

STATEWIDE KNOTWEED CONTROL PROGRAM

2006 Progress Report

January 2007



For more information or additional copies of this report, please contact:

Washington State Department of Agriculture
Pest Program
P.O. Box 42560
Olympia, WA
98504-2560
(360) 902-2070
WSDA Web site: <http://agr.wa.gov>

AGR PUB 805-174 (N/1/07)

Inquiries regarding availability of this publication in alternate formats should be directed to the WSDA Receptionist at (360) 902-1976 or Telecommunication Device for the Deaf at (360) 902-1996.

Cover Photo: Recently established knotweed population in the riparian forest of the Dickey River, Olympic National Park, threatens surrounding native vegetation in an otherwise protected landscape (WSDA).

Extreme care was used during the compilation of the maps 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 and Washington State Department of Natural Resources.

Statewide Knotweed Control Program
2006 Progress Report

January 2007

Prepared by

Marshall Udo
Knotweed Control Coordinator



Valoria Loveland, Director

Table of Contents

Executive Summary	iii
Introduction	1
The Plants.....	1
The Problem.....	2
WSDA Knotweed Control Program	4
Framework	4
Project Selection	5
Budget.....	6
Survey and Treatment Methods.....	7
Regions	8
Public Outreach.....	8
Biological Control Program	9
Results	10
Overview.....	10
Lower Columbia	15
Clark County Noxious Weed Control Board	15
Cowlitz County Noxious Weed Control Board	15
Lewis County Noxious Weed Control Board	15
Skamania County Noxious Weed Control Board	16
Washington State Parks and Recreation Commission	16
Coastal.....	16
The Nature Conservancy.....	17
Pacific County Noxious Weed Control Board.....	17
Washington State Parks and Recreation Commission	17
Olympic Peninsula and Western Hood Canal.....	17
Jamestown S’Klallam Tribe.....	18
Clallam County Noxious Weed Control Board	18
Jefferson County Noxious Weed Control Board	18
Puget Sound and Eastern Hood Canal	19
The Nature Conservancy.....	19
Snohomish County Noxious Weed Control Board.....	19
Skagit County Noxious Weed Control Board.....	19
Island County Noxious Weed Control Board	20
King County Noxious Weed Control Board.....	20
Middle Columbia	20
Yakima County Noxious Weed Control Board	20
Eastern Washington	21
Whitman County Noxious Weed Control Board	21
Asotin County Noxious Weed Control Board	21
Plans for 2007	22

Executive Summary

Since 2004, the Washington State Department of Agriculture (WSDA) has used an annual appropriation of \$500,000 to provide resources to county noxious weed control boards, tribal governments, the Washington State Parks and Recreation Commission, and one non-governmental organization for landscape-scale knotweed control projects. Program cooperators brought \$512,714 of additional local and federal resources to the control projects in 2006. Most program cooperators elected to hire crew members who lived in the communities of the project area. In addition to direct funding, WSDA provided training, outreach materials, and herbicide to program cooperators. In 2006, the centralized purchase of herbicides resulted in a savings of \$7,276.

In river corridors, knotweed can reproduce from fragments and seeds that travel downstream during high-water events, affecting the gravel bars and riparian areas of entire river systems. Due to this dispersal method, control projects required coordination with multiple land owners and across jurisdictions. Approximately 646 acres of knotweed were treated in 2006. Project work occurred in 1,563.9 river miles, and was performed for 1,076 landowners. Program cooperators have reduced the amount of knotweed in each project area, and have expanded control activities into tributaries and downstream areas. Treatment methods that were evaluated resulted in 90% control.

Knotweed populations in the riparian areas of the Little White Salmon River basin of Skamania County exhibited no regrowth during the 2006 treatment season. Fifty-five percent and 71% of the known knotweed patches have been removed from the Skagit and Dungeness River Systems, respectively. All known knotweed populations have been treated in Yakima and Whitman Counties and in the riparian corridors of 24 river systems throughout Washington State.

Projects in 2007 will capitalize on current success by funding ongoing projects that demonstrate significant gains as well as new projects that will protect high-value riparian habitats. WSDA's knotweed program will continue to support cooperators working to protect key components of our watersheds that benefit all the inhabitants of Washington State.

Introduction

The Plants

The invasive knotweed complex is comprised of four herbaceous perennial plant species that are native to Asia. The plants were introduced to the United Kingdom and the United States as garden ornamentals. All four species are listed by the Washington State Noxious Weed Control Board as Class-B noxious weeds on the 2007 Washington State Noxious Weed List. Class-B noxious weeds are not native to Washington State, have a limited distribution, and pose a serious threat to the region. All four species are also included in the Washington State Noxious Weed Seed and Plant Quarantine List (WAC 16-752-610). It is illegal to transport, buy, sell, or trade any of the quarantine species, which limits the spread or introduction of the listed plants through human activities. The four species are commonly referred to as Japanese, giant, Bohemian, and Himalayan knotweed.

- **Japanese knotweed** (*Polygonum cuspidatum* Sieb. & Zucc.) is the variety most commonly associated with knotweed problems. This species spreads vegetatively.
- **Giant knotweed** (*P. sachalinense* Schmidt) spreads vegetatively and produces viable pollen. This species can hybridize with Japanese knotweed.
- **Bohemian knotweed** (*P. x bohemicum* Chrtek & Chrtkova) is the hybrid produced by the giant and Japanese strains. It is thought to produce greater amounts of viable pollen and has the ability to back-cross with both parent species. This species can spread by seed or vegetatively, and is recognized as the most common species in Washington State.
- **Himalayan knotweed** (*P. polystachyum* Wall) spreads mainly through vegetative means. The lance-shaped leaves of this species make it readily identifiable when compared to the other species. This species can spread by seed or vegetatively, and is most common in coastal areas of Southwest Washington.

Invasive knotweeds thrive in moist soil or river cobble, in full or partial sunlight, and are most common along rivers, creeks, roadside ditches, and beaches. All four species will be collectively referred to as knotweed throughout this report.

The native habitats of knotweed include the harsh environment of volcanic slopes, where it plays an important role as a colonizing species. The characteristics of a colonizing plant, the absence of natural enemies and diseases, and the reproductive success of knotweed enable these plants to thrive in the Pacific Northwest.

