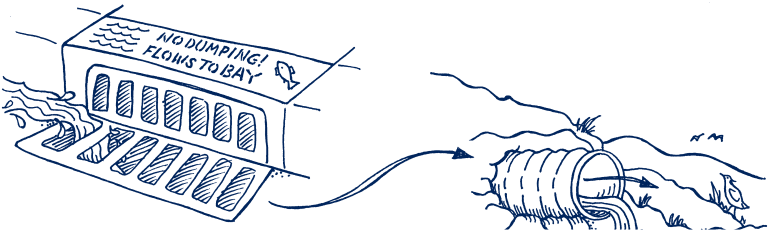
Use the following situations or incidents to help distinguish between a natural creek event and a problem. If you aren't sure whether a situation is a problem, call MCSTOPPP at 415-473-6528. To report a creek incident, see the resources directory in the back of this guide.

Foam. It's not easy to tell the difference between naturally occurring foam and foam caused by excess nutrients or from synthetic sources.

Naturally Occurring Foam. Foam occurs naturally when oxygen combines with plant and animal debris. It may have a tinge of green or golden-brown. It is more common to see naturally occurring foam on windy days or during turbulent conditions when churning water brings more oxygen to the plant and animal material. For example, as clean water leaves a culvert outfall, the turbulence brings more oxygen to the water. This creates foam.

Foam from Excess Nutrients. Excess nutrients from fertilizer or a leaking septic system also produce foam. These excess nutrients increase the production of algae that take up oxygen as they decompose. As oxygen is used up at a faster rate, aquatic life is stressed and can even die. As they decay, more foam is produced. (A brownish colored foam could be from manure.)

Foam from Synthetic Sources. Foam bubbles from substances like detergents and phosphates have an iridescent sheen. This foam does not break apart easily. Consequently it lasts longer and can travel farther downstream than naturally occurring foam.



Dry season culvert flows. Ground-water can seep into the storm drain system even when levels are low. However, dry season culvert flows may indicate a problem from:

- landscape irrigation;
- wash water containing soap;
- cooling tower water discharge (may contain heavy metals);
- swimming pool, spa, or pond drainage containing algaecides or chlorine; and
- a storm drain system connected to a sump pump. Check to make sure this water is clean.

Fish Kills. Fish may die when they are trapped in isolated pools during the summer. As the pools shrink and air temperatures increase, the water temperature increases, and oxygen is lost to the atmosphere. Salmon and steelhead are sensitive to low oxygen levels and warm water temperatures.

Fish killed by a pollution incident are likely to be found in:

- pools covered with an iridescent sheen or floating debris;
- pools with an unusual coloration or cloudiness; or
- smelly water from excess algae in the water (algal blooms).

Oily Sheen. After the first rains of the year, creek water is sometimes covered with an iridescent sheen. As rain washes over streets and parking lots, it picks up oil and carries it to a storm drain. These drains go directly to local creeks and to the Bay without treatment. Seeing a sheen at times other than after the first few rains could indicate a more serious problem.

Homeowner Stewardship: Protecting our Creeks

Good stewardship is essential for healthy waterways and fish and wildlife habitat. Those who live along creeks can most easily help improve—or degrade—our creeks. But whether or not you live right next to a creek, you should be a good watershed steward. Proper landscape and home maintenance will help reduce runoff and pollutants and improve water quality. These guidelines are a starting point for keeping creeks, watersheds, and the Bay healthy.

Landscaping and Yard Maintenance

Managing your landscape properly will help keep creeks healthy.

- Compost leaves, grass clippings, and other organic waste away from the creek and creek banks. Never dump leaves, grass clippings, and prunings onto creek banks or into the creek. Although leaves and organic waste are biodegradable, adding them to a creek system depletes oxygen in the water. This stresses and can even kill fish and other aquatic life. Piles of clippings on creek banks smother native vegetation growing underneath, and can lead to bank erosion. Yard waste pick up services are listed in the resources directory at the back of this guide.

- Keep leaves and litter out of the street gutter so they won't clog storm drains.

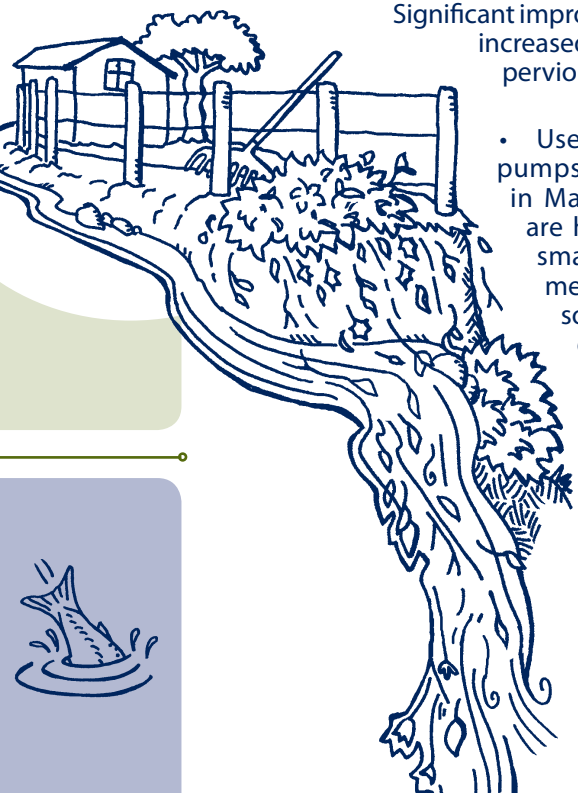
- Avoid or minimize use of fertilizers, and pesticides (insecticides, herbicides, fungicides, etc.). Choose less toxic pesticides such as traps and barriers if possible. If you use fertilizers and pesticides, follow application directions. Many home gardeners over-apply fertilizers and pesticides. Excessive nitrogen and phosphorous that wash into creeks directly (or though storm drain inlets) create algal blooms that deplete the oxygen supply in the water. Excessive amounts of some nutrients are toxic to aquatic life. For more information on less toxic pesticide use in your home or garden, contact MCSTOPPP at 473-6528.

