Use Vegetation to Restore and Maintain Stability

Revegetation of the streambank is one of the most common, and often the most effective, way to prevent erosion along a streambank. This is because roots bind soils together, which prevents erosion, while leaves provide protection from rain splash erosion. In addition, the exposed trunks and stalks provide resistance to stream flow because they slow the water and decrease its erosive energy. An added benefit is that vegetation provides ideal habitat for birds and other animals. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding).

- **Maintain streamside trees**. Avoid pruning trees unless it is necessary to the survival of the plant or the protection of existing property and/or infrastructure as trees can critical shelter and shade for stream wildlife.
- **Do not remove affixed logs**. Logs that have been permanently or securely affixed to the streambank provide valuable habitat. Their removal could negatively impact fish habitat, and might therefore require mitigation. However, downed trees and logs can often deflect high flows, causing serious bed and bank erosion, destroying fish habitat, and degrading water quality. For these reasons, downed trees and logs need to be removed quickly.
- **Plant between October 15 and March 15**. In order to minimize irrigation requirements and ensure that plants receive sufficient water for natural propagation, plant in the fall and early winter. Where soils are dry and water is limited, irrigate as needed until the rainy season.
- **Do not introduce invasive non-native vegetation species into the watershed.** Non-native invasive plants are a serious problem because they often inappropriately constrict water flows and overtake native plant species. (See Design Guide 2 for more on invasive non-natives.
- **Instead, use locally collected native species for revegetation and replacement plantings**. Plant selection and density should be informed by a survey of natural areas on the same creek that have a similar ecological setting. This can inform you as to what species would be found in the area and an approximate population density. See Design Guide 4 and 5.
- **Plant according to moisture needs, using different types of vegetation on the upper and lower sections of the stream bank**. Plants have different tolerances for the wet conditions at the toe of slope. They also vary in drought-tolerance and erosion-control effectiveness on the upper slopes. Some tree species, such as willows and cottonwoods, are more successful when they are closer to the stream. Others, like oaks, enjoy more success higher up the bank. Where stream capacity is an issue for flood protection purposes, choose vegetation that is flexible and that will not collect debris and slow high flows during flood events.
- **Use fast-sprouting grass species for more immediate erosion control**. A regraded slope can be seeded with fast-sprouting grass species such as sterile wheat, or better yet, a native grass/sedge seed mix combined with a biodegradable erosion control blanket. These species provide more immediate erosion control. See Design Guides 4 and 5 for plant species.

- **Do not use chemical fertilizers, herbicides or pesticides**. These chemicals can be easily transported to the creek by wind or rain and degrade water quality, endangering aquatic life.

Watershed-friendly Design: Best Management Practices

This section provides some tips for stream care during construction. Proper use of best management practices (BMPs) can have a tremendously beneficial impact on aquatic species and other wildlife, human health, environment, property, and public services.

Construction BMPs:

- When restoring a damaged section of a streambank, imitate natural stream features, such as channel meanders, appropriate width and depth, and vegetation. This will stabilize the channel. Details of this concept are included in Section 5 of this Design Guide.
- Observe work windows. In-channel work should generally be conducted during the dry season, between June 15th and October 15th, to minimize a negative impacts to plant and wildlife. Sometimes these dates will vary depending on the wildlife species in the area. Do not use heavy equipment during spawning or migration seasons, as it can destroy fish habitat. If construction during periods of stream flow can not be avoided, include measures to separate area of disturbance from stream flow to minimize turbidity in stream.
- Avoid removing in-stream gravel. Avoid disturbing the creek bed, particularly spawning gravel. After project completion, replace or restore any gravel that was moved or removed to maintain spawning areas for fish.
- Take special care when establishing stream access points, because these points can contribute undesirable sediment to the stream. So
    - Use established access point wherever possible.
    - If it is necessary to create a temporary access point for construction, do so as close to the work area as possible in order to minimize adverse impacts. When the project is complete, restore the access point to as natural and stable condition as possible.
    - Prevent soil at construction entrances from being tracked onto streets near work sites.
- Control dust. Dust can be a nuisance, and have an adverse impact on water quality. To control dust:
    - Water active maintenance areas so that they are sufficiently moist to prevent dust.
    - Sweep any paved access roads of visible soil material.
    - Cover trucks hauling sediment, ensure that their tailgates are closed, and brush off any excess dirt.
- Store and secure materials. Remove all building materials, debris, lumber, et cetera within 2 days of completing the project.
- Be wary of mercury and other contaminants. Disturbed or excavated soils in areas where soils are known to contain mercury or other contaminants should be removed or properly capped if the soil will be exposed to flood flows. In areas whose soils are known to contain mercury, remediate the disturbed or excavated soils if they are exposed to flood flows. Wear protective equipment.

Consult the Santa Clara Valley Water District for disposal guidance.

Follow-Up Maintenance:

Do not neglect stream-bank repair after construction is over. Minor maintenance activities help ensure a project's success.

- Remove trash and debris. Sometimes, the accumulation of debris in the channel causes erosion on nearby banks. So:
  - Regularly remove debris such as trash and human-caused debris.
  - Do not put yard waste in the creeks or on the banks, where leaves and clippings can wash into the stream.
- If mulching:
  - Use biodegradable erosion control blankets on bare slopes or if it is too late in the season to establish vegetation. The blankets will last for 1 to 3 years while natives reseed. Monitor the success of natural revegetation before taking aggressive action to revegetate.
  - Woody debris from the site might make for suitable mulch.
  - Use bark and other wood products or fabric blankets above the high water line to prevent erosion of bare soil after construction is completed.
  - Use weed-free certified mulch.
  - Do not use Eucalyptus, Walnut, or Tree of Heaven. They produce an allelopathic compound that can be toxic to plants and aquatic organisms.
- Be careful when trying to control rodents. Burrowing rodents may be a nuisance and can damage levees on streams, but do not use rodenticides. Their effect on the local habitat is too destructive. Instead, consult County Vector Control.
- Revegetate. In areas that have been revegetated, replace dead or dying plants and weeds. Remove non-native plant colonizers. Ensure that all plants receive sufficient water.