

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

STREAM HABITAT IMPROVEMENT AND MANAGEMENT

(Acre)
CODE 395

DEFINITION

Maintain, improve, or restore physical, chemical and biological functions of a stream.

PURPOSES

- Provide suitable habitat for desired aquatic species and diverse aquatic communities
- Provide channel morphology and associated riparian characteristics important to desired aquatic species
- Provide aesthetic values and recreation opportunities associated with stream habitats such as angling and fish viewing

CONDITIONS WHERE PRACTICE APPLIES

Streams where habitat deficiencies limit survival, growth, reproduction, and/or diversity of aquatic species in relation to the potential of the stream.

CRITERIA

General Criteria Applicable To All Purposes

All measures implemented under this practice shall comply with all applicable federal, state, and local laws, rules and regulations.

Federal and State threatened, endangered, and other species of concern shall be carefully considered in aquatic habitat improvement and included in the management plan. No plan shall have long-term adverse effects on threatened or endangered species or species of concern.

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.

In the planning process the aquatic species and life history stage for which the stream is being managed will be identified.

The emphasis in stream habitat improvement will be the establishment of a functioning natural stream channel, consistent with the geomorphological setting, which can:

- Access its floodplain
- Transport its sediment (sediment delivered is balanced by sediment removed)
- Store water in stable banks with a healthy riparian zone.
- Provide fish passage upstream and downstream and allow movement of other aquatic species and stream organic matter to the extent possible.

The stream improvement practices will then be designed using geomorphic parameters consistent with the same stream type. This will generally involve restoration of appropriate:

- Width-to-depth ratio
- Riffle-pool spacing
- Bank stability
- Gradient
- Radius of curvature to width ratio
- Meander pattern

For example, in warm-water fish streams the emphasis will be on the development of large, complex pools with much of the area greater than 30 inches in depth, instream cover, and stable, well vegetated banks with healthy riparian areas.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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Restoration of in-stream habitat should only occur after identified problems within the watershed, such as, downstream dams which break connectivity and prevent fish passage, point and non-point source pollution, land management, and other limiting factors have been addressed. Any stream habitat improvement project should be the end result of an interdisciplinary process that has determined the need for the project in a watershed context.

Structures installed using this practice will not significantly reduce channel capacity.

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.

Manage adjoining riparian corridors in a vegetated condition suitable for desired ecological benefits such as stream temperature moderation, recruitment of instream large wood and fine organic debris, stream bank stability and flood attenuation.

Where practical, natural instream habitat and channel forming processes such as natural meandering and floodplain functions will be restored or maintained.

When present, livestock will be managed in the stream and riparian area in such a manner as to prevent excessive bank trampling, forage utilization and nutrient input.

Use vegetation adapted to the site that will accomplish the desired purpose. Preference shall be given to native species in order to reduce the introduction of invasive plant species; provide management of existing invasive species; and minimize the economic, ecological, and human health impacts that invasive species may cause. If native plant materials are not adaptable or proven effective for the planned use, then non-invasive non-native species may be used.

Criteria for Stabilizing Banks and Improving Instream Cover

The most effective way to improve in-stream cover is to maintain or establish healthy riparian vegetation along the streambanks.

Total watershed conservation planning is a necessary part of stream habitat improvement. Stream improvements will be ineffective if the surrounding resource use contributes to the destruction of the stream fisheries habitat.

Protecting Streambanks from Erosion:

Structural and vegetative measures will conform to the following NRCS Standards as appropriate: Streambank and Shoreline Protection (580) and Chapter 16 of the Engineering Field Handbook.

Utilize fencing and prescribed grazing to prevent bank deterioration, protect vegetation, and to provide off stream watering facilities as appropriate. Refer to NRCS Standards; Prescribed Grazing (528A), Fence (382) Livestock Exclusion (472) and Trough and Tank (614). In most instances, total exclusion of livestock is the best alternative.

Maintain or establish a buffer of woody or herbaceous vegetation between adjacent cropland and the edge of the streambank. Refer to NRCS Standards: Filter Strip (393A), and Forest Riparian Buffer (391) for recommended widths and management.

Where possible, place planned fish habitat structures in areas subject to bank erosion. Where the primary purpose is to control streambank erosion to protect adjacent loss of land or damage to utilities, roads, buildings etc, refer the Streambank Protection (580) standard.

Riparian Vegetation Management:

Any planned mechanical and/or chemical brush control shall be done in accordance with NRCS Standard Pest Management (595).

NOTE: Exercise extreme caution when applying chemicals adjacent to streams. All recommendations and applications must be in strict adherence to, and consistent with

registered use, label directions, and precautions.

Any planned tree or shrub plantings shall be done in accordance with NRCS Standard, Riparian Forest Buffer (391).