- Use slow-release fertilizers to minimize nitrogen runoff. Consider using more ecologically-friendly landscape methods and products, including native plants and ground covers that do not require as much fertilizer or water.

- Avoid applying fertilizers, herbicides or pesticides during the rainy season or on windy days. Pesticide drift threatens riparian plants and aquatic life.

- Properly irrigate lawns and gardens. Use meters, timers, or other measuring devices to control water use. Overwatering adds excess fertilizers and pesticides, and often soil to the storm drain system. It is also a common cause of streambank erosion and slumping.

- Consider using attractive alternatives to impervious concrete when installing a new patio or rebuilding a crumbling walkway. Brick, interlocking pavers, flat stones and decking allow rainwater to infiltrate the soil. Significant improvements have also led to the increased use of porous asphalt and pervious concrete.



- Use water legally. Many water pumps or hose setups are illegal in Marin County. Small streams are heavily impacted by even a small water diversion. In summer, when flow is at its lowest, some streams may only have enough water to support small "pools". These pools sustain aquatic life until winter when the heavy flows resume. It is important to avoid depleting these pools of their water. Diversions and wells located near creeks decrease underground stream-flows which, in turn, drain the pools of their much needed water.

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 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 on line at http://www.waterboards.ca.gov/waterrights/board_info/contacts.shtml.

For your irrigation needs, hook up to Marin Municipal or North Marin Water 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.

Minimizing Soil Erosion

Soil erosion is a natural process. Some sediment is needed to bring nutrients and substrate 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.

Bare banks lead to excessive erosion and high rates of sedimentation in creeks.

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 streambank failure include over-watering lawns, removal of vegetation, and on-site or upstream alteration of the creek channel.

Repairing Streambank Erosion

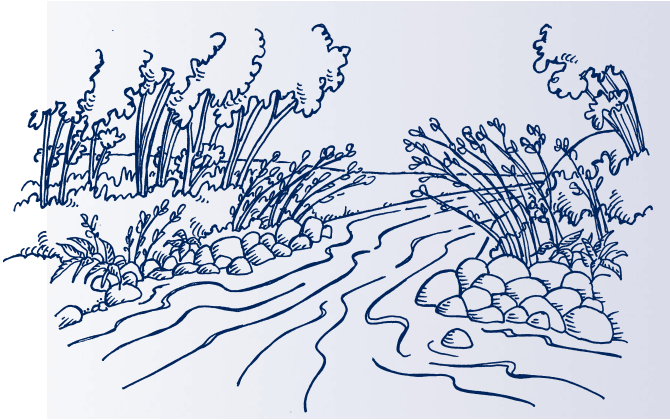
Not all streambank erosion is harmful. Undercut banks and fallen trees provide important habitat for salmonid fish and other aquatic animals. Intervention may be necessary if the erosion threatens property, structures, or roads, or if it threatens prime riparian habitat.

Streambank erosion that is extremely active or caused by human activity–such as a road–should be monitored. Bare, vertical, and actively eroding creek banks are likely to need repair. Less severe problems may not require immediate attention, but treating a problem early may prevent costly fixes later.

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

- Watch problem areas during storm events.
- Consider techniques that use living materials—such as planting willows in areas with rock riprap—to provide habitat. Using concrete alone to stabilize streambanks degrades fish habitat.
- Don't use tires, old appliances, or concrete debris. These items can be undermined by water flows or may contain substances hazardous to creek life.

- Incorporate native plants into your projects, and remember fish and wildlife habitat needs.
- Be sure not to constrict the channel. Flooding is a potential problem on any creek.
- Monitor, care for, and fine tune your projects because every site and situation is unique.
- Consult with qualified professionals (civil engineers, biologists, and other restoration specialists) for assistance.



Erosion Control Resources

The Marin Countywide Stormwater Pollution Prevention Program has the following brochures on controlling erosion:

Repairing Streambank Erosion

Includes information on erosion source identification, whether the erosion needs to be fixed, planning steps for repair, and permitting information.

Groundwork - A Handbook for Small Scale Erosion Control in Coastal California

Call 473-6528 for a free copy.

Permitting Requirements

Most creek repair work requires permitting through your local municipality, the California Department of Fish and Game, U.S. Army Corps of Engineers, and the Regional Water Quality Control Board.

JARPA

The Bay Area Joint Aquatic Resources Permit Application (JARPA) is a simplified permit application for development activites in or near Bay Area aquatic environments. This application applies to any project in, over or along a creek or creek bank, including erosion control and restoration projects. The JARPA permit application is available on line at http://www.sfestuary.org/about-the-estuary/documents-reports. Using this application allows the applicant to fill out only one form and send completed copies with applicable fees to each permitting agency. For additional questions on permitting requirements, call MCSTOPPP at 473-6528.

