NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE SPECIFICATION

STREAM HABITAT IMPROVEMENT AND MANAGEMENT

(Ac.)

CODE 395

Rio Chama, Rio Arriba County, NM

OVERVIEW

The practice purpose is to 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.

This practice applies to 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.

PLANNING

The New Mexico Stream Visual Assessment Protocol, version 2 (SVAP 2) will be used to meet the planning criteria in the 395 practice standard. This document is established in the New Mexico Field Office Technical Guide, Section III.

Stream Visual Assessment Protocol (SVAP 2)

The Stream Visual Assessment Protocol is a NRCS protocol that provides an initial evaluation of the condition of 'wadeable' stream ecosystems at the property level. This preliminary assessment will allow conservationists to assist landowners with determining and understanding the quality of stream habitats located on their property and in identifying resource concerns and their potential causes.

The SVAP 2 can be successfully applied by conservationists with limited training in biology, geomorphology or hydrology; when the users read the protocol's guidance thoroughly before beginning an assessment. To request field training, contact the NRCS state biologist.

Elements. There are fifteen elements assessed in the SVAP 2. For general planning purposes only seven of those fifteen elements are required to be assessed. However, for this practice all fifteen must be assessed.

SVAP 2 Elements

1. Channel Condition	9. Manure or Human Waste
2. Hydrologic Alteration	10. Pools
3. Bank Condition/Stability	11. Barriers to Movement
4. Riparian Area Quantity	12. Fish Habitat Complexity
5. Riparian Area Quality	13. Aquatic Invert. Habitat
6. Canopy Cover	14. Aquatic Community
7. Water Appearance	15. Riffle Embeddedness
8. Nutrient Enrichment	16. Salinity

Quality Criteria for Stream Habitat

Stream improvement will, when applied, result in a conservation system that meets or exceeds the minimum quality criteria for stream habitat.

- A minimum SVAP 2 score of 5.0 is necessary to meet quality criteria.

If the score is less than 5.0 it represents a poor or severely degraded condition. Review the lowest scoring factors and determine which conservation practices can be implemented to bring the score up to 5.0 or higher. If the stream is complex, the planner may need to bring in additional disciplines to fully understand the situation.

If the score is 5.0 or higher and the landowner's objective is to further improve habitat, the planner can develop practices to raise the lowest scoring factors and further improve the overall score. If the stream is complex, the planner may need to bring in additional disciplines to fully understand the situation.

Criteria when Fish/Aquatic Organisms are a Purpose

Application of this practice shall remove or reduce limiting factor(s) in their order of significance, as indicated by results of the habitat evaluation.

SVAP 2 Limitations

The SVAP2 is a *qualitative* assessment based on visually apparent physical, chemical, and biological features within a specified reach of the stream corridor. Because of its qualitative design, the protocol may not detect all causes of resource concerns, especially if such causes are a result of land use actions in other parts of the watershed. If further evaluation is needed, contact the NRCS state biologist or utilize a *quantitative* assessment instead:

USDA, NRCS. 2007. Part 654 Stream Restoration Design National Engineering Handbook, Chapter 3 - Site Assessment and Investigation.

DESIGN

Element 1 - Channel Condition

To address resource concerns related to channel condition use NRCS practice (580) Streambank and Shoreline Protection and/or (584) Channel Stabilization.

Element 2 - Hydrologic Alteration

To address resource concerns related to hydrologic alterations, actions generally require the modification or removal of the impediment to allow natural water dispersion across the riparian/floodplain and between the stream and its floodplain. Associated practices may include NRCS practice (500) Obstruction Removal or the replacement or modification of a structural practice such as dike, dam, access road, or water control structure.

To address resource concerns on backwater wetlands, floodplain wetlands and other wetland associated with the stream, use NRCS practice (659) Wetland Enhancement or (657) Wetland Restoration.

Element 3 - Bank Condition/Stability

Where banks are unstable or moderately unstable, use NRCS practice (580) Streambank and Shoreline Protection. Practice 580 is also used bio-engineering.

Where banks are moderately stable or where it is desirable to further enhance stable banks, use NRCS practice (390) Herbaceous Riparian Cover and/or (391) Riparian Forest Buffer. These practices provide a purpose for streambank stabilization with detailed guidance on riparian planning, implementation, management and monitoring.

If recreational uses and/or livestock are contributing to bank instability, a management plan will be designed to reduce or eliminate the stressors.

- Stable undercut banks will not be removed or altered.