Knotweed emerges early in the season and reaches full height by early summer. The plants flower in late summer or early fall and the aerial shoots die after the first frost. Knotweed

reabsorbs nutrients into its root system, which provides resources to the plants for overwintering and spring shoot emergence.

The Problem

In recent years, knotweed has become more prevalent in the river corridors of Washington State. If left unchecked, knotweed will steadily take over riverbanks and beaches as it has in the eastern United States and Europe.

In the Pacific Northwest, knotweed usually spreads when roots and stems are moved by waterways or human activities. These activities include moving soil that contains knotweed plant material, mowing or cutting of knotweed, or discarding knotweed plant materials in receptive habitats. In river corridors, knotweed can reproduce from fragments and seeds that travel downstream during high-water events, affecting the gravel bars and riparian forests of entire river systems. 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. Due to this dispersal method, control projects required coordination with multiple land owners and across jurisdictions.

Knotweed infestations can block river views and limit river access, which can affect recreational opportunities and property values.

In 2006, the WSDA knotweed control program focused on the treatment of knotweed populations located in riparian areas, where knotweed exhibits the greatest rate of spread and has the most detrimental ecological, social, and economic effects. Knotweed can rapidly colonize scoured shores, islands, gravel bars, and forested areas. Project areas in the early stages of knotweed invasion were also targeted.

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. These functions can take many decades to recover once impacted.

Large woody debris is important to the rivers and streams of the Pacific Northwest. It creates pool habitats, retains spawning gravels, and provides cover for juvenile salmonids. The loss of large woody debris can disrupt natural processes, leading to channel incision, loss of side channel fish habitat, loss of pool habitat, decreased retention of spawning gravels, and decreased cover for juvenile salmonids and their prey. The reduction or modification of riparian vegetation is one cause of decreased large woody debris.

Vegetation communities occupied by knotweed have lower species diversity compared to corresponding stands of uninvaded vegetation. Both deciduous and coniferous trees exhibit decreased juvenile populations in areas with high knotweed stem density, decreasing the number

of individuals available to replace mature trees in the event of a disturbance. Compared to native plant species, knotweed shows a decreased ability to control erosion despite having an extensive root system. During flood events, plant fragments can be washed downstream where rhizome and stem pieces create new infestations. Erosion also increases sediment in streams. Increased sediment is a factor in the loss of productive salmonid habitat. Sediment can fill in the spaces between riverbed gravels that salmonids utilize for spawning and fill in pools used for rearing. It also negatively affects salmonids by smothering viable eggs, decreasing their feeding success, and damaging gill filaments.

Knotweed also affects aquatic invertebrates that compose the basis of the aquatic food chain. The food chain is disrupted by an alteration of the quality and timing of the leaf litter regime. This alteration changes nutrient inputs and soil composition. Invertebrates are the primary food source of juvenile fish species.

A considerable amount of resources have been applied to the protection or restoration of riparian areas in Washington State. For example, \$156 million have been awarded for habitat restoration or protection projects through the Salmon Recovery Funding Board alone. Many of these salmon recovery projects have been located in riparian areas and have addressed factors that limit salmonid production. Limiting factors of salmonid production include elevated stream temperature, increased silt loads, poor riparian conditions, poor floodplain conditions, and a lack of large woody debris. Many of these protection or restoration projects could be impacted by knotweed infestation.

Groups such as the National Fish and Wildlife Foundation, U.S. Fish and Wildlife Service, Washington State Salmon Recovery Board, and others have recognized the threat that knotweed poses to riparian habitats, and have provided resources to knotweed control projects throughout Washington State.

This is a progress report of the Statewide Knotweed Control Program. It describes the program framework, project selection process, budget, survey and treatment methods, knotweed control regions, public outreach activities, efforts to develop a biological control program, results by region and program cooperator, and plans for 2007.

WSDA Knotweed Control Program

Framework

The WSDA Knotweed Control Program provided resources to the control projects carried out by participating cooperators through interagency agreements and contracts. In 2006, WSDA entered into agreements with 16 program cooperators including the Jamestown S’Klallam Tribe, two branches of The Nature Conservancy (TNC), the Washington State Parks and Recreation Commission, and the noxious weed control boards of Clark, Skamania, Skagit, Pacific, Snohomish, Clallam, King, Island, Whitman, Asotin, Yakima, and Lewis counties.

Work was performed in 20 Counties, including Asotin, Clallam, Clark, Cowlitz, Grays Harbor, Island, Jefferson, King, Klickitat, Lewis, Mason, Pacific, Skagit, Skamania, Snohomish, Thurston, Whatcom, Whitman, and Yakima (**Figure 1**). WSDA staff surveyed Pend Oreille

