

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD  
STREAM HABITAT IMPROVEMENT AND MANAGEMENT  
(Ac.)  
CODE 395**

**DEFINITION**

Maintain, improve or restore physical, chemical and biological functions of a stream, and its associated riparian zone, necessary for meeting the life history requirements of desired aquatic species.

**PURPOSE**

1. Provide suitable habitat for desired fish and other aquatic species.
2. Provide stream channel and associated riparian conditions that maintain stream corridor ecological processes and hydrological connections of diverse stream habitat types important to aquatic species.

**CONDITIONS WHERE PRACTICE APPLIES**

All streams and their adjoining backwaters, floodplains, associated wetlands, and riparian areas where geomorphic conditions or habitat deficiencies limit reproduction, growth, survival and diversity of aquatic species.

**CRITERIA**

Planned stream habitat improvements will:

- Address the aquatic species and life history stages for which the stream is being managed
- Be based on a site-specific assessment of local hydrology, channel morphology, geomorphic setting, fish and other aquatic species present, riparian and floodplain conditions, and any habitat limitations including water quantity and quality, food supply, and restriction of upstream and downstream movement of aquatic species using the NRCS Stream Visual Assessment Protocol, Version 2 or comparable evaluation tool
- When applied, result in a conservation system that meets or exceeds the minimum quality criteria for stream habitat established in Section III of the FOTG

Manage adjoining riparian areas to support a diverse vegetation community suitable for the site conditions and desired ecological benefits. Such benefits include stream temperature moderation, recruitment of in-stream large wood and fine organic matter, input of riparian nutrients,

habitat for terrestrial insects and other riparian dependent species, stream bank integrity, and filtration of contaminants from surface runoff.

Where practical, restore or maintain stream habitat and channel forming processes such as natural flow regime, meander migration, sediment transport, recruitment and storage of large wood, and floodplain interactions with the stream.

All stream and riparian activities will occur within state and federal guidelines with regard to timing of spawning, incubation, and rearing of aquatic organisms, and breeding and nesting of terrestrial organisms.

Manage livestock to sustain a healthy stream corridor and associated habitats.

**Criteria for In-stream Structures**

Design in-stream structures to be compatible with the dynamic nature of streams and rivers, facilitate natural geomorphic recovery when possible, and minimize disruption of recreational and other traditional uses of the stream corridor.

Structures installed for the purposes of this standard will not:

- Impede or prevent passage of fish and other aquatic organisms at any time, unless intended to isolate populations of native species of conservation concern
- Cause excessive bank erosion
- Cause unintentional lateral migration, aggradations or degradation of the channel
- Hinder channel-floodplain interactions

Structural in-stream improvement measures applied will be compatible with the geomorphologic stream type. All structural measures applied will be analyzed for stability for the bank full and 25-year flow events.

All in-stream devices will be installed according to a design approved by the MDNR Area Fisheries Manager.

In-stream devices will be protected from erosion by using loose rock riprap and/or shaping and seeding the bank.

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Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact the MN NRCS in your area, or download it from the eFOTG for MN.

### **Criteria for Improving Trout Spawning and Incubation Areas.**

All practices that reduce stream bank and upland erosion to the stream as off site sources of sediment, will improve spawning habitat by maintaining clean gravels in riffles.

Riffles and gravel spawning beds may be established in appropriate situations. Consult with the NRCS State Biologist and MDNR Area Fisheries Manager for sources of information.

Spawning gravel size and configuration will be appropriate for the target fish species and consistent with substrate size of the channel type within the treatment reach. Contact the NRCS State Biologist or MDNR Area Fisheries Manager for information about spawning gravel requirements and/or sources of local fisheries expertise.

### **Criteria for Improving Stream Habitat for Warm Water Fishes.**

In warm water (walleye, northern pike, and smallmouth bass) prairie streams, the emphasis will be on the development of large, complex pools with much of the area greater than 30 inches in depth, and the banks well vegetated with grasses and forbs.

### **CONSIDERATIONS**

Any stream habitat management project is most effective when applied within the context of overall watershed conditions and with clear objectives for stream management goals.

Stream habitat management provisions should be planned in relation to other land uses that may affect stream corridors.

