

STATEWIDE KNOTWEED CONTROL PROGRAM

2014 Progress Report



March 2015



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Cover Photo: Bohemian knotweed infestation on Grandy Creek in Skagit County, Washington (WSDA).

Extreme care was used during the compilation of the data in this report to ensure accuracy. However, due to changes in data and the need to rely on outside sources of information, the Department of Agriculture cannot accept responsibility for errors or omissions, and, therefore there are no warranties which accompany this material. Original data were obtained from the Washington State Department of Ecology, Washington State Department of Natural Resources, and program cooperators.

Table of Contents

Executive Summary	v
Introduction.....	1
The Problem.....	2
The Plants.....	5
WSDA Knotweed Control Program.....	7
Project Selection.....	8
Budget	9
Results.....	10
Outlook.....	11
<i>Appendix A</i>	12

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Executive Summary

The Washington State Department of Agriculture (WSDA) Knotweed Control Program is a key component of the intergovernmental effort to control invasive knotweed in Washington State. Knotweed includes four closely related noxious weeds that aggressively invade high value habitats and displace native vegetation. This program provides funding, coordination, and other resources to cooperators that conduct invasive knotweed control projects and has partnered with, or directly supported, tribal governments, local governments, non-governmental organizations, and other state agencies. The program maintains or creates green jobs across the state, benefiting the environment and economy of Washington, and has provided training and employment to many individuals since 2004.

WSDA works with groups throughout Washington to identify knotweed infestations, develop control projects, and secure grant funding. In order to minimize duplication of effort by program cooperators, WSDA fulfills state-level environmental review requirements, coordinates Federal Clean Water Act permit compliance, provides public notification and education materials, and publishes required notices.

WSDA has received approximately \$5.5 million for knotweed control since 2004. This funding has been critical for our program cooperators to secure additional resources by providing them with state-origin matching funds. For the 2013-2015 biennium (July 1st, 2013 to June 30th, 2015), the WSDA Knotweed Control Program budget is \$910,546, which allows for the support of project activities in watersheds of 21 counties. This level of program support allows cooperators to leverage additional funding from tribal, local, non-governmental, and federal sources to these knotweed control projects.

For the 2013-2015 biennium, 29 proposals requesting a total of \$1,162,839 were submitted. WSDA furnished support to 25 of these projects and one biological control development project, providing a total of \$596,329 for agreements and contracts. With the combination of funds available in 2014, approximately 258 solid acres of knotweed were treated with integrated pest management techniques, and project work occurred in 774 river miles for a total of 3,619 landowners assisted.

WSDA will continue to support knotweed control as program funding allows. The funding outlook in 2015 appears stable. In the past, funding reductions have led to the abandonment of projects and reduced support for ongoing initiatives. In contrast, knotweed projects that have received stable funding have shown a vast decrease in knotweed presence. Stable funding will remain imperative to the success of knotweed control in Washington State.

Introduction

This is a progress report for the Statewide Knotweed Control Program coordinated by the Washington State Department of Agriculture that describes the program framework, survey methods, treatment methods, project selection process, and budget for the 2013-2015 biennium and results for calendar year 2014.

This report presents the methods and results that are common to the knotweed projects that WSDA supports. The results are divided into a programmatic summary to describe the general activity level of program cooperators, and monitoring results that describe the changes at infested sites. Three program measures are used to describe the activity level of program cooperators: solid acres of knotweed treated, river miles worked, and the number of landowners assisted. These metrics allow for the comparison of activity level through time.

Analyzing the total acreage surveyed, monitored, or treated by program cooperators on an annual basis is a reasonable method to describe the amount of area affected by knotweed, but it is not a precise way to detect the change that occurs within infested sites following herbicide applications. Due to this challenge, WSDA used monitoring plots to detect the within-site change of knotweed populations following annual treatment activities implemented by program cooperators from 2004-2012. The trend of these data shows a significant decrease in knotweed following a series of annual treatments.

This trend of significant reductions is consistent with the results seen in all project areas. Across the state, the knotweed populations that persist in project areas have fewer stems per acre and the knotweed that is present exhibits reduced stem height, stem diameter, and overall vigor. As a result of program cooperator efforts, many native plants, including tree and shrub species, have reestablished in areas where they had previously been displaced. Sustained funding is critical to protecting these accomplishments and continuing to remove knotweed from valuable watersheds.

