

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
CHANNEL BED STABILIZATION

(Ft.)

CODE 584

DEFINITION

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

PURPOSE

This practice may be applied as part of a conservation management system to 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 that are undergoing damaging aggradation or degradation and that cannot be feasibly controlled by clearing or snagging, by the establishment of vegetative protection, by the installation of bank protection, or by the installation of upstream water control measures.

CRITERIA

Utilities and Permits. The landowner and/or contractor shall be responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

The landowner shall obtain all necessary permissions from regulatory agencies, including but not limited to the Illinois Department of Agriculture, US Army Corps of Engineers, US Environmental Protection Agency, Illinois Environmental Protection Agency and Illinois Department of Natural Resources – Office of Water Resources, or

document that no permits are required.

Measures shall be designed and installed according to a site-specific plan.

Measures to be applied shall be compatible with improvements planned or being carried out by others.

Sufficient depth shall be maintained to provide adequate outlets for subsurface drains, tributary streams or ditches, or other channels.

Effect of channel work on existing structures such as culverts, bridges, buried cables, pipelines, and irrigation flumes, shall be evaluated to determine impact on their intended functions.

Measures shall be designed for flow duration, depth of inundation, buoyancy, uplift, scour, angle of attack, and stream velocity and be sustainable for higher flow conditions, based on acceptable risk.

Measures shall be compatible with the bank or shoreline materials, water chemistry, channel hydraulics, and slope characteristics, both above and below the water line.

Measures shall be designed for anticipated ice action, debris impact, and fluctuating water levels.

Spoil material from clearing, grubbing, and channel excavation shall be disposed of in a manner that will not interfere with the function of the channel and in accordance with all local, State, Tribal, and Federal laws and regulations.

All disturbed areas around measures shall be protected from erosion. Vegetation shall be selected that is best suited for the anticipated site conditions.

Measures shall be designed to avoid adverse effects on endangered, threatened, proposed,

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service [State Office](#), or visit the [Field Office Technical Guide](#).

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and candidate species and their habitats.

Measures shall be designed to avoid adverse effects on archaeological, historic, structural, and traditional cultural properties.

Measures will not impede the upstream or downstream passage of aquatic organisms.

Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be done when they are causing or could cause detrimental bank erosion or structural failure. Habitat-forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.

Measures shall be designed to maintain the appropriate sediment transport regime in order to avoid detrimental erosion or sedimentation upstream and downstream.

Measures shall not impair the floodway or floodplain functions.

Measures shall not result in adverse effects on the function of the stream or the stream corridor. These adverse effects include destruction of instream habitat, sediment transport imbalances, passage barriers, or unexpected changes in channel plan, pattern, or profile.

When water surface elevations are a concern, the effects of protective measures shall not cause detrimental changes in water surface elevations.

The quantity and character of the sediments entering the reach of channel under consideration shall be analyzed on the basis of both present conditions and projected conditions caused by changes in land use or land treatment and upstream improvements or structural measures.

CONSIDERATIONS

Consider area-wide planning for proper design, function, and management of protective measures, where the design reach involves multiple stakeholders.

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

When designing protective measures, consider the changes that may occur in the watershed hydrology and sedimentation over the design life of the measure.

Consider using woody material removed during construction in the overall practice design.

Consider maintaining or improving the habitat value for fish and wildlife, which includes lowering or moderating water temperature, and improving water quality.

Consider opportunities to improve habitat for threatened, endangered, and other species of concern, where applicable.

Consider maximizing adjacent wetland functions and values with the project design and minimizing adverse effects to existing wetland functions and values.

Consider protecting side channel inlets and outlets from erosion or sedimentation.

Consider the type of human use and social and safety aspects when designing the 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.

Measures should be designed to minimize safety hazards to boaters, swimmers, or people using the channel.

PLANS AND SPECIFICATIONS

Plans and specifications for this practice shall be prepared for specific channel reaches and field sites and shall describe the requirements for applying the practice to achieve its intended purpose(s).

OPERATION AND MAINTENANCE

An Operation and Maintenance plan will be prepared. The plan shall provide specific instructions for operating and maintaining the system to ensure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components.

NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS CONSTRUCTION SPECIFICATION
CHANNEL BED STABILIZATION – ROCK RIFFLES

Scope

The work shall consist of excavation and earthfill, along with furnishing and installing all materials for the channel bed stabilization measures as shown on the drawings and specified herein.

Utilities and Permits

The landowner and/or contractor shall be responsible for locating all buried utilities in the project area, including drainage tile and other structural measures. The landowner will obtain all necessary permissions from regulatory agencies, or document that no permits are required.

General

Construction operations shall be carried out in a manner and sequence that erosion and air and water pollution are minimized and held within legal limits.

Construction should be done during low flow conditions to minimize in-stream disturbances. Construction equipment should be kept out of the channel unless the project permit allows.

The completed job shall present a workmanlike appearance and shall conform to the line, grades, and elevations shown on the drawings or as staked in the field.

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used. The contractor shall be assured that all state laws concerning buried utilities have been met.

Documentation of materials used (rock delivery tickets, geotextile tags, seed tags, etc) shall be saved and provided to NRCS.

All trees, stumps, roots, brush, weeds, broken concrete and asphalt materials, and other objectionable materials shall be removed from designated work area.

Disturbance to the existing banks and trees shall be minimized. Trees with a solid foundation which do not restrict access for installation of treatment methods shall be left intact. As shown on the plans, tree limbs which are impeding the channel flow should be cut off, leaving the root wads intact.

Earthwork

To the extent they are suitable and approved by the inspector, excavated materials are to be used as fill materials. Excess spoil material shall be placed at locations shown on the drawings or as directed by the inspector.

Mound fill over the locations of rock riprap keys to ensure positive drainage from the area after settlement, as shown on the drawings.

Rock Riprap

The rock shall be dense; sound; and free from cracks, seams, or other defects conducive to accelerated weathering. The rock fragments shall be angular to sub-round in shape with the least dimensions not less than 1/3 the greatest dimension of the fragment. Riprap will meet the IDOT gradation and quality designation shown on the plans.

The rock shall be placed to the depths, dimensions and finish elevations specified on the drawings. The rock in place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact with one to another and with the smaller rocks filling the voids. Some hand placement may be required to provide a neat and uniform surface.

Vegetation

A protective cover of vegetation shall be established on any earth surfaces designated on the construction plans. Seedbed preparation, seeding, fertilizing, and mulching shall comply with the construction drawings and Construction Specification 342, Critical Area Planting.

**NATURAL RESOURCES CONSERVATION SERVICE
ILLINOIS OPERATION AND MAINTENANCE
CHANNEL BED STABILIZATION – ROCK RIFFLES**

Follow the operation and maintenance plan below to keep your rock riffles functioning as intended:

- Inspect treated areas and associated practices annually, after significant storm events, and after ice flow to identify repair and maintenance needs.
- Check all rock riprap sections for accelerated weathering and displacement. Replace rock to original grades if necessary. Some movement of smaller stone and sorting of material is expected.
- If any crest stones (large rocks used to form the center of the riffle) move, the riffle should be repaired immediately.
- Periodically inspect the bank area above the rock keys. If any settlement or displacement of the earth fill is observed, the settled area should be promptly refilled and compacted to prevent the formation of a surface flow channel that would erode the supporting bank material.
- All settlement or cracks in the soil should be investigated to determine the cause and immediately repaired.
- Remove any debris that accumulates at the protected section, and immediately upstream or downstream from the installed rock riffle structures.
- In cases where the bank is left in a near vertical position, expect continued bank failure until a stable slope is reached.
- Natural regeneration of native vegetation including woody plants should be left intact to improve bank stability and wildlife habitat.
- If fences are installed, they shall be maintained to prevent unauthorized human or livestock entry.
- Control livestock access on unfenced areas.
- Keep machinery away from steep side slopes. Keep equipment operators informed of all potential hazards.
- Immediately repair any vandalism, vehicular, or livestock damage.

Rock Riffles may be installed in conjunction with other streambank protection methods which have additional O&M requirements. If additional methods are part of the project, see attached O&M.

Additional Details:
