Dealing with Creek Bank Erosion

by Gerhard Epke
2017

Heavy rains filled our creeks to capacity several times this winter and the sustained high flows caused noticeable creek bank erosion through-out the watershed. This was a normal and healthy purge for the creek habitat. But after years of drought it can be alarming to see all that freshly exposed soil and roots for those of us that live or own property along the bank, particularly because engineering a fix can be very expensive and time consuming. There are a number of landscaping practices that can help protect your streambank, but sometimes it may need a structural fix as well.

Rivers and creeks in undeveloped watersheds meander around their floodplains by eroding along their outside bends, jumping their banks at debris jams, or scouring multiple channels. If, decades ago, we hadn't begun confining the creek in its current location, the channels would probably be much shallower and wider. Instead, look off a bridge today and you see the creek channel inset in a narrow area that barely qualifies as a floodplain. Since natural floodplains aren't confined in this way, the concentrated flows have immense power and erosive capacity.

Water erodes banks in several ways. Due to the three months of high flows this winter, most of what we saw this year was scouring action. Water and all the rocks and dirt it carries scour, or 'rub' the soil away. This effect is exaggerated where velocities are high, particularly on the outsides of turns or downstream of walls and smooth surfaces. Another way the bank erodes is by failing, or collapsing under its own weight. This is often, but not always, associated with scouring or erosion that under-mines the base of the slope. Some-times a tree falls into the creek and pulls a big piece of bank in with it.

An erosion-control project on Fairfax Creek included a woven willow fence, whose posts will grow into bushes to protect the slope. Photo by Vicki Burns

What to do about erosion? That depends on its scale and significance.

Small scale or non-threatening erosion might not need to be ad-dressed at all. Scouring is the channel coming into equilibrium with its dis-charge, which reached channel capacity several times this year. So the slope may not erode any further. Mi-nor issues can often be solved by establishing a thicket of strong willow trees or shrubs whose roots support the bank and whose branches slow and buffer the impact of the water. There are myriad techniques to do this: willow stakes, willow walls, willow fascines, and brush layering. The plant material should be installed in the late fall when the soil is wet and the plants do not have to supply water and nutrients to the leaves; that allows roots to develop over the winter and establish the plants. Once they do get established, willows can grow vigorously and constrict the channel. So, depending on the type of willow you plant, pruning may be necessary later. "Groundwork: A Handbook for Small-Scale Erosion Control in Coastal California" is a good resource for learning more on this, available online through the Marin County Stormwater Pollution Prevention Program (MCSTOPPP).

Large projects require the hiring of design professionals and contractors and then obtaining regulatory permits. Most large-scale bank stabilization projects that get approved are designed to incorporate vegetation along with the traditional hard engineering structures such as piers, rocks, and metal cable. Even large pieces of wood can be included to mimic a natural creek bank. If you feel that you might have to under-take a project of this size, you should present a concept for feedback at a monthly Marin Project

Coordination meeting, hosted by MCSTOPPP. See the brochure under Creeks and Watersheds, Creek Permits.

These meetings are attended by regulators from the San Francisco Regional Water Quality Control Board, California Department of Fish and Wildlife, US Army Corps of Engineers, and local public works departments. Their comments can help you avoid costly delays and re-design when you formally apply for a permit. However, it is helpful to enter the meeting with some preliminary engineering and restoration planning done on your concept.