

Johnson Creek Watershed Riparian Reforestation Strategy for Stream Temperature Management

INTRODUCTION

Riparian shading is a means by which excess heat load in Johnson Creek can be offset. Streamside trees can intercept solar energy by shading the stream, floodplain, and the riparian area, resulting in lower in-stream temperatures. Shading can be accomplished by the preservation of existing mature forests that are otherwise at risk from logging or development and by planting trees along streams.

During the fall and winter 2012-2013, the Johnson Creek IJC¹ discussed a riparian prioritization strategy to advance Temperature TMDL recommendations for 80% shade over mainstem Johnson Creek to meet temperature standards for rearing salmonids in the summertime. The Riparian Strategy would identify key areas and parcels for riparian restoration using aerial photos and a Heat Source model for all streams in the basin. The resulting Strategy would then be implemented through private landowner outreach, coordination with public entities, and plantings by the Johnson Creek Watershed Council (JCWC).

Successful riparian revegetation is critical to “the 80% Plan” to ensure benefit to reduced stream temperatures, improved water quality, and enhancement of ESA-listed anadromous fish species habitat. To develop the Riparian Strategy, JCWC staff consulted with jurisdictional, agency, and other watershed-related NGO’s in the area, and integrated current science and best practices into this plan.²

This document provides: 1) Description of the various elements at a site that determine its eligibility for the program, 2) Priority elements that increase our ability to fund and implement projects on specific taxlots, 3) Best practices for weed treatment and riparian forest establishment, and 4) Description of monitoring protocols.

PRIORITY SITE SELECTION

Taxlots with the greatest potential to reduce solar input to the stream, to provide maximum benefit to reduce stream temperatures, improve water quality, and enhance ESA-listed salmonids’ habitat will be selected for funding first (see ranking criteria table next page). Furthermore, the property owner must be willing to sign the programmatic access agreement and show interest in the success of the plantings. Lastly, when possible, close proximity Priority Sites will be grouped by like conditions and designated as Priority Areas to make outreach, treatment, and planting efforts more efficient.

¹ The IJC consists of technical representatives from the JCWC, cities (Portland, Gresham, Damascus, Milwaukie), counties (Multnomah and Clackamas), Metro, both East Multnomah and Clackamas Conservation Districts, the USGS, the Oregon DEQ, ODFW, and the Oregon Department of Agriculture. Since its inception in 1995, the IJC has evolved into a strong and engaged forum for joint collaboration on watershed issues.

² This protocol was modeled on Clackamas River Basin Council’s “Riparian Shading Protocols for Temperature Management,” part of their *Shade-Our-Streams* program. A number of other local riparian revegetation protocols and guidelines were also used, including: Clean Water Services “Design and Construction Standards,” Appendix A: Planting Requirements (2007); The Willamette Partnership’s “Draft Riparian Planting Protocols” (updated 2008); Washington State’s Stream Habitat Restoration Guidelines (2004); and the *Portland Plant List* from the Portland Bureau of Planning and Sustainability (2011).

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RANKING CRITERIA

Priority	Explanation	Data Layer	Measurable Standard
Location	Data from loggers placed throughout the Johnson Creek watershed have shown that summer temperatures are already too high in the upper watershed. We have therefore prioritized the upper mainstem and upper watershed tributaries (including Badger, Sunshine, and Kelley Creeks).	N/A, but riparian sites must be along a body of water with perennial flow.	The Strategy takes a top-down approach, working on priority sites beginning in the upper watershed.
Canopy Cover/ Shade Ranking	Evaluation of current riparian conditions to determine extent of existing streamside vegetation. Sites with limited riparian canopy cover have less thermal interception and, therefore, increasing shade in these areas will have a greater impact on water temperatures. Heat Source Model results are expected to be completed by end of summer, 2013, and will be used to further rank sites based on potential reduction in solar input.	Aerial photos were visually analyzed to determine high-priority sites.	Riparian corridors were determined to have a canopy cover ranking, and sites were scored as follows: 3 = <25% cover 2 = 25-75% cover 1 = >75% cover
Connectivity	Long contiguous stretches of closed canopy riparian corridors help maintain cooler stream temperatures and provide wildlife habitat. Revegetation opportunities on single or contiguous landholdings that connect existing forested areas and/or past or ongoing revegetation projects were prioritized.	Aerial photos, JCWC and East Multnomah SWCD data on past and current projects, were used to determine areas of continuity.	1 = Site acts as a connecting corridor and/or is adjacent to an existing project site.
Confluence	Confluences are important areas of mixing between a stream and its tributary that often function as important fish holding or rearing locations. Planting of confluence areas maximizes the effect of shade on the stream system by providing for maintenance of cooler water areas.	Current stream and taxlot layers were analyzed through GIS to determine the sites located at stream confluences.	1 = Site contains a confluence of streams
Efficiency	Site size and conditions can present benefits or challenges to the project. Planting sites with ≥ 350 feet in stream frontage will result in more planted stream miles, as these projects increase cost effectiveness over sites with less plantable riparian length.	Stream layer and taxlot layers were used to identify stream length.	1 = sites with ≥ 350 feet in stream length

