Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

STREAM HABITAT IMPROVEMENT AND MANAGEMENT

CODE 395

(ac)

DEFINITION

Improve, restore, or maintain the ecological functions of a stream and its adjacent floodplain and riparian area.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve or manage stream habitat by evaluating and addressing factors that impair stream function and structure.

CONDITIONS WHERE PRACTICE APPLIES

All streams and their associated backwaters, floodplains, wetlands, and riparian areas with impaired habitat.

This practice includes the placement of woody material and rock structures in streams to create scour holes or redirect flow for in-stream habitat, for example: root wads, log vanes (deflectors), cross vanes (vortex weirs), rock/log weirs, and overhead cover.

This practice does not apply to—

- The management of fish and wildlife habitat on wetlands enhanced under this standard.
- Streambed or bank stabilization; instead, use Conservation Practice Standard (CPS) Streambank and Shoreline Protection (Code 580), or CPS Channel Bed Stabilization (Code 584).

This practice may be used in conjunction with other practices to address multiple resource concerns at the site.

CRITERIA

General Criteria Applicable to All Purposes

Use this practice to assess, evaluate, and prescribe a comprehensive plan for stream habitat improvement, including the use of associated practices to address functionally connected floodplains and wetlands. Consult with an interdisciplinary team (landowner, DNR fish biologist, technician, conservationist, etc.) to collectively determine habitat and management objectives for fish species, invertebrates, and other aquatic and riparian organisms.

Planned stream habitat improvements must—

- Be applied within the context of the overall watershed conditions and with clear objectives for stream habitat management goals.
- Be based on a site-specific assessment of local hydrology, channel morphology, geomorphic setting, fish and other aquatic species present, riparian area and floodplain conditions, and any habitat limitations including streamflow conditions, water quality, food supply, and restriction on upstream and downstream movement of aquatic species, as determined using the NRCS Stream Visual Assessment Protocol, Version 2 (SVAP2) or comparable State-approved aquatic habitat evaluation tool. Refer to the applicable habitat suitability indices in the WI NRCS Field Office Technical Guide, Section III.
- When applied, results in a conservation system that addresses specific habitat objectives and meets or exceeds the minimum planning criteria for stream and aquatic habitat established in Section III of the Field Office Technical Guide.
- Design in-stream structures to be compatible with the dynamic nature of streams and rivers, facilitate natural geomorphic recovery where possible, and minimize disruption of recreational and other traditional uses of the stream corridor.
- Use acceptable design methodologies and criteria for in-stream structures. Coordinate with State-level technical experts to determine design methodologies applicable to your State or area.
- Enable adjoining floodplain and riparian areas to support a diverse vegetation community suitable for the site conditions and desired ecological benefits to the greatest extent possible.
- Use native plant materials in project installations to the maximum extent possible.
- Manage livestock to sustain a healthy stream corridor and associated habitats.
- Plan structures to function under a wide range of channel flows.

Structures installed for the purposes of this standard must not—

- Impede or prevent passage of fish and other aquatic organisms, unless they are intended to isolate populations of native species of conservation concern as directed by State or Federal species management plans or similar guidance.
- Cause unintentional lateral migration, aggradation, or degradation of the channel.
- Hinder channel-floodplain interactions.

To design large woody material for in-stream habitat, such as root wads, log vanes, log weirs, toe logs, and engineered log jams, refer to NRCS NEH Part 654, TS-14J, *Use of Large Woody Material for Habitat and Bank Protection.*

To design cross vanes, J-hooks, or vortex weirs, refer to NRCS NEH Part 654, TS-14G, *Grade Stabilization Techniques*.

To determine the minimum stone size for stability of boulder placements, refer to NRCS NEH Part 654, TS- 14C, *Stone Sizing Criteria*, Ishbash Method.

To estimate scour depth around habitat structures, refer to NRCS NEH Part 654, TS-14B, *Scour Calculations*.

To design LUNKERS, refer to NRCS NEH Part 654, TS-14O, *Stream Habitat Enhancement Using LUNKERS*.

If habitat structures have the potential to affect the upstream channel gradient for distance of more than 5 times the bankfull width, refer to the criteria and potential effects of the structure in Channel Bed Stabilization (Code 584). A habitat structure that extends across the bottom of a stream, such as a weir or cross vane, can significantly affect the channel gradient upstream. Sediment deposition behind the structure can bury habitat features, such as deep pools, riffles, and overhead cover, for a substantial distance.

