2019

Clackamas River Invasive Species Partnership: Annual Report

Activities and accomplishments of the Clackamas River Invasive Species Partnership to prioritize and manage invasive species and associated restoration efforts in the Clackamas River Basin.

CRISP

Clackamas River Invasive Species Partnership

Acknowledgements

This annual report has been developed on behalf of the *Clackamas River Invasive Species Partnership* (CRISP). In 2019, the collective efforts of CRISP and its participating organizations have continued to make meaningful progress toward protecting the Clackamas River Basin from the ongoing threat of invasive species. The CRISP would like to acknowledge the many contributions of its participating and funding organizations, as well as the efforts of their dedicated personnel. These efforts have helped to ensure the success of the Clackamas River Invasive Species Partnership. Thank You!

Participating Organizations

- *4-County Cooperative Weed Management Area*
- *Bureau of Land Management- Northwest Oregon District*
- *Clackamas County Parks*
- *Clackamas County Water Environment Services*
- *Clackamas River Basin Council*
- *Clackamas Soil and Water Conservation District*
- *Columbia Land Trust*
- *Metro*
- *Natural Resources Conservation Service- Clackamas*
- *North Clackamas Parks and Recreation District*
- *Oregon Department of Agriculture- Noxious Weed Program*
- *Oregon Parks and Recreation Department*
- *Portland General Electric*
- *United States Forest Service- Mt. Hood National Forest*

Funding Organizations

The following organizations have supplied cash or documented in-kind contributions to support CRISP and implementation of the *Clackamas River Invasive Species Management Plan* in 2019. The CRISP partners greatly appreciate the generous support of these organizations.

- *Bureau of Land Management- Northwest Oregon District*
- *Clackamas River Basin Council*
- *Clackamas Soil and Water Conservation District*
- *Metro*
- *Portland General Electric*
- *United States Forest Service- Mt. Hood National Forest*

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Executive Summary

Our Story

The Clackamas River Invasive Species Partnership (CRISP) was formed in response to the steady expansion of invasive species within the Clackamas River Basin. These invasive species degrade our natural areas and greenspaces, diminish the quality of our streams and rivers, decrease the viability of our working lands, and reduce the livability of our communities.

In an effort to mitigate the impact of invasive weeds, the CRISP partnering organizations have been working diligently to build upon our prior success to enhance our management practices through improved coordination. The collaborative approach undertaken by the CRISP focuses on working more cohesively across property lines and jurisdictional boundaries to reduce gaps in management. Through this approach, the CRISP seeks to improve effectiveness by focusing on priority weed infestations that pose the greatest threat to the watershed.

Working Better and Together

In 2019, the CRISP continued its efforts to increase cooperative management approaches outlined in our *Clackamas River Invasive Species Management Plan*. These collaborative efforts allow the CRISP to utilize the unique strengths and expertise of our partnering organizations to improve conditions across the Basin.

In the upper portions of the Clackamas River Basin, CRISP partners have continued to work collaboratively. The United States Forest Service, Oregon Department of Agriculture, Portland General Electric, and Clackamas Soil and Water Conservation District have been working collectively to systematically survey and treat high priority noxious weeds. Partners continued the concerted effort to survey areas with a high potential for the introduction of new invasives, resulting in the detection of several new high-priority weed infestations.

Along the lower portions of the Clackamas River Basin, CRISP partners have increased coordination and are managing weeds from Milo McIver State Park to the confluence with the Willamette, including several of the Clackamas tributaries. In particular, CRISP partners have worked to coordinate work on private and public land to increase connectivity of actively managed properties. This has helped to raise public awareness about the CRISP efforts as well as bolster existing efforts in our open spaces and natural areas.

Making the Investment

CRISP partners have continued to support active weed control efforts in the Clackamas River Basin through an ongoing investment in time and resources.

The CRISP has continued to utilize significant grant funds from the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund* to support implementation. These funds have been a great asset and

have allowed the CRISP to address gaps in active management and to offset shortfalls in current weed control efforts.

CRISP partnering organizations have also invested significant cash and in-kind contributions over the last year. In total, the CRISP partners reported expending $550,000[1] in contracted weed control and restoration services in 2019. The total estimated CRISP-related personnel services reported by partners in 2019 totaled 2163[2] hours. This work supported weed surveys and treatments on over 5366 acres of public and private land[3].

With many of the gaps in management occurring on private lands, CRISP partners continued outreach efforts to private landowners to increase management of priority weeds. In 2019, CRISP partners sent 602 letters to landowners inviting participation in CRISP-related weed survey and treatment activities.[4]

Growing the Partnership

After adoption of the CRISP *Memorandum of Understanding* (MOU) in 2016, 14 partner organizations have continued to refine and develop how we collaborate. There is a sustained interest in our activities, which demonstrates the momentum and vitality of the partnership and the ongoing commitment of its member organizations to improve invasive weed management in the Clackamas River Basin.

The addition of a CRISP-dedicated staff person in December of 2016 has also helped to enhance implementation and coordination amongst partners. This position is housed within the CSWCD's WeedWise program and has assisted with implementation of CRISP-related activities. The CRISP specialist supports activities between partners and has been spearheading implementation of weed control projects throughout the watershed.

Looking Ahead

The past year has proven to be another highly productive year for the CRISP. Activities initiated early in the partnership have informed and influenced our ongoing activities and we continue to refine our coordination, priorities, and methods. The grant funding and partner support along with the ongoing commitment of dedicated staff and contractors will allow CRISP to continue to address existing resource limitations and management gaps. In 2020, we look forward to continuing to build upon our accomplishments in supporting a healthier Clackamas River Basin.

Background

The Clackamas River Invasive Species Partnership (CRISP) was formed in 2014 through a collaborative effort by the Clackamas River Basin Council, the Clackamas Soil and Water Conservation District, and

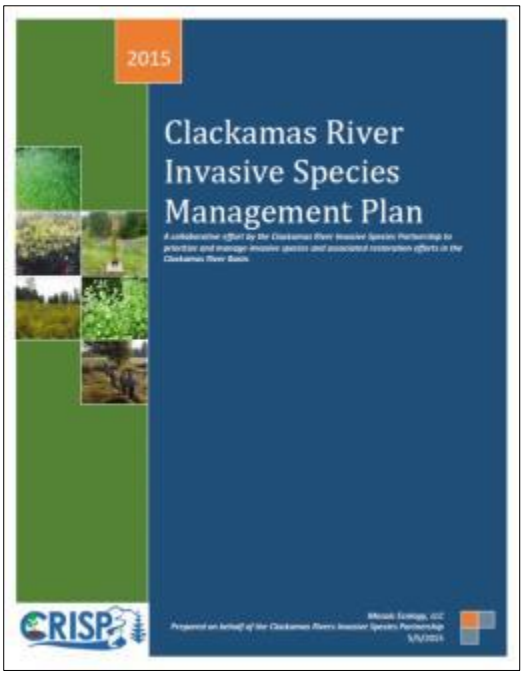
[1] This number accounts for all resources reported by CRBC, CSWCD, NCPRD, NRCS, Metro, and USFS, as well as approved CRISP projects (which were funded by the PGE Clackamas Fund and cash matches from BLM, CSWCD, and the USFS)
[2] This number accounts for hours reported by CLT, CSWCD, Metro, and NCPRD, and includes hours for the CRISP coordinator
[3] This number accounts for surveys and weed treatments reported by CRBC, CSWCD, CLT, Metro, NCPRD, NRCS, ODA, OPRD, PGE, USFS, & WES.
[4] These numbers account for letters sent by CRBC and CSWCD.

Metro to develop the *Clackamas River Invasive Species Management Plan* to prioritize and improve the management of invasive species and associated restoration efforts in the Clackamas River Basin.

In developing the plan, the CRISP partners convened an advisory group—comprised of a diverse group of land managers—to better inform the plan development process.

Upon completion of the *Clackamas River Invasive Species Management Plan* in 2015, participating organizations formed the broader CRISP to support implementation of the management plan. Since that time, the CRISP has grown to include 14 partnering organizations, representing broad interests across the Clackamas River Basin.

Through the adoption of the *Clackamas River Invasive Species Management Plan*, the CRISP established the following goals to guide partnership efforts:



The Clackamas River Invasive Species Management Plan was completed in 2015

- Develop and maintain a coalition of federal, state, regional, and local partners to prioritize and coordinate invasive plant control and revegetation efforts throughout the basin;
- Secure new and sustainable sources of funding to implement and maintain these efforts;
- Align local and regional policies to support implementation of plan goals;
- Promote recognition among public and private land owners within the basin of the need to actively manage invasive plants and enhance natural areas;
- Identify and prioritize sub-watersheds, natural areas, and important habitats for protection and enhancement;
- Develop an invasive plant treatment strategy that identifies and prioritizes specific invasive species management actions through the consolidation of existing efforts and resources;
- Prevent the introduction and spread of new invasive species, reduce the distribution and cover of priority invasive species, and restore priority natural areas currently infested with common, priority, or new invasive species; and
- Outline a strategy to use limited resources to accomplish measureable, impactful, and lasting improvements within the basin.

The *Clackamas River Invasive Species Management Plan* defines a long-term, basin-wide framework for controlling invasive species as well as a short-term strategy that is intended to help focus limited resources on the geographies and initiatives where they can have the greatest impact. The plan is intended to be iterative, and will be adapted and adjusted to changing priorities, partner composition, and conditions within the Clackamas River Basin.

This report documents the approach, activities, and accomplishments of both the partnership and individual participating organizations and demonstrates the breadth of invasive species management underway within the Clackamas River Basin.

Overview of the Clackamas River Basin

The 600,700-acre Clackamas River Basin is made up of 72 percent publicly owned land, 3 percent tribally owned land, and 25 percent privately owned land. The Clackamas River flows 82 miles from its headwaters in the Mt. Hood National Forest to its confluence with the Willamette River just downstream of Willamette Falls in Oregon City, OR. The river descends from an elevation of 6,000 feet down to just 12 feet at its confluence. The basin provides water to more than 300,000 people and contains six dams that provide electricity, water storage, and flood control.

Location of the Clackamas River Basin in Oregon

Invasive Species

The biological condition and land use practices within the Clackamas River Basin have been altered significantly from historical conditions. Activities such as forest clearing, field burning, cultivation, and urban and rural development have intensified land management in the basin. Today, one of the most noticeable ecological side effects of these land uses is the reduced abundance of native species and the increased abundance of invasive species.

The CRISP defines invasive species as non-native species with aggressive growth habits that allow them to spread quickly and cause harm to the social, economic, and ecological resources of our communities. In general, those areas in the basin that have seen more intensive land management and manipulation have a greater diversity and abundance of invasive species. Over time, invasive species can simplify plant communities, replacing complex assemblages of native trees, shrubs, and herbaceous plants with lower diversity, largely non-native communities. The impact of this biological simplification can be far-reaching.

Rare species like mountan pale blue-eyed grass (Sisyrinchium sarmentosum) are under continued threat from invasive species.

