



# ☒ North Carolina Wildlife Resources Commission ☒

Cameron Ingram, Executive Director

## MEMORANDUM

**TO:** NC Division of Water Resources  
NC Department of Environmental Quality

**FROM:** Maria T. Dunn, Coastal Permit Coordinator  
Habitat Conservation Division 

**DATE:** August 19, 2021

**SUBJECT:** Guidelines for Snagging and Clearing Operations of Stream Debris in North Carolina Waterbodies.

The North Carolina Wildlife Resources Commission (NCWRC) is often consulted to provide guidance for snagging and clearing projects, also known as stream debris removal (SDR) projects. The information provided below details the general guidance given for such proposals. Specific instructions for systems that may be designated as Anadromous Fish Spawning Areas (AFSA), Primary Nursery Areas (PNA), and Trout Waters may also be given to prevent impacts to spawning adults, egg, larvae, and juveniles of certain species. Other designations or significant habitat areas may also warrant moratoria protections that would be outlined in project specific discussions. Please contact NCWRC staff to discuss snagging and clearing proposals prior to project scheduling and implementation to ensure appropriate measures are taken to minimize impacts to wildlife resources. Important information includes length of reach, typical reach condition, method of operation, and approximate timeline.

We do not object to the snagging and clearing of debris to reduce potential flooding to residential areas, cropland, and roads. However, significant and excessive removal of woody debris can have a profound and measurable adverse impact on aquatic communities. Specific impacts include:

- 1) Fish forage reduction: Woody debris in streams provides large amounts of surface area for aquatic insect colonization and offer better growing conditions than the stagnant mud characterizing most of the stream-bottom habitat.
- 2) Fish refuge reduction: Cover provided by snags and other woody debris are important refuges for many small riverine fishes enabling them to sustain larger populations. These smaller fishes are important food sources for resident gamefish species.

- 3) Increased nutrient loading downstream: The biological community supported by snags removes large amounts of organic matter and nutrients from upstream waters converting them to forms readily suitable for transfer up the food chain to fish or waterfowl.
- 4) Increased turbidity during snag removal: Bottom disturbances during the spring spawning season have the potential to adversely affect spawning of resident and anadromous fishes in and downstream of the project site. Settling of sediments during the critical egg and/or fry life history stage has the potential to significantly reduce fish densities in the impact area.
- 5) Reduction of wildlife foraging and cover areas: Log-jams, root wads, and streambank vegetation provide key foraging, cover, and denning sites for reptile, amphibian, and riparian wildlife species.
- 6) Loss of brood habitat for wood ducks: The complete removal of log-jams and overhanging vegetation, including shrubs and trees, serves to reduce the suitability of streams as wood duck brood habitat. Young wood ducks need the overhead cover that is provided by streamside vegetation at least 2 feet above the surface of the water.

In general, the NCWRC is not concerned with routine clearing and snagging of man-made agricultural ditches as this activity aids to reduce the potential flooding of residential areas, crop lands, and roads. Therefore, the recommendations provided in this document would not apply. However, we recommend contacting our agency if the snagging and clearing project pertains to a natural feature that is jurisdictional to rules established by the NC Division of Coastal Management (NCDQM), NC Division of Water Resources (NCDWR), or US Army Corps of Engineers (USACE) and has either been modified by past ditching or provides connectivity to important habitats. Certain altered systems in the coast may be designated as important habitat areas by the NC Division of Marine Fisheries (NCDMF) or NCWRC. If it is determined important aquatic resources are present, then management practices to conserve habitats may be requested. These requests would likely be less restrictive than the following standard guidance established for more natural systems.

The following guidelines are intended to assist the sponsors of snagging and clearing projects with making decisions that will minimize impacts to in-stream fish and wildlife habitats. These guidelines are based directly on basic definitions of stream conditions as described in "Stream Obstruction Removal Guidelines", published by the American Fisheries Society in 1983.