Before designing and implementing stream habitat improvements, consider the known or expected concerns within the watershed, such as: point and non-point source pollution; water diversions; and land management activities likely to influence stream habitat conditions. Additional measures that should be taken singularly or in combination to improve stream habitat include:

1. Complete a general assessment of watershed conditions that are likely to affect the functions of the stream and its riparian area.
2. Incorporate stream habitat improvements into a conservation plan that addresses soil quality, prescribed grazing, nutrient management, pest management, and other management practices for reducing non-point sources of pollution.
3. Provide fish passage upstream and downstream and allow movement of other aquatic species and organic matter to the extent possible and when compatible with state and federal fish management objectives (see

conservation practice standard Aquatic Organism Passage (396)).

4. Reduce or manage excessive runoff due to watershed development, roads or land-use activities.
5. Restore or protect riparian and floodplain vegetation and associated riverine wetlands.
6. Maintain adequate in-stream flows to sustain diverse habitats for fish and other aquatic species, especially during critical life history stages of spawning, incubation and rearing.
7. Provide heterogeneous and complex physical habitat components consistent with the physiographic setting and important to fish and other aquatic species in the watershed. These include suitable spawning substrates, structural elements such as boulders and/or large wood where appropriate, resting pools, overhead cover, and diverse riparian plant communities.
8. Provide in-stream barriers to exclude aquatic nuisance species from upstream habitats where prescribed by state and federal fish management agencies to protect native fish populations.
9. Provide screens on water pumps, diversion ditches, or any area where unintentional entrainment of aquatic species is likely to occur.
10. Improve floodplain-to-channel connectivity for development of seasonal or permanent backwater, wetland and off-channel habitats consistent with the local climate and hydrology of the stream.
11. Maintain natural surface water, hyporheic, and ground water interactions to the extent possible.
12. Control spread of exotic plant and animal species.
13. Manage recreational and other land use activities to minimize impacts on stream banks, riparian vegetation and water quality.

### **PLANS AND SPECIFICATIONS**

Plans and specifications shall be developed for each site where stream corridor management and improvement actions are to be implemented.

The plan will include detailed goals and objectives of the planned actions, a site description, the dates and sequence in which improvements or management actions will be completed, a vegetation planting plan, maintenance requirements, and monitoring guidelines for evaluating the effectiveness of the conservation actions. The plan shall specify:

- Location and extent of modification of the stream reach to accomplish the planned purpose

- Riparian plant species and stocking rates if needed to accomplish the planned purpose
- Planting dates, as well as the care and handling of seed or other planted materials to ensure an acceptable rate of survival
- Site protection and preparation requirements for establishment or recruitment of riparian vegetation if needed
- Drawings to illustrate installation or implementation requirements.

Trout Unlimited. 2009. Driftless Riparian Habitat Guide. 20 pp.

## OPERATION AND MAINTENANCE

A detailed operation and maintenance plan shall be developed for all applications. The plan shall provide for periodic inspection and prompt repair or modification of any structures that are found to cause excessive stream bank or streambed instability.

All structural measures shall be evaluated on an annual basis. Post-project monitoring and evaluation of stream and riparian habitat conditions shall be conducted to determine if actions implemented are providing for management of the stream corridor habitats as planned. Any repair actions, if needed, shall comply with state and federal guidelines for protecting spawning, incubation and rearing times of aquatic species and breeding and nesting times of terrestrial species.

## REFERENCES

Bureau of Land Management. 1998. Riparian Area Management: A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas. TR-1737-15.

Federal Interagency Stream Restoration Working Group (FISRWG). 1998. National Engineering Handbook 653 –Stream Corridor Restoration: Principles, Processes and Practices.

Newbury, F.W. and Gaboury, N.N., 1983. Stream Analysis and Fish Habitat Design - A Field Manual. Newbury Hydraulics Ltd. Gibsons, British Columbia, Canada. 262 pp.

USDA-NRCS. 1998. [The Practical Streambank Bioengineering Guide](#).

USDA-NRCS. 2005. National Biology Handbook Part 620. Aquatic and Terrestrial Habitat Resources.

USDA-NRCS. 2006. National Engineering Handbook Part 654. Stream Restoration Design Handbook.

USDA-NRCS. 2009. National Biology Handbook Part 614, Subpart B. Stream Visual Assessment Protocol. Version 2.

Roni, P. 2005. Monitoring stream and watershed restoration. American Fisheries Society, Bethesda.