

Final

ALIGNING INVASIVE RIPARIAN SPECIES REMOVAL & SALMON RECOVERY

A First Step to Optimal Riparian Forest Health in the Snohomish Basin

Prepared for
Snohomish County

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1 INTRODUCTION

Purpose

This high-level policy document was prepared to communicate the priorities and strategies of the Snohomish Basin salmon recovery lead entity (Lead Entity) for addressing invasive riparian plant species across the Snohomish Basin. Other documents completed as part of this effort include a reach-scale strategy called the Lower Skykomish River Knotweed Management Plan (2022) and a literature review focused on knotweed. All three products were developed with funding from a Floodplains by Design grant awarded to Snohomish County by the Washington State Department of Ecology.

The 2019 Status and Trends report for the Snohomish Basin Salmon Conservation Plan calls for an increased rate of riparian buffer restoration and the need for a comprehensive riparian health strategy. The completion of this basin-wide document is the first step in developing that strategy for integration into the update process for the salmon conservation plan.

The basin-wide document is intended to be a tool that will help the Lead Entity committees, salmon recovery partners and project sponsors, and knotweed practitioners working within the Snohomish Basin to identify areas of alignment for utilizing Lead Entity-directed funding to manage invasive riparian plant species and to expedite priority work. The document includes the following sections:

- **Section 1: Introduction** explains the purpose, background, and relationship to associated documents and processes.
- **Section 2: Approach to Addressing Invasive Species in the Snohomish Basin** describes the issues caused by invasive-dominated riparian areas, explains the role of managing invasive riparian species as a first step towards riparian health, and identifies priority approaches for aligning the removal of such species with salmon recovery efforts.
- **Section 3: Implementing Knotweed Control within a Salmon Recovery Framework** describes scenarios when efforts to control knotweed or other invasives species best align with salmon recovery priorities and what project sponsors should consider when seeking salmon recovery funding.
- **Section 4: Funding** describes funding sources currently used for knotweed removal as well as sources that may not be commonly accessed but should be leveraged for future work in the basin.
- **Section 5: Information Gaps and Future Work** details the types of information still needed to successfully manage knotweed across the basin and complete additional work for the Riparian Forest Health Strategy.

- **Section 6: Recommendations & Next Steps** summarizes some policy and funding options to pursue in order to remove barriers and establish conditions to enable knotweed control to be the first step in expediting riparian restoration in the basin.

Background

A healthy riparian forest provides many crucial functions and benefits that form and maintain habitat for salmon during their freshwater life stages. The attributes of a healthy riparian forest (e.g., species composition, density, size, and age structure) vary depending on its location in the watershed, with differences in soil type, stream size, adjacent topography, elevation, and precipitation. Restoring riparian forests has been central to salmon recovery for decades.

In addition to providing structural habitat attributes, riparian areas are critical to food web function and water quality conditions that salmon need for successful rearing and growth. Native riparian forests provide habitat for insects that contribute to the freshwater food web, providing shade to buffer stream temperature increases in the summer and filtering water that runs off from adjacent uplands, thereby reducing sediment and pollutants.