- Only trees with a degree of lean steeper than 45 degrees should be targeted for removal. Dead trees leaning toward the channel can be removed. All loose material captured by affixed woody debris in the channel is allowed to be removed.
- Root wads from cut trees should be left in place and on their original alignment.
- Bushes, limbs, and other materials hanging in or over the water that do not obstruct flow or navigation should not be removed.
- As much work as possible should be performed by hand labor from boats to minimize impacts to stream banks, riparian vegetation, and aquatic resources. When hand labor is not practical, heavy equipment should be operated from barges or platforms on the water to minimize bank disturbance.
- Debris removed from the waterway must not be placed in a manner that restricts flows or fills wetlands.

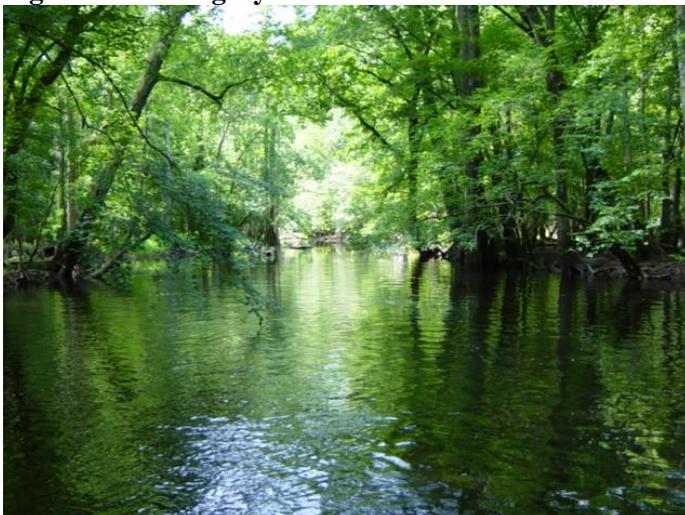
- Systems designated as Anadromous Fish Spawning Areas (AFSA), Primary Nursery Areas (PNA) or Trout Waters may have restrictions or moratoria for in-water work to minimize impacts to spawning adults, eggs, larvae, and juveniles of certain species. Please contact NCWRC staff for consult.
- Systems designated as Critical Habitat or have known populations of protected species may have restrictions or moratoria for in-water work to minimize impacts to spawning adults, eggs, larvae, and juveniles of these species. Please contact NCWRC staff for consult.
- Project proposals in systems designated as a North Carolina Natural and Scenic River or as a Federal Wild and Scenic River should consult with state and federal resource agencies prior to project planning.
- Certain watersheds are subject to buffer rules regulated by the NCDWR. Activities should be compliant with the rules and contact with NCDWR staff is recommended.

We have taken these basic stream condition descriptions and matched them with digital photos in order to illustrate a group of specific snag situations most likely to be found within the channels of coastal streams. The following four conditions are ranked based on degree of obstruction, from no obstruction to severe obstruction. The removal action guidelines should be used when deciding on the degree of woody debris removal necessary to achieve canoe and small vessel navigability. We believe that adherence to these guidelines will result in improvements in flow where streams are significantly blocked by woody debris, improvements in navigability for canoes and other small vessels while at the same time, maintaining the integrity of highly valuable aquatic habitats required by numerous species of fish and wildlife. These guidelines are provided for a suite of coastal systems that range in size, so all descriptions may not be completely appropriate for every system.

**I. Category 1 Condition Definition:**

Stream segment has natural flow and no work is required. Flow may be impeded in some situations, but no problems are present. There may be present various amounts of in-stream woody debris and fine sediments, such as silt, logs, and brush. Woody debris may be either in contact with a streambank or within the actual stream channel. Overhanging limbs and trees shade the stream channel, but do not inhibit navigation by canoes or other small vessels.

**Figure 1A: Category 1 Condition**



**Figure 1B: Category 1 Condition**



Category 1 Removal Action Guidelines:

1. No action should be taken to remove logs, limbs, and other woody debris in these situations.
2. Overhanging limbs and streamside bushes, vines, and small trees should be left standing and in their current state.

***II. Category 2 Condition Definition:***

Stream segment has no major flow impediments, but existing conditions are such that obstructions may likely form in the near future. This condition is generally characterized by small accumulations of logs and/or other woody debris which occasionally spans the entire stream width (i.e., fallen tree).