Budget reductions have previously resulted in the inability to support follow-up activities at project sites. When a site is left untreated, small amounts of living knotweed can return to original infestation levels in as few as three seasons, placing the site back on a path towards a monoculture of knotweed and subjecting the project area to the negative consequences of knotweed invasion.

The Problem

The invasive knotweeds are non-native plants that have been introduced to Washington State without the factors that keep their populations under control in their native range. Knotweed alters riparian vegetation communities, disrupts nutrient cycling, negates riparian restoration efforts, negatively affects the recreational use of watercourses, and decreases property values. Knotweed has been reported in every county of Washington State. These plants are pioneer species that quickly colonize disturbed areas. Once knotweed becomes established, it is very difficult to remove, and single patches can persist for more than 100 years.

In the Pacific Northwest, knotweed spreads when roots and stems are moved by flowing water or human activities. Human activities include moving soil that contains knotweed plant material, mowing or cutting knotweed, or discarding knotweed plant material in vulnerable habitats.



Figure 1. Gravel bar in the Washougal River during summer flow (left) and winter flow (right) levels.



Figure 2. Knotweed plants sprouting from plant fragments deposited by flood water.

In river corridors, knotweed reproduces from fragments and seeds that travel downstream, affecting the gravel bars and riparian forests of entire river systems. Figure 1 shows natural flooding of a knotweed-infested gravel bar. This site served as a source for new infestations as knotweed stem and root fragments were transported downstream by the flowing water. Root and stem fragments as small as one inch can produce a new plant. As a result, one patch can be the source of many downstream populations.

Figure 2 shows knotweed sprouting from fragments deposited by floodwaters in the Cowlitz River valley. If left untreated, these small plants will form multi-stemmed patches. When these patches coalesce, they exclude all other vegetation. Figure 3 shows a knotweed-infested watershed in Pacific County.

Knotweed had displaced most of the understory plants at this site and occupied any opening created by natural disturbance.



Figure 3. Watershed in Pacific County infested by Bohemian knotweed.

Riparian areas are transitional habitats located between terrestrial and aquatic ecosystems such as lakes or rivers. Riparian areas provide shade, nutrients, and large woody debris to both aquatic and terrestrial ecosystems. Over time, riparian areas that are occupied by early-successional native species such as alder, willow, and other shrubs, move toward a plant assemblage dominated by conifers. These functions take many decades to recover once impacted by any disturbance.

Substantial resources have been applied to the protection or restoration of riparian areas in Washington State for the benefit of fish, wildlife, and recreation. Many of these projects seek to reintroduce or protect riparian vegetation that is critical to self-sustaining ecological services of forests and streams. However, many of these projects are located in areas vulnerable to knotweed invasion. Knotweed infestations can ruin the sustainable benefits of these projects by

out-competing the offspring of the native plantings and dominating the vegetation community in the long-term.

When sites are heavily infested by knotweed, there are fewer juvenile trees available to replace mature trees removed by natural disturbances such as wind, flood, or fire. Instead, the knotweed present in the understory fills any gaps that are created. Failure to control knotweed at these sites will result in a monoculture of knotweed that excludes beneficial riparian vegetation in the future.

The lack of juvenile tree species in knotweed-infested riparian forests could also result in a decrease in large trees available to fall into stream channels. These large pieces of wood, also known as large woody debris are important to the rivers and streams of the Pacific Northwest. Large woody debris creates pool habitats, retains spawning gravels, and provides cover for juvenile salmonids. The loss of large woody debris can disrupt natural processes, leading to a down-cutting of the stream bed, loss of side channel fish habitat, loss of pool habitat, decreased retention of spawning gravels, and decreased cover for juvenile salmonids and their prey. Depending on the time of year and salmon species, a decrease in the number of pieces and volume of large woody debris has been shown to decrease the number of salmon that utilize the section of stream lacking large woody debris. This could negatively impact efforts to restore salmon populations.

Knotweed can also have a negative effect on aquatic invertebrates that are the basis of the aquatic food chain by disrupting or altering the quality and timing of leaf litter inputs. This lowers the species diversity of invertebrates and negatively affects the organisms and processes that depend on them. Invertebrates are the primary food source of juvenile fish species.

