

## Bioengineering



*Bioengineering can be used to stabilize stream banks and restores riparian zones using living willow material and strategic amounts of large rock. Application of this technique can prevent loss of valuable agricultural land and sediment pollution that harms salmon and steelhead. Willow has extensive root systems and, when used in combination with large rock, structures can resist flood flows. Willow even bounces back when buried in sediment and they trap sediment in transport and rebuild stream terraces. Succession at bioengineering sites leads to colonization by other riparian tree species like alder, ash, maple and cottonwood. If large rock is used in structures, layers of river aggregate and willows are placed within the boulder structure.*



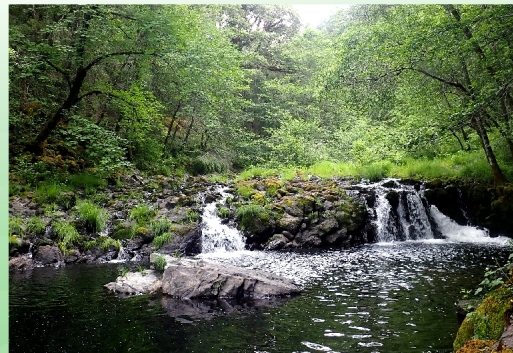
## Free Technical Assistance



*We can provide consultation on eroding stream banks and riparian restoration opportunities and help seek grant funds to fix problems. Prevent sediment pollution and protect your valuable riparian zones and adjacent private lands. Call 707 223-7200 for assistance.*

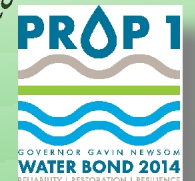
## Easements

*The riparian zones of Tenmile Creek are unique in the region and are critical for providing good fish and wildlife habitat. Easements can play a role in retaining these areas as land owners receive fees in exchange forgoing any development.*



# Tenmile Creek Riparian Zones: Protection, and Restoration

- **Bioengineering**
- **Small Scale Planting**
- **Easements**



707 223-7200

[www.EelRiverRecovery.org](http://www.EelRiverRecovery.org)

## Restoration in 2021!...

*The Eel River Recovery Project has been awarded a State Water Resources Control Board grant to fix 620 feet of eroding stream banks in 2021 on Cahto Creek, Mill Creek and Streeter Creek, all*



*important salmon and steelhead producers. The Cahto Creek project will help save the historic Cahto Trail and create a diverse gallery forest on the bank opposite where bioengineering will be used to stop bank erosion. The Mill Creek bank failure is 300 feet long and there is spawning and rearing habitat adjacent. The Streeter Creek failure is on the Black Oak Ranch. Funding for this project comes from a 319h grant that is aimed at abating non-point source pollution. Work will begin in April 2021.*



## Fish and Riparian Zones...



*Riparian zones are the areas immediately next to streams that are influenced by flood flows and subsurface water. They are often lush forests that shade the stream and create a cool microclimate that buffers water temperatures. Wetland vegetation can thrive in riparian zones and, along*



*with trees and their roots, they absorb nutrients from over-land flow and trap sediment in transport and rebuild stream terraces. Streams coming off Cahto Peak often have riparian zones comprised of coniferous trees like Douglas fir, while Tenmile Creek on the valley floor has magnificent oaks that shade it. When mature trees fall in, they play an important role in creating diverse habitat for salmon and steelhead.*

## Living Willow Magic...

*Willows have evolved to colonize open gravel bars as river terraces shift with cycles of floods and drought. Once they establish root systems, they help stabilize river terraces. While willows can be washed out by flood flows, they can make great strides in colonizing new terraces during cycles of drought. Private land owners and volunteers can help stabilize banks using willow sprigging where willow branches are inserted into eroding areas during months of high rainfall, such as February. Cutting should be of native willow growing near the site to be stabilized. Cuttings should be  $\frac{3}{4}$  of an inch in diameter and long enough to insert into bank and still have 2-3 feet above ground. Make sure that the branches are not buried upside-down which causes a high rate of mortality.*