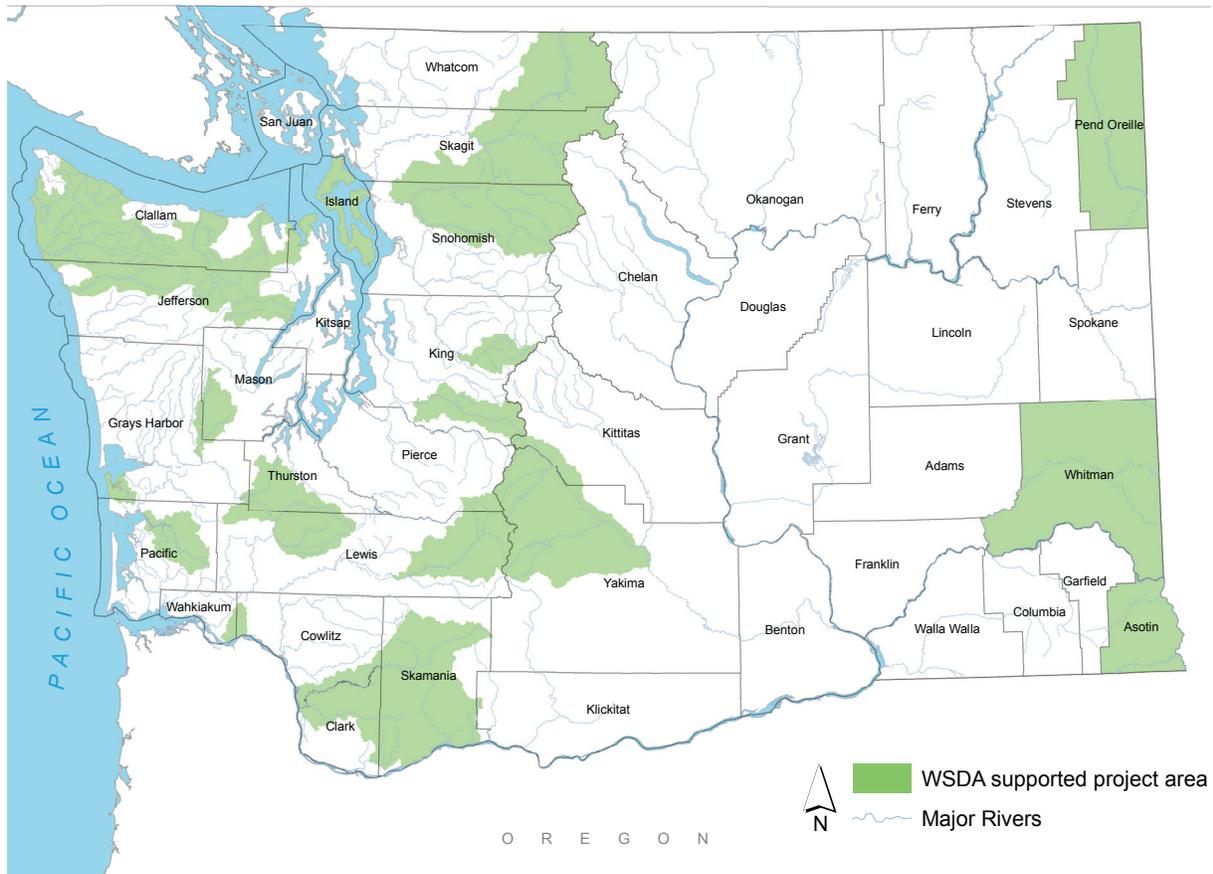


Figure 1. Washington State counties and WSDA-supported knotweed control project areas

County for knotweed.

Program cooperators were encouraged to identify projects that would address areas with low-level knotweed infestations, protect functional riparian habitats, or target project areas that are in the early stages of invasion. Watershed boundaries were used to delimit project areas except for the Whitman County, Asotin County, Pend Oreille County, and Cape Disappointment State Park knotweed control projects.

Most program partners elected to hire field crew members from the local communities of the project areas. This enhanced the ability of project managers to gain permission to treat knotweed populations on private property.

Since the inception of the statewide knotweed control project, WSDA has produced required environmental review, provided public notification materials, provided technical training, published required notices, and coordinated with program cooperators and federal agencies to leverage state funding to secure additional resources.

WSDA continued to work cooperatively with the Washington State Department of Ecology to administer the National Pollutant Discharge Elimination System (NPDES) permit for noxious and quarantine list weed control, extending coverage for knotweed control in compliance with the permit and conducting required water quality monitoring.

Project Selection

For the 2006 control season, WSDA solicited proposals for knotweed control projects in March 2006. Projects that addressed knotweed populations in any area of Washington State were eligible to receive support. In May 2006, a knotweed advisory panel provided input on the criteria used to evaluate project proposals. Members of the knotweed advisory panel included representatives from county weed boards, WSDA, Washington State Noxious Weed Control Board, Department of Natural Resources, Department of Fish and Wildlife, Department of Ecology, and The Nature Conservancy.

The panel recommended that cooperative agreements for the 2007 fiscal year focus on projects that were well underway, projects that could cost-effectively eradicate knotweed populations, and projects that demonstrated a commitment to long-term monitoring of the project area. The advisory panel suggested that the portfolio of projects demonstrate WSDA's commitment to support projects throughout Washington State.

An internal review committee selected projects that fulfilled these criteria, and recommended that those projects receive support during the 2007 fiscal year. In 2006, eighteen proposals requesting a total of \$649,873 were submitted. This compares to fourteen proposals submitted in 2005, requesting a total of \$823,442. In 2006, sixteen projects were funded, receiving a total of \$391,746 (**Table 1**).

Table 1. Estimated budget activity for the 2007 fiscal year.

Activity	Budget Expenditure	
¹ Purchased Services		\$391,746
	Clark County	\$90,000
	Skamania County	\$54,000
	The Nature Conservancy (SW)	\$45,000
	Pacific County	\$40,000
	Clallam County	\$35,000
	The Nature Conservancy (Skagit)	\$30,000
	Lewis County	\$26,761
	Jamestown S'Klallam Tribe	\$15,000
	King County	\$15,000
	Whitman County	\$10,000
	Snohomish County	\$8,713
	Yakima County	\$7,872
	Island County	\$6,000
	Skagit County	\$4,000
	State Parks	\$3,500
	Asotin County	\$900
² Herbicide Purchase		\$10,000
³ NPDES Water Quality Monitoring		\$3,000
⁴ WSDA Coordination		\$95,254
	Total	\$500,000

1. Contracts and agreements to carry out control projects in selected watersheds
2. WSDA provided all herbicide used in the projects
3. Laboratory analysis of water samples for residual herbicide concentrations required by NPDES permit.
4. WSDA coordination expenses include agency administration costs, salaries and benefits for a full-time coordinator and part-time clerical support, travel, attorney costs, vehicle and equipment costs, printing, and other goods and services.

Budget

WSDA used an appropriation of \$500,000 to implement a statewide knotweed control program. In 2006, WSDA allocated \$391,746 of the appropriation for contracted knotweed control services (**Table 1**). Program cooperators brought approximately \$512,714 of additional local and federal funding to current knotweed control projects.

All WSDA expenditures directly supported the control work of cooperators, including NPDES-required water quality monitoring, and the purchase of all herbicides used for knotweed control activities. As a result of the centralized herbicide purchase, the program realized a savings of \$7,276 in 2006.