The Impacts of Invasive Species

Watershed Health

Invasive species can impact watershed health by reducing water quality, canopy cover, and stream bank stability. When invasive species replace a native riparian forest, the reduced canopy cover and root diversity lead to an increase in water temperatures and an increase in the rate at which rainwater enters the stream. This can make streams more prone to flooding, incision, and erosion. In turn, this can lead to increased turbidity, siltation, and the mobilization of legacy pesticides.

Biodiversity

When a few invasive species replace a broad diversity of native trees, shrubs, and herbaceous plants, the value of the habitat is severely reduced. Native plants provide shelter, food, and structure that animals depend on for survival. As floristic diversity is reduced at a site, so too is faunal diversity. Invasive species have been partially or wholly responsible for the decline of 42 percent of threatened and endangered species (Pimentel *et al*. 2005)[5].

[5] Pimentel, D, R. Zuniga, D. Morrison. 2005. Update on the environmental and economic costs associated with alien-invasive species in the United States. *Ecological Economics* **52**:273– 288.

Tree Cover

The native forest canopy provides the lowest cost, most sustainable form of temperature regulation, storm water interception, and wind buffering available. These ecosystem services make our communities more livable, more sustainable, and more attractive. However, throughout the Clackamas Basin, forests are being or have been replaced or compromised by invasive species such as English ivy (*Hedera helix*), old man's beard (*Clematis vitalba*), Himalayan blackberry (*Rubus armeniacus*), and knotweed species (*Fallopia japonica, Fallopia xbohemica,* and *Fallopia sachalinensis*).

Soil Health

Many invasive plants are known to change soil composition, available moisture, and soil chemistry. Some invasive plants are also known to be allelopathic, altering soil chemistry by releasing chemicals through their roots or by dropping leaves onto the surrounding environment. Allelopathic chemicals can prevent seeds of desirable species from germinating or can reduce their growth and survival. For example, in areas where garlic mustard (*Alliaria petiolata*) has become heavily established, few other species are able to grow, allowing garlic mustard to spread more rapidly.

Invasive weeds like oblong spurge (Euphorbia oblongata) are both toxic and also threaten natural forest regeneration.

Agriculture and Forestry

Invasive plants are estimated to reduce the annual productivity of the United States agricultural sector by 12 percent (Pimentel 2009)[6]. For many farmers, controlling invasive species on their land can be one of the most time consuming and expensive aspects of crop production. The additional labor and chemical application costs associated with controlling these invasive species results in higher costs to consumers.

Similarly, the cost of conducting forestry activities has greatly increased the need to control invasive species after harvesting trees until a new stand can be established. Failure to control invasive species on farms and forests can either lead to crop loss or require expensive intervention to prevent crop loss.

Economics and Society

Invasive species are calculated to cause approximately $120 billion in losses and control costs to the nation's economy each year (Pimentel 2005)[6], impacting society directly and indirectly. They increase costs and reduce productivity on both the farm and in the forest. They harm water quality, and thus increase the need for costly infrastructure to clean and manage both stormwater and drinking water. They also reduce the diversity of species in native habitats, sometimes requiring costly intervention in order to prevent species from becoming threatened or endangered. Invasive species can reduce the

[6] Pimentel, D. 2009. Environmental and Economic Costs of the Application of Pesticides Primarily in the United States. Integrated Pest Management: Innovation-Development Process. pp 89-111. Springer Netherlands.

value of land and interfere with desired land uses. They also reduce the resilience of our communities, making them more susceptible to storms, power outages, flooding, heat waves, and landslides.

Invasive species are impacting the Clackamas River Basin in the same ways that they are impacting the rest of the nation. Community resilience and livability have been reduced. Habitat, water quality and biological diversity are diminished. Farming, forestry and other economic activities are losing significant productivity due to invasive species.

Despite efforts to date, the diversity and abundance of invasive species in the Clackamas Basin continue to increase and aggressive new invaders are being found each year. This increase can only result in greater costs to residents, greater losses in productivity for farms, forests, and businesses, and reduced biological diversity and habitat quality for future generations.

Management Strategies

In developing the *Clackamas River Invasive Species Management Plan,* the CRISP partners outlined a framework for managing invasive species within the basin. This framework includes four primary prescriptions that can be applied across the basin to address the threat of invasive species: prevention; survey and EDRR; control, containment and exclusion; and restoration. Application of each specific prescription is based on habitat values, availability of resources, species and site prioritizations, and the quality of existing data. Ideally, at least one of the four prescriptions can be applied to every area of the basin allowing for the plan to be implemented basin-wide.

Boot brushes are one tool to prevent the introduction and spread of invasive species.

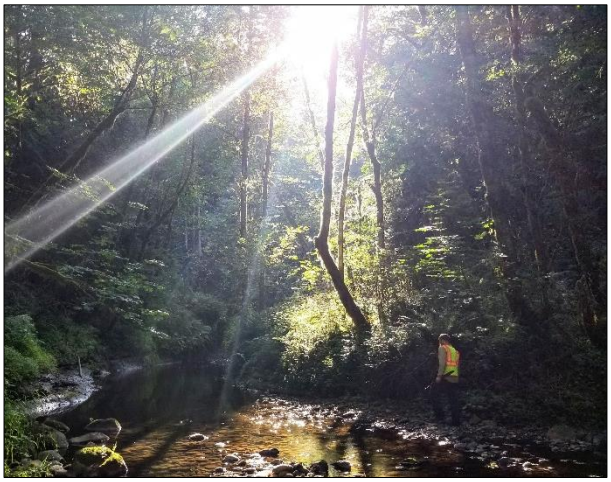
Prevention

Preventing the spread and introduction of new invasive species is the first and most important line of defense in the basin. This prescription is designed to be implemented basin-wide, but with a particular emphasis on frequently visited recreation sites and areas with significant habitat value. Actions include public education about invasive weeds, installation of boot cleaning stations and informational signage, requiring machinery to be cleaned before and after mobilization to a site, and use of weed-free straw and gravel, among other strategies.

Survey and EDRR

The second line of defense against invasive species in the basin is to develop a robust, basin-wide program for surveying and mapping new and priority invasive species. The focus of this prescription will be developing a methodology for identifying priority survey areas, integrating presence and absence data for priority invasive species into a shared database, and identifying and eradicating new invasive plants before they can establish.

Control, Containment, and Exclusion



A contractor crew member scouts for invasive weeds. Surveys are important for early detection and control.

Many invasive species are already widely established in the basin; others are well established only in portions of the basin. The focus of this prescription is to develop a strategic approach that allows the partners to prioritize specific species and patches for control. Control efforts focus on identifying vector pathways for spread and preventing further expansion. Existing data about habitat quality, known weed patches, species-specific biology, and partner restoration efforts allow infestations to be prioritized to maximize the impact of existing resources within the basin.

Restoration

Once invasive species invade an area, their presence can dramatically alter the composition of natural systems. In heavily impacted areas, the functional diversity of a site may become so compromised that the system is unable to recover without direct intervention following invasive species removal.

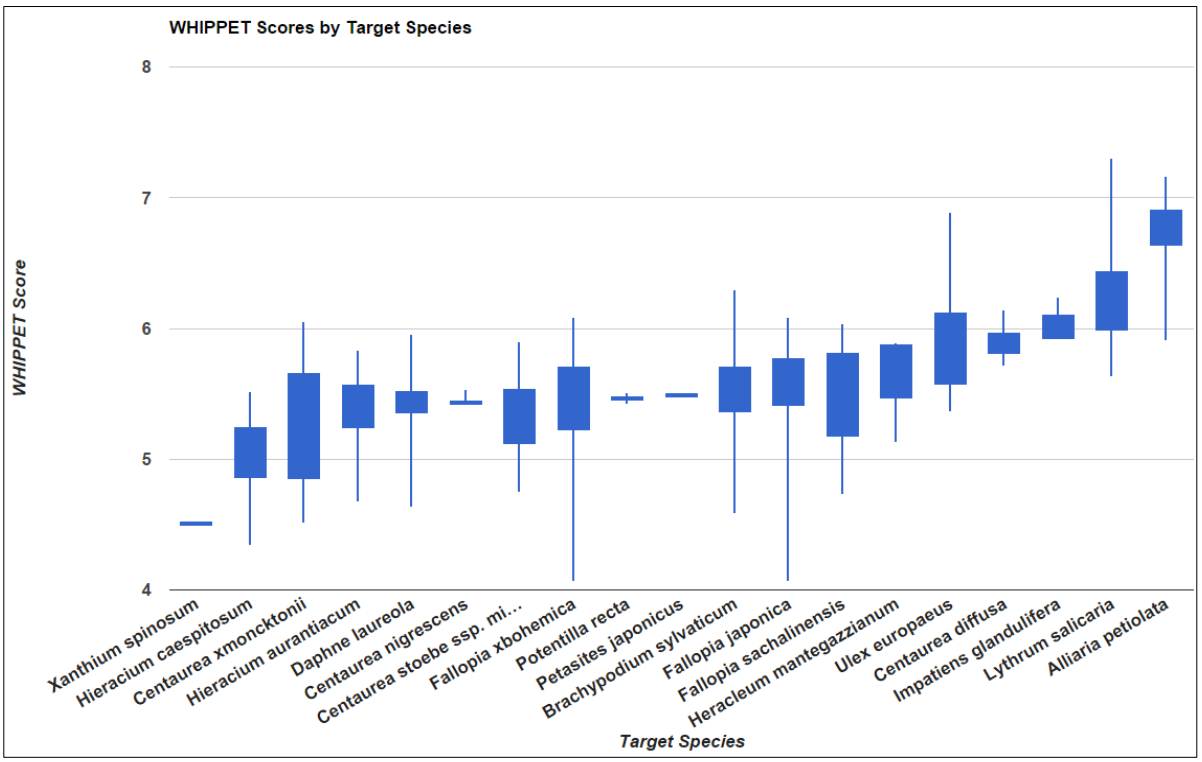
Restoration of native plant communities is an important tool for reducing the risk of re-colonization by invasive species and is typically necessary when a site will not naturally recover following invasive species removal. Restoration efforts are employed only when there is a reasonable degree of certainty that large-scale disturbances will not occur at the site in the near future. Also due to the relative expense of restoration efforts, the landowner or managing agency must have adequate funding to ensure successful restoration and long-term maintenance of the site following implementation.

Partnership Priorities

The *Clackamas River Invasive Species Management Plan* defines a set of priorities to maximize the impact of CRISP partner efforts. This effort consists of developing objective models to define the species and infestations to target as well as the geographical priorities for implementation by CRISP partners.

Invasive Species Prioritization

To prioritize invasive species, a prioritization model known as the *Weed Heuristics: Invasive Population Prioritization for Eradication Tool* (WHIPPET) developed in California, was adapted for use within the Clackamas River Basin. Using WHIPPET, CRISP partners evaluated 19 species. Some of the species with the highest mean rankings include *Alliaria petiolata, Lythrum salicaria, Impatiens glandulifera, Centaurea diffusa, Ulex europaeus, Heracleum mantegazzianum, and Fallopia* spp. The WHIPPET model prioritized infestations based on their relative impact, invasiveness, and feasibility of eradication. The resulting patch prioritization served as a tool to improve implementation at local and regional scales.