Protecting the Riparian Corridor

Riparian vegetation stabilizes creek banks, cools water temperatures for aquatic life, and creates wildlife habitat. Vegetation removed by humans or high intensity storms should be replanted. Bare banks lead to excessive erosion and high rates of sedimentation in creeks.

- Build sheds, decks, and other structures away from creek banks. Check with local building departments to determine legal setbacks. Putting structures near the creek often requires that streamside vegetation be removed. This can lead to bank instability. If clearing is necessary, remove as little vegetation as possible.

- Leave a natural, unlandscaped buffer zone between structures and the creek bank. Don't extend yards to the edge of the bank.

- Plant native woody vegetation to protect creek banks from the force of flowing water. Select native plants that already grow along the creek.

- Avoid planting invasive non-native plants. These plants may not provide good bank stability. They often take over, crowd out native species, and do not provide the same fish and wildlife habitat as native plants. **Some extremely invasive plants to avoid are:**

  Giant reed (Arundo donax)
  Bamboo
  Pampas grass
  Periwinkle (Vinca major)
  Cape and **English Ivy**
  Scotch, French or **Spanish broom**
  Acacia
  Ice plant
  Tree-of-Heaven

If removing non-native plants, use caution to minimize soil erosion. **Whenever non-native plants are removed, replant with native vegetation appropriate for that area.**

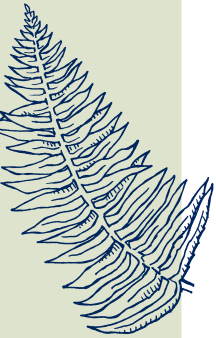
Cape Ivy

English Ivy

Using Native Plants

Native species should be used for replanting a riparian corridor. These plants provide attractive landscaping and habitat for native animal species. Local genetic plant stock is best adapted to local conditions. 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.

Sword Fern



Native plants often require less water and are more resilient to insects and disease than many ornamental, non-native plants. Many are also good for erosion control.

Visit a native plant nursery to help select species that will thrive in your garden or on your streambank. Visit the Marin County Stormwater Pollution Prevention Program website: www.mcstoppp.org for native plant lists and information on local plant sources.

California Rose

Riparian Trees and Shrubs in Marin County

These native trees commonly grow in the freshwater reaches of the Marin County watersheds listed below. If you live in a tidal area, a watershed outside Marin County, or if you need help identifying plant species, call Marin County Flood Control District at 473-6549. A more detailed native creekside plant list is also available on our website at www.mcstoppp.org.

Novato Creek and Miller Creek watersheds. California bay, California box elder, coast live oak, Oregon ash, valley oak, and willow (red and yellow).

Corte Madera Creek watershed. California bay, California box elder, coast live oak, Oregon ash, valley oak, and willow (red and yellow). Also white alder and coast redwood in some areas.

Mill Valley Creek watershed. Big-leaf maple, California bay, coast redwood, tanbark oak and white alder.

Western Marin and Coastal watersheds. California bay, big-leaf maple, coast redwood, red alder, douglas fir, and Oregon ash.

Other common riparian trees are California black walnut, California buckeye, California nutmeg, and madrone.

Common riparian shrubs include California blackberry, blue elderberry, California hazelnut, coffeeberry, dogwood, ninebark, salmonberry, snowberry, spice bush, thimbleberry, twinberry, toyon, western azalea, California rose, and many ferns.

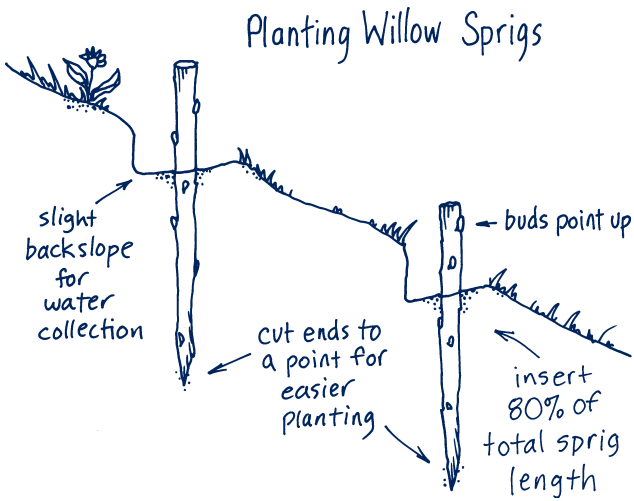
Tips on Planting "Natives"

- 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 don't naturally occur in your area will require extra care and maintenance to become established.
- Visit the Marin County Stormwater Pollution Prevention Program website at: www.mcstoppp.org for native plant lists and information on where to purchase native plants.
- Consult "Go Native!" for ideas on native, deer resistant, fire resistant, and drought tolerant plants, as well as those suitable for creekside planting. Call Marin County Stormwater Pollution Prevention Program at 473-6528 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 generally do not need fertilizers and pesticides.

Planting Willows

Historically, willows grew along most of the creeks in coastal California, and they still do. Willows are an effective and inexpensive way to armor creek banks and gullies and to provide important wildlife habitat. Prune and shape willows to keep them from invading the creek channel and potentially causing flooding and bank erosion problems. Allowing trees to grow tall will help shade out the lower growing vegetation.

Revegetating with willows is the easiest way to establish woody vegetation on a denuded creek bank. (If planting requires recontouring–or grading–request a copy of "Repairing Streambank Erosion" from MCSTOPPP at 473-6528.) Grading may require a creek permit. Adequate year-round water and sun are keys for willow establishment and survival. Even if a creek doesn't have year-round, above-ground flows, the ground water may be near enough to the surface to support willows.



