



Targeted Constituents

● Significant Benefit		▶ Partial Benefit		○ Low or Unknown Benefit	
● Sediment	○ Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances		
○ Nutrients	○ Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes	

Implementation Requirements

● High		▶ Medium		○ Low	
○ Capital Costs	○ O & M Costs	○ Maintenance	○ Suitability for Slopes >5%	○ Training	

Description

Channel lining is the artificial surfacing of bed, banks, shore or embankments to resist erosion or scour. This management practice is likely to create a significant reduction in sediment.

Suitable Applications

- Soft (geotextiles) channel lining can be used to support permanent vegetative growth in a drainage way or as protection prior to placement of a permanent protective layer.
- Permanent (hard or soft) channel lining can be used when an ordinary seeding and mulch application would not be expected to withstand the force of channel flow.
- Permanent lining can only be applied in dry-weather channels (having flow most the year) with expressed permission from TDEC.

Approach

- These systems should be designed by a licensed professional civil engineer.
- The following materials are applicable for soft (or “green”) channel linings. Generally, these types of practices are not applied in dry-weather streams (have water flowing most of the year). These practices are most often effective in wet-weather conveyances (only have flow when it rains).
 - Excelsior
 - Jute mats and cells
 - Wood fiber mats and cells
 - Geosynthetic mats or cells
 - Brushlayering
- The following “hard” materials are applicable for permanently lining channels.
 - Pre-cast concrete block (“woven” or individually placed)

- Rip rap
- Cast-in-place concrete
- Gabions
- Sacked concrete
- Soil cement
- Air blown mortar

Rip rap, cast-in-place concrete, and pre-cast concrete blocks should only be utilized with expressed permission from the Engineering Department.

Maintenance

- Application of the net and matting materials above is described in the Nets and Mats (TCP-9), and Geotextiles (TCP-10) BMPs.
- Brushlayering applications are discussed in detail in TCP-16: Brush or Rock Filter.
- Riprap installation is detailed in TCP-20: Riprap.
- Soft (or “green”) channel linings should be inspected monthly for the first year after construction, quarterly through the second year after construction and biannually (twice per year) thereafter.
- Hard channel linings should be inspected monthly for the first year after construction and annually thereafter.
- If net or matting materials are damaged, repair or replace immediately.
- Any spaces left bare in riprap or brushlayering applications due to erosion or scouring are to be repaired and replaced with their respective lining materials.

Limitations

- Hard (concrete, rip rap, etc.) permanent channel linings often result in prevention of habitat establishment.
- Inadequate coverage results in erosion, washout, and poor plant establishment.
- If the channel grade and liner are not appropriate for the amount of runoff, channel bottom erosion may result.
- If the channel slope is too steep or riprap is too small, displacement may occur.
- Riprap may block channel resulting in erosion along the edge.

Primary References

Soil Erosion Prevention and Sediment Control Reducing Nonpoint Source Water Pollution on Construction Sites, University of Tennessee, Knoxville, Department of Civil and Environmental Engineering, August 1998.

California Storm Water Best Management Practice Handbooks, CDM et.al. for the California SWQTF, 1993.

Caltrans Storm Water Quality Handbooks, Construction Contractor’s Guide and Specifications, April 1997.

**Subordinate
References**

Caltrans Highway Design Manual, 1997.