

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CLEARING AND SNAGGING

(Ft.)

CODE 326

DEFINITION

Removal of vegetation along the bank (clearing) and/or selective removal of snags, drifts, or other obstructions (snagging) from natural or improved channels and streams.

PURPOSE

Reduce risks to agricultural resources or civil infrastructure by removing obstructions that hinder channel flow or sediment transport in order to:

- Restore flow capacity and direction;
- Prevent excessive bank erosion by eddies or redirection of flow;
- Reduce the undesirable formation of bars; and/or;
- Minimize blockages by debris and ice.

CONDITIONS WHERE PRACTICE APPLIES

Any natural or improved channel where the removal of vegetation, trees, brush, and other obstructions is needed to accomplish the listed purposes.

CRITERIA

The design shall address all modified flow conditions caused by clearing and snagging.

Capacity. The capacity of the channel, both before and after modification, shall be determined using National Engineering Handbook (NEH) Part 654, Stream Restoration Design, Chapter 6, Stream Hydraulics. The value of the Manning's "n" roughness coefficient used to determine channel capacity after modification shall reflect the degree of natural changes and maintenance expected to occur in future years.

Location. The area to be cleared and snagged shall include the perimeter and flow area of the channel. Trees on the bank that are leaning over or other objects that may fall into the channel may be included.

Clearing and snagging may also be used for other areas, such as temporary disposal areas or travel ways, required for implementation of this practice.

Stability. Clearing and snagging may affect channel stability. The effect on downstream and upstream reaches due to the removal of obstructions shall be analyzed using appropriate stream and channel geomorphologic procedures.

Debris Disposal. Material cleared and snagged shall be removed from the floodplain or deposited in areas or in a manner that will not significantly affect the flow capacity of the floodplain.

Vegetation. All areas denuded and/or disturbed during clearing and snag removal shall be restored by planting vegetation. Native vegetation shall be used where practical. Vegetation established as part of this practice shall include ecologically suitable species obtained from local sources wherever practical.

Disturbance of wetlands, riparian areas, and fish and wildlife habitat sites shall be minimized or avoided where possible.

The establishment of vegetation on cleared and snagged areas shall be in accordance with [Conservation Practice Standard \(342\) Critical Area Planting](#).

CONSIDERATIONS

Debris in stream systems affects the physical characteristics of the stream as well as the diversity and abundance of its aquatic

organisms. Fisheries and/or Aquatic Biologists can assist in evaluating and incorporating measures to improve aquatic and riparian-wetland habitat:

Enhancements for fish and wildlife values should be incorporated as needed and practical. Special attention should be given to landscape aesthetics and to protecting and maintaining key shade, food, and den trees.

Habitat forming elements that provide cover, food, pools, and water turbulence should be retained or replaced to the extent possible

Root balls of fallen trees that are securely anchored in the channel or naturally-formed logjams may provide fish habitat and/or stability. The effects of these items shall be included in the channel capacity hydraulic analysis.

Existing on-site woody debris should be incorporated into design to help stabilize banks, modify channel flow, provide anchorage and food for invertebrates, and provide habitat and cover for fish. Note that woody debris should be securely fastened as dislodged woody debris may be a risk to downstream structures such as bridges, dams, or other civil works.

When determining if leaning trees will be removed, consideration should be made to the impact these trees have on thermal cover for the stream as well as the impact that of falling leaves and branches have on the aquatic insects.

Erosion rates decline as a percentage of vegetative roots in a streambank increases. Selection of appropriate riparian vegetation will increase the streambank's ability to resist future erosion.

Sediments may be re-suspended in the flow due to the clearing and snagging activity. Treatments that promote beneficial sediment deposition and the filtering of sediment and dissolved substances should be considered.

Schedule in-stream work to avoid environmentally sensitive periods such as spawning and migration to the fullest extent possible.

Measures and practices should be incorporated, as needed and practical, to address modified flow conditions such as:

- A lowered hydraulic gradient which may drain adjacent flood plains more quickly.
- Decreased groundwater recharge in water losing streams resulting from reduced residence time in the channel and adjacent floodplains.

Ground-disturbing activities associated with this practice have the potential to adversely affect protected plant species and may encourage the establishment of exotic and/or non-native species. Quickly revegetating disturbed areas can minimize the introduction of non-native species.

Temporary erosion and sediment best management practices can be used to minimize the delivery of fine sediment to adjacent and downstream reaches.

Construction methods that enhance fish and wildlife values should be incorporated as needed and practical:

- Use of hand operated equipment, water based equipment, or small equipment will minimize soil, water, and other resource disturbances.
- Operate heavy machinery from atop adjacent streambanks to the fullest extent possible.

After all material has been removed from streambank locations, limit machinery access to riparian areas to minimize damage to stream habitat.

When native vegetation is not a viable option, care should be used to avoid invasive species.

PLANS AND SPECIFICATIONS

Plans and specifications for clearing and snagging shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose(s).

Construction operations shall be carried out in a manner and sequence so that impacts on the environment will be minimized and held within acceptable limits.

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As a minimum, include, as applicable, the following items in the plans and specifications:

- limits of area requiring clearing and snagging
- location of ingress and egress to the site
- description of works of improvement and extent of removal
- location of disposal areas or location of areas off limits for disposal of debris
- location and description of trees or woody vegetation to be left undisturbed
- method of debris disposal
- manner and sequence of construction operations so that impacts on the environment will be minimized
- erosion control measures, as applicable
- vegetative requirements for areas denuded and disturbed, as applicable

All operations shall be carried out in a safe and skillful manner. Safety and health regulations shall be observed and appropriate safety measures used.

OPERATION AND MAINTENANCE

A maintenance program shall be established by the landowner/user to maintain channel capacity and vegetative cover. Items to consider are:

- Area should be assessed after each major storm event for downed trees and debris accumulation. Remove downed trees and debris accumulations that are causing bank erosion problems as soon as possible.
- Periodically inspect the area for signs of streambank undermining or instability.
- Clear any vegetation and/or debris that block side drainage structures and channels.

REFERENCES

USDA-NRCS. 2007. National Engineering Handbook, Part 654, Stream Restoration Design Handbook. Washington, D.C.

USDA-NRCS. 2009. National Biology Handbook, Part 614, Stream Visual Assessment Protocol. Washington, D.C.