Knotweed often negatively affects residential property and transportation infrastructure (Figure 4). Along right-of-ways, knotweed can grow through materials used for roadways, causing the need for expensive repairs. Knotweed patches also pose potential sight-distance hazards to vehicle operators due to rapid growth, affecting public safety on roadways.



Figure 4. Negative impact of knotweed on transportation in King County.

Habitat modeling performed by WSDA indicates that knotweed currently occupies a small fraction of its potential habitat in Washington. However, there is evidence that knotweed populations outside of current project areas will continue to expand, and will eventually invade these suitable areas.

The Plants

The invasive knotweed complex is comprised of four herbaceous perennial plant species from the buckwheat family (Polygonaceae) that are native to Asia. They are broadleaf plants that have green stems and reddish nodes (Figure 5). The plants were introduced to the United Kingdom and the United States as garden ornamentals in the early part of the 20th century. The four species are commonly referred to as Japanese, Giant, Bohemian, and Himalayan knotweed. All four species occupy similar habitats and cause similar negative impacts. They are collectively referred to as knotweed in this report. The four species are alternatively placed in either *Polygonum* or *Fallopia* genus.



Figure 5. The green, bamboo-like stems of invasive knotweed.

- **Japanese knotweed** (*Polygonum cuspidatum* Sieb. & Zucc.) The leaves of this plant are blunt at the base and sharply tapered at the tip (Figure 6). The stems of this plant usually grow to 7 feet tall. Stem diameters range from one-half to one inch.
- **Giant knotweed** (*P. sachalinense* Schmidt) This is the largest of the four invasive knotweed species. It has large heart shaped leaves (Figure 6), stems that can grow up to 12 feet tall, and stem diameters up to two inches.
- **Bohemian knotweed** (*P. x bohemicum* Chrték & Chrtkova) This is the hybrid produced by giant and Japanese knotweed. Leaf shape, stem diameter, and stem heights are variable, but are usually within the range of the smaller Japanese knotweed and larger giant knotweed. It is the most common invasive knotweed species in Washington State.
- **Himalayan knotweed** (*P. polystachyum* Wall) has lance-shaped leaves that make it readily identifiable when compared to the other species (Figure 6). The stems of this plant usually reach one half inch in diameter, and four to five feet in height. It is most common in the coastal areas of southwest Washington.



Figure 6. Leaves of three species of knotweed. From left to right are the leaves of giant, Japanese, and Himalayan knotweed.

All four species are listed as Class B noxious weeds on the Washington State Noxious Weed List (WAC 16-750-011). Class B noxious weeds are designated for control in regions of Washington State where they are not yet widespread. In regions where Class B noxious weeds are abundant, mandatory control is decided at the county level. In addition, all four species are included in the Washington State noxious weed seed and plant quarantine list (WAC 16-752-610). Under this rule, it is illegal to transport, buy, sell, or trade any of the invasive knotweed species.



Figure 7. Flowering knotweed in Skamania County.

Invasive knotweeds have extensive underground rhizome and root systems. They thrive in moist soil or river cobble, in full or partial sunlight, and are most common along rivers, creeks, beaches, and disturbed areas.

The aerial stems of knotweed emerge in spring and reach full height by early summer. The plants flower in late summer or early fall (Figure 7), and the aerial shoots die after the first frost leaving living underground root systems. The dead shoots persist through the winter, and can remain standing for several years (Figure 8).



Figure 8. Dead aerial stems of knotweed on the East Fork Lewis River in Clark County.

WSDA Knotweed Control Program

Since 2004, the Washington State Department of Agriculture has partnered with multiple organizations to locate and control knotweed in select watersheds across the state. Implementing annual field surveys and targeted herbicide applications has proven to be a very effective means of controlling knotweed. Program cooperators survey for knotweed by wading or boating streams and driving right-of-ways in each project area. The location of knotweed is documented, and this information is used to identify the ownership of affected parcels. Figure 9 shows the location of a knotweed plant being recorded in the Hoh River. Program cooperators provide educational materials and notification to each landowner prior to the performance of any control activities. Most landowners are familiar with the negative impacts of knotweed and welcome the assistance provided by program cooperators.



Figure 9. Recording the location of a knotweed plant in the Hoh River.