Willows can be planted from dormant cuttings or "sprigs" following these steps:

1. Cut willows in the fall as soon as the leaves have dropped, and the ground is soft and wet. It is critical to plant willows as early as possible. This gives them a chance to develop good root systems before they sprout leaves in the spring. Planting too late is the most common cause of failure.

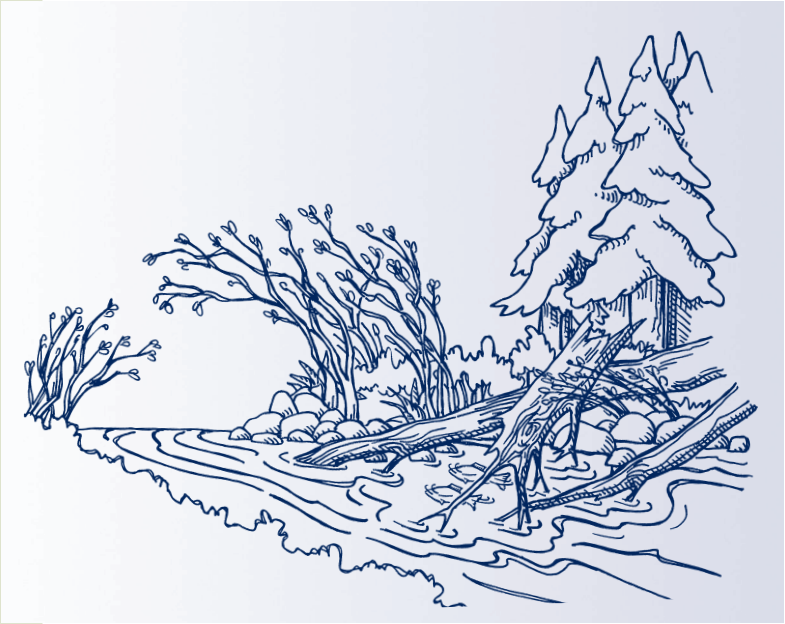
2. Willow cuttings should be at least 3/4 inch in diameter, and bigger is better. Large diameter branches can be used. Cuttings should be at least 14 inches long but can be longer. It is important to remember which end of the cutting is the top. Willows planted upside down will not grow. When making cuttings, cut the bottom end at an angle. This will make the cutting easier to insert into the ground, and help you remember which end to plant.

3. Plant cuttings by pushing the cut end into soft soil, or make a hole with a sharp stick or pick. If you make a hole, be sure to compress soil tightly around the cuttings. They may need to be pounded in with a hammer. To give plenty of area for root growth, bury at least two-thirds of the length of the cutting. Angle sprigs slightly downstream to prevent them from being undermined by storm flows.

4. Plant willows low enough on the bank to ensure adequate soil moisture during the summer. Even if streams or gullies have year-round water, willows that are planted too high are likely to dry out and die. Cuttings should not need water if they are planted in an appropriate area.

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's 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. If you are unsure about managing woody debris, contact the

California Department of Fish and Game or Marin County Flood Control at 473-6549.

- Most fish can swim through or around debris barriers. If you know that fish can't swim through a barrier, contact the California Department of Fish and Game at (707) 944-5500. Removing barriers, especially permanent barriers such as dams or wiers, may require Permits. For more information, request a copy of "Repairing Streambank Erosion" from MCSTOPPP at 473-6528.

- Brush, grass clippings, or other material should 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.

Creek Friendly Home Maintenance

Even in small amounts, hazardous materials such as gasoline, paint, motor oil, antifreeze, solvents, pool chemicals, batteries, pesticides, and many cleaners will contaminate a creek, harm fish and wildlife, and impair recreational activities.

In Marin County, it is a misdemeanor or infraction to dispose of, or dump, any of these items in creeks, on roadways or into storm drains. Violators are liable for cleanup costs and fines.

Home Maintenance Tips

- Keep trash and other debris out of the creek, off the street, and out of storm drains. Remove trash that may have piled up in the creek before the rainy season. For large or partially buried items, contact your local public works department.

- Take all hazardous items (paint, solvent, pesticides, etc.) to a household hazardous waste collection program. Central, South and West Marin residents should call the Household Hazardous Waste Hotline at 485-6806 for dates, times, and locations. Novato residents should call 892-7344.

- Clean water-based paint brushes in a sink, not in the gutter or creek.

- Place paint thinner or turpentine in a container to clean oil-based paint brushes and rollers. Allow the solids to settle out and carefully transfer the liquid to another container for reuse. Take the solids to a hazardous waste collection program.

- Use water-based paint removers and paints if possible.

- Dispose of water that is used to clean carpets, upholstery, or floors down sinks or toilets. Professional carpet and upholstery cleaners should put wastewater into the sanitary sewer, or haul it away to be treated.

If you use a septic tank, call County Environmental Health Services at 473-6907 for disposal information.

- Use less toxic cleaning products in your home. For a free guide, call Marin County Stormwater Pollution Prevention Program at 473-6528.

- Use mechanical methods to clean drains that are blocked by roots. Avoid copper-based root control products. For more information, call Marin County Stormwater Pollution Prevention Program at 473-6528.

- 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 creek.

- Drain waterbeds (water-filled mattresses) to the sanitary sewer. Waterbed chemicals can be toxic to aquatic life.

