

Stream Habitat Improvement and Management (Acre) 395

DEFINITION

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

PURPOSES

1. Provide suitable habitat for desired aquatic species.
2. Provide stream channel and associated riparian conditions that maintain ecological processes and 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 fish stream improvements will be based on a stream assessment that identifies habitat limitations. This assessment may be conducted using the **Stream Visual Assessment Protocol, Water Quality Indicators Guide** or other assessment procedure. When assessing large projects, coordination with the Michigan Stream Team, MDNR Fisheries biologists, and/or local watershed councils is required. Individuals conducting stream assessments, designing, supervising construction, and approving the final installation will meet the requirements identified in the Michigan Job Approval Authority List.

Planned stream habitat improvements will address the aquatic species and life history stages for which the stream is being managed and when applied will result in a conservation system that meets or exceeds the minimum quality criteria for stream habitat established in Section III of the Field Office Technical Guide (eFOTG). Guidance for stream restoration can be found in the NRCS Stream Restoration Guidance Handbook (NEH-654) and the NRCS Stream Corridor Restoration Principles, Processes, and Practices Handbook (NEH-653).

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

Manage adjoining riparian areas to support diverse natural vegetation suitable for the site conditions and desired ecological benefits. Such benefits include stream temperature moderation, recruitment of instream large wood and fine organic matter, input of riparian nutrients and terrestrial insects, streambank stability, and filtration of contaminants from surface runoff.

Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to minimize the introduction of invasive plant species. If native plant materials are not adaptable or proven ineffective for the planned use, then non-native species may be used. Refer to the eFOTG, Section I, Invasive Plant Species for plant materials identified as invasive species.

Design in-stream structures that are compatible with the dynamic nature of streams and rivers and minimize disruption of recreational or 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 organism, cause excessive bank erosion, cause unintended lateral migration, aggradation or degradation of the channel, and hinder channel-floodplain interactions.

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.

Any stream habitat management provisions should be planned in relation to overall watershed conditions that may impact stream habitat. Before designing and implementing instream habitat improvements, consider the known or expected problems within the watershed, such as: point and non-point source pollution, land management activities, and other watershed-related concerns.

In addition, evaluate the stability of the stream corridor using the following indicators:

Channel instability may be characterized by leaning trees on both sides of the stream, tree trunks in the middle of the channel, exposed infrastructure (pipes), or headcuts (channel incision).

Channel stability may be characterized by herbaceous vegetation at the low water line, self-sustaining populations of sensitive fish species, and/or aquatic moss growing on submerged rocks.

Measures that should be used singularly or in combination to improve stream habitat, include:

- Incorporation of stream habitat improvements into a conservation plan that addresses soil quality, nutrient management, pest management, and other management practices for reducing non-point sources of pollution.*
- Restoration or protection of riparian and floodplain vegetation and associated riverine wetlands.*
- Maintenance of suitable instream flows for aquatic species especially during critical life history stages of spawning, incubation, and rearing.*

- Providing physical habitat components important to aquatic species such as sediment-free spawning gravel, boulders, large wood, resting pools, overhead cover, and riparian vegetation. Use components that mimic high quality sites within the watershed. For example, use wood instead of rock in a stream where wood is the dominant, channel-shaping substrate.*
- Providing barriers/screens to exclude fish from water pumps, diversion ditches, or any area where unintentional entrapment of aquatic species is likely to occur.*
- Improving floodplain-to-channel connectivity including seasonal or permanent backwater, wetland, and off-channel habitats consistent with the local climate and hydrology of the stream.*
- Addressing non-point source pollution issues such as poorly constructed road crossings, streambank erosion induced by man, or discharge sites that are degrading the health of the stream.*

All material excavated or removed during construction will be placed so it cannot erode back into the stream. Spoil will be properly stabilized and vegetated.

Careful consideration will be given to impacts on endangered, threatened, or special concern species including aquatic and terrestrial species such as wood or spotted turtles, Hungerford's crawling water beetle, or the 19 listed species of freshwater mussels.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Specifications for this practice will be prepared by an individual meeting the Michigan Engineering Job Approval Authority requirements.

The plan will include a detailed site description and the sequence in which improvement actions are to be implemented.

All applicable federal, state and local laws, rules and regulations will be followed.

Specifications shall include:

- *Location and extent of modification of the stream reach to accomplish the planned purpose;*
- *Riparian plant species and rates if needed to accomplish the planned purpose;*
- *Planting dates, and care and handling of seed or planted materials to ensure an acceptable rate of survival;*
- *Site protection and preparation requirements for establishment or recruitment of riparian vegetation if needed; and*
- *Drawings to illustrate installation or implementation requirements.*

6. Rosgen, Dave; 1996, Applied River Morphology. Wildlife hydrology, Pagosa Springs, Colorado.
7. *Protocol for Field Surveys of Stream Morphology at Gaging Stations in Michigan.* 2005. <http://michigan.gov/deq>
8. *Stream Restoration Design Handbook.* 2007. USDA NRCS publication NEH-654.
9. *Stream Corridor Restoration Principles, Processes and Practices, 1998, USDA NRCS, publication NEH-653.*

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed that is consistent with the purposes of this practice, its intended life, and the criteria for its design.

This practice will be inspected *annually for the first three years or until established* and restored as needed, to maintain the stated purpose. Additional operation and maintenance requirements will be developed on a site-specific basis to assure performance of the practice as intended.

REFERENCES

1. The Guidelines for Management of Trout Streams in Wisconsin, 1967. Technical Bulletin #39.
2. Stream Corridor Restoration: Principles, Processes, and Practices. Stream Corridor Restoration Manual. October 1998.
3. Stream Habitat Improvement Handbook, 1992, USDA Forest Service, Technical Publication R8-TP16.
4. Hunt, R.L. 1993, Trout Stream Therapy. The University of Wisconsin Press.
5. Engineering Field Handbook, Chapter 16, "Streambank and Shoreline Protection."