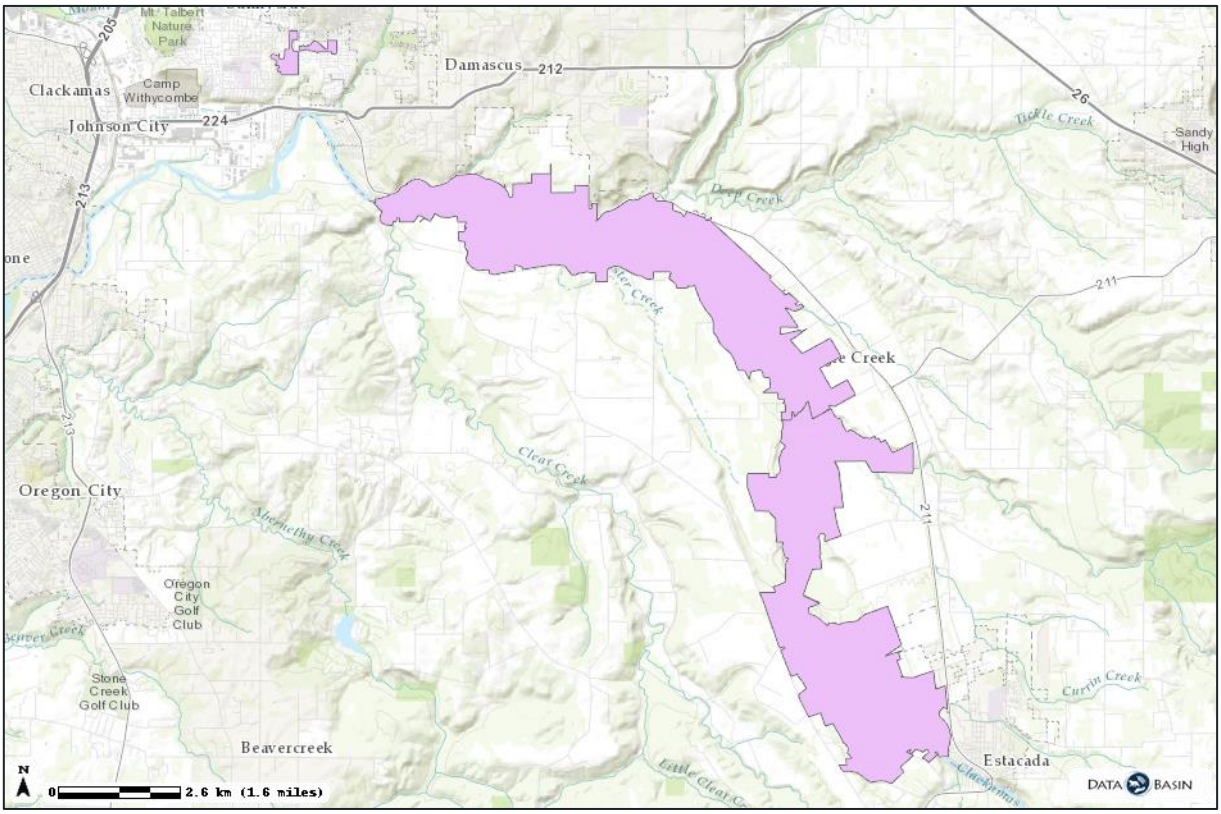
WHIPPET model score distributions for 19 target species evaluated.

Geographic Prioritization

The *Clackamas River Invasive Species Management Plan* applies to the Clackamas River Basin as defined by the Clackamas Hydrologic Unit Code (17090011) in Clackamas and Marion counties of Oregon. Due to the size and complexity of the watershed, as well as resource scarcity, CRISP partners prioritized specific geographic action areas. They ranked sub-watersheds as high, medium or low priority based on:

- data from the Intertwine Alliance's Regional Conservation Strategy (http://www.theintertwine.org/projects/regional-conservation-strategy),
- existing partner participation,
- rare, threatened and endangered species, and
- partner investments and engagement

From this assessment four sub-basins were identified for implementation. These included the upper watershed, North Fork Eagle Creek, Dubois Creek/Clackamas River, and Lower Clackamas River/Rock Creek. To further focus collaborative efforts in the initial implementation phase, CRISP partners identified targeted focus areas along the Clackamas River, from the Carver Boat Ramp to Barton Park, between Barton Park and Milo McIver State Park, as well as a small urban area in Happy Valley near Sieben Creek.



The CRISP targeted demonstration areas in the Clackamas River Basin.

Accomplishments

The many activities undertaken by the CRISP in 2019 demonstrate the partnership's growing strength. The 2019 season was the third full year of implementation after securing grant funding through the PGE administered *Clackamas Mitigation Fund*. These resources, in conjunction with other CRISP partner support greatly enhanced the capacity of the CRISP to address new invasive species threats in the basin. 2019 was also the third full year of having a dedicated CRISP specialist, housed within the Clackamas SWCD WeedWise program, to help with coordination and implementation of CRISP-related projects.

In the 2019 field season, the CRISP continued to implement strategies identified in the *Clackamas River Invasive Species Management Plan.* In particular, improved coordination of activities within the targeted demonstration areas has allowed the CRISP to close gaps in management and enhance existing efforts. Development of the partnership steadily continues. CRISP has focused on building capacity and infrastructure to solidify the partnership and secure resources to continue implementation of the management plan.

Individual organizations within CRISP continue to accomplish an immense amount of work within the watershed. Member organizations are working steadily to combat invasive weeds and to restore degraded habitat. The increased communication and collaboration between partnering organizations resulting from the partnership has enhanced these efforts significantly over the last several years.

Meetings and Coordination

Following development of the *Clackamas River Invasive Species Management Plan*, CRISP partners established a summer and winter meeting schedule for the CRISP.

In July 2019, the Clackamas SWCD hosted the summer CRISP meeting to discuss CRISP partner activities. The event was attended by 14 representatives from 11 participating organizations. The summer meeting included a number of discussions and announcements of important CRISP activities including:

CRISP partners pause for a photo after the July 2019 meeting

- Update on the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund grant* and general budget review*;*
- Announcement of new lineup and prices for contractors for 2019 - 2021;
- Formal election of the CRISP chair and vice chair per the MOU;
- Discussion and revision of CRISP 10-year goals;
- Updates from CRISP partners about spring 2019 activities and ongoing efforts;
- Review and prioritization of five projects proposed by CRISP members

The CRISP also held a winter meeting in December 2019 at the new Clackamas SWCD office. This meeting was attended by 11 representatives from ten organizations. The winter meeting incorporated relevant updates and discussions on a number of CRISP-related topics including:

- Update on the budget, including the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund grant,* and announcement of renewed funding for the next grant cycle;
- Priority weed discussion and review of current weed lists;
- Discussion of 2019 outreach activities and planned activities for 2020;
- Discussion of data sharing status and ideas for improved collaboration
- Updates from CRISP partners about 2019 activities and ongoing efforts;
- Review and prioritization of eight projects proposed for 2019 by CRISP members.

CRISP coordination has been bolstered through the use of a shared CRISP calendar and online directory. These two resources have helped to establish a fixed schedule and consistent access to supporting documentation. The online directory also allows for collaborative development of resources.

Grants and Funding

2019 was the third full year of the implementation of resources allocated from the PGE administered *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund*. In conjunction with this resource, CRISP partners have dedicated an additional $42,500 in cash contributions in 2019 to support

project implementation and the coordination of CRISP-related activities. Clackamas SWCD committed $35,000 and the BLM committed $7,500. Additionally, the Mt Hood National Forest also granted CRISP's request for Retained Receipts funding for $51,500, thus bringing 2019 revenue sources, outside the *Clackamas Fund,* to $94,000.

CRISP BUDGET SUMMARY

REVENUE SOURCE	
PGE	*$205,899*
Metro	*$0*
BLM	*$7,500*
Mt Hood NF	*$51,500*
CSWCD	*$35,000*
TOTAL REVENUE	***$299,899***
EXPENSES	
Contracted Services	*$135,219*
CRISP Sponsored Projects	*$135,219*
Personnel Services	*$90,338*
CRISP Specialist	*$75,338*
CRBC Services	*$15,000*
TOTAL EXPENSES	***$225,557***
BALANCE	***$74,342***

IN KIND CONTRIBUTIONS

DOCUMENTED SOURCES	
Contracted Services	*$414,438*
CRBC Contracted Services	*$28,768*
CSWCD Contracted Services	*$34,606*
Metro Contracted Services	*$231,000*
NCPRD Contracted Services	*$2,064*
NRCS Contracted Services	*$18,000*
USFS funds to ODA and USFS staff	*$100,000*
Personnel Services (hrs)	*254*
CSWCD Personnel (hrs)	*174*
CRISP Partners (hrs)	*895*
CRISP Specialist (hrs)	*1144*

Documented revenue and expenses from CRISP partners in 2019.

In addition to the $94,000 in cash contributions and the $135,219 spent on CRISP-sponsored projects, CRISP partners documented an additional $414,438 in contracted weed control and restoration services. Furthermore, the CRISP also continues to seek additional grant funds to support the implementation of the *Clackamas River Invasive Species Management Plan*.

Partner Contracting

Clackamas SWCD, on behalf of the CRISP, invested significant resources in developing and administering contracts and agreements between funders and partners in 2019. This included administering the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund* and associated agreements with Metro, PGE, CRBC, and BLM.

On behalf of CRISP, the Clackamas SWCD also sought and received project funding for 2019 through the Mt Hood National Forest retained receipts program. To support this effort, contracting was completed in 2019.

Contractor Pool

One of the barriers to implementation identified by several CRISP partners in the *Clackamas River Invasive Species Management Plan* was inadequate access to qualified weed control and restoration contractors. To help address this issue, the Clackamas SWCD has maintained not-to-exceed contracts with professional weed control, restoration, and botanical survey contractors, known as the contractor pool. These contractors are used for all CRISP projects and help CRISP partners streamline weed control efforts across ownership boundaries and facilitate more effective and consistent weed management.

In order to maintain the CRISP contractor pool, the Clackamas SWCD issued a new request for proposal in 2019. After a competitive process, CSWCD signed contracts with eleven professional contractors. These contracts help to ensure that implementation costs are controlled at a competitive rate.

Outreach

In support of the *Clackamas River Invasive Species Management Plan,* the Clackamas SWCD and the Clackamas River Basin Council continued a large outreach effort to private riparian landowners within the targeted demonstration areas, on properties adjacent to high priority invasive weeds, and along Clackamas tributaries targeted for weed control and restoration efforts. More than 600 letters about priority weed surveys, weed treatment, and restoration activities were sent to private landowners within the basin. Staff followed up with many contacts and provided new weed surveys, priority weed treatments, and technical advice to private landowners across the Clackamas River Basin.