Accumulations are isolated, not massive and do not presently cause upstream ponding. Navigation by canoes is possible but with some effort to pass through or over in-stream obstructions.

**Figure 2a: Category 2 Condition**



**Figure 2b: Category 2 Condition**



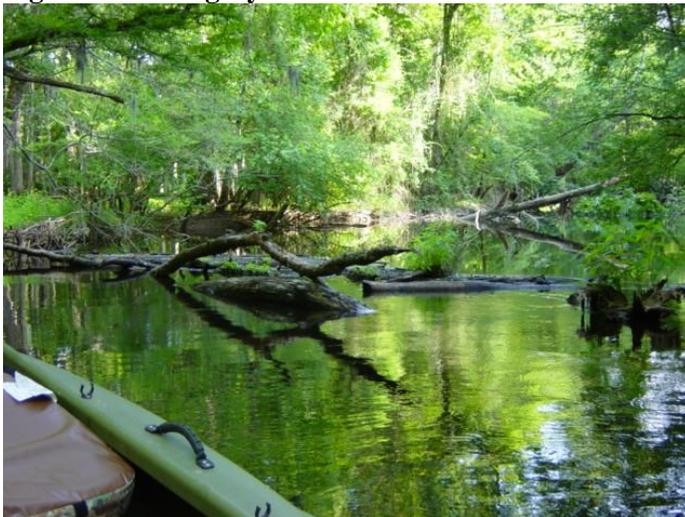
**Category 2 Removal Action Guidelines:**

1. Minimal action may be allowable to remove limbs and other portions of snags that are above the surface; limbs should be cut off at or just below the surface.
2. All submerged logs and limbs outside of a navigable opening should be left undisturbed.
3. Trees that have fallen entirely across the stream channel that would require canoe portage can be cut in such a way that a passageway is opened. Any part of the tree that originates in the water (i.e., root wad) should be left in place and not dragged from the stream.

**III. Category 3 Condition Definition:**

Stream segment has significant blockages. Navigation with a canoe around at least one side of the obstruction is difficult but not impossible. Obstructions are generally characterized by large accumulations of lodged trees, root wads, and/or other woody debris that frequently span the entire width of the stream. Although impeded, some flow moves through or under the obstruction. Large amounts of fine sediment have not covered the lodged obstruction.

**Figure 3a: Category 3 Condition**



**Figure 3b: Category 3 Condition**



**Category 3 Removal Action Guidelines:**

1. Removal actions may restore navigation for a single canoe and may not exceed those necessary to reduce obstructions to Category 1 or 2 Condition specifications. In systems where larger vessels can navigate, woody debris can be removed up to 1/3 the width of the water body.
2. Acceptable actions include cutting limbs even with the surface of the water, cutting and removing sections of tree trunks that are allowing lodging of woody debris during storm events.
3. Woody debris on the outer edges of the obstruction that are in contact with either streambank should be left undisturbed, including root wads and overhanging limbs.

**IV. Category 4 Condition Definition:**

Stream segment is characterized by major blockages causing unacceptable flow and extreme navigational problems. Obstructions consist of compacted debris and/or sediment that severely restrict appropriate vessel access, requiring overland portage.

**Figure 4a: Category 4 Condition**



**Figure 4b: Category 4 Condition**



Category 4 Removal Action Guidelines:

1. Remove only enough woody debris from the center of the stream channel that will allow navigation by single canoe. In systems where larger vessels can navigate, woody debris can be removed up to 1/3 the width of the water body.
2. Woody debris on the outer edges of the obstruction that are in contact with either streambank should be left undisturbed, including root wads and overhanging limbs.
3. Removal actions may not exceed those necessary to reduce obstructions to Category 1, 2, or 3 Condition specifications.

Thank you for the opportunity to provide guidance on snagging and clearing operations. If you have any additional comments or questions, please contact me at (252) 948-3916 or at [maria.dunn@ncnwildlife.org](mailto:maria.dunn@ncnwildlife.org)