Survey and Treatment Methods

Most cooperators surveyed project areas by wading or boating streams and driving the right-of-ways located in each project area. The location of knotweed was documented, and this information was used to identify the ownership of affected parcels. Landowners were contacted and asked if they would allow knotweed control activities on their property. Landowners were required to sign a permission-to-enter/waiver-of-liability document before any treatment was conducted. Most landowners were familiar with the negative impacts of knotweed and welcomed the assistance provided by program cooperators.

Treatment methods were selected based on site characteristics according to integrated pest management (IPM) principles. Integrated pest management is a pest management concept that uses the most appropriate pest control method and strategy to meet management objectives in an environmentally and economically sound manner.

An important IPM consideration of the program was to treat all known knotweed populations in the river system, starting at the upstream extent of the infestation and working in a downstream direction. This strategy ensures that untreated knotweed plant material will not re-infest treatment sites as it moves downstream during high-water events, and requires the participation of all affected landowners in the stream corridor.

Treatments consisted almost entirely of herbicide applications. Treatments were conducted May through October or until the first frost of the year. Manual methods, including digging and hand pulling, require return site visits and are not ecologically sensible in riparian habitats.

Four types of herbicide applications were used during the 2006 control season. These included injection of herbicides containing glyphosate, foliar applications of herbicides containing triclopyr or glyphosate, and the application of a tank mixture of an herbicide containing imazapyr with an herbicide containing glyphosate. The herbicide products used by the program cooperators at aquatic sites were registered for use in aquatic environments. WSDA mandated that all herbicide applications be made under the supervision of a licensed applicator.

Foliar delivery of herbicide was the primary treatment method used by project cooperators. The injection delivery method was also used to deliver undiluted herbicide containing glyphosate directly into the hollow stems of the plant. The injection method is labor intensive and inappropriate for large-scale treatments, treatments of Himalayan knotweed, and for situations when small stem size does not allow for this application method.

Results from the WSU efficacy study showed that all available treatment options that were evaluated provided similar high levels of control. In 2005, knotweed control averaged 90% one year after treatment. With this information, cooperators were able to select the treatment option that best met their local needs based on specific site conditions, without compromising effectiveness.

Regions

In an effort to leverage state resources and obtain funding from other sources, seven knotweed control regions have been formed in Washington State (**Figure 2**). The regions are an aggregate of Washington State Water Resource Inventory Areas. The grouping was based on the Washington State Salmon Recovery Funding Board, National Oceanic and Atmospheric



Figure 2. *Knotweed control regions of Washington State. Regions are comprised of multiple Water Resource Inventory Areas, and are based on the Washington State Salmon Recovery Funding Board, NOAA, and USFWS regions for salmonid recovery.*

Administration (NOAA) and U.S. Fish and Wildlife Service (USFWS) regions for salmonid recovery. The regions have been modified to correspond with the boundaries of local knotweed working groups or cooperative weed management areas.

Public Outreach

In 2006, WSDA produced a flyer that was used throughout the state to educate stakeholders about the threat knotweed presents to the ecosystems of the Pacific Northwest. The majority

of program cooperators provided information to stakeholders by placing news stories and notices in local media sources. Several of the program cooperators displayed exhibits explaining the local knotweed project at their county fairs.

All program cooperators conducted public outreach and education activities in conjunction with efforts to obtain signatures on the required permission/liability forms. The Washington State Parks and Recreation Commission installed interpretive signs explaining the control project at Cape Disappointment State Park.

Biological Control Program

Fritzi Grevstad, Ph.D., of the University of Washington has been working with an international group of scientists to develop a biological control program for the control of Japanese, giant, and Bohemian knotweed. The development of a biological control program includes surveying the native and introduced range of knotweed for organisms that have an impact on the health of the plants.

Dr. Grevstad has surveyed Washington and Oregon for native insects that utilize knotweed as a host. The results of this survey showed that very few insects utilize knotweed as a host and those that did were generalist species, were never very abundant, and did not have any negative impacts on the health of knotweed.

Dr. Grevstad has selected three invertebrates that are native to Japan as potential biological control agents. These agents were collected in Japan by collaborating scientists from CABI-Biosciences (United Kingdom). One of these insects (a chrysomelid beetle) was imported into an Oregon State University quarantine facility in 2006. If additional funding is secured for this project, the agents will be subjected to rigorous tests to evaluate their host preference, impacts to native and economically important vegetation, and their effects on knotweed species.

The availability of biological control agents would be a beneficial addition to current control methodologies.

Results

Overview

In 2006, work was performed for 1,076 landowners, which protected both public and private land in the immediate treatment area, and areas downstream of the treatment sites. Control crews worked in 24 of the 62 Washington State Water Resource Inventory Areas (**Figure 3**), surveying and treating 646 acres of knotweed in 1,563.9 river miles.