Element 4, 5 & 6 - Riparian Area Quantity and Quality, and Canopy Cover

To address resource concerns related to the riparian area, use the guidance provided in NRCS practice (390) Herbaceous Riparian Cover and/or (391) Riparian Forest Buffer. These practices provide detailed guidance on facilitating natural regeneration, re-establishment, and management, including: guidance on species selection, site preparation, planting techniques and maintenance.

Element 7, 8, 9, 14 & 15 - Water Appearance, Nutrient Enrichment and Manure or Human Waste Present, Riffle Embeddedness, and Salinity.

Addressing resource concerns related to turbidity, sediment loading, nutrient loading, excessive salinity and other pollutants will require additional assessments to determine the source(s) of the pollutants. Once determined, use the appropriate conservation practice to remedy. For example, if failing streambanks are contributing to the sediment loading, use NRCS practice 580 to stabilize the banks and practice 391 to re-establish the riparian zone.

Element 10 – Pools

To address resource concerns related to lack of adequate pool habitat, use NRCS practice (580) Streambank and Shoreline Protection and/or (584) Channel Stabilization.

Element 11 - Barriers to Aquatic Species Movement

To address resource concerns related to fish or other aquatic organism passage within the stream, use NRCS practice (396) Aquatic Organism Passage. This practice provides detailed guidance on the modification or removal of barriers that restrict or impede movement of aquatic organisms.

Element 12 & 13 - Fish/Aquatic Invertebrate Habitat and Aquatic Invertebrate Community

If all other elements are addressed, the aquatic habitat conditions should automatically improve with time. For example, if practice 580 is used to restore the channel condition thereby improving the pool to riffle ratio and reducing sediments, and practice 390/395 is used to re-vegetate the streambank to provide bank stability and canopy cover; then all elements for providing fish and aquatic habitat needs should be met.

However, in some cases it may be desirable to install structures to provide habitat until natural recovery can occur. This is mostly commonly provided as instream large wood and rocks placement. Refer to the next section.

Large Wood Placement

This component replaces the natural occurrence of fallen riparian trees or parts of trees that are submerged in the water and large enough to remain during normal flows.

Placed large wood is designed to function at a discrete location within the stream channel or along streambanks, and may include placements ranging from single logs to 'engineered' log jam. Although some degree of adjustment, deformation, or even relocation may be allowed, large wood placements are expected to remain relatively stable within the channel and to provide benefits to natural channel processes and aquatic habitat within their zone of influence. Habitat benefits are both immediate and long term.

Criteria for Large Wood Placement:

1. The SVAP2 must demonstrate that this component will address resource concerns for stream species of concern (i.e. improve instream habitat complexity, hiding/resting cover, and increased food availability). Approval may be granted by a fish habitat biologist.
2. A stream assessment that includes channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile.
3. Large wood and root wads placed into the stream will mimic genus, age, and size of mature trees found in intact, reference riparian areas in the MLRA where the project is located. Projects may not be appropriate where large wood is not a natural part of the system.
4. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist.
5. Boulders placed to provide ballast (stabilization) shall only be used if the geomorphic setting and project design demand this component.
6. Timing of work windows will be established for the project by the fish habitat biologist; to protect critical periods for aquatic and riparian species.
7. Sensitive areas such as wetlands, willow patches, spawn-rearing areas, new plantings, and recovering streambanks will be protected from heavy equipment impacts (including the ingress/egress routes).
8. The project will not be authorized if it may create undue risk to human safety or property.
9. Permitting under the Clean Water Act (CWA) may be required, have the applicant consult the U.S. Army Corps of Engineers to obtain any necessary permits or concurrences.

Visual & physical cover provided by a rootwad (USFWS)

References for planning and designing wood placement:

Cramer, M. 2012. Stream Habitat Restoration Guidelines. Technique 7 and Appendix G.

D'Aoust and Millar 2000: Stability of Ballasted Woody Debris Habitat Structures.

Gippel et al. 1996: Hydraulic Guidelines for the Re-Introduction and Management of Large Woody Debris in Lowland Rivers.

NRCS 2013. TN27.2: Guidance for Stream Restoration. Colorado NRCS.

NRCS 2007, TS14J: Use of Large Woody Material for Habitat and Bank Protection.

NRCS 2007, TS14H: Flow Changing Techniques.

NRCS 2001: Incorporation of Large Wood Into Engineered Structures.

Sylte and Fischenich 2000: Rootwad Composites for Streambank Erosion Control and Fish Habitat Enhancement.

Fischenich and Morrow 2000: Streambank Habitat Enhancement with Large Woody Debris.

LUNKER Structure

LUNKERS (Little Underwater Neighborhood Keepers) can be installed to provide cover, refuge from high velocities, and bank stabilization (NRCS 2007, TS14O).