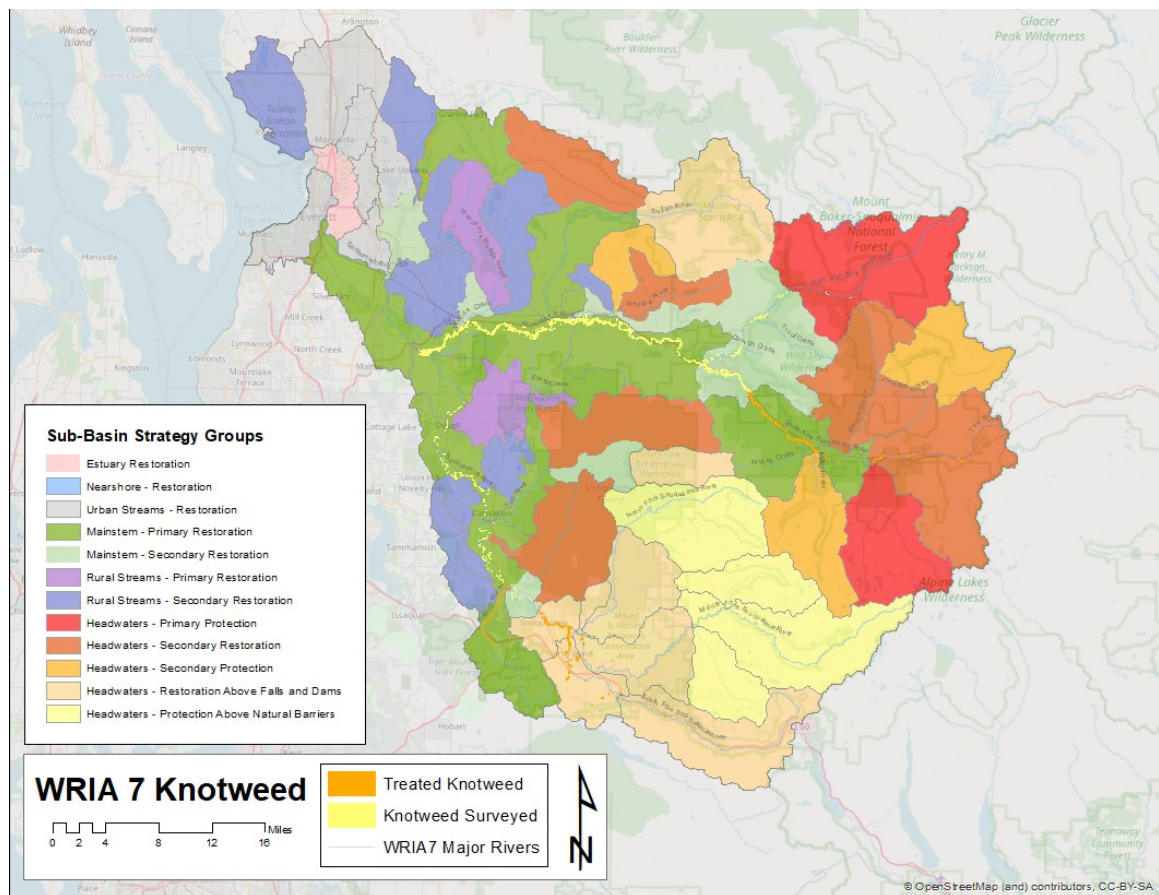
Knotweed and other invasives are widespread in riparian areas throughout the Snohomish Basin. The extent of the problem presents challenges – funding, capacity, logistics, and access – that make it difficult to address knotweed systematically. A programmatic approach is not only expensive but also time consuming, with multiple years of treatment often required prior to tree planting. Historically, there has been an opportunistic approach to knotweed control across the basin by various sponsors, with varying levels of success and varied commitment and funding for long-term maintenance. Previously treated sites are at risk of reinfestation if knotweed exists upstream, so investment in control projects can be risky without long-term stewardship. This has resulted in concerns over funding knotweed removal projects using salmon recovery funding and a call from the Snohomish Basin Salmon Recovery Technical Committee to develop a strategy.

The funding allocated by the Lead Entity is in great demand for implementing large-scale restoration projects across the basin, particularly in the estuary and mainstem floodplain. The 2019 Status and Trends report shows funding allocations and project locations since adoption of the Salmon Conservation Plan. Most of the restoration funding and effort have been directed to the estuary, mainstem, and nearshore, exceeding the 80 percent allocation goal. In contrast, the funding and effort directed to rural streams and headwaters fell short of allocation goals (15 percent and 5 percent, respectively). The 2019 Status and Trends report also noted the importance of restoring riparian areas and recognizing the threat of widespread invasive species, including knotweed. The report calls for a comprehensive riparian health strategy, and completion of this document is the first step.

One group already working to advance a more comprehensive approach to invasive riparian species control is the Water Resource Inventory Area (WRIA 7) Knotweed Working Group. In 2020 this group began meeting to develop more detailed protocols, improve coordination, and share information across the basin. The shared documents of the Working Group, coordinated by Snoqualmie Watershed Forum staff, were instrumental in developing this document and the

associated Knotweed Literature Review. In addition, interviews with individuals from both the Working Group and the Snohomish Basin Salmon Recovery Technical Committee provided the basis for framing issues and identifying next steps.

This document is not a compilation or summary of the efforts of the WRIA 7 Knotweed Working Group, but it has been informed by their approach and identified barriers. Furthermore, the document is neither a riparian revegetation strategy for the basin, nor an inventory of knotweed or other infestations in the watershed. To provide context, though, Figure 1 shows the current extent of both treated and untreated knotweed within the Sub-basin Strategy Groups of the Snohomish River Basin Salmon Conservation Plan.