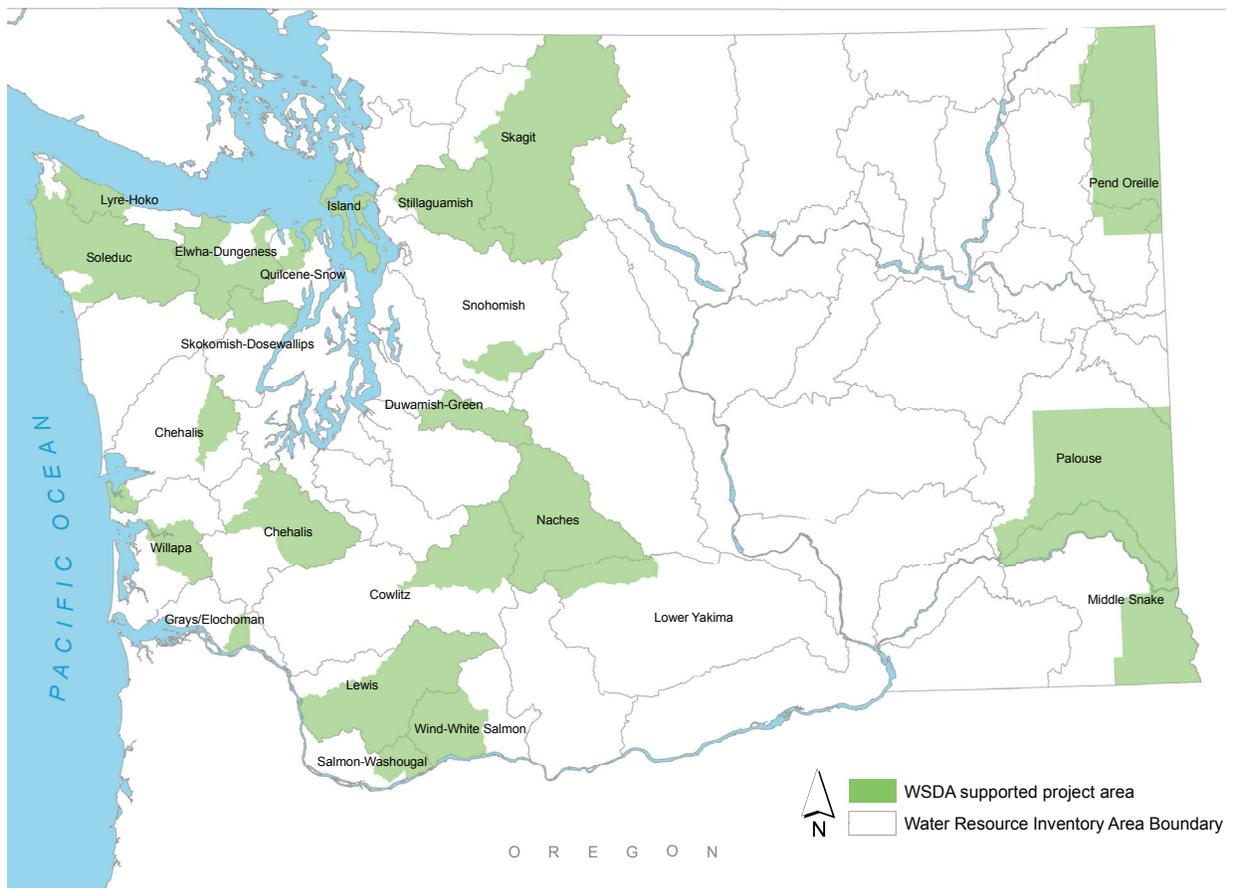


Figure 3. *Water Resource Inventory Areas of Washington State and areas where knotweed control work was performed in 2006.*

Program results show a decrease in the number of acres treated, and an increase in the number of river miles where work was performed compared to the results of the 2005 treatment season. This is representative of the substantial reduction of knotweed in the project areas. This reduction has allowed for efficient retreatment of existing sites and the expansion of knotweed control efforts into downstream areas and tributaries. **Figure 4** and **Table 2** show the approximate location of each project and results of the 2006 treatment season, respectively.

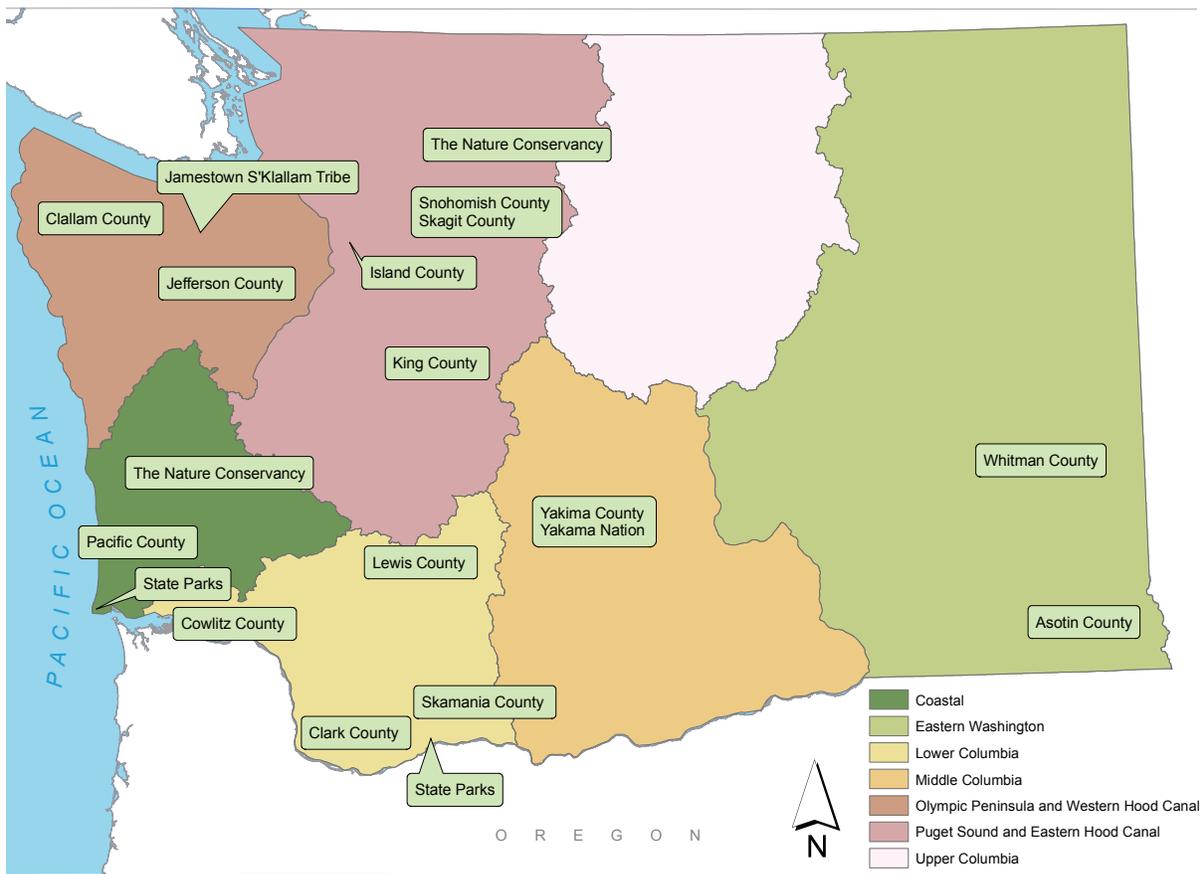


Figure 4. *Approximate locations of project areas and related program cooperator by knotweed control region.*

Table 2. Results by region and program cooperator for the 2006 control season.

