

2009
Olympic Knotweed Working Group



Knotweed in Sekiu, 2009

prepared by
Clallam County Noxious Weed Control Board

For more information contact:

**Clallam County Noxious Weed Control Board
223 East 4th Street Ste 15
Port Angeles WA 98362**

360-417-2442 or

clucero@co.clallam.wa.us or

<http://clallam.wsu.edu/weeds.html>

CONTENTS

EXECUTIVE SUMMARY	1
OVERVIEW MAPS	2 & 3
PROJECT DESCRIPTION	4
Project Goal.....	4
Project Overview.....	4
2009 Overview.....	4
2009 Summary.....	5
2009 Project Procedures.....	6
Outreach.....	8
Funding.....	8
Staff Hours.....	8
Participating Groups.....	9
Observations and Conclusions.....	10
Recommendations.....	10
PROJECT ACTIVITIES BY WATERSHED	
Quillayute River System	12
Big River and Hoko-Ozette Road.....	15
Sekiu River.....	18
Hoko River.....	20
Sekiu, Clallam Bay and Highway 112.....	22
Clallam River.....	24
Pysht River.....	26
Sol Duc River and tributaries.....	28
Forks.....	34
Valley Creek.....	36
Peabody Creek.....	37
Ennis Creek.....	38
Dungeness River.....	40
Snow Creek and Salmon Creek.....	42
Port Townsend.....	44
Big Quilcene River.....	45
Little Quilcene River.....	47
Spencer Creek.....	48
Dosewallips River.....	49
Fulton Creek.....	51
Hoh River.....	52
APPENDICES	
I. Total Herbicide Use.....	53
V. Sample Letter for New Landowners.....	54
VII. Table of all Landowner Agreements.....	55
XII. Photographs.....	56

EXECUTIVE SUMMARY

PROJECT GOAL

The goal of this project is to protect the natural resources, ecosystem functions and land values in Clallam and Jefferson Counties from the impacts of invasive knotweeds.

PROJECT OVERVIEW

The Olympic Knotweed Working Group (OKWG) is a loose-knit consortium of governments, tribes, non-profits and private landowners, working together since 2005 to eliminate invasive knotweed from riparian areas in Clallam and Jefferson Counties. (See list of participants on page 9.) The group meets twice a year for the purpose of sharing information and creating a strategic plan for knotweed control. Clallam County Noxious Weed Control Board (CCNWCB), as the *de facto* group leader, coordinates the meetings and supports the work of other group members by acquiring Landowner Agreements, distributing herbicide, coordinating projects and in some cases supplying an aquatic applicator. CCNWCB also attempts to “fill in the gaps” by controlling knotweed in areas not otherwise covered and educates the community about knotweed impacts and control.

2009 OVERVIEW

We monitored known sites, re-treated as necessary, surveyed and did first-time treatments on 3 waterways. We are now working in at least 21 different watersheds, covering large areas in both Clallam and Jefferson Counties. The decision of the Clallam County Noxious Weed Control Board to require control of knotweed on the Big and Hoko Rivers enabled us to treat knotweed sites on both those waterways for which we had previously been unable to obtain permission.

The bulk of our work has changed from surveys and first-time treatment of knotweed to monitoring and re-treatment of known infestations. Because of this shift crews did not take electronic data points. Instead they noted the status of each site on a spreadsheet of all known parcels. Crews reported no visible knotweed on 117 parcels (out of 418). However, absence in a given year does not necessarily mean eradication.

Previous treatments have greatly reduced plant size so herbicide use has declined dramatically. In some watersheds crews spent more time searching for plants than actually treating. Digging was initiated as a means of eliminating small plants that had already been treated for several years.

A knotweed report form was added to the CCNWCB’s website and at least a dozen knotweed reports were received and acted upon during the year.

Future work will focus on ensuring adequate follow-up where aquatic applicators are needed, while working toward encouraging landowners to assume responsibility for small populations of knotweed, as appropriate.

2009 ACCOMPLISHMENTS

In 2009 Clallam County Noxious Weed Control Board and OKWG partners:

- Managed **205 existing Landowner Agreements**, solicited and obtained **28 new Landowner Agreements** (covering 418 parcels—see Appendix III).
- Helped **209 landowners** by monitoring, treating or re-treating knotweed.
- Surveyed, treated, monitored or re-treated approximately **120 miles** of rivers or streams, **18 miles** of road and approximately **47 other acres** in Sekiu, Clallam Bay, Forks or Port Townsend
- Worked with **12** other OKWG participants, including a mix of federal, tribal, state and local entities
- Used or distributed **140 gallons** of herbicide
- Coordinated 2 meetings of the OKWG
- Acquired an NPDES permit for aquatic herbicide use and did all the reporting associated with it
- Maintained a database of knotweed activity in Clallam and Jefferson Counties and managed an online knotweed report form