- When washing your vehicle, it is best to use a commercial or coin-operated car wash where the water is recycled before being discharged to a sanitary sewer (not a storm drain). If you must use the street or driveway to wash your car or truck, try washing your vehicle with water only (no soap or detergent) to keep soapy water from entering a storm drain. If possible, wash your vehicle over a grassy or gravel area where soapy water can soak into the soil. Buckets of soapy water should be poured down an indoor drain (i.e. a sink or

CAR WASH KIT

MCSTOPPP offers a free "fish-friendly" carwash kit, intended for fundraising or multiple car-washing events. The kit allows the user to block the stormdrain and redirect soapy water to an appropriate location. To reserve the kit, contact MCSTOPPP at 473-6528.

toilet)–not a storm drain. All soap–even biodegradable–can harm fish and other aquatic life.

- Properly care for your cars and boats. Call MCSTOPPP for more information.

- For proper recycling of used motor oil and other automotive products, call 1-800-CLEAN-UP. Motor oil can coat fish gills (depriving them of needed oxygen), and coat the feathers of birds (interfering with their ability to keep dry and warm). Oil can also poison animals when, in an effort to clean themselves, they ingest the oil.

Metal Matters

Lead, nickel, cadmium, copper, and/or acid can be found in household and automotive batteries. Metals can also be found in waste antifreeze and in waste brake and transmission fluids. Car exhaust, motor oil, grease, worn metal plating, and brake linings deposit lead, zinc, and copper onto streets and parking lots. Urban runoff washes these metals into the storm drain system.

Excessive levels of some metals can lead to adverse health effects. Metals can also accumulate in the food chain.

Pool and Spa Maintenance

- Drain pools or spas 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. Call your local wastewater treatment plant for guidance. See list in the resources directory section of this guide.

- Backwash pool filter rinse water into the soil not the creek, street, or storm drain.

- Use diatomaceous earth (DE) cautiously. DE is a natural substance used in pool filter systems. If DE gets into the creek, it can cut the gills of aquatic animals, making them more susceptible to infection and disease.

- For a free brochure on pool and spa maintenance, call Marin County Stormwater Pollution Prevention Program at 473-6528.

Septic Systems

Most rural residences use septic systems for sewage disposal. Septic systems operate by collecting sewage in a concrete tank, and allowing the liquid portion to percolate into the ground through perforated pipe (leach lines). Most of the treatment occurs in the soil absorption system. Solids should be pumped out of the collection tank periodically and hauled off site by a licensed pumper.

Septic systems are safe and effective, as long as they are properly designed, installed and maintained. If not, they can be a source of groundwater and surface water contamination. Leaky septic systems can pollute domestic water systems by contaminating the aquifer that the residential well draws from. Older homes may have a primitive system composed of a redwood or metal box with no leach lines. These systems do not effectively distribute waste and have been replaced by more modern designs.

Human waste leaking from faulty septic systems can be an important source of water pollution. Like livestock waste, human sewage contains nutrients and pathogens. Human sewage poses a more serious health risk than livestock waste because of the chance that it contains human disease organisms.

Proper septic system maintenance includes having the tank pumped regularly–usually every two to five years depending on usage patterns. Call the Environmental Health Services office (473-6907) for advice or free literature on maintaining your septic system. A licensed septic tank pumper can also recommend appropriate service. Minimizing the amount of liquid that goes into the system and avoiding unnecessary solid waste (such as paper towels, rags, garbage disposal, diapers, etc.) helps a septic system operate properly.

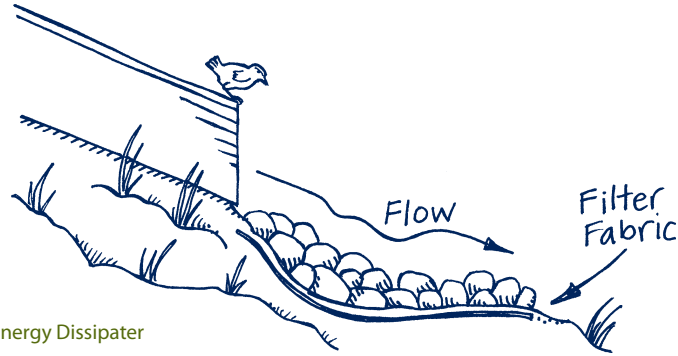
For further information see www.co.marin.ca.us/ehs or download free publications from the National Small Flows Clearinghouse at www.nesc.wvu.edu

Minimizing Runoff from your Property

Water running off your property can carry soil, chemicals, and other pollutants directly into the creek or into a storm drain (which empties directly into a creek or the Bay).

- Minimize paved areas. Impervious driveways, walkways, and patios increase the amount of water that flows into creeks and storm drains—adding to flooding problems. Instead of concrete, use wooden decks, brick or stone paths, gravel, paving stones, or concrete blocks so that water can permeate through spaces and soak into the ground.

- Direct roof gutter runoff and drain pipes across vegetated or graveled areas–away from your house, the creek or street gutter, if possible.



Energy Dissipater

If you live on a creek:

- Reduce free flowing or piped water, from your backyard to the creek or creek bank, that can add to streambank erosion.
- Guide water to the creek in a protected way. Rock-lined channels and energy dissipaters can be incorporated into your landscape design. Be sure to maintain creek bank vegetation.
- Minimize disturbance to the creek banks. Roots of riparian plants will help stabilize the banks.