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TREATMENT & PLANTING

Though site-specific treatment and planting plans will be developed for each Priority Area, there are general protocols and best practices that be applied broadly. Treatment and planting protocols are further enhanced by experiential knowledge of JCWC staff, partners, and revegetation contractors.

Site Preparation Specifications

1. **Treatment area:** In readying priority riparian areas for planting, control of invasive species within and around the 50-foot planting buffer will be typical. In some cases, site prep and maintenance treatments will occur within 100 feet of the stream where treatment surveys indicate the additional invasive species treatment buffer is needed.
2. **Timeline:** Site prep will typically include one season of invasive species management. On severely disturbed sites, site prep may take up to three seasons to ensure aggressive invasive species have been managed prior to planting.
3. **Contract services:** Site prep, planting and maintenance will be done primarily by professional restoration contract crews and JCWC staff to increase success of plant survival and productivity of program.

Planting Protocols

1. **Planting buffer:** An average width of 50 feet will be planted along the stream, measured from bankfull width.
2. **Plant species:** Riparian plant communities native to the Johnson Creek watershed (based on the *Portland Plant List* for Riparian Areas www.portlandonline.com/auditor/index.cfm?&a=322280&c=34460).
3. **Plant sources:** Native plant seed sources should be natural Northern Willamette Valley and foothill populations growing under 1,000 feet in elevation. Nurseries from the local level will be used for grow-out contracts when possible.
4. **Plant types:** The majority of trees and shrubs will be one-to-two year old bare root seedlings planted during winter and early spring in their dormant state, though some containerized plants may be used for fall and spring plantings. Native grasses and forbs are recommended to reduce erosion and the colonization of new weed species. Live pole cuttings of selected species may be used for unstable banks, areas with low water table, or other adverse conditions. Cuttings are sourced from a local distributor within the watershed.
5. **Planting densities:** Site planting densities should range between 1600-2400 stems per acre depending on site conditions. These densities will allow for early shading out of non-natives, and some anticipated mortality. Sound Native Plants' Plant Quantity Calculator is useful for finding appropriate planting numbers for varying sites (<http://www.soundnativeplants.com/calculator>).
6. **Plant survival:** A minimum of 1200 stems per acre will be healthy and maintained at each site by the time of site completion (5 years, if funding allows).
7. **Planting on hydrologically disconnected riparian areas:** Johnson Creek is channelized and incised due to the constructed rock wall lining the channel for much of its length. In these areas, where the riparian zone is perched and disconnected from the natural flood zone, common riparian plant species may not be appropriate. In these cases, plants more common in upland coniferous forests may be selected (see *Portland Plant List* for Western Hemlock-Douglas Fir Forest)

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Maintenance

1. **Timing:** Maintenance of the planted buffers and the adjacent site prep areas will typically occur for two years after the planting year. Subsequent maintenance years (up to three additional) may be required at severely disturbed sites and will be built into the site maintenance costs.
2. **Invasive Species:** Maintenance to invasive species will typically include two to three treatments per season. The goal is <25% cover by invasive species.
3. **Replanting:** When monitoring shows the stem per acre density of new plantings has dropped below 1200, replanting efforts will be organized for the upcoming planting season. Often, one can expect to inter-plant approximately 25% of original plantings in year 2 to maintain stem counts. Adjustments to inter-planting numbers can be made based on monitoring information collected.

MONITORING

1. **Site visits:** Yearly summer monitoring visits will occur, beginning with the planting year and continuing for two years after the planting year or until all maintenance has been completed, whichever comes last. Additional informal site visits will likely occur throughout the year.
2. **Invasive Species:** During each site visit, observation of invasive species conditions such as treatment effectiveness, new growth, new species present, and other information will be documented.
3. **Plant Survival:** Health and survival of new plantings will be formally monitored at the yearly summer monitoring visit and noted informally at every site visit.
4. **Photo-monitoring:** Before-and-after photos will be taken of each project from multiple angles that best capture evidence of invasive species control and native tree and shrub growth.