SOURCE: King County, 2015-2021

Snohomish County Riparian Forest Health Project

Figure 1
Knotweed extent overlaid on sub-basin strategy groups

The annual funding need for riparian restoration and knotweed control greatly outstrips the funding available. Given the reality that knotweed control projects are unlikely to be able to rely on funds allocated by the Lead Entity, the purpose of this document is to highlight when and where knotweed projects would be most competitive, position knotweed projects as a necessary first step in improving riparian function across the watershed, and identify additional funding sources project sponsors could access to support this important work.

This basin-wide document is purposely high level, suggesting future work and next steps as part of an adaptive management approach for continued coordination between the Lead Entity and knotweed practitioners. A literature review focused on knotweed impacts, treatment methods, and restoration following treatment was developed in parallel to support this document and the Lower Skykomish Knotweed Management Plan, which provides a much more detailed set of strategies, outreach methods, and data on the extent of knotweed infestations in the reach. For examples of other knotweed-specific strategy documents, see the Hood Canal Knotweed Regional Control Strategy (no longer available on the Hood Canal Coordinating Council [HCCC] website), and Re-Green the Green (WRIA 9 riparian revegetation strategy).

This document acknowledges that in most of the Snohomish Basin where riparian forest is absent or degraded – from urban areas to lowland floodplains to higher elevation areas within the anadromous zone – the first step towards restoring riparian function is to treat knotweed and other invasive species and actively shift the composition of the riparian area to native tree cover. Whether the goal is full restoration or simply a minor improvement in riparian function, knotweed and other invasive species infestations must be addressed up front. This document further acknowledges that invasive species control is just one aspect of riparian forest health. Other threats and barriers to process-based restoration within riparian areas are not fully addressed here. Instead, the document is step one in a larger effort to develop a complex and multi-layered strategy to improve riparian forests across a large and diverse watershed in Puget Sound.

2 APPROACH TO ADDRESSING INVASIVE SPECIES IN THE SNOHOMISH BASIN

Knotweed (*Follopia* spp. inclusive of *F. japonica*, *F. x bohemica*, and *F. sachalinensis*) is an invasive plant that often forms a monoculture or mingles with blackberry and other invasive species to create a riparian zone along rivers and streams dominated by herbaceous, invasive species rather than native forest cover. A literature review developed as a parallel product to this strategy describes the key findings from a body of literature based on studies and research from across North America and Europe where the species was introduced. The literature review covers lifecycle, history and distribution, restoration techniques, and impacts on native plant species, soil chemistry, and nutrient cycling. The literature review also confirms that there is a gap in the literature documenting specific impacts of knotweed on local aquatic ecosystems. While this gap is inclusive of salmon in the Pacific Northwest, there is also consensus among practitioners that native trees and shrubs provide a suite of structural and biological functions that are necessary for salmon to thrive which are absent where knotweed is dominant. In other words, the theory of change is: if a knotweed monoculture is precluding native vegetation from establishing, then actions to reduce knotweed (or other invasive species monocultures) and increase native vegetation along streams and rivers will improve habitat conditions for salmon.

The theory of change establishes that **actions to remove or reduce invasive species cover are the necessary first steps in riparian restoration** in many parts of the Snohomish Basin. This statement may seem obvious, but it is fundamental to successful communication and coordination across the Lead Entity and knotweed practitioners working locally. Understanding that there is a fundamental position that underpins the work across the basin is helpful when identifying where priorities overlap and differ as work advances.

The Lead Entity and Lead Entity Committees refer to the local level salmon recovery bodies that orient their work around the implementation and adaptive management of the Salmon Conservation Plan. The Lead Entity committees include policy and technical experts as well as staff and elected officials who are members of the Snohomish Basin Salmon Recovery Forum and the Snohomish Basin Salmonid Recovery Technical Committee. One of many roles of the Lead Entity committees is to review and advance projects for salmon recovery grant funding (including Salmon Recovery Funding Board (SRFB) and Puget Sound Acquisition & Restoration (PSAR)). Snohomish County is the fiscal sponsor for the Lead Entity.

Knotweed practitioners, as defined here, represent a wide range of weed scientists, restoration ecologists, land managers, noxious weed control boards, and county staff. They are often project sponsors conducting work in the Snohomish Basin. Knotweed practitioners include members the Knotweed Working Group and others who may not participate the Working Group but are implementing knotweed control strategies in the basin. In many cases the same individual or group may be a part of a Lead Entity committee and a knotweed practitioner.

The Lead Entity does much more than direct funding to salmon recovery projects, but that is a key element of their work and one of the primary reasons why clear communication is needed across the Lead Entity and knotweed practitioners.