Program Cooperator by Region	Acres Treated	River Miles	Landowners Assisted
Lower Columbia			
Clark County	87.0	134.0	67
Skamania County	88.0	90.0	154
Lewis County	17.0	41.0	67
State Parks	1.1	1.0	1
Cowlitz	85.5	4.2	21
Coastal			
Pacific County	196.9	43.0	103
The Nature Conservancy	7.6	207.0	100
State Parks	1.0	na	1
Olympic Peninsula and Western Hood Canal			
Clallam County	27.0	232	83
Jamestown S'Klallam Tribe	1.0	8.5	68
Jefferson County	0.2	13	11
Puget Sound and Eastern Hood Canal			
The Nature Conservancy	5.5	500	75
Snohomish County	80.7	8.2	113
Skagit County	1.0	na	22
Island County	2.0	na	16
King County	17.6	85	81
Middle Columbia			
Yakima County / Yakama Nation	5.4	82	61
Upper Columbia			
No Projects at this time			
Eastern Washington			
Whitman County	6.5	100	25
Asotin County	15	15	7
Total	646.0	1563.9	1076

na = not applicable

Figure 5 shows one of the treatment sites in the Washougal River, Skamania County. In 2004, the gravel bar was infested with knotweed. In 2006, almost all of the knotweed has been removed, and the native willows have remained.



Figure 5. *Photos of one of the treatment sites in the Washougal River system, Skamania County. The top photo was taken prior to any treatments in August of 2004, and the bottom photo was taken in October 2006. Top photo shows flowering knotweed (white flowers) intermixed with native willow. The bottom photo shows the removal of most knotweed patches, and the remaining willow.*

The knotweed populations that persist in project areas exhibit significantly reduced stem density, stem height, stem diameter, and overall vigor. This has allowed many native plants — including tree and shrub species — to colonize areas where they had previously been displaced by knotweed.

Knotweed populations in the riparian areas of the Little White Salmon River Basin of Skamania County exhibited no regrowth during the 2006 treatment season. Fifty-five percent and 71% of the known knotweed patches have been removed from the Skagit and Dungeness River Systems, respectively. All known knotweed populations have been treated in Yakima and Whitman Counties and in the riparian corridors of the following watercourses:

Lower Columbia

- Wind River
- Canyon Creek
- Little Creek
- Woodard Creek
- Carson Creek
- East Fork Lewis River
- North Fork Lewis River
- Abernathy Creek

Coastal

- North Fork Willapa River
- South Fork Willapa River
- Elk River
- Black River
- Scatter Creek

Olympic Peninsula and Western Hood Canal

- Dungeness River
- Hoh River
- Dosewallips River
- Big River

Puget Sound and Eastern Hood Canal

- Upper Skagit River
- Cascade River
- Sauk River
- Green River

Middle Columbia

- Naches River

Eastern Washington

- Palouse River
- Asotin Creek

Initial survey, treatment, and outreach took place in Whitman and Asotin Counties of Eastern Washington during the 2006 treatment season. An initial survey of Pend Oreille County for knotweed was also conducted. This initial work resulted in the treatment or detection of knotweed populations in the early stages of invasion, and demonstrated WSDA's commitment to support knotweed control projects throughout Washington State.

In 2006, WSDA had an opportunity to directly support the knotweed control efforts of the Jamestown S'Klallam Tribe in its third treatment season in the Dungeness watershed. This support allowed the control crew to retreat the greatly reduced knotweed populations, and moved the Tribe closer to its goal of removing knotweed from the Dungeness River System.

Lower Columbia

2006 marked the third year that WSDA has provided resources to the noxious weed control boards of Clark, Lewis, and Skamania Counties, and the Washington State Parks and Recreation Commission for the control of knotweed in the Lower Columbia River Basin. This was the first year that the Cowlitz County Noxious Weed Control Board knotweed control project was supported.

Clark County Noxious Weed Control Board

The Clark County Noxious Weed Control Board—in cooperation with local public utility districts, local sport groups, and landowner volunteers—have worked to control knotweed in Clark County since 2004.

In 2006, the noxious weed control board treated 87 acres along 134 river miles. Work was performed for 67 landowners during the knotweed control project. All known knotweed populations in the riparian areas of the Lewis River System were treated

Cowlitz County Noxious Weed Control Board

Cowlitz County crews surveyed and treated 85.5 acres of knotweed along 4.2 river miles of Abernathy Creek. The 2006 treatment season was the first year knotweed has been treated in Abernathy Creek, and it was also the first year that WSDA has supported this project. All known knotweed populations in riparian areas were treated in 2006. This work was performed for 21 landowners

Lewis County Noxious Weed Control Board

In 2006, the Lewis County Noxious Weed Control Board surveyed and treated 17 acres of

knotweed in 41 river miles of the Upper Cowlitz River. The noxious weed control board surveyed and treated 13.5 acres of knotweed in 35 river miles in 2005, and 17 acres of knotweed in 28 river miles in 2004.

Due to the high levels of control, Lewis County has been able to expand efforts into downstream areas, tributaries, and upland sites. Work was performed for 67 landowners

Skamania County Noxious Weed Control Board

The Skamania County Noxious Weed Control Board surveyed and treated infestations in the Wind, Washougal, and Little White Salmon River basins of Skamania County. Skamania County Crews also treated 95% of the known knotweed infestations in Klickitat County. The work in Klickitat County was a result of a partnership with the Klickitat County Noxious Weed Control Board.

In 2006, Approximately 88 acres of knotweed were treated in 90 river miles. Approximately 70 acres were treated in 44 river miles in 2005, and 31.9 acres treated in 44 river miles in 2004. The increase in acres treated and river miles per season is due to the expansion of the control efforts into tributaries, downstream areas, and upland sites.

All known knotweed populations of riparian areas have been treated in Canyon Creek and the Wind River. Riparian populations of knotweed in the Little White Salmon River exhibited no regrowth in 2006. Work was performed for 154 landowners

Washington State Parks and Recreation Commission

The Washington State Parks and Recreation Commission contracted with the Skamania County Noxious Weed Control Board to treat knotweed populations along Little Creek and Woodard Creek that flow through Beacon Rock State Park. County crews will retreat these areas in June of 2007. Approximately 1.1 acres of infestation were treated in 2005. This compares to approximately 1.3 acres of infestation treated in 2004.