Treatment methods are selected based on site and infestation characteristics according to integrated pest management (IPM) principles. An important IPM consideration for the program is the treatment of all known knotweed populations in the selected river corridor, starting at the upstream source of the infestation and working in a downstream direction. This strategy helps to ensure that untreated knotweed plant material will not re-infest treatment sites as it moves downstream.

Treatments are conducted when the knotweed plants are actively growing. Figure 10 shows a crewmember making a targeted herbicide application to knotweed in Clark County. Program cooperators apply formulations of the systemic herbicides imazapyr or glyphosate, alone or in combination. Foliar delivery of herbicide was the primary treatment method used by project cooperators in 2014. The use of herbicide has been proven to be the most effective treatment method.



Figure 10. Crewmember treating knotweed in Clark County.

WSDA knotweed program helps to ensure that licensed and trained professionals make herbicide applications near water.

Program cooperators use herbicides that are registered in Washington State for use in or near water. WSDA requires that all herbicide applications be made under the supervision of a licensed applicator. Funding to support the

Project Selection

The organizations that implement knotweed control projects in Washington State are growing in both numbers and type. Many cooperative weed management groups have formed to combat invasive knotweed, bringing together landowners, land management agencies, tribal governments, county noxious weed control boards, fisheries enhancement groups, conservation districts, and other conservation organizations and citizen groups. With the increase in organizations involved in knotweed control comes an increase in need for funding to support cross-jurisdictional projects on the scale of whole river systems.

For the 2013-2015 biennium, stakeholders recommended that WSDA support projects that:

- protect previous accomplishments;
- can cost-effectively control knotweed populations; and
- will protect large, ecologically important areas.

In combination with these recommendations, WSDA used the project area's current infestation level, health of riparian areas, and the extent that requested funds would be used to leverage additional funding to rank proposals and develop a list of projects that would be supported.

For the 2013-2015 biennium, 29 proposals requesting a total of \$1,162,839 were submitted. WSDA furnished support to 25 of these projects and one biological control development project, allocating a total of \$596,329 for agreements and contracts. Figure 11 shows the location and scope of the supported projects.

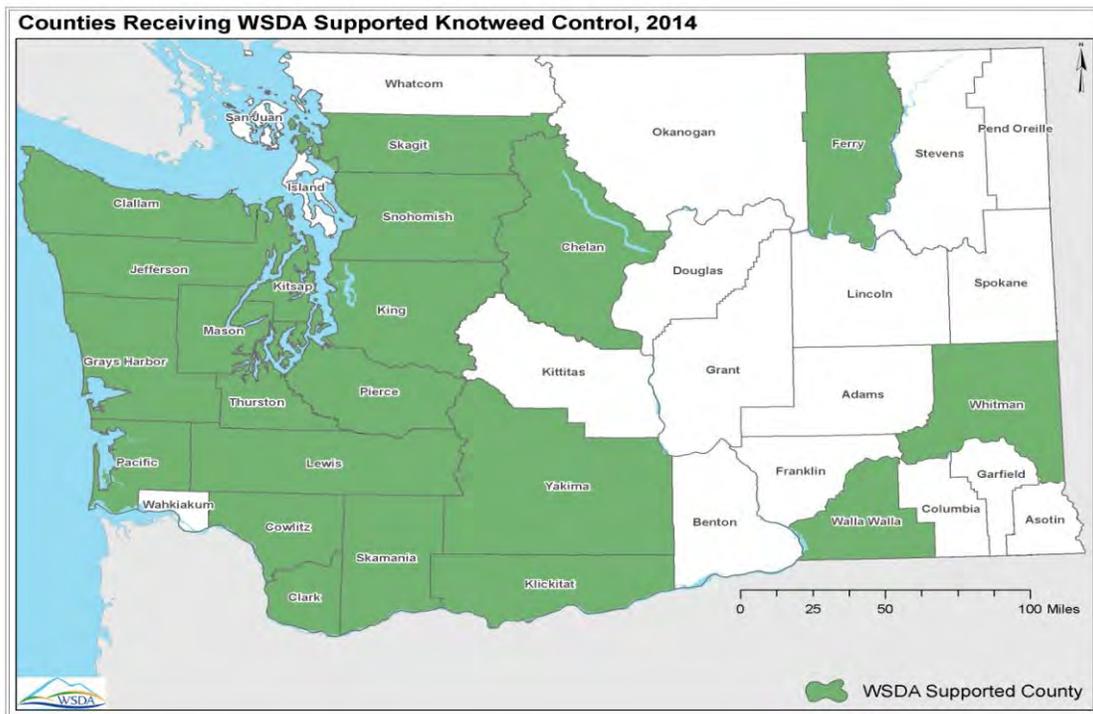


Figure 11. Map depicting the counties where WSDA supports knotweed control projects.