The Lead Entity and project sponsors center their priorities around salmon populations and focus more on riparian forest function as the ultimate outcome of their efforts in a riparian area. Riparian function is cited as an important aspect of salmon recovery in the technical foundations of the Salmon Conservation Plan, including the Snohomish River Basin Ecological Analysis for Salmonid Conservation 2005.¹ Recent white papers developed for the Technical Committee call for riparian restoration, including the WRIA 7 Climate Change Impacts to Salmon Issue Paper 2017² and the Water Temperature Conditions in the Snohomish River Basin 2021.³

The broad functions of riparian forests critical to salmon recovery are:

- Shade from native trees and shrubs in the riparian zone (reducing water temperatures in both the river and the hyporheic zone).
- Input of large wood from fallen trees for structure and habitat complexity (to form pools, hiding areas to avoid predators, and sort gravels for spawning substrate).
- Source of insects and detritus from the riparian zone (as prey for salmonids and functioning food web and nutrient cycling in the interface between aquatic and terrestrial habitats).
- Filtration of runoff (to reduce sedimentation and pollution from upland sources).

A more detailed explanation of riparian buffer functions and a synthesis of the best available science on buffer widths was developed by King County in 2019 (Kubo et al. 2019).

Knowing that invasive species infestations degrade the functions of riparian forests described above, the extent of the problem can be overwhelming. The Lead Entity generally does not perceive knotweed eradication as within their immediate objectives. Their objective is to shift the riparian areas from dominance of knotweed/invasive/non-native vegetation cover to native vegetation cover to increase riparian function for salmon.

Another distinction between the two communities is that the Lead Entity does not consider natural regeneration an option after knotweed treatment. All projects should include the planting of native trees to expedite growth and ensure that native vegetation replaces the invasives as the canopy of riparian areas. Because newly planted riparian areas will be the long-term source of large wood in the rivers, it is also important to the Lead Entity to plant native conifers (where

¹ See Snohomish Basin Salmonid Recovery Technical Committee (2004). The EASC used a riparian function screen to evaluate the relative condition of riparian forests and the ability of those forests to contribute LWD to streams. LWD impacts stream habitat conditions by altering channel form, influencing sediment routing, and controlling particulate organic matter storage.

² See leDoux et al. (2017). This paper, also known as the “Climate White Paper” highlights the following key actions: increase the rate of planting and protecting riparian buffers to help stabilize in-stream temperatures; and restore functional riparian buffers quickly to help reduce sediment load.

³ See Kubo et al. (2021). Riparian restoration and protection are considered among the highest priorities for improving temperature impairments across the Snohomish River Basin; multiple benefits are shown and cited in Table 7 of the paper.

they would naturally occur) and other species that will contribute downed wood and restore natural processes in the river.

While recognizing the interface between aquatic and terrestrial habitats, knotweed practitioners are focused on the location and extent of knotweed infestations, with the goal of reducing knotweed cover to maintenance levels. Ideally, knotweed control efforts would follow a methodical, programmatic approach to achieve eradication – or, more likely, reduction to maintenance levels – starting from upstream areas and moving to downstream areas. In practice, the work tends to be opportunistic (i.e., tied to individual projects), with site location and available funding dictating how and to what degree knotweed is managed. In a similar vein, efforts to monitor previously treated sites and prevent new infestations are often unfunded, despite being critical work.

The Knotweed Working Group defines maintenance levels as “the gross area of knotweed has been reduced by at least 95%. A full draft protocol and working definitions are under development as of the writing of this document.

Under the ideal top-down approach, which is most likely to be employed by counties or government agencies, knotweed practitioners often work upstream of the anadromous zone as a best practice. While these practitioners may consider natural regeneration as an option in some settings, they also plant native trees and shrubs as a strategy to prevent reinfestation. Knotweed practitioners also plant native species to meet the goal of increasing native cover in the riparian zone for fish and other species, particularly when required by certain funders.

Both communities – the Lead Entity and knotweed practitioners – understand that a “top-down” approach is the preferred method to manage knotweed infestations in a watershed. Working from the top of a basin or watershed downstream is a best management practice acknowledged by the local Knotweed Working Group and others to prevent reinfestation of treated areas. If flooding, construction activities, or natural dispersal sends plant parts from upstream to downstream, they can establish new infestations. Ensuring there is little to no source population upstream is more efficient and ultimately more successful. However, this is often incredibly difficult to achieve in large basins with large infestations on a variety of public and private lands. The difficulty is not only in funding, but in coordination, access, and consistent treatment/maintenance of sites. There are times and places when an exception to the top-down approach is warranted, particularly within a basin like the Snohomish where these efforts have been underway for decades. The Knotweed Working Group will continue to meet and assist with coordination and identification of ways to reduce barriers and allow for a more successful top-down approach.