Along with outreach letters, representatives from both CSWCD and CRBC spoke at a variety of events about CRISP and priority weeds in the Clackamas Basin. CRBC taught many classes to landowners, promoting the CRISP whenever appropriate. In conjunction with the Pacific Northwest Garlic Mustard Working Group, the CRISP coordinator also spoke about CRISP at both the annual Connect conference (a conference for SWCDs, watershed councils, and land trusts in Oregon) and in a webinar for the Western Governors' Association.

The CRISP was also promoted by partners through both print and online materials. CRBC highlighted CRISP on the front page of their fall 2019 publication "Current News." Metro also published an article titled "Partners fight invasive weeds" in their quarterly publication, "Our Big Backyard." The CSWCD's WeedWise website contains pages about the partnership, and about ongoing CRISP projects, such as the upper watershed surveys and the goatsrue project.

Data Management

In an effort to improve data sharing and data collection, the Clackamas SWCD— in conjunction with the 4-County CWMA Mapping and Data subcommittee— developed a data collection standard for use by CRISP partners. CRISP partners are encouraged to adopt these standards to streamline future data analysis.

The Clackamas SWCD also provided two trainings in 2019 for the Fulcrum data collection system (http://www.fulcrumapp.com/). These trainings were focused toward contractors in the CRISP contractor pool, as well as interested CRISP partners. The Fulcrum system is currently in use by Clackamas SWCD to coordinate CRISP contractors and collect data. The system has also been used in a limited capacity by CRBC, NCPRD, PGE, and OPRD.

CRISP partners have also been encouraged to submit weed observation, survey, and treatment data to Oregon iMapInvasives (http://login.imapinvasives.org/orimi/map/) to inform invasive species management at the state and regional scale.

CRISP Partnership Projects

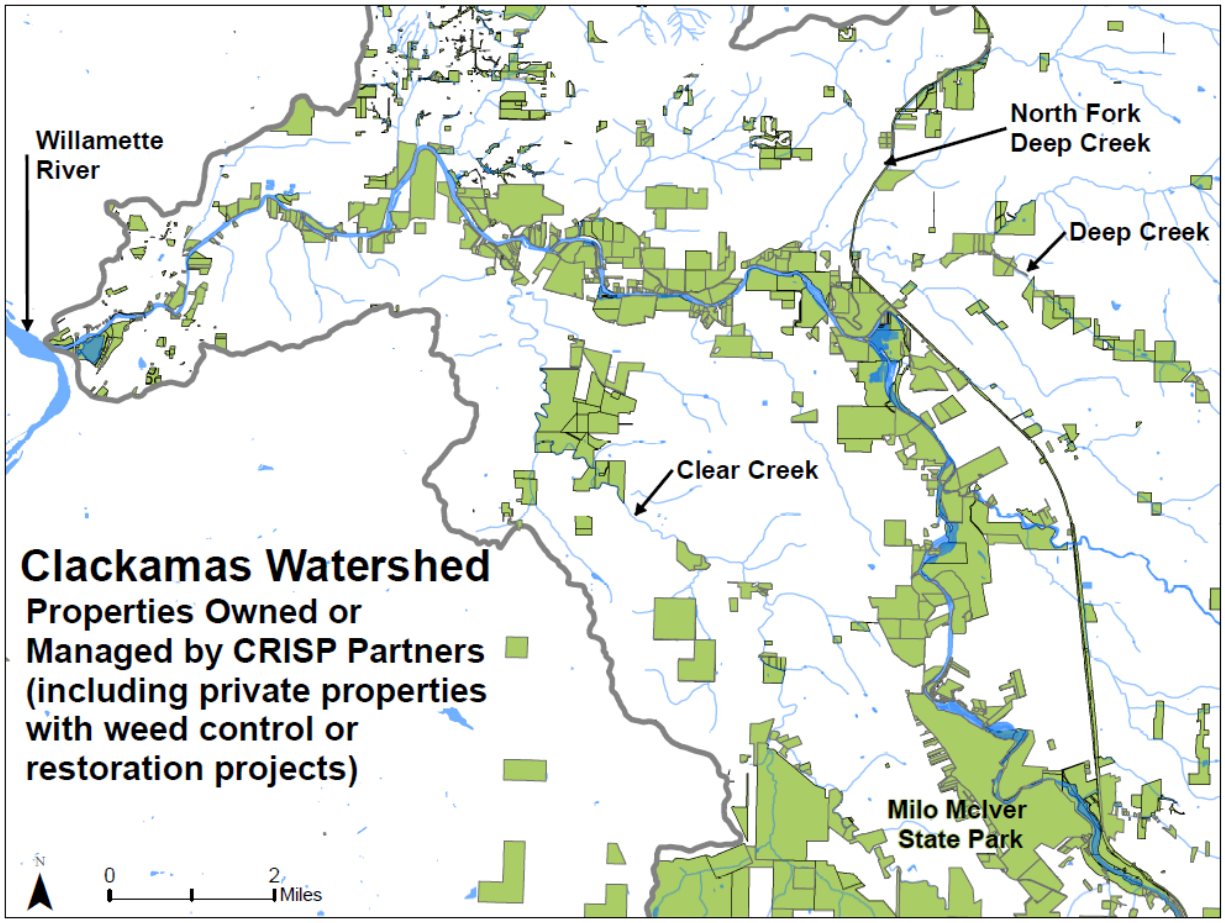
In 2019, CRISP partners continued to use the project proposal process, developed in 2017, to submit projects for discussion and prioritization. These projects are implemented using the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund*, as well as funds from other contributing partners. The project proposal process has provided a feedback loop among CRISP partners to help ensure that the positive impact of our resources is maximized. It has also allowed the CRISP to take advantage of partner familiarity with on-the-ground needs and ensure that management gaps are filled.

2019 Implementation Highlights

As 2019 was the third year of full implementation of the CRISP Management Plan, the initial momentum has continued and there is much to celebrate.

Access to properties

Thanks to the collaborative CRISP efforts, many geographic gaps continue to be filled. Some partners access and manage their own land, while other partners conduct outreach to private landowners, while still others collaborate to make sure unmanaged public land gets treated. As a result, CRISP partners collectively have access to a lot of land!



This map shows Clackamas Basin properties collectively owned or managed by CRISP partners as of December, 2019.

Garlic Mustard

Garlic mustard is a high priority weed affecting many floodplain areas along the Clackamas.

According to the WHIPPET prioritization model, garlic mustard is the highest priority CRISP weed. It spreads rapidly, crowds out native plants, and weed managers across the Portland Metro area spend a large amount of resources to control it. In 2019, CSWCD treated 74 sites, with many of these sites receiving 2 or 3 treatments, and this is in addition to CRISP-owned properties (e.g. Metro treated garlic mustard on properties they own). In addition to the 74 treated sites, seven sites that previously had garlic mustard were visited and no garlic mustard was detected.

2019 was also the second year of garlic mustard control on Clackamas islands (treatments also included knotweed and false brome). The islands had previously been a significant management gap in need of attention, but they were also a difficult hurdle as accessing and treating islands can be complicated. The islands have been a major source of weed infestations, and these treatments reduce the spread of weed propagules along the entire river. Within the Clackamas Basin, 82% of known garlic mustard patches are within the floodplain, and as seen in the map in the "Access to Properties" section, CRISP partners have access to much of the land near the River, meaning we are able to effectively keep this weed in check.

Surveys: North Fork Deep Creek Highlight

Surveys are critical in the effort to find new weed populations, as well as to define the edges of existing populations, and they also help to inform decisions about the prioritization of weed control. As a result of CRISP funding, collaboration, and outreach, partners were able to survey 204 new locations across the watershed.

As a result of discussions focused on knotweed and project prioritization at the semi-annual CRISP meetings, we sought to expand our surveys to properties along North Fork Deep Creek, a tributary of the Clackamas. CSWCD was able to get permission to survey seven new properties, and then treated knotweed on four of them. This work helps to protect the investments made on controlling knotweed along both North Fork Deep Creek and the Clackamas River.

Upper Watershed: Surveys and Treatments

Of the 204 new surveys in 2019, 52 were in the upper watershed, allowing us to find and control new populations of knapweeds, hawkweeds, and other weeds in areas that rarely get monitored. In 2019, the upper watershed survey plan addressed the 45 Road system, looking at roadsides, including decommissioned ones. Contracted crews also scouted for priority weeds at the big culvert replacement site where Road 45 crosses the South Fork Clackamas.

Weed treatments in 2019 continued to expand as a result of the increased coordination between the USFS, PGE, ODA, and CSWCD. ODA focused on weeds in the upper half of the National Forest, CSWCD

tackled known weed patches in the lower half, PGE treated weeds on properties they manage within their Federal Energy Regulatory Commission (FERC) boundary, and USFS staff treated weeds in various locations and also collaborated with and supported the other three partners.

Pale Blue-Eyed Grass in the National Forest

Pale blue-eyed grass, *Sisyrinchium sarmentosum,* is a rare iris with only about 24 known sites worldwide, all of which are in the PNW. Pinhead Creek, which is in the Clackamas Ranger District of the Mt. Hood National Forest, contains several subpopulations of pale blue-eyed grass, all of which are being encroached by weedy vegetation and shrubs. As a result of the partnership and retained receipts funding awarded to CRISP by the USFS, CSWCD was able to hire a contractor to address the weeds and shrubs encroaching on this rare and sensitive plant. The work will reduce the competition with fast-growing weeds and also allow more sunlight to reach the plants. This project had been needing attention for many years, and the CRISP provided both the momentum and necessary channels for CSWCD and the USFS to work collaboratively to take action.

Deep Creek Knotweed

Deep Creek is a tributary of the Clackamas River, and the Clackamas River Basin Council began controlling knotweed along this tributary in 2017, as part of a CRISP project they proposed. After successful treatments in 2017 and 2018 and continued outreach to many landowners, CRBC was able to treat more properties in 2019, thus adding to their Shade our Streams sites and treating a very long, almost continuous stretch of Deep Creek that had been invaded with knotweed. After their first year of treatment, they noticed an 85 – 98% reduction in knotweed patches. Landowners are seeing these good results, and the news is spreading, leading to more landowners signing up. This has allowed CRBC to treat knotweed on large stretches of Deep Creek.

Knotweed creates thick monocultures in riparian areas and has been a major problem along Deep Creek for many years. CRBC has been able to treat it with the help of CRISP. Photo: Sound Native Plants

Implementation Summary

In 2019, CRISP participating organizations carried out a significant amount of weed control and restoration work within the Clackamas River Basin. Although reported metrics differ substantially between CRISP partnering organizations, a meta-analysis of reporting organizations revealed that in 2019, CRISP partners:

- Maintained a database of location information for 23,586 weed observations from 222 species
- Maintained active permissions for 702 public and private properties[7], on about 4400 parcels[8]

[7] Reporting organizations: BLM, Clackamas County, CLT, CRBC, CSWCD, OPRD, & USFS

- Carried out surveys on 204[9] sites totaling more than 726 acres[10],
- Treated invasive weeds on over 436[11] sites totaling over 4640 gross acres[12],
- Planted over 218,180[13] shrubs and trees and 14,000[14] bulbs and plugs at more than 63 restoration sites[15]

Although impressive, the accomplishments documented here only represent a portion of the data reported from ten of our 14 CRISP participating organizations. Therefore, these accomplishments should be considered to be highly conservative estimates of activities undertaken.

