

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD

**STREAM CORRIDOR IMPROVEMENT**

(Feet)

CODE 745 CA INTERIM

**DEFINITION**

Restoration of a modified or damaged stream to a more natural state using bio-engineering techniques to protect the banks, and to re-establish the riparian vegetation.

**Scope**

This standard applies to measures used to reestablish a stream corridor, using a geomorphic approach for stability. Measures to protect the bed and banks can include vegetation, structures, or a combination of the two. Restoration and management of the riparian vegetation are also included. It does not apply to short reaches of streams that should be treated by Practice 580-Streambank Protection, or 584-Stream Channel Stabilization.

**PURPOSES**

To return the stream corridor to a natural state for one or more of the following purpose:

1. To prevent the loss of land, damage to utilities, roads, buildings, or other facilities adjacent to the banks.
2. To maintain or restore channel capacity to convey the runoff of the designed storm flows.
3. To maintain or restore channel meanders to accommodate low-flows and provide for riparian vegetation establishment and growth on the flood plain.
4. To reduce bank erosion and sediment load; as well as to control the location of sediment deposition.
5. To improve the vegetative cover of the stream corridor and the riparian vegetation along the banks.
6. To improve water quality and habitat for fish, and improve the stream corridor as a riparian habitat for wildlife.

7. To restore the visual quality of the stream corridor.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to streams where the flow regime has changed, the streambanks are eroding, the bottom is degrading, or where a change in the watershed has caused a change in the runoff.

**CRITERIA**

Because each reach of stream is unique, measures for corridor improvement must be installed according to a plan adapted to the specific site.

Designs for stream corridors shall be conform to the following principles:

1. Protective measures to be applied shall be compatible with improvements planned or being carried out by others.
2. The channel grade must be controlled, either by natural or artificial means, before any permanent type of structural protection can be considered feasible, unless the protection can be safely and economically constructed to a depth well below the anticipated lowest depth of streambed scour.
3. Stream corridor improvement shall be started at a stabilized or controlled point and ended at a stabilized or controlled point on the stream.
4. Needed channel clearing and removal of stumps, fallen trees, debris, and gravel bars that force the streamflow into the streambank shall be an essential element of the work.
5. Changes in channel alignment shall be considered only after an evaluation of the effect on the land use, interdependent water disposal systems, hydraulic characteristics, existing structures, and fish and wildlife habitat.
6. Structural measures must be effective for the design flow and capable of withstanding greater

flows without serious damage. They shall also be designed to avoid an increase in erosion downstream or upstream of the planned measures.

7. Vegetation shall be established and protected on the eroding banks, especially on areas that are susceptible to infrequent inundation. Deferred grazing may be necessary to obtain the vegetative cover necessary to protect against erosion.

### **Components**

Component conservation practices to complete Stream Corridor Improvement may include, but are not limited to the following:

322-Channel Vegetation  
 350 Sediment Basins  
 382 Fences  
 412 Grassed Waterways  
 528A Prescribed Grazing  
 645 Wildlife Habitat Mgt.  
 342 Critical Area Planting  
 584 Stream Channel Stabilization  
 580 Streambank Protection

Design criteria for individual components shall be according to the Practice Standard for the individual practice.

### **Basic Data Requirements**

The design for stream corridor improvements requires extensive basic field data, and analysis in order to fit the various elements into a system that will allow the stream to function in a natural state.

- Step 1. Prepare a statement of the problem and all objectives.
- Step 2. Develop the historical cause of the damage by looking at the watershed characteristics as a whole.
- Step 3. Obtain soils map of the watershed, and determine the land forms, and the associated environment as related to the flooding history.
- Step 4. Classify the stream using the "Process-based Geomorphic Classification System, (by Rosgen)
- Step 5. Conduct a field investigation to identify sediment producing areas,

Step 6. Obtain cross-section surveys for the low-flow (active flow) and high-flow (flood-plain) channels.

Step 7. Determine the active channel bankfull capacity, and the runoff for various frequency storms.

Step 8. Obtain bedload and suspended sediment load samples, for volume and grain size determinations.

Step 9. Develop sediment rating curves of load versus stream flows.

Step 10. Develop hydraulic rating curve for the active-flow and flood flow channels.

Step 11. Determine stable stream type.

Step 12. Develop a flow duration curve.

Step 13. Determine volume of sediment moved for active bankfull discharge.

Step 14. Prepare a preliminary design for meander, of the active-flow channel for a capacity to convey the runoff from a 2-yr. frequency storm. Check for bank stability, and if not, then provide for treatment to assure bank protection.

Step 15. Design for the passage of high-flows as may be associated with storm events of 100-year. The out-of-bank channel should be stable usually provided by a well established vegetative cover.

Step 16. Review plan with Sponsors, including risk factors, concept of design, costs, management plans, and maintenance items.

Step 17. Prepare final construction drawings and specifications.

### **Grazing Management**

If the stream corridor is to allow grazing; a grazing management plan shall be prepared and to be an integral part of the application of this practice.

### **Fish and Wildlife**

Special attention shall be given to maintaining, improving, and minimizing damage of existing habitat for fish and wildlife. Design feasibility for fish habitat improvement, can be determined after

currently classifying the stream reach. A biologist will be consulted for evaluation of proposed habitat improvement measures for fish and wildlife.

### **Landscape Resources**

Considerations shall be given to the use of construction materials, grading practices, vegetation, and other site development elements that minimize visual impacts and maintain or complement existing landscape uses such as pedestrian paths, climate controls, buffers, etc.

## **CONSIDERATIONS**

### **Water Quantity**

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, deep percolation, and ground water recharge.
2. Effects on downstream flows and aquifers that affect other uses and users.
3. Effects on the water table of adjoining fields.
4. Effects of watershed discharge into streams.

### **Water Quality**

1. Filtering effects of vegetation on movement of sediment, and sediment-attached or dissolved substances.
2. Effects on erosion and movement of sediment, and soluble and sediment-attached substances carried by runoff and streamflow.
3. Effects on sediment intrusion into spawning grounds.
4. Effects of phasing and timing of construction and the establishment of vegetation.
5. Effects of changes in water temperatures.
6. Short-term and long-term effects on wetlands, fish habitat, and water-related wildlife habitats.
7. Effects on the visual quality of onsite and downstream water resources.

### **Endangered Species Considerations**

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that critical periods, such as spawning, eggs in gravels and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example, there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

## **PLANS AND SPECIFICATIONS**

Plans and specifications for stream corridor improvement shall be in keeping with this standard or the standard for the component practice and shall describe the requirements for applying the practice to achieve its intended purpose.

## **OPERATION AND MAINTENANCE**

An operation and maintenance plan will be prepared by the designer. The plan shall outline the minimum requirements needed for the corridor to function properly for the designed life period.

The maintenance plan is to include periodic inspections to observe performance and to identify need for repair or a change in management practices. Necessary maintenance and/or repair activities are to be initiated promptly.