Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

CHANNEL BED STABILIZATION

Code 584

(Ft.)

DEFINITION

Measure(s) used to stabilize the bed or bottom of a channel.

PURPOSE

This practice may support one or more of the following:

- Maintain or alter channel bed elevation or gradient
- Modify sediment transport or deposition
- Manage surface water and groundwater levels in floodplains, riparian areas, and wetlands

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to the beds of existing or newly constructed alluvial or threshold channels undergoing damaging aggradation or degradation that cannot be feasibly controlled by clearing or snagging, establishment of vegetative protection, installation of bank protection, or installation of upstream water control measures.

This practice also applies to channels where the removal of barriers to aquatic organism passage would result in destabilization of the channel bed.

CRITERIA

Design and install measures according to a site-specific plan in accordance with all local, State, Tribal, and Federal laws and regulations. Apply measures that are compatible with improvements planned or being carried out by others.

Evaluate effects of channel work on existing structures such as culverts, bridges, buried cables, pipelines, and irrigation flumes to determine impact on their intended functions. Analyze the quantity and character of sediments entering the channel reach under consideration on the basis of both present and projected conditions caused by changes in land use or land treatment and upstream improvements or structural measures. Select measures that are compatible with the bank or shoreline materials, water chemistry, channel hydraulics, and slope characteristics, both above and below the waterline.

Design measures to—

- Withstand flow duration, depth of inundation, buoyancy, uplift, scour, angle of attack, stream velocity, and higher-flow conditions, based on acceptable risk.
- Maintain sufficient depth to provide adequate outlets for subsurface drains, tributary streams,

ditches, or other channels.
- Maintain the appropriate sediment transport regime in order to avoid detrimental erosion or sedimentation upstream and downstream.
- Anticipate ice action, debris impact, and fluctuating water levels.
- Avoid adverse effects on endangered, threatened, proposed, and candidate species and their habitats.
- Avoid adverse effects on archaeological, historical, structural, and traditional cultural properties.
- Minimize safety hazards to boaters, swimmers, or people using the channel.

Measures must not—

- Impair the floodway or floodplain functions.
- Cause detrimental changes in water surface elevations when water surface elevations are a concern.
- Impede the upstream or downstream passage of aquatic organisms, unless the objective is to restrict invasive species access.

Dispose of spoil material from clearing, grubbing, and channel excavation in a manner that will not interfere with the function of the channel. Protect all disturbed areas around measures from erosion. Select vegetation or other measures that are best suited for the anticipated site conditions.

Clear the channel to remove stumps, fallen trees, debris, and sediment bars only when they are causing, or could cause, detrimental bank erosion, structural failure, or reduction of channel capacity that results in above-average overflows on adjacent floodplains. Retain or replace habitat-forming elements that provide cover, food, pools, and water turbulence to the extent possible.

CONSIDERATIONS

Assess channel stabilization needs in sufficient detail to identify the causes contributing to instability (e.g., watershed alterations resulting in significant modifications of discharge or sediment production). Due to the complexity of such an assessment, consider using an interdisciplinary team and watershed modeling.

When designing protective measures—

- Conduct area-wide planning efforts for proper design, function, and management of protective measures if the design reach involves multiple stakeholders.
- Consider the changes that may occur in the watershed hydrology and sedimentation over the design life of the measure.
- Use woody material removed during construction in the overall practice design.
- Consider using native species for re-vegetation of disturbed areas.
- Maintain or improve the habitat value for fish and wildlife, which includes providing cover, lowering or moderating water temperature, and improving water quality.
- Improve habitat for threatened, endangered, and other species of concern, where applicable.
- Maximize adjacent wetland functions and values and minimize adverse effects to existing wetland functions and values.
- Protect side channel inlets and outlets from erosion or sedimentation.

Plan for the type of human use and social and safety aspects when designing protective measures. Use construction materials, grading practices, vegetation, and other site-development elements that enhance aesthetics, recreational use, and maintain or complement existing landscape uses such as pedestrian paths, climate controls, and buffers. Avoid excessive disturbance and compaction of the site during installation.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for specific channel reaches and field sites that describe the requirements for applying the practice to achieve its intended purpose(s). At the minimum the plan will include:

- Topographic map
- Drainage area
- Velocities
- Safety

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance plan that provides specific instructions for operating and maintaining the system to ensure it functions properly. Provide for periodic inspections and promptly repair or replacement of damaged components.

REFERENCES

USDA, NRCS, Conservation Engineering Division, National Engineering Handbook, Part 653, Stream Corridor Restoration.

USDA, NRCS, Conservation Engineering Division, National Engineering Handbook Part 654, Stream Restoration Design.

USDA, NRCS, Stream Restoration Planning and Design, Fluvial System Stabilization and Restoration Field Guide.