Contract crews preparing for knotweed control.

Partner Expenditures Summary

In 2019, CRISP partners reported significant expenditures in support of weed control and restoration activities within the Clackamas River Basin. A meta-analysis of partner reported partner expenditures revealed:

- A total of 2163 staff hours[16]
- A total of $414,438 in contracted weed control and restoration services[17]
- In addition to partner expenditures, $135,219 was spent on contracted services for CRISP-sponsored projects. Fourteen different projects were proposed and completed by 7 partners: Clackamas County, CLT, CRBC, CSWCD, Metro, NCPRD, and OPRD.

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[8] Reporting organizations: BLM, Clackamas County, CLT, CRBC, CSWCD, Metro, NCPRD, OPRD, PGE, USFS, & WES
[9] Reporting organizations: CRBC, CSWCD, Metro, & NCPRD
[10] Reporting organizations: CRBC, CSWCD, & NCPRD
[11] Reporting organizations: CRBC, CSWCD, CLT, Metro, NCPRD, NRCS, ODA, OPRD, & WES
[12] Reporting organizations: CRBC, CSWCD, CLT, Metro, NCPRD, NRCS, ODA, OPRD, PGE, USFS, & WES
[13] Reporting Organizations: CRBC, CLT, Metro, & NCPRD
[14] Reporting Organization: Metro
[15] Reporting Organizations: CRBC, CLT, Metro, PGE, & WES
[16] Reporting organizations: CLT, CSWCD, Metro, & NCPRD
[17] Reporting organizations: In-Kind Services from CRBC, CSWCD, Metro, NCPRD, NRCS, & USFS

Participating Organization Activities

CRISP partner organizations reported a significant number of activities undertaken over the last year within the Clackamas River Basin. The information provided by partnering organizations differed between organizations in terms of scope and specificity, and therefore, the items documented below may not fully reflect all activities of an organization or the entirety of work underway. Organizational activities included here were either reported through an annual summary by the partnering organization or through documentation from CRISP partner meetings.

Many of the reported activities have been undertaken independently of the CRISP planning efforts, but are provided here to illustrate the breadth and volume of work currently underway by CRISP partners within the Clackamas River Basin to control and prevent the spread of invasive weeds. In sharing these accomplishments, the partnership hopes to increase awareness and facilitate better cooperation among CRISP partners moving forward with implementation in subsequent years.

4-County CWMA

The 4-County Cooperative Weed Management Area (CWMA) focuses on support and enhancement of weed management across the Portland Metro region. Each year, the 4-County CWMA has one general meeting in Clackamas County hosted by the Clackamas SWCD. The 2019 meeting featured highlights of activities across Clackamas County, with many CRISP partners attending.

Lindsey Karr, CRISP coordinator with CSWCD, spoke about the District's annual contractor training. She trains contractors on priority weed identification, data collection protocols, and the use of Fulcrum, a data collection app. The Lolo Pass Hawkweed Project is a collaborative priority weed project on the Mt. Hood National Forest within the Bonneville Power Administration powerline corridor, targeting primarily meadow and orange hawkweeds. Beth Myers-Shenai of ODA, Courtney Gattuso of CSWCD, Sam Leininger of CSWCD, and Angie Kimpo of the Portland Water Bureau shared the history and current management of the Lolo Pass Hawkweed Project. For the final presentation, Elaine Stewart with Metro, presented on Metro's goals and management in some of Metro's more sensitive natural areas.

Lindsey Karr, CRISP coordinator and CSWCD WeedWise specialist, shares about training contractors on invasive plant identification and data collection apps.

The 4-County CWMA Mapping and Data sub-committee also provides support to CRISP partners through the development and maintenance of data collection standards. These standards provide guidance to organizations collecting weed observations and treatment data. The standards are integrated with Oregon iMapInvasives to support data sharing throughout the state and region.

In cooperation with the Columbia Gorge CWMA, the 4- County CWMA has continued to develop a series of Best Management Practices guides. These guides outline control methods for 22 invasive weeds, and have been made available to CWMA partners for use within their own organizations.

Bureau of Land Management- Northwest Oregon District (BLM)

The Bureau of Land Management- Northwest Oregon District reported active management efforts in the Clackamas River Basin in cooperation with the Clackamas SWCD. In 2019, two BLM properties just upstream from Barton Park were targeted for control and/or survey, and three BLM parcels in the upper watershed were treated for roadside weeds. The lower watershed properties are in close proximity to several other CRISP partner activities. The upper watershed sites are a high priority because of their location; treatments of these small roadside weed patches will help to prevent more pristine forested areas from being impacted.

False brome is a significant invader being managed by BLM throughout its management areas.

In 2019, after many years of work, the BLM was able to finalize an Environmental Assessment that will allow the BLM to both treat invasive weeds that do not currently have a state-listed noxious weed designation. Escaped plants such as periwinkle (*Vinca minor*) are currently impacting several properties within the Clackamas River targeted sub-basins, but could be treated under current rules. Many of these invasive weeds are of particular concern, especially in high-quality natural areas in the Eagle Creek sub-basin. The EA will also allow the BLM and its partners to expand their options for herbicide control, allowing land managers to choose more effective herbicides.

In addition to active weed management efforts, the BLM also provided funding to support the CRISP dedicated WeedWise Specialist for coordination and implementation of the *CRISP Management Plan.*

Clackamas County - Parks

Clackamas County Parks routinely manages weeds as part of their standard park maintenance activities. In managing established parks, Clackamas County Parks serves at the interface between the general public and natural areas, providing opportunities to promote outreach and education efforts to the general public. Due to the heavy use of these areas by the public, they are also threatened by the introduction of invasive species through human-mediated dispersal. Clackamas County Parks also works with the County Dumpstoppers program to address illegal garbage dumping on public lands. These dump sites have been identified as likely introduction points for new invasive weeds into the watershed.

In 2019, priority weed control efforts on County properties were carried out in cooperation with CRBC and CSWCD. At Barton Park, Metro did restoration work and weed treatments from 2014 to mid-2018, in conjunction with their work at River Island Natural Area. However, their funding for Barton Park ended in 2018. As a result of the CRISP collaboration and partnership, CSWCD was able to continue these weed treatments in 2019 to protect the years of work done by Metro.

At Fisherman's Bend, CRBC treated weeds in the 100 foot riparian buffer through their "Shade our Streams" program, which helps protect their prior restoration planting. They also treated knotweed and garlic mustard across the entire site. At Billy Goat Island, a caretaker has been working to clear invasive weeds and revegetate the site, and CSWCD has been contributing to this work through the CRISP, treating both garlic mustard and knotweed. At Metzler Park, where there was just a few stems of knotweed along the stream, CSWCD treated them, preventing larger infestations downstream.

Madrone Wall is a Clackamas County park containing old growth Douglas fir trees and over 100 documented species of native plants. Its rocky bluffs are home to nesting peregrine falcons.

CRISP partners also proposed a survey and treatment project at Madrone Wall, where rocky bluffs are home to nesting peregrine falcons. The site also contains old growth Douglas fir trees, many species of native plants, and a noteworthy population of Madrone trees. CSWCD worked with a contractor to survey the entire site in the fall, and then treated the false brome.

Clackamas County - Water Environment Services (WES)

Clackamas County – Water Environment Services (WES) supports weed control efforts in the lower portions of the Clackamas River Basin on the natural areas they own, and on site-specific restoration projects in conjunction with their RiverHealth Stewardship Grant Program. The grants vary from year to year, but frequently involve invasive weed control activities. For example, in the 2019-20 fiscal year, the RiverHealth Stewardship Program is funding 3 groups that are treating weeds within the Clackamas Basin

The Carli Creek site, located on the lower portions of the Clackamas River, is a constructed wetland for storm water treatment. WES has been treating weeds here and also completed the planting phase of the project in 2019.

on approximately 18 acres, along approximately 4,000 linear feet of streams.

In 2019, WES completed planting of the 15-acre Carli Creek project, a constructed wetland for storm water treatment. Invasive weed treatments are ongoing and will continue over the coming years to maintain the project after implementation.

WES also continued ongoing invasive species control on its other natural areas in the Clackamas basin, including the Rock Creek Confluence site (approximately 12 acres), and the Rose Creek Natural Area (approximately 5.6 ac).

Clackamas River Basin Council (CRBC)

The Clackamas River Basin Council is proud to be a part of the CRISP collaborative process. Their work has included detailed management, planning, and coordination with ongoing CRBC projects such as the Shade Our Streams program, as well as with CRISP-specific weed projects with high priority weeds along Deep Creek and other key locations. Not only does their work in the CRISP program target and restore riparian areas not already being managed by their other programs, it helps to protect the important investment of the Shade Our Streams properties by reducing future invasive species and EDRR weeds threats in the lower basin.

Deep Creek site after 1 year of knotweed treatment. The dead knotweed canes show space that is now open for native shrubs and trees to grow, thus gradually increasing shade and habitat, and reducing erosion.

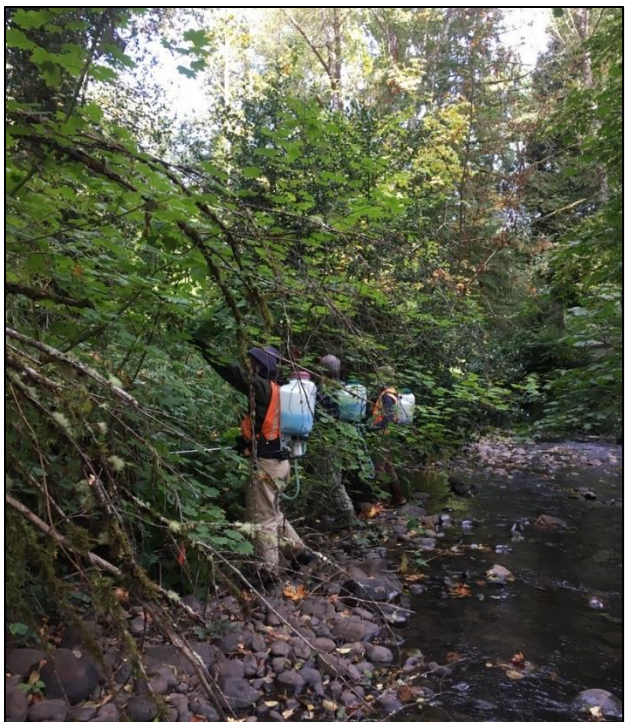
CRBC has worked with a major cash match from PGE in their Shade Our Streams program to help remove invasive weeds and install streamside forests in the Clackamas River basin. Each of their restoration sites is accessed with an eye towards EDRR weeds and potential participation in the CRISP program. The key EDRR weeds treated on CRBC's CRISP and Shade Our Streams sites were knotweed, meadow knapweed, false brome, and garlic mustard.