Grazing systems can benefit riparian zones when the objective is to maintain undercut banks using grassy riparian areas. This technique requires very careful management to assure the site is not overgrazed. Do not recommend this technique unless assured that the land user fully understands the grazing system, and is capable of managing the system.

Instream Devices:

Artificial instream devices can be used to provide cover and spawning sites. Structural measures, such as logs, bank covers, boulders, gabions, jetties, lunkers, streambarbs, rock riffle grade controls, bendway weirs, etc., may be used where appropriate. All of these devices must be installed so that they are stable during high flows and do not cause increased flood damage, bank instability or bed instability.

Structural instream improvement measures applied will be compatible with the geomorphological stream type. All structural measures applied will be analyzed for stability for the stream-forming discharge event and top of bank event at the flood-prone width elevation.

All instream devices shall be designed using applicable standards such as Streambank and Shoreline Protection (580) and Stream Channel Stabilization (584).

Instream devices will be protected from erosion by using loose rock riprap, and/or shaping and seeding the bank, or other appropriate method. Refer to Streambank Protection (580) and Critical Area Planting (342) standards.

Criteria for Enhancing Fish Migration.

Artificial barriers and culverts must allow for fish passage. When feasible, use structures that are bottomless and span the base flow channel. Refer to Fish Passage (396) standard and consult with the NRCS Engineer, Biologist and IDNR Stream Biologist for further information.

Removal of woody vegetation and debris from the stream should only be done after careful consideration of the potential adverse consequences to stream dynamics and fisheries habitat. Most logjams are passable by fish and are desirable fish habitat.

Criteria for Improving Water Quality.

Improve or maintain vegetative cover throughout the local watershed to reduce sediment inputs to the stream and help maintain season long flows.

Manage for well-developed riparian vegetation to shade and cool the stream; to prevent bank erosion; to maintain narrower deeper channels; to filter pollutants from adjoining land uses; and to reduce frequency and severity of ice jam flooding.

Protect streambanks and adjacent wetlands from excessive streambank trampling by livestock.

Additional Criteria Applicable to Provide Aesthetic Values and Recreational Opportunities.

Recreational and other land use activities will be managed to minimize impacts on stream corridor vegetation and water quality.

CONSIDERATIONS

Stream habitat management provisions should be planned in relation to other land uses 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. 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.

Engineered instream structures such as flow deflectors may be considered to provide stream stability and/or habitat elements until the channel and adjacent riparian area can

function as a habitat of complex stream structure in dynamic equilibrium. There are several options that can be used singularly or in combination to improve stream habitat. These include:

- Through watershed planning, establish soil conservation, nutrient management, and pesticide management practices and other management techniques for non-point sources of pollution.
- Reduce or manage excessive runoff due to watershed development.
- Restore or protect riparian and floodplain vegetation and associated riverine wetlands.
- Maintain suitable flows for aquatic species and channel maintenance.
- Provide physical habitat components important to aquatic species such as sediment-free spawning gravel, boulders, large wood, resting pools, overhead cover, and stable banks.
- Provide barriers/screens to exclude fish from water pumps, diversion ditches, etc.
- Improve floodplain-to-channel connectivity including off-channel habitats.
- Provide alternative streamside access for recreational use, livestock, and equipment.

Consider all environmental impacts. Stream habitat improvement projects will serve to improve aquatic habitats and subsequently benefit threatened or endangered species or species of concern and other native aquatic species dependent on this environment. There may be short-term negative impacts when in-stream construction activities occur (e.g., sedimentation causing turbidity and siltation). Therefore, timing of project activity should be considered in order to reduce short-term negative impacts.

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. These documents are to list

"as a minimum" the requirements for installing the practice, such as the kind, amount or quality of materials to be used, and the timing or sequence of installation activities. Structural measures shall be designed per Chapter 16 of the Engineering Field Manual.

NRCS staff is encouraged to work closely with the IDNR Stream Biologist, NRCS Streambank Stabilization Specialist, NRCS Agricultural Engineer, NRCS Biologist, US Fish and Wildlife Service Biologist in developing site specific plans and specifications.

The landowner is responsible for complying with all applicable federal, state, and local laws, rules, and regulations.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed for all applications. The plan shall provide for periodic inspection and prompt repair should the application of practices cause streambank or streambed instability. All instream structural measures shall be evaluated on an annual basis.

REFERENCES

Federal Interagency Stream Restoration Working Group; 1998, *Stream Corridor Restoration: Principles, Processes, and Practices*. *Stream Corridor Restoration Manual*. National Engineering Handbook Part-653.

USDA Forest Service; 1992, *Stream Habitat Improvement Handbook*, Technical Publication R8-TP16.

USDA NRCS; *Streambank and Shoreline Protection*. Engineering Field Handbook, Chapter 16.

Rosgen, Dave; 1996, *Applied River Morphology*. *Wildlife hydrology*, Pagosa Springs, Colorado.