Budget

The Washington State Department of Agriculture has administered a knotweed control program since 2004 when the Legislature provided an appropriation of \$500,000 per year for a pilot program in southwest Washington. Including that initial investment, WSDA has received around \$5.5 million to control knotweed since 2004. This funding has been critical for the ability of our program cooperators to secure additional resources by providing them with state-origin matching funds.

For the 2013-2015 biennium, the WSDA knotweed control program budget is \$910,546 (Table 1). WSDA coordination expenses include agency administration costs, salaries and benefits for coordination, legal and clerical support, equipment costs, printing, and other goods and services.

Table 1. Estimated budget activity for the 2013-2015 biennium.

Activity			Expenditure
Purchased services			\$596,329
	10,000 Years Institute	\$35,000	
	Chelan County	\$47,277	
	Clallam/Jefferson County	\$25,000	
	Clark County	\$50,000	
	Center for Natural Lands Management	\$45,000	
	Cowlitz County	\$20,000	
	Ferry County	\$3,000	
	Hood Canal Salmon Enhancement Group	\$35,000	
	King Conservation District	\$7,500	
	Lewis County	\$21,984	
	Mason County	\$8,000	
	Oregon State University	\$55,000	
	Pacific County	\$15,000	
	Pierce Conservation District	\$65,000	
	Skagit County	\$15,000	
	Skagit Fisheries Enhancement Group	\$40,000	
	Skamania/Klickitat County	\$40,000	
	Snohomish County	\$42,000	
	Tri-State Steelheaders	\$10,000	
	Yakima County	\$8,068	
	Whitman County	\$4,000	
	Washington State University	\$4,500	
Herbicide/Equipment			\$60,000
Coordination			\$254,217
	Total Biennial Expenditures		\$910,546

Results

In addition to a biological control development project with Oregon State University and Washington State University (see *Appendix A*), in 2014 WSDA provided resources to the 10,000 Years Institute, Skagit Fisheries Enhancement Group, Hood Canal Salmon Enhancement Group, Center for Natural Lands Management, Tri-State Steelheaders, Pierce Conservation District, King Conservation District, and the noxious weed control boards of Chelan, Clallam, Clark, Cowlitz, Ferry, Jefferson, Klickitat, Lewis, Mason, Pacific, Skagit, Skamania, Snohomish, Whitman, and Yakima counties to control knotweed. These cooperators implemented knotweed control projects in watersheds of 21 counties.

WSDA uses three metrics to track the progress of each project. *Solid Acres Treated* is a measure of how many acres a dispersed population would occupy if all knotweed plants were grouped together. *River Miles* and *Landowners Assisted* includes any survey, treatment, and/or monitoring activities. In cases where our projects are focused on the treatment of upland knotweed populations in order to prevent the infestation of the shorelines of rivers, the river miles measured does not apply. Table 2 shows a summary of the work performed by program cooperators in 2014.

Table 2. Results by program cooperator for the 2014 control season.

<u>Organization</u>	<u>Solid Acres Treated</u>	<u>River Miles</u>	<u>Landowners Assisted</u>
10,000 Years Institute	0.31	30.35	20
Chelan County	0.68	63.7	811
Clallam/Jefferson County*	2.625	33.255	91
Clark County	14.24	28	1086
Center for Natural Lands Management	29.492	51.1	106
Cowlitz County	14.56	46.8	83
Ferry County	0.5751	1	13
Hood Canal Salmon Enhancement Group	4.28	35.5	233
King Conservation District	7.92	30	31
Lewis County	18	44	158
Mason County	3.94	1.74	30
Pacific County	4.62	2	20
Pierce Conservation District	110	70.5	88
Skagit County	11.7	12.2	25
Skagit Fisheries Enhancement Group	1.3	68.8	44
Skamania/Klickitat County*	2.5	99.4	292
Snohomish County	25.35	30.36	111
Tri-State Steelheaders	0.84	25	21
Yakima County	4.393	82	346
Whitman County	0.10	18	10
Total	257.5751	773.705	3619
*These groups worked in a shared project area with a combined crew			