On Deep Creek, CRBC has been treating knotweed with the support of CRISP for three years. Five of the knotweed treatment sites on Deep Creek were in their third year of treatments and showed a 95% reduction average. Ten sites were in their second year of knotweed control, showing an 85% reduction. On one particular stretch of Deep Creek, there was one landowner with a lot of knotweed- infested land who declined to participate in the program. In 2019, the property was sold, and CRBC is now actively conducting outreach to the new landowner to treat the knotweed. All of the properties on Deep Creek that CRBC has been working with are privately owned, and landowners have been happy with the treatment results and are sharing their successes with neighbors. One landowner at the confluence of Deep Creek and Tickle Creek who originally declined the

program, saw the positive difference on his neighbor's properties and signed his 15-acre site up mid-treatment period.

Other Notable activities accomplished by the CRBC in 2019 include:

- Surveyed 71 sites, totaling 345 acres. This includes 5.6 miles of streamside properties on Deep Creek, 2 acres of upland property, and 20 acres of existing Shade our Streams properties on the Clackamas mainstem
- Treated CRISP priority weeds at 23 sites along Deep Creek and the Clackamas
- Treated 105 acres and 14 stream miles through the Shade our Streams program.
- Worked on various phases of 42 different restoration projects. This includes 88,700 native trees and shrubs planted, 11.78 river miles restored
- Sent 41 pieces of outreach information to potential partnering landowners. To landowners already participating, 3 additional pieces of educational material were provided (Information on invasive weeds, knotweed treatment, and "Parting with Pesticides" program), as well as an invitation to a series of educational workshops.
- Hosted multiple landowner educational workshops including: "What's in My Stream?" "Living with Wildlife," "Naturescaping at Home," and "Healthy Streams and Forests"



A contracted crew treats knotweed on Deep Creek. CRBC has been doing CRISP-supported knotweed treatments on Deep Creek since 2017. Photo: Sound Native Plants

Clackamas Soil and Water Conservation District (CSWCD)

The Clackamas SWCD operates an active weed control program in the Clackamas River Basin and throughout Clackamas County. This work is spearheaded through both their conservation planning efforts and the WeedWise program. The WeedWise program focuses on landscape scale management of invasive weeds. In particular, the focus of this program is the management of priority invasive weeds that may have limited abundance and distribution within Clackamas County. Current efforts by the WeedWise program include offering free control of priority invasive weeds to private property owners across the county. This service is voluntary and provided as a service to county residents.

The WeedWise program also maintains a county priority weed list for use by regional land managers, based on statewide risk assessments and the abundance of weeds within Clackamas County. This weed list can be found on the WeedWise website (https://weedwise.conservationdistrict.org/weeds).

In 2019, the Clackamas SWCD WeedWise program continued to serve as administrators for the CRISP. A primary focus of the WeedWise program in this effort has been to build capacity and infrastructure to support CRISP-related activities. In this capacity, the Clackamas SWCD WeedWise program has also served as a hub for CRISP-related information pertaining to the mapping of weed observations, site surveys, treatments, project sites, and priority weed information associated with the *Clackamas River Invasive Species Management Plan*.

In 2019, the Clackamas SWCD continued its focus on education and outreach to support the CRISP. In cooperation with the PNW Garlic Mustard Working Group, the CRISP coordinator gave two presentations that highlighted the importance of partnership and collaboration in the control of garlic mustard. The first presentation was for the Western Governors' Association, and the second was at Connect, an annual conference for Soil and Water Conservation Districts, Watershed Councils, and Land Trusts. The WeedWise program also hosted their annual contractor and partner training, focusing on invasive weed identification and data collection. In addition to website posts about multiple CRISP weed control projects and the upper watershed surveys, the WeedWise program also featured update of CRISP-related activities on social media. These updates are intended to inform the general public and help to raise awareness about current CRISP efforts.

The WeedWise program also initiated two landowner mailings, sending 561 letters to private landowners within the targeted demonstration area along the Clackamas River, along Clackamas tributaries, and others in close proximity to known priority weed locations. These letters resulted in 45 new landowner permissions, which allowed Clackamas SWCD to find new weed observations and begin weed treatments.

Mouse-ear hawkweed is an ODA class A noxious weed. As a result of CRISP surveys, a previously unknown patch, only the 2nd in Clackamas County, was found and treated.

Notable activities in 2019 undertaken by the Clackamas SWCD WeedWise program within the Clackamas River Basin include:

- Surveyed 52 locations in the upper watershed with a focus on the 45 road system. These surveys identified new observations of meadow knapweed, European and common, shiny and Robert's geranium, invasive blackberries, European mountain ash, and creeping buttercup.
- Carried out 415 invasive weed control treatments at 282 different sites, with total gross size of 644 treated acres and a net infested size of 37 acres;
- Treated knotweed on 81 knotweed sites on the Clackamas River upstream from Richardson Creek, in the Eagle Creek Basin, lower Deep Creek, North Fork Deep Creek and middle/upper Clear Creek;
- Treated garlic mustard on 74 sites (monitored an additional 7 sites with no garlic mustard found);

- Weed treatments in the lower watershed: false brome (33 sites), purple loosestrife (15 sites), spurge laurel (13 sites), sulfur cinquefoil (11 sites), policeman's helmet (5 sites), oblong spurge (6 sites), orange hawkweed (5 sites), meadow hawkweed (2 sites), mouse-ear hawkweed (1 site), giant hogweed (1 site), goatsrue (2 sites), and milk thistle (1 site);
- In the upper watershed, CSWCD treated false brome (4 sites), spotted knapweed (4 sites), diffuse knapweed (4 sites), meadow knapweed (1 site), shiny/Robert's geranium (5 sites), European hawkweed (5 sites), common hawkweed (2 sites), black locust (1 site), houndstongue (1 site), rush skeleton weed (1 site), goutweed (1 site), holly (1 site), European mountain ash (2 sites), bird's foot trefoil/Scotch broom/St John's wort (1 site)
- Surveyed 66 sites in the lower watershed for a total of 360 surveyed acres across the entire basin;
- Maintained a total of 23,586 weed observations within the basin for 222 invasive weed species, adding 1060 new observations in 2019;
- Maintained 712 active permissions with private landowners;
- Invested 1318 hours of total staff time on CRISP-related activities;
- Spent a total of $169,825 on contracted services inside the Clackamas Basin ($135,219 on CRISP-approved projects and $34,606 on in-kind contributions towards contracted services).

CSWCD treated invasive weeds on 12 Clackamas River Islands in 2019. These treatments help prevent the spread of weeds in riparian and floodplain areas. Photo: Mosaic Ecology

Columbia Land Trust

Columbia Land Trust is a private, non-profit organization that owns and manages land as habitat for fish and wildlife in the lower Columbia River region of Oregon and Washington. The Land Trust also holds conservation easements on private lands and provides technical support to landowners. In the Clackamas River watershed, the Land Trust owns a 23-acre riparian and upland forest called the McGahan Natural Area, located across the river from Milo McIver State Park. The Land Trust also holds a conservation easement on a 32-acre site near Madrone Wall Park. The Clackamas SWCD has partnered with the Land Trust to control weeds on the McGahan site since at least 2012. Columbia Land Trust joined CRISP in late 2017.

In 2019, CRISP funded two rounds of weed control at the 23-acre McGahan site. Work included herbicide applications and manual control. Target species included false brome (*Alliaria petiolata*), spurge laurel (*Daphne laureola*), ivy (*Hedera hibernica*, *H. helix*), yellow archangel (*Lamiastrum galeobdolon*), English holly (*Ilex aquifolium*), Himalayan blackberry (*Rubus armeniacus*), tansy ragwort (*Jacobaea vulgaris*), thistle (*Cirsium* spp.), and empress tree (*Paulownia tomentosa*).

Columbia Land Trust staff are also continuing to restore habitat by planting and maintaining native vegetation in small areas along the property boundaries where neighbors' yards and structures have encroached on the natural area in the past. In 2019, staff installed a total of 80 shrubs and trees, and 50 sword ferns, at two planting sites. Time was also spent maintaining several hundred plants that were installed in 2017-2018. Columbia Land Trust staff hours dedicated 45 hours to on-site CRISP-related activities at the McGahan Natural Area (contractor coordination, weed control, planting, and plant maintenance) in 2019.

The McGahan Natural area is a 23 acre riparian and upland forest, located across the Clackamas River from Milo McIver State Park. Here, CLT staff installed and mulched shrubs, trees, and ferns on the border of the property.

Metro

Building on the accomplishments of previous years, Metro controlled a variety of invasive weeds across its properties in 2019. In the Clackamas Basin, sites included Bakers Ferry, Barton Natural Area, Cazadero, Cazadero North, Clackamas Bluffs, Clear Creek Canyon, Clear Creek North, Jonsson Center, North Fork Deep Creek, North Fork Deep Creek Forest, North Logan, Richardson Creek, River Island, and Upper Abernethy Natural Areas were the focus of extensive weed management work.

Early detection and rapid response (EDRR) treatments were completed by staff or contractors depending on timing, extent and funding availability, while site-wide treatments were typically completed by contractors.

In 2019, Metro initiated the following activities:

- 14 sites surveyed and treated
- 1812 total site acres under management

- Over 30 species managed including: Italian arum (*Arum italicum*), blackberry (*Rubus bifrons*), black locust (*Robinia pseudoacacia*), butterfly bush (*Buddleja davidii*), old man's beard (*Clematis vitalba*), creeping bellflower (*Campanula rapunculoides*) false brome (*Brachypodium sylvaticum*), garlic mustard (*Alliaria petiolata*), gout weed (*Aegopodium podagraria),* ivy (*Hedera hibernica & H. helix*), knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), lesser celandine (*Ranunculus ficaria),* meadow knapweed (*Centaurea × moncktonii*), milk thistle *(Silybum marianum),* policeman's helmet (*Impatiens glandulifera*), American pokeweed (*Phytolacca americana*), purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), Scotch broom (*Cytisus scoparius*), spurge laurel (*Daphne laureola*), thistles (*Cirsium* sp.), yellow arch angel (*Lamiastrum galeobdolon*), yellow flag iris (*Iris pseudacorus*), periwinkle (*Vinca* sp.), poison hemlock (*Conium maculatum*), English holly (*Ilex aquifolium*), teasel (*Dipsacus fullonum*), and other grasses, broadleaf weeds, and weedy trees.
- Over 800 staff hours invested
- Invasive control utilizing five contractors, with receipts totaling $95,000.
- Native plantings and plant maintenance utilizing seven contractors, with receipts totaling over $136,000.

Restoration crew prepares for invasive species treatments at River Island Natural Area.