The Lead Entity is particularly interested in seeing a successful top-down approach at the basin or even sub-basin scale due to concerns about investing time and funding in places that may be reinfested. Simultaneously, the Lead Entity committees do not control or manage adequate funding to invest in a top-down approach to eradicate knotweed in the basin. They would be very supportive of that work happening in an efficient and coordinated way with dedicated funds.

Most funding allocated by the Lead Entity has historically been focused on the anadromous zone in the basin; however, new science points to the importance of upland forests and riparian areas in

the upper watershed for addressing water temperature and water quantity and the Lead Entity Committees may be motivated to consider funding work higher up in the basin than was previously the case; however, the funding constraints and competition with other project types remain a barrier for the likelihood of using Lead Entity funds for extensive knotweed control work.

3 IMPLEMENTING KNOTWEED CONTROL WITHIN A SALMON RECOVERY FRAMEWORK

Although many individuals and organizations are part of a Lead Entity committee and are also knotweed practitioners, it is important to consider how to work across and communicate between the two communities to hasten riparian restoration in the basin. It is also important to consider how success is determined and measured. The goal of knotweed practitioners is most often to reduce an infestation down to maintenance levels or lower at a site. For the Lead Entity, the goal of eradication may hold true, but in practice at specific sites the following is considered success:

- An eventual increase in riparian function for fish: restoration assisted wood recruitment, increased shade, reduced erosion, and increased food web interactions between species.
- Over time, increased riparian function leads to a longer-term shift in dominance from invasive to native species riparian cover.

Both communities agree that a top-down approach is most efficient; however, the difficulties in following a strict top-down approach in a complex basin like the Snohomish have been described above. Each community has considerations to justify deviating from a top-down approach. From the Lead Entity perspective, a “jump” downstream to a lower site is considered a priority for salmon recovery in the following scenarios:

- Knotweed treatment as the first phase of work for large restoration projects (e.g., floodplain reconnection) where ground disturbance could mobilize invasives and affect downstream areas. This would be the case where knotweed and other invasives are treated at the site for 2–3 years as project design is finalized and permits are secured.
- Areas that are high priority for riparian improvements, especially those that align with water temperature strategies where shade is a priority for temperature management (see Kubo et al., 2021 and the *Recommendations & Next Steps* section). These sites would focus on riparian function, with knotweed removal as a first step prior to planting. In some instances, knotweed treatment can occur simultaneously with planting.
- Demonstration sites that are high priority for showcasing removal methods to encourage landowner buy-in at priority sites that have been recently acquired for habitat protection and where large-scale restoration is not planned in the future.
- Maintain and steward sites previously invested in with SRFB/PSAR funds, including previously restored riparian areas and sites where knotweed has infested non-vegetated areas (e.g., gravel bars).

To compete for salmon recovery funding for a knotweed treatment project through the Lead Entity process, a project sponsor should consider and include the following details in their proposal:

- Document that the project or parcel fits within one of the supported “exception” situations.
- Present successful outcomes of the project in terms of native species dominance and associated habitat functions for fish, as opposed to a lack of invasive species. Be sure to cite relevant literature to back up your claims and do not assume that reviewers, who are usually not knotweed experts, are familiar with the knotweed literature.
- Describe the timeline and activities in terms of when trees will be planted (with knotweed removal being the initial effort of an overall riparian restoration approach).
- Describe the project’s location within the context of the upper extent of knotweed (refer to Sub-basin Strategy Groups):
 - If the site is on the mainstem, how far downstream from active removal efforts is the site, and what is being done or planned in adjacent areas to prevent re-infestation?
 - If the site is within a non-mainstem sub-basin, describe the planned or active removal efforts within the sub-basin and upstream of the site. Does this effort represent part of a top-down strategy within the sub-basin?
- Once the 10-year riparian targets for the basin have been defined, discuss the project outcomes with respect to the targets at the reach, sub-basin, and basin-wide scale. Describe the contribution of the project or an aggregation of project sites toward the riparian targets. Note that the buffer size to be planted following treatment may determine whether or not the project is eligible salmon recovery funding sources (see the *Funding* section below).