Coastal

2006 marked the third year that WSDA has provided resources to The Nature Conservancy, The Pacific County Noxious Weed Control Board, and the Washington State Parks and Recreation Commission for knotweed control work in the Chehalis River basin, the Willapa River basin, and at Cape Disappointment State Park.

The Nature Conservancy

This Nature Conservancy crew worked in conjunction with state and county agencies to treat the lightly infested watersheds of Scatter Creek and the Elk, Newaukum, and Black Rivers in the Chehalis River Basin. Initial survey of the Satsop River, Skookumchuck River, and Lincoln Creek also took place. Two hundred seven river miles were surveyed, and 7.6 acres of knotweed were treated in 141 affected river miles.

In 2006, the crew surveyed and treated all known infestations on the entire length of the Black River and its tributaries in Thurston County. The crew also worked with Department of Natural Resources personnel to locate and treat all infestations on the Elk River in Grays Harbor County. Some of the treated area included the Elk River Natural Resource Conservation Area. The work on these two rivers protected large ecologically sensitive areas from the threat of extensive infestations of knotweed. Work was performed for 100 landowners

Pacific County Noxious Weed Control Board

The Pacific County Noxious Weed Control Board surveyed and treated all known knotweed infestations in the Willapa River Basin in conjunction with the Pacific County Conservation District. Work was performed in 43 river miles and 55 road miles of the Willapa River Basin.

In 2006, approximately 196.9 acres were treated. Due to the high level of control, field crews treated fewer acres in a larger project area compared to the 2005 season when 303 acres were treated in 33 river miles. This control program was able to assist 103 landowners in the Willapa River Basin.

Washington State Parks and Recreation Commission

Washington State Parks contracted with the Pacific County Noxious Weed Control Board to treat one acre of Himalayan knotweed at Cape Disappointment State Park. The infestation of Himalayan knotweed threatens two rare vegetation communities that are globally imperiled. This area has been treated for three consecutive years. The 2004 treatment was not successful, but the implementation of a different treatment strategy has reduced the knotweed stem density and vigor.

Olympic Peninsula and Western Hood Canal

WSDA provided resources to the Jamestown S'Klallam Tribe and the noxious weed control boards of Clallam and Jefferson Counties for control work in 14 river basins, including the Hoh, Big, Clallam, Sol Duc, Quillayute, Dungeness, Duckabush, Dosewallips, Dickey, Bogachiel, Calawah, Sekiu, Hoko, and Pysht river basins. The 2006 season was the second year that WSDA

has supported the Clallam County Noxious Weed Control Board, and the first year the Jamestown S’Klallam Tribe and the Jefferson County Noxious Weed Control Board have received funding.

Jamestown S’Klallam Tribe

The Jamestown S’Klallam Tribe has worked to control knotweed in the Dungeness River system since 2004. WSDA supported this project for the first time in 2006. Knotweed populations are limited to the lower 8.5 miles of the mainstem of the Dungeness, and the existing populations have been significantly reduced compared to the initial level of infestation. The Jamestown S’Klallam Tribe treated approximately one acre of knotweed in 2006.

The Jamestown S’Klallam Tribe has successfully removed 71% of the knotweed patches in the 425 acre project area. Sixty-eight landowners were assisted.

Clallam County Noxious Weed Control Board

Clallam County is the lead entity of the Olympic Knotweed Working Group. Members of this group include: the Quinault Indian Nation, Makah Tribe, Jamestown S’Klallam Tribe, Lower Elwha S’Klallam Tribe, Port Gamble S’Klallam Tribe, Quileute Tribe, National Park Service, U.S. Forest Service, U.S. Fish and Wildlife Service, Washington State Department of Natural Resources, Department of Transportation, Department of Agriculture, Clallam County Conservation District, Merrill and Ring Timber Company, 10,000 Years Institute, and the noxious weed control boards of Clallam, Jefferson, Mason, and Grays Harbor Counties. The working group members completed work in 232 river miles in 27 river systems.

Clallam County crews worked in the Big, Sekiu, Clallam, Pysht, and Sol Duc Rivers. Twenty-seven acres of knotweed were treated directly by Clallam County crews. Work was performed for 83 landowners.

Jefferson County Noxious Weed Control Board

With the assistance of the Clallam County Noxious Weed Control Board, the Jefferson County Noxious Weed Control Board performed surveys and control work in the Duckabush and Dosewallips Rivers, and Snow and Salmon Creeks. These river systems have a very low level of knotweed infestation. Crews hired from the local area surveyed 13 river miles, with approximately 0.2 acres of knotweed treated in the project area. This was the first year WSDA provided support for this project. Work was performed for 11 landowners.

Puget Sound and Eastern Hood Canal

2006 was the second year that WSDA provided support to The Nature Conservancy and the noxious weed control boards of Snohomish, Island, and King Counties. 2006 was the first year that WSDA provided support to the Skagit County Noxious Weed Control Board. Work was performed in the Upper Skagit River basin, the Stillaguamish River basin, the Middle Fork Snoqualmie River basin, Green River basin, and Island County.

The Nature Conservancy

The Nature Conservancy treated 5.5 acres of upland and riparian knotweed in a project area that contained 500 river miles of the Skagit and Sauk Rivers. The Nature Conservancy is the lead entity of the Skagit Knotweed Working Group. Members of this group include private landowners, non-governmental organizations, and state, federal, and county agencies. The working group has been controlling knotweed in the upper Skagit basin since 2001.

Similar to all of the knotweed control projects, The Nature Conservancy has experienced high levels of control, and has observed the complete removal of 55% of the knotweed patches from the project area. Work was performed for 75 landowners

Snohomish County Noxious Weed Control Board

The Snohomish County Noxious Weed Control Board, as a member of the Stillaguamish Cooperative Weed Management Area, has worked with regional partners to control knotweed and other noxious weeds. The regional partners include the Washington State Department of Fish and Wildlife, Department of Natural Resources, U.S. Forest Service, Snohomish County Surface Water Management and Parks Department, Stillaguamish Tribe of Indians and Stilly Bank Savers Project, Snohomish Conservation District, and the Stillaguamish-Snohomish Fisheries Enhancement Task Force.