Outlook

The WSDA Knotweed Control Program is a key component of the intergovernmental effort to control knotweed in Washington State. This program provides funding, coordination, and other resources to cooperators that conduct knotweed control projects and partners with, or directly supports, tribal governments, local governments, non-governmental organizations, and other state agencies.

WSDA continues to work with program cooperators to develop sustainable knotweed control strategies. As in the past, state resources were utilized to leverage additional funding. Combining funding and resources from multiple sources allows program cooperators to implement projects on the scale of entire watersheds. In 2015, program cooperators will continue to place emphasis on landowner participation and education. This provides landowners and land managers with the knowledge and experience to be the long term stewards of their respective project areas.

WSDA will continue to support the development of biological control methods for knotweed. Typically, biocontrol agents do not reduce the populations of invasive plants as much as other control techniques. However, if self-sustaining populations of biocontrol agents can be developed in the future, this may constitute a cost-effective and self-sustaining suppression strategy for sites heavily infested by knotweed.

If left untreated, there is evidence that the small amount of live knotweed present at treatment sites can return to the original infestation level in as little as three seasons, eventually surpassing the infestation level present prior to any investments in knotweed control. This would result in the loss of progress toward long-term knotweed control, increased future control costs, degradation of environmental quality, and the alteration of the sustainable ecological services of invaded sites.

WSDA will continue to support knotweed control as program funding allows. The funding outlook in 2015 appears stable. In the past, funding reductions have led to the abandonment of projects and reduced support for ongoing initiatives. In contrast, knotweed projects that have received stable funding have shown a vast decrease in knotweed presence. Stable funding will remain imperative to the success of knotweed control in Washington State.

Appendix A

Annual Progress Report

Knotweed Biological Control Program 2014

Submitted by Fritzi Grevstad, Oregon State University

Introduction

The biological control program for invasive knotweeds (*Fallopia* spp.) is in the final stages of testing and permitting. In November of 2013, the knotweed psyllid (*Aphalara itadori*) from Japan was approved by the Technical Advisory Group for Biological Control of Weeds (TAG) for release into North America. The project is now in the regulatory hands of the USDA Animal and Plant Health Inspection Service (APHIS) and is posed for review by the U.S. Fish and Wildlife for compliance with the National Environmental Policy Act.

Two biotypes of the psyllid are proposed as biocontrol agents. Colonies of both biotypes are maintained in the Oregon State University Quarantine facility in Corvallis, Oregon. The northern biotype from the Island of Hokkaido performs best against giant knotweed and some genotypes of hybrid knotweed. The southern biotype from the Island of Kyushu is most effective against Japanese knotweed and most genotypes of hybrids. Both are needed to control the varied knotweed species complex that is invasive in North America. The objectives proposed in this project represent the final steps to bring the knotweed biocontrol program into the implementation phase.

Progress by Objective for 2014

(1) Maintain colonies of the two biotypes of *Aphalara itadori*.

Healthy colonies of the two biotypes of *Aphalara itadori* were maintained in the quarantine facility at Oregon State University throughout the project period. Knotweed rhizomes were collected from field sites at Netarts (giant knotweed), Crabtree Creek (hybrid), and Nestucca River (Japanese knotweed) in Oregon, and from Montesano, WA (all three knotweeds). These rhizomes were grown in a non-quarantine greenhouse and transferred into the quarantine facility as needed to feed the psyllids. Parasitic wasps were introduced into the greenhouse and quarantine cultures periodically to control aphid pests on the plants. Dead or depleted knotweed plants were removed from the psyllid rearing cages every two weeks and sterilized in the autoclave before disposing.

(2) Attend the Annual Meeting of the Technical Advisory Group on Biological Control of Weeds (TAG) and carry out any follow-up studies recommended by the TAG.