The inclusion of these details will help reviewers understand the role of the project within the larger effort of both knotweed management in the basin (or within a sub-basin) and how it fits with the future riparian targets through revegetation and restoration of buffers. However, including these details does not necessarily mean that salmon recovery funding (SRFB and PSAR as mentioned above, and possibly including Cooperative Watershed Management grants or other locally directed programs) will be made available for these projects. As pointed out in the 2019 Status and Trends report, much progress is needed on a variety of project types and key habitats within the basin to support recovery. The successful project sponsor will not only identify when and where there is the highest likelihood for invasive species management as part of a larger, higher priority project type for competitive grant cycles, but also identify other funding sources and tools available to work in parallel with salmon recovery efforts in the basin. Leveraging flexible or specific funding opportunities will be a crucial approach for a successful Riparian Forest Health Strategy in the basin.

4 FUNDING

Understanding that the funding sources directed by the Lead Entity are not enough to fully fund all the necessary restoration actions in the basin and certainly not the full scope of invasive species management, additional funding opportunities must be leveraged and even created to ensure that riparian areas are restored at the pace and scale necessary for recovery. In addition, some sites may not qualify for certain funding sources if they cannot meet the minimum buffer requirements of one site potential tree height (SPTH) required by SRFB and other state funding sources following the Washington Department of Fish and Wildlife (WDFW) guidance (Rentz et al. 2020). Where there are willing landowners for the restoration of smaller buffers, it will be important to know what funding sources allow flexibility or to focus on specific outcomes, such as water quality. While larger buffers are the goal, this tiered approach may allow for additional function to be realized in the near-term and for matching potential restoration sites with the appropriate funding opportunities.

This section summarizes opportunities for funding riparian invasive removal/reforestation and maintenance in Snohomish Basin. Table 1 identifies funding sources that are currently used for implementing knotweed removal activities, in addition to sources that may not be commonly accessed but should be leveraged for future work. As this project was underway, several exciting new funding opportunities were under development in response to the state's focus on riparian buffers and federal investments in salmon recovery and climate resilience. Due to timing, the details of these new sources (America the Beautiful grant program, and EPA riparian buffer funding) are not available for inclusion in this report, but they are included at the end of Table 1 and should be tracked and considered by individual entities, the Knotweed Working Group, and the Lead Entity.

TABLE 1.
FUNDING SOURCES AND ALIGNMENT WITH KNOTWEED MANAGEMENT IN SNOHOMISH BASIN

Funding Source	Knotweed Treatment Eligible?	Outcomes Required to be Competitive	Geographic Priority	Notes
Washington State Department of Agriculture (WSDA) Knotweed Control Program	Y		Basin-wide	Requires that the treatment is top-most infestation in basin and following a top-down approach.
County Noxious Weed Programs	Y		King County	Snohomish County general funds are limited to roadside infestations.
Floodplains by Design (Ecology)	Y	Floodplain function	Mainstem sub-basins	Knotweed removal is allowable; should be a component of a larger grant proposal (e.g., Lower Skykomish).
Salmon Recovery Funding Board/PSAR	y	Salmon habitat, trees planted	Basin-wide	Projects should follow Lead Entity Strategy and adhere to the buffer standards in Manual 18 Appendix K.

Funding Source	Knotweed Treatment Eligible?	Outcomes Required to be Competitive	Geographic Priority	Notes
Conservation Reserve Enhancement Program (CREP) (NRCS)	Y	Trees planted	Private land Eligible on specific stream segments: see WA map on Washington Conservation Commission website	One of the stated goals of CREP is to “increase control of critical invasive species.” Program funds maintenance of buffers up to 5 years after planting, primarily to control invasive species. Minimum buffer width is 50 feet on at least 70% of the stream length (flexibility allowed along up to 30% of the length).
Water Quality Combined Financial Assistance: Centennial & Section 319 Clean Water Grants and loans (Ecology)	Y	Trees planted/ water quality improvements		Sub-basins with TMDLs (Pilchuck [2021], Snoqualmie [2011], and others) likely to be most competitive.
Streamflow Grants (Ecology)	y	Trees planted/ salmon habitat		The 2021 (unapproved) draft Watershed Restoration & Enhancement Plan lists the Woods Creek Riparian Restoration Partnership, led by Snohomish Conservation District & Partners, as a project. Others are likely eligible.
Coastal & Marine Restoration Grants Community-Based Restoration (NOAA)	Y	Salmon habitat		Riparian and invasive species management likely possible as a component to a larger proposal that includes at least one “anchor” project.
Bureau of Indian Affairs grant	Y		On reservation	Only tribal governments are eligible for this funding source; Snoqualmie Tribe of Indians has used it for treating invasive species on or near the reservation.
National Estuary Program (NEP): Puget Sound (Habitat)	?	Salmon habitat, water quality		Flexible funding: may allow top-down approach, a comprehensive strategy is likely needed to be competitive; new NEP guidance coming soon.
National Estuary Program: Puget Sound (NWIFC)	?			Only available to member tribes; can fund priority work outside of reservation.
Cooperative Watershed Management Grant (King County)	y	Salmon habitat	King County	Partner proposals that expand beyond just knotweed removal are more competitive (e.g., incorporating riparian restoration components).
Coastal Protection Fund – Terry Husseman Account (Ecology)	y	Riparian planting or other improvements in addition to invasives		Riparian restoration work is eligible. Funding amounts vary each year based on revenue available.
Regional Conservation Partnership Program (NRCS)	Y	Trees planted, other NRCS-eligible benefits		Requires a sponsor organization (typically Conservation District) and separate grant application but accesses existing NRCS funds; allows for reach-scale efforts and creative match. Work with others in the region with experience for guidance on whether to pursue.
Open Space – River Corridor Grants (King County)	y	Integrated with floodplain management and passive recreation projects	King County mainstem river floodplains (Snoqualmie, SF Skykomish, Tolt, Raging)	New funding source through Parks Levy; invasives/riparian projects eligible as part of habitat restoration projects.