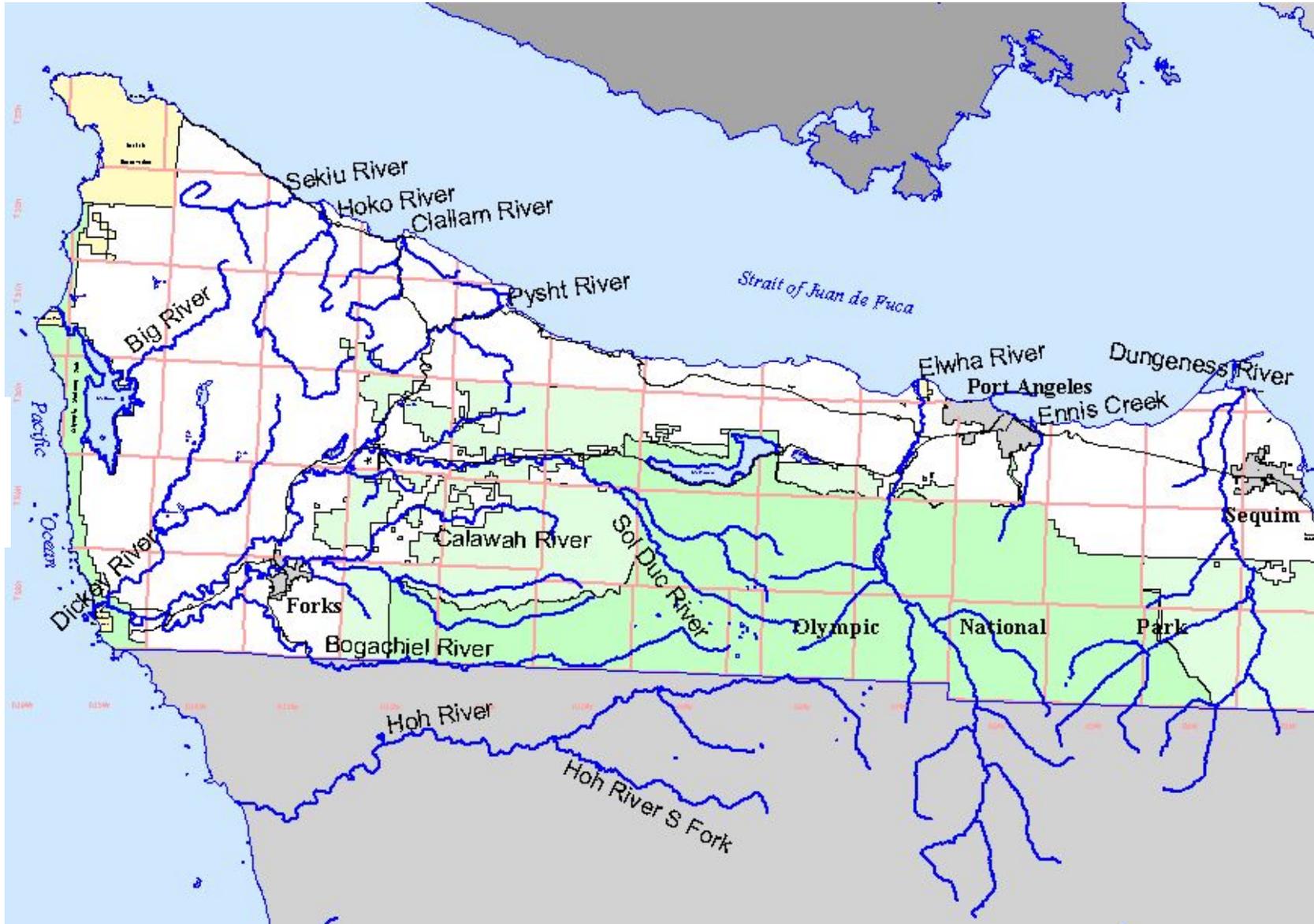
STAFF HOURS

CCNWCB staff spent a total of 2,976 hours on knotweed projects in 2009. 68% of staff hours were spent in the field, surveying, monitoring or treating knotweed. The bulk of the remaining hours were spent managing or acquiring Landowner Agreements.

FUNDING

These projects were funded by: Washington State Department of Agriculture (WSDA), US Forest Service Forest Health Protection Fund, Clallam County Noxious Weed Control Board, and separate funding administered by the Quileute Tribe and 10,000 Years Institute.

OVERVIEW MAP OF CLALLAM COUNTY AND WEST JEFFERSON COUNTY



OVERVIEW MAP OF EAST JEFFERSON COUNTY



PROJECT DESCRIPTION

PROJECT GOAL

The goal of this project is to protect the natural resources, ecosystem functions and land values in Clallam and Jefferson Counties from the negative impacts of invasive knotweed. The project focused on riparian areas; rivers were chosen for their high significance to fish and wildlife or their natural resource value to public or tribal entities.