Example: If the weir height is 2 feet above the channel bed and the gradient is 0.004 ft/ft, sediment deposition can extend 500 feet upstream. $2ft \div 0.004\frac{ft}{ft} = 500\ ft$

CONSIDERATIONS

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 stream interactions with the floodplain.

Incorporate riparian buffers to facilitate channel-forming processes, as well as encourage activities that promote riparian function to provide 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, streambank integrity, and filtration of contaminants from surface runoff (see CPSs Riparian Forest Buffer (Code 391) and Riparian Herbaceous Cover (Code 390)).

Project design should consider risks resulting from adjustment of in-stream structures. Habitat objectives can be met as structures transition or change over time; however, consider potential damage and resulting effects on offsite property, public infrastructure, and human safety from structure movement.

Specific measures that should be considered either singularly or in combination to improve stream habitat include—

- Providing aquatic organism passage upstream and downstream to the extent possible and when compatible with State and Federal species recovery or management objectives (see CPS Aquatic Organism Passage (Code 396)).
- If possible, locating stream crossings in areas with the least effect on stream geomorphic function or aquatic habitat.
- Providing screens on water pumps, diversion ditches, or any areas that are within the landowner's control, where unintentional entrainment of aquatic species is likely to occur.
- To the greatest extent possible, maintaining adequate in-stream flows to sustain diverse habitats for fish and other aquatic species, especially during critical life-history stages.
- Maintaining natural surface water, hyporheic, and groundwater interactions to the extent possible.
- Improving floodplain-to-channel connectivity for development of seasonal or permanent backwater, wetland, and off-channel habitats consistent with the local climate and stream hydrology.
- Restoring stream and riparian area function by utilizing natural materials and methodologies such as, but not limited to, flexible wood placement (unanchored, unpinned), beaver habitat restoration, spawning riffles, and boulder complexes where and when practical and feasible.
- Restoring or protecting riparian area and floodplain vegetation and associated riverine wetlands.
- If planting in adjoining floodplains and riparian areas, selecting plants that provide pollen and nectar for pollinators. Maximizing plant diversity in riparian areas can result in increased

populations of pollinators and other terrestrial insects upon which fish feed.

- Controlling the spread of exotic plant and animal species to the greatest extent possible.
- Reducing or managing excessive runoff due to watershed development, road construction, or land- use activities that are within the landowner's control.
- Adjusting stream management actions to address the timing, intensity, frequency, and duration of recreation, grazing, planting, fertilizing, watering, or resource removal activities for the improvement and maintenance of stream and associated floodplain and riparian area habitat.
- Integrating other closely related practices to develop a comprehensive and multidisciplinary plan for the project site.

PLANS AND SPECIFICATIONS

Develop plans and specifications for each site to implement stream habitat management and improvement actions.

As a minimum, plans must include—

- Goals and objectives of the planned actions.
- A site description, including survey data that depict existing conditions and illustrate proposed changes to a subject reach's dimension, pattern, and profile.
- Data that characterize the structure and composition of the streambed and banks.
- Design drawings and job sheets that document quality, quantity, placement, dimensions, and elevations of structures, including installation timing and location.
- Dimensions, species type, and minimum ballast cover for large woody material. Include the type of cover and level of compaction.
- Size and location of boulder placements and depth of embedment.
- All facilitating practices including their respective specifications and their operation and maintenance requirements.
- The dates and sequencing for improvements or management actions.
- If planting is a component of the project, include a vegetation planting plan that identifies species, stocking rates, planting dates, care of seed or other plant materials, acceptable rate of survival, replanting requirements; alternatively, use specifications outlined within the facilitating and component practices.
- Incorporation of permit requirements, if any, into the specifications, design, and operation and maintenance requirements of the practice.
- Responsible party for collecting any post-construction survey data.

OPERATION AND MAINTENANCE

Develop a detailed operation and maintenance plan for all applications that details periodic inspection and prompt repair or modification of any structures that are not meeting design objectives.

Provide monitoring guidelines for evaluating the effectiveness of the conservation actions in the short- and long-term.

Conduct postproject evaluation of stream and riparian habitat conditions using the same preproject evaluation tool (e.g., SVAP2, or other) to determine if the implemented actions have resulted in improved habitat or have fully addressed resource concerns.

Coordinate any needed repair actions in order to comply with State and Federal guidelines for protecting aquatic and terrestrial species.

REFERENCES

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