

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
SOUTH DAKOTA SUPPLEMENTS ITALICIZED**

STREAMBANK AND SHORELINE PROTECTION

(ft.)

CODE 580

DEFINITION

Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.

PURPOSE

To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes:

1. To prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks;
2. To maintain the capacity of the *water body by reducing sediment produced by eroding banks*;
3. To *reduce the offsite or downstream effects of sediment resulting from bank erosion*;
4. To *improve or enhance the riparian corridor for fish and wildlife habitat, aesthetics, recreation, or cultural resource protection*.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to streambanks or natural or constructed channels and shorelines of lakes, reservoirs, or estuaries where they are susceptible to erosion from the action of surface and subsurface water, ice, or debris or to damage from livestock, wildlife, pedestrian, or vehicular traffic.

This practice only applies to controlling erosion on shorelines where the problem can be solved with relatively simple structural measures, vegetation, or upland erosion control practices and where failure of structural measures will not create a hazard to life or result in serious damage

to property. It does not apply to erosion problems on the Missouri River and similar areas of complexity not normally within the scope of the Natural Resources Conservation Service (NRCS) authority or expertise. All revetments, bulkheads, or groins are to be no larger than three feet above design water surface.

LEGAL REQUIREMENTS

All work planned and constructed must comply with applicable state and federal laws and regulations.

DESIGN CRITERIA

Because each reach of a channel, lake, or estuary is unique, measures for streambank and shore protection must be installed according to a plan and adapted to the specific site.

Designs for streambanks shall be according to the following principles:

1. Protective measures to be applied shall be compatible with improvements planned or being carried out by others.
2. *Protective measures shall be based on the soil type, water chemistry, and slope characteristics both above and below the water line and the proximity of other structures and improvements.*
3. *End sections shall be adequately bonded to existing measures or terminate in stable areas.*
4. *Steep unstable slopes and deep cut banks may require grading prior to installing protective measures. Maximum slope shall be determined by soil materials and the type of measure installed.*

Conservation practice standards are reviewed periodically and updated if needed. The current version of this standard is posted on our website at www.sd.nrcs.usda.gov or may be obtained at your local Natural Resources Conservation Service.

5. *Provisions will be made to protect the measure from overland flow and internal drainage if needed.*
 6. *Measures applied shall not adversely affect threatened and endangered species as well as species of special concern as defined by the appropriate state and federal agencies.*
 7. *Measures shall be designed for anticipated ice action and fluctuating water levels.*
 8. *All disturbed areas around protective measures shall be protected from erosion.*
 9. *All revetments, bulkheads, or groins are to be no higher than three feet (0.9m) above mean high water.*
6. *Measures planned shall not limit the stream's access to the floodplain.*
 7. *Stream segments to be protected shall be classified according to a system deemed appropriate for the state. Measures shall be compatible with stream type. Incised channels that contain the five-year or greater flows shall be evaluated with particular caution due to excessive velocities and shear stress.*
 8. *When water surface elevations are a concern, the effects of protective measures on channel roughness shall be evaluated.*

General Criteria for Streambanks

Designs for streambanks shall be according to the following principles:

1. *The channel grade shall be stable-based on a field assessment, before any permanent type of bank protection can be considered feasible, unless the protection can be constructed to a depth below the anticipated lowest depth of streambed scour.*
2. *When necessary, a protective toe shall be provided for stability.*
3. *Channel clearing to remove stumps, fallen trees, debris, and bars shall only be done when they are causing or could cause detrimental bank erosion or structural failure. To the extent possible, habitat forming elements that provide cover, food, and water turbulence shall be retained.*
4. *Changes in channel alignment shall not be made unless the changes are based on an evaluation that includes an assessment of both upstream and downstream geomorphology. The current and future discharge-sediment regime shall be based on an assessment of the entire watershed above the proposed channel alignment.*
5. *Measures shall be functional for the design flow and be able to withstand floods without serious damage. They shall also be designed to avoid an*

General Criteria for Shorelines

Designs for shoreline protection shall be according to the following principles:

1. *Structural shoreline protective measures shall be keyed to a depth to prevent scour during low water.*
2. *For the design of structural shoreline protection measures, the site conditions below the waterline shall be evaluated for a minimum of 50 ft. (15 m) distance from the shoreline measured at the design water surface.*
3. *The height of the protection shall be based on the design water surface plus the computed wave height and freeboard.*
4. *When vegetation is selected as the protective treatment, a breakwater shall be used until the vegetation is established. Vegetation shall be selected that is best suited for the soil/moisture regime.*

CONSIDERATIONS

An assessment of streambank or shoreline protection needs should be made 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 an interdisciplinary team should be utilized.

Ownership patterns may require group planning for proper design, function and management of protective measures.

Vegetative measures should be considered above the elevation where structural measures are required.

Utilize vegetative species that are native and compatible with local ecosystems. Avoid introduced or exotic species that could become nuisances. Consider species that have multiple values such as those suited for biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides. Avoid species which may be alternate hosts to disease or undesirable pests.

Livestock exclusion is needed during establishment to maintain plant vigor. Wildlife may also need to be controlled during establishment of vegetative measures. Temporary and local population control methods should be used with caution and within state and local regulations.

Caution should be used when considering woody phreatophytes and hydrophytes that deplete ground water.

Measures that promote beneficial sediment deposition and the filtering of sediment, sediment-attached, and dissolved substances should be considered.

Consider the type of human use and the social and safety aspects when designing the protective measure. Use construction materials, grading practices, vegetation, and other site development elements that minimize visual impacts and maintain or compliment existing landscape uses such as pedestrian paths, buffers, etc.

Maintain or improve the function of protection measures for fish and wildlife, including habitat creation, lowering or moderating water temperature, and improving water quality.

Adverse impacts to habitat should be avoided if possible or mitigated if unavoidable.

Toe rock should be large enough and graded to provide aquatic habitat.

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 minimize

adverse effects to existing wetland functions and values.

Consider utilizing large woody debris removed from the channel or streambank into the overall practice design.

A landscape analysis should be made to determine the condition and function of the stream corridor and the amount of fragmentation. Measures should be designed to maintain or improve the condition of the corridor and improve connectivity. Re-establishment of associated stream corridor vegetative components should be made when necessary to insure long term stability and functioning.

When appropriate, establish a buffer strip at the top of the bank or shoreline protection zone to help maintain and protect installed measures and to improve their function.

PLANS AND SPECIFICATIONS

Plans and specifications for streambank and shoreline protection shall be prepared for specific field sites and based on this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Plans and specifications include construction plans, drawings, job sheets, construction specifications, narrative statements in conservation plans, or similar documents. These documents are to specify the requirements for installing the practice, such as the kind, amount, or quality of materials to be used, or the timing or sequence of installation activities.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be prepared for use by the owner or other responsible for operating and maintaining the system. The plan shall provide specific instructions for operating and maintaining the system to insure that it functions properly. It shall also provide for periodic inspections and prompt repair or replacement of damaged components or erosion.