Funding Source	Knotweed Treatment Eligible?	Outcomes Required to be Competitive	Geographic Priority	Notes
Aquatic Lands Enhancement Account (ALEA)	Y		Must be associated with navigable waters of the state.	"Habitat enhancement such as native plantings and invasive plant removal" is allowed under eligible project activities, but members of the Knotweed Working Group have not accessed this source.
Southern Resident Killer Whale Program (NFWF)	y	Trees planted	Basin-wide	Bring Back the Natives or other NFWF programs may be a better fit for funding. The "Improve Habitat Quality" priority includes projects that implement priority action from the PSP Action Agenda that improve habitat and address runoff, contaminants, and other pollutants. Riparian restoration work is an eligible category.
Bring Back the Natives (NFWF)	Y		Basin-wide	Invasive species management is listed as a priority activity, but this is a national funding source and can be competitive.
Promise the Pod – One Tree Planted (BEF)	N	Trees planted	Basin-wide	Bonneville Environmental Foundation manages this reimbursement program for projects in Puget Sound and beyond. Consider aggregating projects and getting funding for every tree planted in a reach or sub-basin.
Partners for Fish and Wildlife (USFWS)	Y		Private property	Provides technical and financial assistance to landowners interested in restoring and enhancing wildlife habitat on their land. Removal of invasive species was a common attribute of past projects.
Coastal Program (USFWS)	Y			Supports restoration and protection of fish and wildlife habitat on public and private lands.
New: America the Beautiful (NFWF)	Y			Funding from several federal agencies combined in one application. Department of Interior funding: only states and tribes are eligible; allow riparian restoration/invasive species treatment; NRCS funding: all sponsors eligible but emphasis given to specific working lands (not Puget Sound)
New: EPA will be announcing a competitive riparian buffer funding program	?			Coming soon: follow EPA announcements. This program will be specific to Puget Sound.

Legend:

Y = Knotweed treatment is clearly eligible and/or regularly used to fund work in WRIA 7.

y = Knotweed treatment is technically eligible but not often a project type that is awarded funding.

? = Needs more research.

N = Knotweed treatment is not an eligible activity.

Additional funding sources to consider beyond those listed in Table 1 are:

- Grants from private foundations, utilities, and municipalities.
- Fee for service and pay for performance contracts.

- Accessed funding from water quality violations or other settlement funds similar to those distributed by the Coastal Protection Fund (Ecology) and Rose Foundation grants.

Carbon credits: The sale of carbon credits could be used to cover the costs of long-term maintenance of plantings. The Pierce Conservation District found that the process to sell credits through City Forest Credits was straightforward and enough to fund stewardship activities over the 25-year life of the agreement for projects that are at least 200 acres in size. Maintenance and monitoring can be one of the most difficult aspects of riparian restoration to fund, so this may represent an important opportunity for filling a known gap.

Parcel assessments: The King County Noxious Weed Control Board uses a parcel assessment to fund some of the county’s knotweed efforts. While it is not enough, it is important to have local, dedicated funding for these efforts. As of the writing of this report, the Snohomish County Noxious Weed Control Board is considering an assessment.