Creek Friendly Recreation

- Look for fish, but don't catch them. Steelhead and Salmon are currently considered endangered species in this area. Fishing for steelhead or salmon in local creeks is illegal. To report someone interfering with fish, contact the California Department of Fish and Game at (888)334-2258.

  Steelhead are best viewed from above or adjacent to large, deep pools. Go on a sunny day when the water is calm. Bridges offer good lookout spots.

- Good places to view salmon and steelhead in west Marin County are the fish ladder at the San Geronimo Golf Club (Roy's Dam), Devil's Gulch in Samuel P. Taylor State Park, and Shafter Bridge. Go a few days after a heavy rain.

- Supervise children. They are naturally curious, but they can unintentionally kill or harm aquatic life.

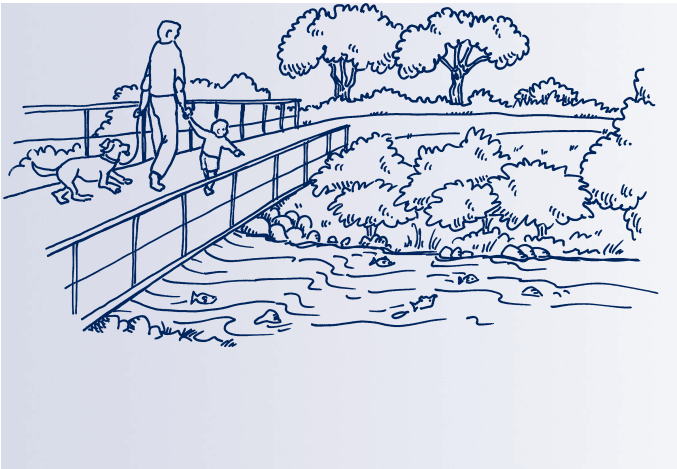
- Avoid walking on bare creek banks, especially in the winter, rainy season. This will help prevent erosion.

- Avoid walking in streams, especially during spawning season (October through May), when fish are laying eggs and hatching. Avoid walking in pools where fish live during the summer. Be careful not to stir up the creekbed where young fish take shelter. Muddied water blocks sunlight, clogs fish gills, and makes insects difficult for fish to see.

- Limit pet access to the creek and keep pets on a leash. Pets scare off fish and wildlife and muddy the creek water. Pick up after your pets. Animal waste increases bacterial levels and contributes excess nutrients to the creek. Excess nutrients cause algal blooms which consume the oxygen in the water.

- Stay on the trail. Mountain bikers and hikers should avoid using short cuts and illegal trails. Such "trails" are not properly designed or maintained. Using them contributes to erosion problems and adds sediment to the creek.

- Pack out your trash. Fish and other animals can become entangled and injured or killed in 6-pack rings and old fishing lines. Plastic and styrofoam can harm or block the digestive tract of marine animals and seabirds.



Resources Directory

Reporting a Creek Pollution Problem

Call your local stormwater program during business hours if you notice unusual substances in or around a storm drain, creek, or flood control channel; to report a spill; and, to report an illegal discharge. All area codes are 415.

County of Marin	473-6528
City of Belvedere	435-3838
Town of Corte Madera	927-5057
Town of Fairfax	453-1584
City of Larkspur	927-5017
City of Mill Valley	388-4033
City of Novato	899-8246
Town of Ross	453-1453 ext.163
Town of San Anselmo	258-4600
City of San Rafael	485-3355
City of Sausalito	289-4100 ext.106
Town of Tiburon	435-7399

After normal business hours, call the County Sheriff's non-emergency line at 415-473-7233.

To report fish kills or poaching, call the California Department of Fish and Game at (707) 944-5500 or 1-888-CAL-TIPP.

Technical Assistance

Marin County Stormwater Pollution Prevention Program
(415) 473-6528
P.O. Box 4186
San Rafael, CA 94913-4186
www.mcstoppp.org
Offers free technical assistance on repairing creekbank erosion, and offers referrals to appropriate agencies regarding water pollution prevention activities. Provides educational materials on protecting local waterways for the general public and businesses. Coordinates storm drain stenciling opportunities for community or school groups.

Marin County Flood Control District
(415) 473-6549
DPW, Civic Center Administration Bldg., Room 304
P.O. Box 4186, San Rafael, CA 94913-4186
http://www.co.marin.ca.us/depts/PW/main/index.cfm
Responds to creek pollution problems including obstruction to flows and creek bank erosion.

Marin County Environmental Health
(415) 473-6907
http://www.co.marin.ca.us/depts/CD/main/comdev/ehs/index.cfm
Offers assistance with septic system issues.

Marin County Watershed Groups

If you are interested in helping to protect your creek at the local level, contact the following:

Friends of Corte Madera Creek Watershed
(415) 456-5052
www.friendsofcortemaderacreek.org

Friends of Novato Creek
(415) 883-8339
www.novatocreek.org

Friends of Willow Creek, Sausalito
(415) 453-482 ext. 202
https://sites.google.com/site/friendsofthecreeksausalito/the-creek

Gallinas Watershed Council
(415) 578-2580
www.gallinaswatershed.org

Miller Creek Watershed Stewards
rachel@KHE-Inc.com

Mill Valley Streamkeepers:
(415) 388-4187
www.millvalleystreamkeepers.org

Salmon Protection and Watershed Network (SPAWN),
Lagunitas Creek and San Geronimo Creek
(415) 488-0370 or www.spawnusa.org