PROJECT OVERVIEW

The Olympic Knotweed Working Group (OKWG) is a loose-knit consortium of governments, tribes, non-profits and private landowners, all working to eliminate invasive knotweed from riparian areas in Clallam and Jefferson Counties. The group has met twice a year since 2005 for the purpose of sharing information and creating a strategic plan for knotweed control. Clallam County Noxious Weed Control Board (CCNWCB), as the *de facto* group leader, coordinates the meetings, supports the work of other group members and also attempts to “fill in the gaps” by controlling knotweed in areas not otherwise covered.

2009 OVERVIEW

CCNWCB hired a two-person crew to work on knotweed control in the west end of Clallam County for four months. The Makah Tribe did no knotweed control off the reservation so the CCNWCB west end crew monitored and controlled knotweed on the Sekiu, Hoko and Big Rivers and sites on Highway 112 and the Hoko-Ozette Road, work which had previously been performed by the Makahs. Other staff worked on projects in east Clallam County and Jefferson County. Weed board staff frequently worked with other crews, especially if an aquatically-licensed operator was needed. We continued to monitor and treat knotweed in known areas and treated sites on Peabody Creek, the Little Quilcene River and Fulton Creek for the first time.

CCNWCB tracked, coordinated, acquired landowner permission, distributed herbicide and in some cases supplied an aquatic applicator for ongoing projects in the Calawah, Bogachiel, Dickey, Quillayute, and Hoh Rivers.

The scope of work of CCNWCB and the OKWG has increased over the years. Treatments began in 2005 with a half mile stretch of the Big River. Now we are working in multiple watersheds (about 22), covering almost all of both Clallam and Jefferson Counties. In 2009 OKWG partners surveyed, monitored, treated or re-treated 120 miles on different rivers or creeks. They also treated knotweed sites in Sekiu, Clallam Bay, Forks and Port Townsend and on Highway 112, totaling 47 acres. The larger scale of work makes coordination and record-keeping far more complex, involving more staff time.

The bulk of our work has changed from surveys and first-time treatment of knotweed to re-treatment of known infestations. Because of this shift (and because of difficulty in finding GPS satellites) crews did not take electronic data points, which made it difficult to quantify the effectiveness of previous years' treatments. Herbicide use has always declined dramatically in the second year of treatment (compared to the first) and generally a smaller decline has been noted in subsequent years. Without specific data, herbicide use is generally used as the indirect indicator of the amount of knotweed present on any site.

Where multi-year treatments have occurred, more time is spent searching for small plants than treating. Crews experimented with digging plants that displayed only minor regrowth after several years of treatment, based on the possibility that most of the root had already been killed. Because of the small leaf surface area of epinastic plants we are concerned that spraying is becoming less effective. This method may prove premature since other OKWG partners attempted digging and found small plants were still attached to very large roots.

Crews reported that no knotweed was seen on 112 previously-treated parcels in the west end of Clallam County, where treatments have taken place for up to 5 years. Very few new sites were found in the west end, therefore we were able to spend more time surveying and treating knotweed on Port Angeles streams, especially Peabody and Ennis Creeks.

More work was accomplished in Jefferson County than in previous years, particularly on the Big Quilcene River. This is a natural and desirable outcome of the close collaboration between the two counties.

2009 SUMMARY

This list summarizes work accomplished in 2009 and reported to CCNWCB by all members of the Olympic Knotweed Working Group (OKWG), particularly in Clallam and Jefferson Counties.