Additional notes of interest:

- Metro planted 114,750 native trees and shrubs, 9000 native live stakes, and 450 pounds of native seed throughout 6 of the 14 Clackamas River sites in 2019.
- Two new EDRR weeds were detected in 2019 and treated on Metro sites; creeping bellflower (*Campanula rapunculoides*) at the Jonsson Center & gout weed (*Aegopodium podagraria)* at North Logan.

Site-specific activities by location include:

Bakers Ferry

- EDRR: garlic mustard (*Alliaria petiolata*), false brome (*Brachypodium sylvaticum*), Italian arum (*Arum italicum*), yellow flag iris (*Iris pseudacorus*), purple loosestrife (*Lythrum salicaria*), policeman's helmet (*Impatiens glandulifera*), lesser celandine (*Ranunculus ficaria)*
- Site wide: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), butterfly bush (*Buddleja davidii*), knapweed (*Centaurea* sp.), ivy (*Hedera hibernica & H. helix*)

Barton Natural Area

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), purple loosestrife (*Lythrum salicaria*), garlic mustard (*Alliaria petiolata*), meadow knapweed (*Centaurea ×*

moncktonii), Italian arum (*Arum italicum*). Monitoring for sulfur cinquefoil (*Potentilla recta*) as populations were found in close proximity by CSWCD.

- Site wide: false brome (*Brachypodium sylvaticum*), butterfly bush (*Buddleja davidii*), spurge laurel (*Daphne laureola*), old man's beard (*Clematis vitalba*), ivy (*Hedera hibernica & H. helix*), Scotch broom (*Cytisus scoparius*)

Clear Creek Canyon

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), yellow arch angel (*Lamiastrum galeobdolon*)
- Site wide: false brome (*Brachypodium sylvaticum*), meadow knapweed (*Centaurea × moncktonii*), ivy (*Hedera hibernica & H. helix*), and periwinkle (*Vinca* sp.)

Clear Creek North

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), Italian arum (*Arum italicum*), butterfly bush (*Buddleja davidii*), yellow arch angel (*Lamiastrum galeobdolon*)
- Site wide: false brome (*Brachypodium sylvaticum*), ivy (*Hedera hibernica & H. helix*)

Cazadero Natural Area

- EDRR: meadow knapweed (*Centaurea × moncktonii*), false brome (*Brachypodium sylvaticum*)
- Site Wide: Scotch broom (*Cytisus scoparius*), spurge laurel (*Daphne laureola*), and tansy ragwort (*Senecio vulgaris*)

Clackamas Bluffs

- EDRR: false brome (*Brachypodium sylvaticum*)
- Site Wide: old man's beard (*Clematis vitalba*), periwinkle (*Vinca* sp.), ivy (*Hedera hibernica & H. helix*)
- A new parcel was purchased in 2018 adding 100 acres to this site.

Cazadero North

- EDRR: yellow flag iris (*Iris pseudacorus*) - manual removal of yellow flag along stream, American pokeweed (*Phytolacca americana*)
- Site Wide: ivy (*Hedera hibernica & H. helix*), teasel (*Dipsacus fullonum*)

Jonsson Center

- EDRR: creeping bellflower (*Campanula rapunculoides*), yellow arch angel (*Lamiastrum galeobdolon*), knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*)
- Site Wide: false brome (*Brachypodium sylvaticum*), ivy (*Hedera hibernica & H. helix*), periwinkle (*Vinca* spp.), and Scotch broom (*Cytisus scoparius*)

North Fork Deep Creek

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), Italian arum (*Arum italicum*), American pokeweed (*Phytolacca americana*)
- Site Wide: ivy (*Hedera hibernica & H. helix*), periwinkle (*Vinca* sp.)

North Fork Deep Creek Forest

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*)
- Site Wide: holly (*Illex aquifolium*), lemon balm (*Melissa officinalis*), vinca *(Vinca spp.*), ivy (*Hedera hibernica & H. helix*)

North Logan

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, an F. × bohemica*), lesser celandine (*Ranunculus ficaria,* close to eradication), butterfly bush (*Buddleja davidii*), meadow knapweed (*Centaurea × moncktonii*), garlic mustard (*Alliaria petiolata*), gout weed (*Aegopodium podagraria)*
- Site wide: false brome (*Brachypodium sylvaticum*), scotch broom (*Cytisus scoparius*), ivy (*Hedera hibernica & H. helix*), periwinkle (*Vinca* spp.), old man's beard (*Clematis vitalba*)

Richardson Creek

- EDRR: garlic mustard (*Alliaria petiolata*), Italian arum (*Arum italicum*), yellow flag iris, knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), false brome (*Brachypodium sylvaticum*), milk thistle *(Silybum marianum)* – a new population found and treated in 2018.
- Site wide: old man's beard (*Clematis vitalba*), periwinkle (*Vinca* sp.), ivy (*Hedera hibernica & H. helix*), blackberry (*Rubus bifrons*), reed canary grass (*Phalaris arundinacea*)

Richardson Creek – Metro continues weed control and revegetation efforts at Richardson Creek Natural Area after the large restoration project completion in the Summer of 2018. Photo depicts planting of the site in the winter of 2019.

River Island

- EDRR: knotweed (*Fallopia japonica, F. sachalinensis, and F. × bohemica*), garlic mustard (*Alliaria petiolata*), Italian arum (*Arum italicum*), meadow knapweed (*Centaurea × moncktonii*), purple loosestrife (*Lythrum salicaria*), lesser celandine (*Ranunculus ficaria,* close to eradication), poison hemlock (*Conium maculatum*)

- Site wide: false brome (*Brachypodium sylvaticum*), butterfly bush (*Buddleja davidii*), Scotch broom (*Cytisus scoparius*)

Upper Abernethy

- EDRR: false brome (*Brachypodium sylvaticum*), Italian arum (*Arum italicum*)
- Site wide: English holly (*Ilex aquifolium*), English hawthorn (*Crataegus monogyna*), periwinkle (*Vinca* sp.), ivy (*Hedera hibernica & H. helix*), blackberry (*Rubus bifrons*), reed canary grass (*Phalaris arundinacea*).

Natural Resources Conservation Service- Clackamas (NRCS)

NRCS provides technical and financial assistance to local landowners through their farm bill funded programs. Within the Clackamas River Basin, weed control efforts are typically undertaken in conjunction with other conservation practices on private lands.

Current technical and financial assistance has focused predominantly on the management of common invasive weeds. The NRCS works very closely with the Clackamas SWCD and typically refers landowners to the SWCD for weed control programs. These resources are available on an ongoing basis and, where appropriate, should be considered for CRISP-related implementation.

Before and after photos at a Clackamas SWCD oak restoration site where NRCS controlled blackberry.

In 2019, NRCS spent $36,113.10 in cost share funds to treat 186 acres through the use of the conservation practices of Herbaceous Weed Control and Brush Management. This included forested and crop lands in both Clackamas and Multnomah Counties. The primary targets for these treatments are non-native blackberries, Scotch broom, knotweed, non-native hawthorn and holly. These practices took place across 23 different contracts with private landowners.

NRCS is developing a Soil Health in Pasture Livestock System Conservation Implementation Strategy (CIS) so they can target grazing and pasture lands. This would help them target livestock-related resource concerns and water quality, which often include an invasive weed control component.

North Clackamas Parks and Recreation District (NCPRD)

North Clackamas Parks and Recreation (NCPRD) owns and manages five natural areas in the Clackamas watershed totaling approximately 39 acres. Additionally, they assist Water Environment Services (WES) in the maintenance of 14 acres on WES-owned property. NCPRD serves at the interface between the general public and natural areas within urban portions of the Clackamas River Basin. Their properties provide a unique opportunity to promote outreach and education efforts to the public, but are also under the greatest threat from the introduction of invasive species through human induced movement.

NCPRD acquired Hidden Falls Nature Park in 2019. This 21.34 acre natural area is bisected by Rock Creek, a tributary to the Clackamas River. Before NCPRD owned this property, access was restricted and there was no information of weed presence. Once NCPRD gained ownership, they partnered with CRISP to survey and record the presence of priority weed species. Surveyors observed spurge laurel, false brome, and bohemian knotweed.

Using CRISP contractors and grant funding, NCPRD treated approximately 1 acre of Bohemian knotweed along Rock Creek and a ½ acre of false brome on the Hidden Falls property. Initial knotweed and false brome treatments seem to have been effective, and they are planning a follow-up treatment for 2020. The individual spurge laurel was pulled during the survey and no more have been detected.

Over 5,000 native trees and shrubs were planted as part of the development of Hidden Falls. Many of these were planted as mitigation for development, but they are replacing dense stands of blackberries and other weeds and will have a net benefit to the watershed.

CRISP contractors treat Bohemian knotweed at Hidden Falls.

NCPRD also manages invasive species (CRISP priority, ODA listed, and site specific) on the remaining acreage in their care. This included the removal of approximately one acre of blackberry at Trillium Creek Park and planting approximately 400 bare root native plants and 200 live stakes. Contractors performed initial treatments of another half-acre of blackberry at Trillium Creek that will be planted in 2020 or 2021.

In-kind contributions for 2019 included $2,064.62 spent on weed control contractors in the Clackamas Basin. Target species were Himalayan blackberry and shiny geranium. NCPRD spent a total of 50 hours of staff time on weed control and CRISP related activities. NCPRD also sends seasonal employees to CRISP weed ID training and submits observations of priority weeds using the Fulcrum app.

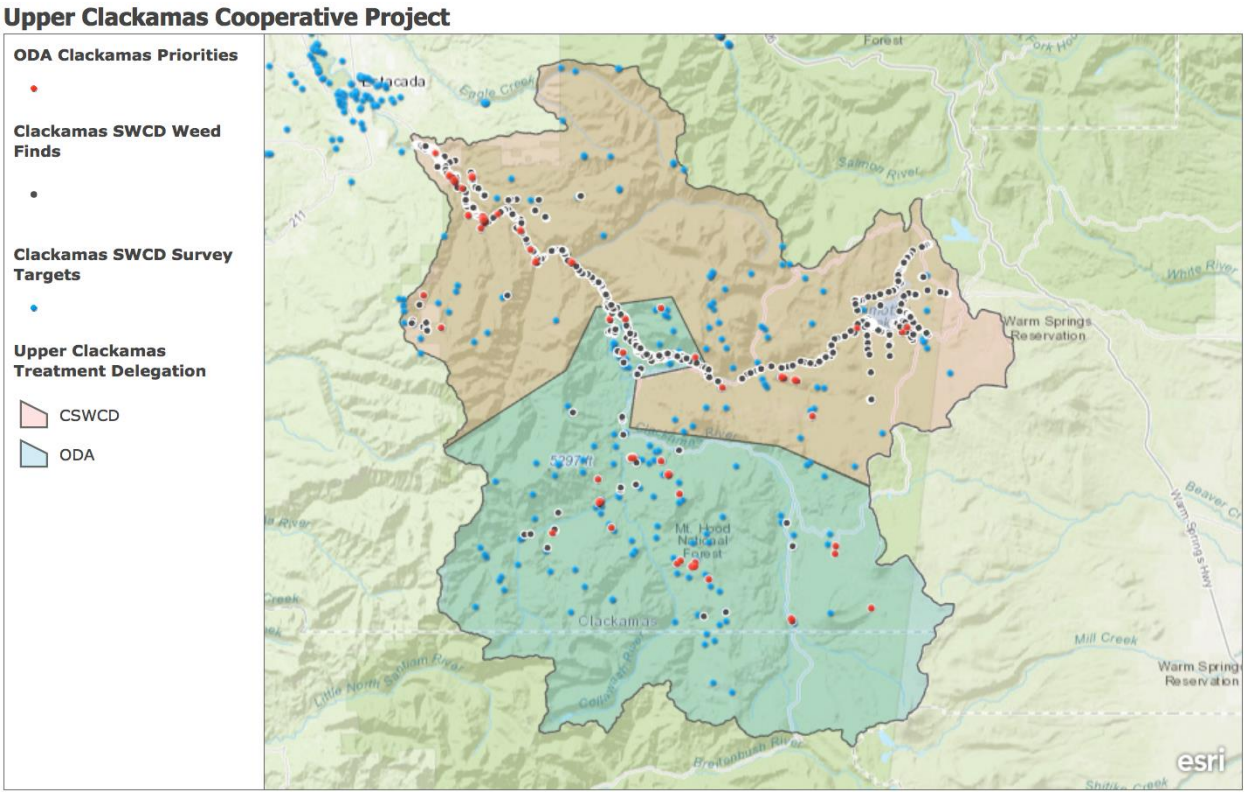
The south side of Trillium Creek was restored in 2018-2019. Work on the north side will take place in 2020-2022 as part of a USFW grant.

