

## Clearing and Snagging (feet)

### Definition

Removing snags, drifts, or other obstructions from a channel.

### Scope

This standard applies to the clearing of trees and brush and the removal of sediment bars, drifts, logs, snags, boulders, piling, piers, headwalls, debris, and other obstructions from the flow area of a natural or excavated channel. It also applies to selective snagging, which is the selective removal of obstructions from the channel and streambanks to increase its capacity to carry water.

### Purpose

To increase the flow capacity of a channel by improving its flow characteristics; to prevent bank erosion by eddies; to reduce the forming of bars; and to minimize blockages by debris and ice.

Special attention shall be given to restoring, maintaining or improving landscape resources and habitat for fish and wildlife, where applicable.

### Conditions where practice applies

Any channel or floodway where the removal of trees, brush, and other obstructions is needed to accomplish one or more of the listed purposes. If clearing and snagging are likely to result in channel erosion, impairment to the landscape resource quality, or impairment to habitat for fish and wildlife, either the clearing and snagging shall not be done or practices to minimize such damages shall be applied concurrently with the clearing and snagging.

### Planning Considerations

#### Water Quantity

1. Possible downstream flooding.
2. Effects of changed drawdown on bank stability.
3. Effects of changed flow conditions on ground water recharge.

#### Water Quality

1. Effects of discharge changes on the flood plain and channel relative to erosion and sediment production, both during construction and after establishment.
2. Effects on sediment load, sediment-attached substances, organic loadings.
3. Relationship between stream quality and aquifer quality where ground water recharge occurs.
4. Temporary and long-term effects on visual quality of water and landscape.
5. Effects on on-site and downstream water temperatures.

#### Design criteria

The capacity of the channel, both before and after improvement, shall be determined by use of Manning's Formula, using applicable values of the retardance factor "n," for both conditions. The value of "n" used to determine channel capacity after improvement shall reflect the degree of maintenance expected in future years.

The area to be cleared and snagged shall include the perimeter of the channel, the flow area of the floodway, or both. Adjacent trees or other objects that may fall into the channel shall also be included. Clearing and snagging may be specified for other areas, including berms, for use as temporary disposal areas or travelways, or for planned conservation uses.

Channel stability shall not be impaired by clearing and snagging. The criteria for determining channel stability in open channels (582) shall be complied with. The effect of removing obstructions on downstream reaches shall be considered.

#### 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.

### **Clearing and Snagging Specifications**

All trees, stumps, and brush to be removed within the perimeter of the channel shall be cut as close to the ground as the cutting tools permit. If other areas are to be cleared, the trees, brush, and other woody vegetation shall be cut within the maximum distance above the ground level specified.

Trees shall be felled in such a manner as to avoid damage to other trees, property, and objects outside the limits of clearing.

Down trees, logs, drifts, boulders, debris and other obstructions lying wholly or partly in the channel shall be removed. Pilings, piers, headwalls, and sediment bars that obstruct the free flow of water shall be removed if so designated in the drawings.

If herbicide treatment is planned, the stumps and brush in the specified area shall be treated at the time of clearing according to the recommendations of the manufacturer of the herbicide specified or being used.

The use of explosives in all clearing and snagging operations shall be in strict compliance with applicable state statutes and regulations.

If channels are located in cultivated areas or in areas of high value land, trees, logs, and all combustible material resulting from the clearing and snagging operations shall be burned, buried, or piled in designated disposal areas as specified. All burning shall be performed outside the channel and shall conform to regulations in effect in the area. In other areas, such as woodland or rangeland, where burning is prohibited, material shall be disposed of in such a manner that it does not float away or reenter the channel. Residue from burning and noncombustible material shall be buried outside the channel or placed in designated disposal areas. All buried material shall have an adequate earth cover to permit proper land use.

Selective snagging, where possible, shall be performed primarily with hand-operated equipment, water-based equipment, or small equipment used in a manner that will minimize soil, water, and other resource disturbances.

Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and practical. Special attention shall be given to visual resources, protecting and maintaining key shade, food, and den trees and to stabilization of disturbed areas.

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CLEARING AND SNAGGING SPECIFICATIONS

All trees, stumps, and brush within the perimeter of the channel shall be cut as close to ground level as conventional cutting tools permit. If other areas are to be cleared, the trees, brush and other woody vegetation shall be cut within the maximum distance above ground level specified.

Trees shall be felled in such a manner as to avoid damage to other trees, property, and objects outside the limits of clearing.

Down trees, logs, drifts, boulders, debris and other obstructions lying wholly or partially within the channel shall be removed. Piling, piers, headwalls, and sediment bars that obstruct the free flow of water will be removed when so designated in the project plan.

If herbicide treatment is planned, the stumps and brush in the specified area shall be treated at the time of clearing in accordance with the recommendations of the manufacturer of the herbicide specified or being used.

The use of explosives in all clearing and snagging operations shall be in strict compliance with applicable State statutes and regulations.

If channels are located in cultivated areas or in areas of high value land, trees, logs, and all combustible material resulting from the clearing and snagging operations shall be burned, buried, or piled in designated disposal areas as specified for the project. In other areas, such as woodland or range land, where burning is prohibited, material shall be disposed of in such a manner that it will not float away or re-enter the channel.

All burning shall be performed outside the channel and shall conform to regulations in effect in the area.

Residue from burning and non-combustible material shall be buried outside the channel or placed in designated disposal areas. All buried material shall have adequate earth cover to permit proper land use.

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**CLEARING AND SNAGGING ENGINEERING NOTEKEEPING**

**Design Survey, Design, and Plans**

- A. The following data will be recorded.
1. Location sketch.
  2. Minimum widths to be cleared and snagged.
  3. Description of trees and objects to be removed (Ex. all trees leaning 30 degrees, all logs that are perpendicular to flow, all debris, etc.)
  4. Disposal area and method.
  5. Before and after "n" value.
  6. Type of equipment to be used.
  7. Design approval signature and date.

**Construction Check**

- A. The following data should be recorded as supporting data when the job is completed:
1. Measurement of length and widths.
  2. Statement as to adequacy of clearing and snagging.
  3. Statement as to adequacy of disposal.
  4. Statement as to overall adequacy of job, signature, and date.

**Recording Data**

All data may be recorded in an engineering field notebook.