Boulder/Rock Placement

This component replaces the natural occurrence of submerged or partially submerged large boulders (> 20" diameter) or groupings of smaller rocks (>10 inches and < 20 inches in diameter) interspersed relatively close together in the channel.

Criteria for Boulder/Rock Placement:

1. The SVAP2 must clearly demonstrate that installation of this component will address resource concerns for stream species of concern (i.e. improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability). Alternately, approval may be granted by a fish habitat biologist

2. A stream assessment that includes channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile.

3. Shall only be used if the geomorphic setting and stream condition is appropriate for this component.
   - Select stable stream reaches which are not likely to degrade and undermine rock placements.
   - The greatest benefits are realized in streams that are moderately wide and shallow, with high velocity (flows ≥2 feet per second) and a gravel or cobble bed. It is not recommended for sand bed streams.

4. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located.
   - Rock size will be based upon stream size, flow characteristics, bed stability, desired habitat effects, and the capacity of available heavy equipment.
   - Large 2-5 ft dia, irregularly shaped, angular boulders provide the most hiding spaces. However, rocks should not be more than 25 to 30% of bankfull depth after partial embedment, and rock diameters should be no more than 1/8 the width of the stream.
   - Quarry rock is preferable since it will not usually require anchoring or lacing together.

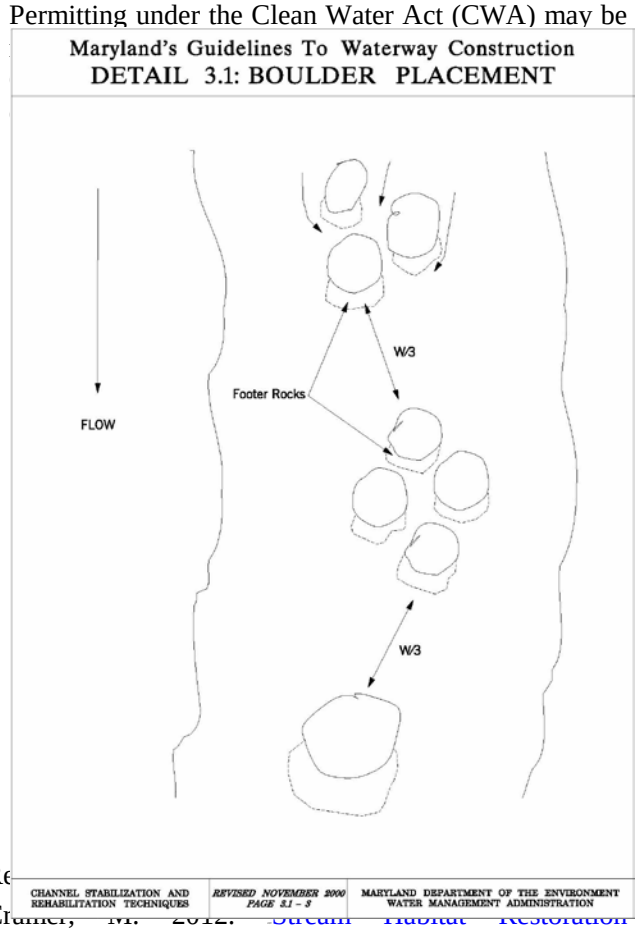
5. Large rocks/boulders should be placed in streams to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during implementation of the project design.
   - Embed the 3-5 boulders a short distance into the stream bed in a triangular pattern with spaces between the boulders ranging from 6 in to 1 ft. This spacing provides cover and other habitat niche needs, and ensures the creation of scour pockets. Boulders should be placed in the middle half of the channel where deposition is not expected to occur. A suggested spacing of clusters within the same stream segment is one-third of the stream width apart.
   - Avoid locations where placement could divert the steam channel's thalweg or threaten impingement on potentially unstable stream banks.
   - Footer rock(s) may be required. Boulders placed on top of footer rocks so that the boulder is offset in the upstream direction.

6. Timing of work windows will be established for the project by the fish habitat biologist; to protect critical periods for aquatic and riparian species.

7. Sensitive areas such as wetlands, willow patches, new plantings, and recovering streambanks will be protected from heavy equipment impacts (including the ingress/egress routes).

8. Where spawning gravel is disturbed by rock placement, restore the spawning area substrates.

9. Permitting under the Clean Water Act (CWA) may be



Re
Cramer, M. 2012. Stream Habitat Restoration Guidelines. Technique 7 and Appendix G.

NRCS 2013. TN27.2: Guidance for Stream Restoration. Colorado NRCS.

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

Fischenich and Seal 2000: Boulder Clusters.