Funding on the horizon: The Puget Sound Partnership’s Mobilizing Funding Initiative should also be tracked, as well as opportunities arising from the State-Tribal Riparian Pathways. Note that many grant programs and legislation do not specifically include or exclude invasive species management and often refer to “degraded” riparian areas; it will be important to ensure that language about eligibility of invasive species management as a first step to riparian restoration is clearly allowable in current and future grant programs.

5 INFORMATION GAPS & FUTURE WORK

Gaps Identified by the Knotweed Working Group

The Knotweed Working Group identified the following studies and strategies needed in order to fill gaps, better understand the problem, and make progress through a coordinated approach:

- **Lower Snoqualmie Knotweed Mobility Study:** Build out a comprehensive map of knotweed throughout the floodplain, including tributaries; develop an analysis of knotweed movement and infestation; and better define the necessary treatment.
- **WRIA 7 Landowner Outreach Strategy:** Produce a concise document that describes how and where to engage landowners for riparian restoration projects (see Lower Skykomish Knotweed Management Plan – companion document to this basin-wide approach and the Siuslaw Coho Partnership example).
- **Fundraising Strategy:** Section 4 identifies several opportunities for additional funding and approaches to expedite riparian restoration. The Knotweed Working Group identified a specific funding strategy as a necessary step to working across the basin with multiple partners. These participants may want to prioritize sites and develop details regarding the sequencing of work and potential funding sources. A strategy may include details on which entities will pursue each funding source, who will manage the grants, and how match funding requirements will be achieved at a site or reach scale.
- **Economic Impacts of Knotweed:** Prepare an assessment of economic impacts, considering the value of riparian corridors and the spatial and temporal costs of not addressing knotweed in the basin.

Additional Aspects of Riparian Forest Health

At the onset of this project, the Snohomish Basin Salmon Recovery Technical Committee noted that invasives species management is just one of many issues that need to be addressed across the basin in order to achieve riparian forest health for fish recovery. Other issues include the lack of regulations, additional tools for addressing and incentivizing the restoration of degraded riparian areas on private property, conflicting use of riparian areas on public property (e.g., recreation), roads and utilities, forest management in the upper watershed, and others. This document provides a framework for considering the first step of riparian restoration for the management of invasive species. Several of the additional aspects listed here may be best addressed at a state or regional level through the Site-Tribal Riparian Pathways approach. Others may be best addressed at the local level through local land use, recreation planning, and other efforts that require direct, local engagement. A further treatment of these issues is beyond the scope of this project but will be necessary to achieve the riparian targets [under development].

6 RECOMMENDATIONS & NEXT STEPS

Key recommendations follow for immediate next steps to hasten the pace of riparian restoration in Snohomish Basin and address the buffers currently degraded by the dominance of invasive species:

- Complete the development of riparian targets to communicate the importance of riparian areas, including those above anadromy, and expectations for buffer size in the basin.
- Identify and communicate the highest priority areas for initial water temperature protection and restoration; these priority sites and reaches will indicate to knotweed practitioners where to focus their work and coordinate with tree planting crews.
- Identify and advocate for (local) funding sources that can pilot pay-for-performance⁴ RFPs whereby successful bidders deliver and are paid for producing outcomes in key locations as opposed to reimbursable grants. With performance-based contracting, clear metrics and terms must be agreed to by the funders/grant managers and project sponsors.
- Work with the Department of Ecology to develop proposals for the riparian restoration actions identified in TMDL plans and secure funding through current and new sources.
- Track/advocate for the development of an assessment to pay for knotweed management in Snohomish County.
- Determine where organizational capacity is needed to develop project opportunities on private property and identify a 2- to 5-year project pipeline.
- Determine which knotweed practitioners and their crews are not equipped to conduct tree planting and stewardship activities in addition to their knotweed treatment, maintenance, and monitoring. Consider forming teams and partnerships to achieve a full restoration approach.
- Coordinate with Washington Department of Natural Resources (DNR) to ensure that the implementation of their Snohomish Watershed Resilience Action Plan prioritizes invasive species management and that DNR crews are coordinating with and working toward shared outcomes in the basin.
- Support the work of the Knotweed Working Group to develop protocols, coordinate mapping and data collection, and implement a comprehensive approach to knotweed control in the basin.

⁴ Pay for performance contracts link payment to the delivery of measurable environmental outcomes, inspiring private-sector innovation to find and implement solutions that work (Environmental Incentives, 2022).

- Build out knotweed management plans for other priority reaches and sub-basins that will benefit from management plans in order to provide a level of detail that is not possible within a basin-wide strategy.
- Build out a comprehensive Riparian Forest Health Strategy.

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