NCPRD received a grant award for restoration work within the Rock and Sieben Creek watersheds in the 2020-2022 biennium. Funds will support weed control and establishment of native plant communities at the sites under NCPRD management in the Clackamas watershed.

Oregon Department of Agriculture (ODA) - Noxious Weed Control Program

The ODA Noxious Weed Control Program serves a leadership role in managing invasive species at the state level, providing regular guidance related to risk assessment and noxious weed listings to help protect the state from new invasive weeds. In this capacity, they also support an early detection and rapid response effort to contain, control, and eradicate high priority Class A noxious weeds, which can include enforcement of noxious weed laws when applicable. ODA also supports education and outreach efforts associated with noxious weed control through the development of noxious weed brochures, their website, and associated materials.

In addition to their state-level responsibilities, ODA implements weed control within the Clackamas River Basin on behalf of the Mt Hood National Forest. In both 2018 and 2019, ODA's main focus in the Clackamas Ranger District was addressing priority weed finds resulting from the intensive survey commissioned by Clackamas SWCD in 2017.



Map showing noxious weed survey locations and results from the Clackamas SWCD 2017 surveys, and the designated priorities for the Oregon Department of Agriculture.

The upper watershed was divided into two sections with ODA staff mainly treating sites in the uppermost section and Clackamas SWCD staff treating slightly lower elevation areas. Staff from both agencies teamed up to address a spreading population of false brome in the remote Collawash drainage near Bagby Hot Springs. ODA also monitored and treated previously known sites in the Ranger District as needed, and nearly all these areas were showing excellent control or were absent of plants, with the exception of false brome in the Collawash area. Areas of treatment included Highway 224/Road 46, Timberlake Job Corps campus, Ripplebrook Rd. 4631 & 4635, Bagby Hot Springs Rd. 70 area, Collawash Rd 63 area, Rd 42, and Rd 57 area.

Clackamas Ranger Districts Weed Targets:

- Diffuse Knapweed (*Centaurea diffusa*): B-rated
- False Brome (*Brachypodium sylvaticum*): B-rated
- Japanese Knotweed (*Fallopia japonica*): B-rated
- Spotted Knapweed (*Centaurea stoebe*): B(T)-rated
- Sulfur Cinquefoil (*Potentilla recta*): B-rated

By the numbers:

- Treated 1.1 net acres over 710 gross acres
- 68 sites chemically treated, 12 sites manually treated, 9 sites monitored and no plants found
- 5 new sites found

Oregon Parks and Recreation Department (OPRD)

Within the Clackamas River Basin, OPRD has a major focus on the management of invasive weeds at Milo McIver State Park. OPRD has been working for the last several years to map and treat infestations of priority noxious weeds throughout the park system and has developed a management strategy for controlling these invasive weeds.

Weeds of greatest focus within the park are garlic mustard (*Alliaria petiolata*) and false brome (*Brachypodium sylvaticum*). Milo McIver State Park has been identified as the upstream-most infestation of both of these priority invasive weeds in the Clackamas River Basin, and therefore, control and management of these weeds are of particular importance. Other target invasives are yellow archangel, meadow hawkweed, English ivy, Old Man's Beard and mouse ear hawkweed.

In early 2017, OPRD staff met with Clackamas SWCD's Lindsey Karr and Integrated Resource Management's Matt Mellenthin to discuss strategy in the coming years for false brome control at Milo McIver State Park, and get a better understanding of CRISP-priority species occurrences around McIver. OPRD continued efforts in 2019 to target false brome within the park, working the outlying patches, trailheads, trails, riparian floodplain and other vector areas.

Garlic mustard is the second priority species that was targeted in 2019, continuing multiple years of effort to hand pull or spot spray every garlic mustard plant discovered within the park. OPRD was successful at obtaining CRISP funding to support this work, complementing the OPRD funding dedicated to the project. In 2019, it was realized that there were still new locations of garlic mustard being found along the roadsides within the park. Populations of mature garlic mustard were found on the fish hatchery located with the park boundaries, near the maintenance lawn mower. OPRD and IRM has been working with the hatchery to control the population within the fish hatchery property and prevent future spread of garlic mustard.

OPRD serves at the interface between the general public and natural areas within the Clackamas River Basin. They have a genuine opportunity to promote outreach and education efforts to the general public. OPRD staff also keep a lookout for CRISP priority weed species in its Clackamas basin properties.

Portland General Electric (PGE)

In 2019, Portland General Electric was active in the Clackamas River Basin implementing their Vegetation Management Plan (VMP), in accordance with Federal Energy Regulatory Commission license requirements for the Clackamas Hydro Project. Implementation of the VMP includes three interrelated programs: Vegetation Maintenance Program, Invasive Non-native Plant Species Prevention and Control Program, and Revegetation Program.

Non-Native Invasive Plant Prevention and Control

PGE staff conducted manual control of small populations of invasive non-native plants and employed a licensed contractor to conduct herbicide treatments of larger populations at multiple locations in the Clackamas River Watershed within the Mt. Hood National Forest (MHNF) during 2019. Approximately 30

net acres were treated on the MHNF. PGE and the contractor coordinated with the MHNF botanist prior to the work. PGE also conducted routine invasive non-native control work at facilities on PGE land outside of the MHNF near Estacada, at PGE's River Mill gravel pit and Estacada Rock Products (both are sources of rock for PGE gravel augmentation projects in the Clackamas Basin), and at restoration sites. Species focused on included herb Robert, shiny geranium, knapweeds, purple loosestrife, and knotweed. More common invasive non-native species, including English ivy, Canada and bull thistle, and Himalayan blackberry, were also treated.

A contractor treating invasive plants at PGE's River Mill gravel pit in 2019

An invasive non-native plant inventory is required every three years under PGE's Clackamas Hydro Project VMP. Terrestrial surveys of all high-probability areas within the project boundary were completed in 2017, and the PSU Center for Lakes and Reservoirs completed aquatic surveys in Project waters in 2017. The surveys confirmed 18 invasive non-native plant species within the project boundary. No invasive non-native aquatic plants were identified in Estacada Lake, Faraday Lake, North Fork Reservoir, Lake Harriet, or Timothy Lake during the surveys. The next surveys will be conducted in 2020.

In addition to the efforts undertaken by PGE in accordance with their FERC relicensing, PGE also supported CRISP efforts through administration of the *Clackamas River Hydroelectric Project Mitigation and Enhancement Fund*. In 2016, the Clackamas SWCD was awarded a 5-year grant totaling $431,250 for on-the-ground implementation of CRISP-related activities. In 2019, the fund awarded CRISP an additional $258,192. These resources will greatly enhance the ongoing efforts across the Clackamas River Basin and help address gaps in current management identified by partnering organizations.

PGE revegetation along section of North Fork Reservoir shoreline during March 2019.

PGE Revegetation and monitoring at multiple sites

PGE conducted initial or follow-up revegetation (five sites) and related monitoring (14 sites) during 2019 where project-related construction and maintenance, recreation improvements, or habitat-restoration activities have created disturbed soil. All sites are monitored annually for a minimum of three years to ensure revegetation success, and control measures are conducted as appropriate to prevent the establishment of invasive non-native plants.

United States Forest Service- Mt Hood National Forest

The US Forest Service works in cooperation with a number of partners to carry out a variety of invasive weed management activities on the Mt Hood National Forest (MHNF).

Invasive plant management is a high priority for the MHNF. In 2019, the MHNF spent an estimated $400,000 on invasive plant management program. These funds were mostly generated from timber sale receipts, with the rest coming from appropriated sources.

Priority weed control activities on the National Forest are carried out in cooperation with the Oregon Department of Agriculture - Noxious Weed Control Program, Portland Water Bureau, Portland General Electric, Clackamas County, CRISP, Wasco County, Oregon Department of Transportation, and Bonneville Power Administration. In 2019, these treatments equated to over 1,000 gross acres of noxious weed control in the Clackamas River Basin.

Crews work on the Mt Hood National Forest to control weedy vegetation that is threatening habitat for the rare plant, pale blue-eyed grass.

The MHNF is also committed to preventing the introduction of invasive weeds on the national forest. They require certified weed free forage for all livestock on the MHNF. They also require the use of certified weed-free straw, and inspections of sourced rock and gravel quarries, as well as equipment decontamination before initiating ground disturbing activities on the national forest. To support these efforts, they have also been working with partners from ODA to certify local sources of gravel and rock for use on the MHNF.

The MHNF is also committed to increasing awareness of invasive species and promoting early detection and rapid response of new invasive weeds. In 2019, the MHNF partnered with the Pacific Northwest Invasive Plants Council and Clackamas SWCD to host an early detection training for Forest Service staff, partner agencies, and the general public. Also the Forest Service has partnered with Play, Clean, Go, Wild Spotter, and EDDMaps West.

Thank You

Reflecting on the many accomplishments of the Clackamas River Invasive Species Partnership, it is clear there has been an immense amount of support to help stop the spread of invasive species within the Clackamas River Basin.

We would like to thank all of our participating organizations for their many contributions in 2019. The success of the CRISP is a reflection of the commitment of these participating organizations to the long term health of the Clackamas River Basin.

We would especially like to thank the representatives and staff of our participating organizations who have contributed their passion, expertise, and dedication to this partnership. We would also like to thank our many funders for ensuring the viability of the CRISP and for investing in the future of the Clackamas River Basin. Thank you!