Tam Valley Watershed Group
(415) 381-0875

Tomales Bay Watershed Council
(415) 868-9081
www.tomalesbaywatershed.org

Trout Unlimited
(415) 924-4248
www.tucalifornia.org

Watershed Resources for Marin County

Marin County Watershed Program
www.marinwatersheds.org

CA Coastal Commission
1-800-COAST-4U
www.coastforyou.org

The Bay Model
(415) 332-3871
www.spn.usace.army.mil/bmvc/

Marine Mammal Center
(415) 289-7325
www.marinemammalcenter.org

North Bay Riparian Station
(415) 332-1941
www.mywatershed.org

Point Reyes Bird Observatory
(415) 868-1221
www.prbo.org

Redwood Creek (National Park Service)
(415) 331-0771

Students and Teachers Restoring a Watershed (STRAW)
(707) 781-2555 ext. 358
www,prbo.org/cms/192 or lrogers@prbo.org

Wild Care
(415) 453-1000
www.wildcaremarin.org
Bay Area Watershed Resources

The Bay Institute
(415) 506-0150
bayinfo@bay.org or www.bay.org

Friends of the San Francisco Estuary
(510) 622-2337

San Francisco Bay Joint Venture
(510) 286-6767
www.sfbayjv.org

San Francisco Estuary Institute
(510) 430-0801
www.sfei.org

Urban Creeks Council
(510) 540-6669
www.urbancreeks.org

Watershed Assessment Resource Center
(510) 622-2337 (same number as Friends of SF estuary)

Recycling and Hazardous Waste Disposal

Mill Valley Refuse Service
(415) 457-9760
Tiburon and Belvedere residents should call (415) 924-1868
Serves Mill Valley, Corte Madera, Belvedere, Tiburon. Strawberry, Almonte, Alto, Homestead Valley, and some unincorporated areas. Provides weekly pick up of metal cans, glass bottles, #1 through #7 plastic, paper products, and milk cartons. Green waste cans are picked up every other week. Will pick up motor oil, oil filters, latex paint, and household batteries by appointment.

Marin Sanitary Service
(415) 456-2601
Serves San Rafael, Kentfield, Larkspur, San Anselmo, Ross, Las Galinas Valley Sanitary District, Ross Valley Sanitary District and some unincorporated areas. Provides weekly pick up of aluminum and tin cans, glass bottles, #1 and #2 plastic bottles, office waste paper, newspapers and cardboard. Green cans for yard waste are picked up every other week. Extra yard waste will be picked up for an additional fee. For additional information visit their website at www.marinsanitary.com.

Fairfax Garbage Disposal
(415) 453-8355
Serves the town of Fairfax and some unincorporated areas. Provides weekly pick up of aluminum and tin cans, glass bottles, #1 through #7 plastic, and paper products. Green waste is collected on a weekly basis.

Bay Cities Refuse Service
(415) 332-3646
Serves the town of Sausalito and some unincorporated areas. Provides weekly pick up of metal cans, glass bottles, #1 through #7 plastic bottles and paper products. Green cans for yard waste are picked on the first and third Mondays of each month.

Novato Disposal
(415) 897-4177
Serves the town of Novato. Provides weekly pick up of metal cans, glass bottles, #1 through #7 plastic, milk cartons, and paper products. Green waste cans are collected every week. For additional information visit their website at www.novatodisposal.com.

Shoreline Disposal
(800) 862-4659
Serves all of West Marin and some unincorporated areas. Provides weekly pick up of aluminum, glass bottles, #1 through #7 plastic and paper products. Green waste cans are collected at the beginning of each month.

Marin Recycling Center
(415) 453-1404
535 Jacoby Street, San Rafael
Buys back California Redemption Value (CRV) aluminum cans, glass bottles, and #1 and #2 plastic bottles. The facility is open Tuesday through Sunday from 8am to 4pm. You may also drop off fluorescent tubes, scrap aluminum, copper, brass, and large quantities of paper and cardboard that cannot be collected with your curbside recycling. Marin Recycling also accepts old cars for dismantling and recycling for a nominal fee.

Novato Recycling Center
(415) 897-4177
7576 Redwood Blvd., Novato
Buys back California Redemption Value (CRV) metal, glass and plastic containers. Accepts paper products as well as all non-CRV metal, glass and plastic. Hours of operation are Tuesday through Sunday from 10am to 4pm. Accepts from households: fluorescent tubes, car batteries, motor oil, oil filters, latex paint, and household batteries. For more information visit their website at www.novatodisposal.com.

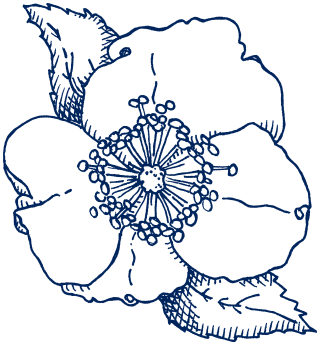
Marin Household Hazardous Waste Facility
(415) 485-6806
565 Jacoby Street, San Rafael
Accepts most household hazardous waste from all Marin County residents except Novato residents. They do not accept explosives, lab chemicals, radioactive materials, medical waste, and most compressed gases. All hazardous waste must be packaged in a container no greater than 5 gallons or 50 pounds. Do not mix different types of hazardous waste in the same container. For more in formation visit their website at www.marinsanitary.com.

Novato Household Hazardous Waste Facility
(415) 892-7344
This facility accepts common household hazardous materials from Novato residents only. This facility is open by appointment on the first and third Sunday and Monday of each month. For additional information visit their website at www.novatodisposal.com.