The Technical Advisory Group on Biological Control of Weeds (the TAG) is a panel that carefully reviews proposed biological control introductions prior to permitting by USDA-APHIS-PPQ. The members include representatives from 13 different North American agencies with environmental and agricultural interests. In November 2013, after a 13-month review of the “petition to release” document, the TAG recommended field release of the knotweed psyllid into North America. Their reviews were sent to APHIS as well as to the project director. Although the TAG approved of the release overall, some reviewers suggested that additional varieties of buckwheat (*Fagopyrum esculentum*) be tested. Therefore, we acquired 6 named varieties of buckwheat from the USDA-ARS National Plant Germplasm System. To date, we have completed testing both psyllid biotypes on 3 of these varieties (Giant American, Pennquad, and Manor). Testing of the remaining 3 varieties is underway (Mancan, Tempest, and Winsor Royal). The results are in line with our earlier results with an unnamed (or unknown) variety of buckwheat and suggest that the risk to these plants from the knotweed psyllid is minute.

(3) Continue testing of the relative impact of the knotweed psyllids on target knotweed genotypes

We completed most of this objective in a prior year (see 2013 report). In 2014, our research paper (with John Gaskin (ARS) and others) was published in the journal *Biological Invasions*. The paper focuses on the diversity and distribution of knotweed genotypes in the Pacific Northwest. The study involved many volunteers who collected leaf samples throughout Washington, Oregon, British Columbia, Idaho, and Montana. Knowledge of the genotypes of knotweed present in different river systems is important as it will allow us to select biotype of the knotweed psyllid that will be most effective.

Gaskin, J.F., M. Schwarzlander, F.S. Grevstad, M.A. Haverhals, R.S. Bouchier, and T.W. Miller. 2014. Extreme differences in population structure and genetic diversity for three invasive congeners: knotweeds in western North America. *Biological Invasions* 16:2127–2136.

Two posters on the knotweed biocontrol project were presented at the Annual Meeting of the Entomological Society of America in Portland, Oregon. In addition to providing general information about the knotweed biocontrol project, the two posters showed results of experiments comparing the performance and impacts of the two psyllid biotypes on different knotweed species and genotypes:

Grevstad, F. and Bouchier, B. Biological control for invasive knotweeds in North America using the psyllid *Aphalara itadori*.

Bouchier, R., Van Hezewijk, B., and Grevstad, F., and Gaskin, J. Performance of biotypes of the biological control agent, *Aphalara itadori* on North American knotweed species and genotypes.

(4) Environmental assessment and permit application.

In February of 2014, the P.I. applied for a permit from APHIS-PPQ to release *Aphalara itadori*. APHIS responded with request for additional information which was then provided in an addendum to the original TAG petition document. This information will assist APHIS in their preparation of a Biological Assessment document which will be reviewed by the US Fish and Wildlife Service. APHIS later recommended that we provide additional experimental evidence of an absence of harm to threatened and endangered species. Although the psyllid is not able to develop on these species (based on tests with closely related surrogate plant species), the Biological Assessment must show that no harm will be caused by adult stages that may encounter the listed species in the field, even if they do reproduce on the plants. The P.I. has also been in communication with the USFW member on the Technical Advisory Group to obtain clarification of what type of evidence would be sufficient.

We recently acquired and are currently growing the needed plant species to carry out a limited number of tests in which impacts (if any) will be quantified. Based on our previous tests and observations, we expect no impacts whatsoever as the psyllids die off quickly when caged on these non-target plants.

(5) Carry out pre-release surveys at release sites in Washington.

Currently, we have 3 field release sites selected in Washington. Two sites are on the Skykomish River, and one site is on the Wynoochee River near Montesano. Locations have been selected in coordination with Jennifer Andreas (Washington State University Extension), Les Holcomb (Washington Dept. of Fish and Wildlife), and Sonny Gohrman (Snohomish County).

With the current emphasis on facilitating the permit process and conducting additional testing in the quarantine, pre-release field surveys at the future release sites has not yet been conducted beyond the cursory surveys that were carried out last year. Hopefully, the permit process will be far enough along that our focus can move into the field in the spring of 2015. Our planned pre-release surveys will follow a standard protocol currently being developed in collaboration with East Coast partners.



The image on the left shows *Aphalara itadori* adults and eggs on a knotweed stem, and the image on the right depicts a Giant knotweed plant damaged by the psyllid.