The Snohomish County Noxious Weed Control Board conducted knotweed treatments in the North Fork and South Fork Stillaguamish River. In 2006, the Snohomish County crew treated 80.7 acres of knotweed for 113 landowners in the project area compared to 69.4 acres treated in 2005. Work was performed in 8.2 river miles. Twenty-three acres of knotweed were treated with WSDA funds.

Skagit County Noxious Weed Control Board

The Skagit County Noxious Weed Control Board worked in the Stillaguamish River Basin. Knotweed populations near Lake Cavanaugh were surveyed and treated for the first time in 2006. This work was performed with the assistance of the Stillaguamish-Snohomish Fisheries Task Force, which donated resources to conduct outreach activities. Skagit County crews treated

knotweed for 22 landowners. The sum of all the treatments equaled one acre.

Island County Noxious Weed Control Board

The Island County Noxious Weed Control Board worked with a private contractor to survey and treat knotweed populations in Island County. The knotweed control work in Island County addressed a low-level knotweed infestation. Two acres of knotweed were treated in 2006, compared to 3 acres in 2005. The reduction of treated acres occurred despite the expansion of the project area to include all of Island County. Island County assisted 16 landowners.

King County Noxious Weed Control Board

The King County Noxious Weed Control Board, as the lead entity in the Middle Fork Snoqualmie Cooperative Weed Management Area, treated approximately 10.8 infested acres along 5.5 river miles. King County utilized WSDA funding to treat 2 acres of the 10.8 acres. Crews performed survey and treatments in 28.5 river miles.

All of the work was conducted by crews comprised of county staff, Washington Conservation Corps members, and members of Earth Corps. 2006 was the first year that WSDA has had the opportunity to support the protection of the functional riparian forests of this watershed. Work was performed for 41 landowners.

WSDA also provided herbicide to King County for their knotweed control work in the Green/Duwamish River. Crews treated 6.8 acres of knotweed in 56.5 river miles for 40 landowners on the Green/Duwamish River. All known riparian populations of knotweed in the Green River were treated this season

Middle Columbia

WSDA provided resources to the Yakima County Noxious Weed Control Board and the Yakama Nation to perform knotweed control activities in the Naches and Yakima Rivers. This was the second year that WSDA supported this project.

Yakima County Noxious Weed Control Board

The Yakima County Noxious Weed Control Board surveyed and treated knotweed on the Naches and Yakima Rivers with the assistance of the Yakama Nation. This work was a continuation of the project that was started by Yakima County in 2004.

In 2005, approximately 8.5 acres were treated over a project area of 18 river miles. In 2006,

crews treated 5.4 acres of knotweed along 37 river miles of the Naches and Yakima Rivers, and surveyed an additional 45 river miles within the river basin. The reduction of knotweed has allowed for the expansion of the project area to include tributaries and downstream areas. All known knotweed infestations in Yakima County and the Naches River Basin were treated during the 2006 season. Work was performed for 61 landowners.

Eastern Washington

2006 marked the first year that WSDA provided resources to the noxious weed control boards of Whitman and Asotin Counties. Both of these project areas are in the early stages of invasion, with very few knotweed populations.

Whitman County Noxious Weed Control Board

The Whitman County Noxious Weed Control Board partnered with local municipalities and a private contractor to survey and treat knotweed in Whitman County and the Palouse River Basin. 2006 was the first year that the noxious weed control board was able to address the knotweed populations in Whitman County, and it was the first year that WSDA provided resources to the noxious weed control board and local municipalities of Whitman County.

The noxious weed control board surveyed 60 river miles of the Palouse River, 40 miles of the Snake River, 450 road miles in Whitman County, and completed surveys of 18 municipalities in Whitman County. The results of this survey showed 6.5 acres of knotweed in Whitman County.

The Whitman County Noxious Weed Control Board contracted with a commercial applicator to treat 1.5 acres of the infestation, and the remaining 5 acres were treated by local municipalities. All known knotweed populations were treated in Whitman County this season. Work was performed for 25 landowners.

Asotin County Noxious Weed Control Board

The Asotin County Noxious Weed Control Board carried out knotweed survey and control work as a part of its “New Noxious Weed Invaders” program. This was the first year that WSDA supported the knotweed control activities of Asotin County. This project focused on the high priority riparian areas of Asotin County, where 15 acres were found to be affected by knotweed. Asotin Creek supported the only known riparian area infested with knotweed in Asotin County, all of which was treated this season.

Next season, survey work will include the local municipalities of Asotin County. This will allow for the detection of knotweed populations before they can affect the sensitive riparian areas of the region. Work was performed for seven landowners.

Plans for 2007

Since 2004, the Washington State Department of Agriculture has provided resources to county noxious weed control boards, tribal governments, the Washington State Parks and Recreation Commission, and one non-governmental organization for landscape-scale knotweed control projects. Program results show a decrease in the number of acres treated, and an increase in the number of river miles where work was performed compared to the results of the 2005 treatment season. This is representative of the substantial reduction of knotweed in the project areas.

In addition to WSDA's program, there are other entities involved in knotweed control projects in a number of the state's watersheds including the state departments of Fish & Wildlife, Natural Resources and Transportation, public utility districts, US Forest Service, National Park Service, county noxious weed control boards, municipalities, Tribal governments, non-governmental organizations, private landowners, fisheries enhancement groups, and county conservation districts. WSDA will continue to disseminate current knotweed control information to those groups and coordinate control efforts with those projects.

Projects in 2007 will capitalize on current success by funding ongoing projects that demonstrate significant gains as well as new projects that will protect high-value riparian habitats. Projects in areas with low-levels of knotweed invasion show high returns on modest investment. Treating these areas in the early stages of infestation prevents knotweed from spreading throughout a given riparian system. WSDA's knotweed program will continue to support cooperators working to protect key components of our watersheds that benefit all the inhabitants of Washington State.