

Riparian Planting – Methow Watershed Effectiveness Monitoring Protocol

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Introduction

Riparian restoration is a widespread habitat restoration technique utilized by the Methow Restoration Council partnership to increase stream shading and habitat complexity. Riparian plantings to establish diverse and functional riparian buffers are a common component of many instream habitat restoration efforts and given enough time to mature will provide inputs of large wood and nutrients and provide a natural form of bank stability.

The Methow Salmon Recovery Foundation (MSRF) has implemented over twenty riparian restoration projects over the past six years and has achieved a high degree of overall project success and plant survival with these efforts. Planting prescriptions and techniques have been refined using post-planting site assessments to guide future plantings.

Post-project plant and site maintenance is a critical link in the development of a successful riparian restoration project. Planting maintenance (i.e., watering, weeding, mowing, and fence/cage maintenance) is important in the 3-5 years post-planting to assist the plants in developing root structure to enable them to access groundwater and/or hyporheic flows. After this point, the plantings are generally self-sustaining and maintenance levels can be scaled back significantly.

MSRF is confident that it has developed a riparian planting program that can routinely achieve >85% plant survival over 3-5 years post-installment. But riparian plantings are a long-term restoration strategy and the shade benefits they provide may take decades to become fully established. Yet, there is a need to assess the effectiveness of the riparian plantings to ensure project goals are achieved over both the short (~3 years) and long-term (~10-20 years). Specifically, plant survival and growth should be monitored for a decade to assess planting effectiveness for shade development and individual plant survival and growth.

To meet the need for a relatively simple, cost effective means to assess riparian planting effectiveness, MSRF has developed the following protocol (modified from the *Protocol for Monitoring Effectiveness of Riparian Planting Projects*; SRFB 2008).

Monitoring Goal

To determine the effectiveness of riparian plantings at increasing riparian vegetation density and shade.

Monitoring Objectives

1. Determine the survival and growth (height) of installed plants over the first decade post-installation.
2. Determine species composition, relative cover, and shade provided by the riparian planting zones before planting and over the first decade post-installation.
3. Determine reproductive development (i.e., vegetative growth, sexual maturity) of installed plants to assess plant vigor over the first decade post-installation.
4. Determine causes of mortality on installed plants over the first decade post-installation.

Methods

This methodology is designed to be applied to riparian projects that are at least >0.25 acres in size. It can be applied to a sub-site that meets these criteria within a larger planting, but the methodology is less applicable for smaller projects due to the use of the ten study plots that require ~2,000 square feet to lay out. Smaller projects can use this methodology but should either reduce the number of plots (i.e., the whole planting could be considered as one plot) or remove them all together. The methodology may also need to be modified to account for other site-specific attributes and constraints.

Table 1. Riparian Planting Effectiveness Monitoring Workflow

Step	Activities	Years	Further Description
1	Establish ten randomly selected 16' diameter vegetation plots in each planting site.	Year 0 - Prior to planting	Plots can be measured from a baseline transect established perpendicular to the site (enclosure fence line can be used if available). Plots are defined from center point (installed rebar and cap) using an 8' cord as the radius of the plot. All subsequent measurements will be made within this plot.
2	Enumerate all installed plants by species in the full site.	Year 0 - After planting	Estimate the percentage of a) installed and wild stems and b) installed and wild canopy cover within the full site.
3	Uniquely tag and enumerate all installed plants within the ten plots.	Year 0 - After planting	
4	Measure installed plant survival (dead or alive) in plots and in full site.	Years 1, 2, 3, 5 & 10	
5	Measure installed plant growth (plant height) in plots	Years 1, 2, 3, 5 & 10	Height is measured from the ground to the highest point on the stem of the plant.
6	Estimate relative percent cover [ground (<0.5m), understory (0.5-5m), overstory (>5m)] of all woody plants in plots.	Year 0 - Prior to planting & years 1, 2, 3, 5 & 10	
7	Measure shade (% cover) in plots using a densiometer.	Year 0 - Prior to planting & years 1, 2, 3, 5 & 10	Densiometer readings are the average taken at the four directions.
8	Determine if each installed plant in plots has sent out suckers/basal sprouts or fruiting bodies (yes or no).	Years 1, 2, 3, 5 & 10	
9	Measure installed plant mortality/damage & cause in plots	Years 1, 2, 3, 5 & 10	Animal damage assessment follows SRFB (2008) classification in Table 2

Table 2. Animal damage assessment classes (from SRFB 2008).

Damage Class	Description
0	No browse damage
1	Terminal leader not browsed, less than 1/3 lateral branches browsed
2	Terminal leader not browsed, 1/3-2/3 lateral branches browsed
3	Terminal leader not browsed, > 2/3 lateral branches browsed
4	Only terminal leader browsed
5	Terminal leader browsed, less than 1/3 lateral branches browsed
6	Terminal leader browsed, 1/3-2/3 lateral branches browsed
7	Terminal leader browsed, < 2/3 lateral branches browsed
8	Terminal leader browsed, > 2/3 lateral branches browsed
9	Girdled and/or cut off stems

Analyses

Field data (indicators) will be analyzed to determine the metrics of plant survival, growth, cover, and shade. The following analyses will be completed post-installation.

1. Installed plant survival percent for entire site and within plots in years 0, 1, 2, 3, 5, and 10.
2. Installed and natural plant density, relative percent cover (per plot and site) and canopy shade (per plot) in Years 0, 1, 2, 3, 5, and 10.
3. Installed plant reproductive development and plant animal damage per plot in years 1, 2, 3, 5, and 10.

Reporting

Monitoring reports should be prepared after years 3 and 10. Reports will include a project summary, methods, results, and a discussion of the project effectiveness. A key contribution of this reporting will be to inform adaptive management of the current project and to inform future riparian restoration efforts. A “lessons learned” section of the report will highlight key findings and recommendations.