Used Oil Recycling Hotline
1-800-CLEAN-UP
Information on drop off locations for used oil, filters, and other recyclables.

Corte Madera Fire Department
(415) 927-5077
Provides an annual wood chipping services to residents of Corte Madera.

Marin Hazardous and Solid Waste Joint Powers Authority
www.zerowastemarin.org
Get up-to-date recycling and hazardous waste disposal information. You can even find out where to take unwanted items for re-use or disposal through their online Recycling Guide.



Gardening and Home Maintenance Resources

A sample of materials available from the Marin County Stormwater Pollution Prevention Program, (415) 473-6528:

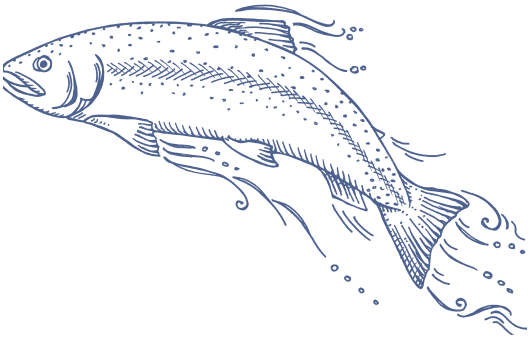
- The Healthy Home and Garden - A series of fact sheets on assorted pests of the home and garden
- Clean It! Safer Housecleaning Methods
- Control It! Less Toxic Methods to Control and Prevent Pests in and Around the Home
- A Kid's Guide to Backyard Bugs
- Native Plants for Gardens and Creekbanks (Go Native!)
- The 10 Most Wanted Bugs in Your Garden
- Don't Plant a Pest
- Dogs & Creeks Bookmark
- Repairing Streambank Erosion
- Growing Gardens from Garbage: A Guide to Composting, Mulching, and Grasscycling
- Yard Clippings and Your Creek Bank
- Carwashing the Fish-Friendly Way
- Managing Pools and Spas
- Best Management Practices for Construction Activities
- Blueprint for a Clean Bay
- Groundwork
- Keeping It Clean- how you can help protect our creeks
- Fish-Friendly Guide
- Pollution Prevention: It's Part of the Plan
- Apartment Managers' Best Management Practices
- Recycling Used Motor Oil and Filters
- Horse Owners Guide to Water Quality Protection
- How to Improve Coho Salmon and Steelhead Habitat

University of California Cooperative Extension, Marin Master Gardeners
(415) 499-4204
Marin Master Gardeners are trained volunteers who serve as horticultural consultants to home gardeners and non-commercial horticultural groups. They provide information on plant health and gardening practices for vegetables, trees, soils, lawns, ornamental horticulture, insects, diseases, use of pesticides, and related topics.

Discharges to the Sanitary Sewer

For emptying pools and spas, contact your local wastewater treatment plant. All phone numbers are in the 415 area code.

Almonte Sanitary District (Almonte) 388-8775
Alto Sanitary District (Alto) 388-2609
Bolinas Community PUD 868-1224
Central Marin Sanitation Agency 459-1455
City of Belvedere (Belvedere) 435-3838
City of Sausalito (Sausalito) 332-0240
County Sewer Maintenance District (Murray Park-Kentfield, San Quentin Village) 499-6524
Homestead Valley Sanitary District (Homestead Valley) 388-4796
Las Gallinas Valley Sanitary District (Lucas Valley, Marinwood, Northgate, Portola Gardens, San Rafael Meadows, Santa Venetia, Terra Linda) 472-1734
North Marin Water District (Oceana Marin, Tomales) 897-4133
Novato Sanitary District (Bahia Vista, Novato) 892-1694
Richardson Bay Sanitary District (Del Mar Estates, Hawthorne Terrace, Strawberry) 388-0124
San Rafael Sanitation District (San Rafael) 454-4001
Sanitary District #1 (Fairfax, Greenbrae, Kenfield, Kentfield Woodlands, Larkspur, Ross, San Anselmo, Sleepy Hollow) 461-1122
Sanitary District #2 (Corte Madera) 927-5057
Sanitary District #5 (Tiburon) 435-1501
Sausalito-Marin City Sanitary District (Marin City, Sausalito) 332-0244
Sewerage Agency of Southern Marin (Mill Valley) 388-2402
Tamalpias Community Services District (Kay Park, Tam Valley, Tam Woods) 388-6393



Notes:

INFORMATION USED BY PERMISSION

- Portions of this Creek Care Guide were published in Creek Care: A Guide for Rural Landowners © 1995 by U.C. Cooperative Extension. The original guide was developed as part of the Marin Coastal Watershed Enhancement Project, which was coordinated by U.C. Cooperative Extension. Marin Community Foundation is gratefully acknowledged for their permission to adapt the original source material used in this guide.
- Versions of Fish Facts and Managing Woody Debris appear in How You Can Help Improve Salmon and Steelhead Habitat by Prunuske Chatham, Inc. © 1995 by Marin Municipal Water District.
- Information for Minimizing Soil Erosion is drawn from Groundwork by Liza Prunuske. © 1987 by Marin County Resource Conservation District.
- Information for Taking a Watershed Approach drawn from Stream Care Guide by Nancy Reichard. © 1987 by Natural Resources Services, a division of Redwood Community Action Agency (Eureka, CA).
- Identifying Creek Pollution is based on When is it a problem and when is it not. Coyote Creek Riparian Station.

DISCLAIMER

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