- Managed **205 existing Landowner Agreements**. [Clallam County Noxious Weed Control Board (CCNWCB) and Jefferson County Noxious Weed Control Board (JCNWCB)]
- Solicited and obtained **28 new Landowner Agreements** [CCNWCB and JCNWCB].
- Many of these agreements covered multiple parcels. We are currently managing agreements on **418** parcels (CCNWCB)
- Helped **201 private landowners** by monitoring, treating or re-treating knotweed (CCNWCB)
- Directly treated land owned by **8 public entities** including **3** state agencies (WA State Parks, WA Department of Natural Resources and WA Department of Fish and Wildlife), **3** cities (Forks, Port Angeles and Port Townsend) and **2** counties (Clallam and Jefferson) (CCNWCB and JCNWCB)
- Treated or re-treated **4 miles (95 acres)** of the Dickey River [Quileute Tribe and The North Cascades Exotic Plant Management Team with the National Park Service]
- Treated or re-treated **10 miles (693 acres)** on the Bogachiel River [Quileute Tribe and CCNWCB]
- Treated or re-treated **6 miles (110 acres)** on the Calawah River [Quileute Tribe]
- Treated or re-treated **1 mile (40 acres)** on the Quillayute River [Quileute Tribe, CCNWCB and the Olympic National Park—North Cascades Exotic Plant Management Team].
- Monitored and re-treated **12.3 miles** of the Big River [Clallam County Noxious Weed Control Board and The North Cascades Exotic Plant Management Team with the National Park Service].
- Monitored and re-treated approximately **18 miles** of the Hoko-Ozette Road [CCNWCB].
- Re-treated **0.4 miles (12 acres)** on the Sekiu River [CCNWCB].
- Monitored, treated or re-treated **8 miles (12 acres)** of the Hoko River [CCNWCB].
- Monitored, treated or re-treated **50 parcels (26 acres)** in the Sekiu-Clallam Bay area and on Highway 112 [CCNWCB].
- Monitored and re-treated **5 miles (81 acres)** on the Clallam River [CCNWCB].
- Controlled **4 sites** on the Pysht River [Merrill & Ring, Burdicks and CCNWCB].
- Treated or re-treated **45 miles (89 acres)** on the Sol Duc River [Quileute Tribe and Clallam County Noxious Weed Control Board and The North Cascades Exotic Plant Management Team with the National Park Service].
- Treated or re-treated **3 miles** of Lake Creek, **4 sites** on Lake Pleasant and **2 sites** in the nearby community of Beaver (**52 acres**). [CCNWCB].
- Monitored, treated or re-treated **33 parcels (20 acres)** in Forks [CCNWCB]
- Treated or re-treated several sites on the Elwha River [Lower Elwha Klallam Tribe and The North Cascades Exotic Plant Management Team with the National Park Service]
- Treated **¼ mile** on Valley Creek, **½ mile** of Peabody Creek and **1 mile** of Ennis Creek [Clallam County Noxious Weed Control Board and The North Cascades Exotic Plant Management Team with the National Park Service].
- Treated or re-treated **½ mile (11 acres)** on Snow Creek [CCNWCB, JCNWCB and WCC]
- Treated or re-treated **4 miles (56 acres)** of the Big Quilcene River [CCNWCB, JCNWCB, WCC and the Skokomish Indian Nation]
- Treated **1 mile ((5 acres)** on or near the Little Quilcene River [JCNWCB and the Hood Canal Salmon Enhancement Group]
- Treated or re-treated **½ mile (5.5 acres)** on the Dosewallips [CCNWCB]
- Re-treated **¼ mile (4 acres)** on Spencer Creek [CCNWCB]
- Treated **¼ mile (1 acre)** on Fulton Creek [CCNWCB]
- Treated approximately **1 acre** in Port Townsend [JCNWCB]
- Monitored and re-treated **15 miles (1,000 acres)** on the Hoh River [10,000 Years Institute, JCNWCB and The North Cascades Exotic Plant Management Team with the National Park Service].
- Treated 4 other small sites, not on any of the waterways listed above.
- Supplied training and herbicide and loaned tools to 2 private landowners so they could treat their own knotweed.
- Coordinated a spring and a fall meeting of the OKWG [CCNWCB]
- Distributed herbicide to other Olympic Knotweed Working Group (OKWG) members. All members of the OKWG used a total of approximately **140 gallons** of herbicide. (See Appendix I for a table of herbicide use)

2009 PROJECT PROCEDURES

1. Surveys and Monitoring

- Surveys and monitoring were conducted from June 2nd to September 30th, on foot or by boat.
- Boats with trained rowers were supplied by the Quileute Tribe.

2. Project Teams

- Teams were typically comprised of 2-5 people and always included an aquatic licensed applicator unless sites being treated were strictly terrestrial.
- Marsha Key (licensed aquatic applicator) and Rafael Ojeda made up the CCNWCB west end team.
- Cody Hagen (licensed aquatic applicator), Bonnie Eyestone (licensed aquatic applicator), Andy Hokit, Greywolf Nattinger and Eibhlinn Cowan-Kuist made up another CCNWCB team which worked in east Clallam County and east Jefferson County.
- The Quileute Tribe crew, led by Garrett Rasmussen (licensed aquatic applicator), worked on west end watersheds and the CCNWCB west end crew sometimes worked with the Quileutes when doing so was efficient or, in the case of the Bogachiel, to supply match for a grant.
- Jill Silver (100,000 Year Institute—licensed aquatic applicator) and a crew hired by 10,000 Years Institute worked on the Hoh River
- The North Cascades Exotic Plant Management Team with the National Park Service worked on knotweed populations within the Olympic National Park boundary on the Dickey, Quillayute, Big, Sol Duc and Elwha Rivers and on Ennis Creek
- Cathy Lucero (CCNWCB Coordinator and licensed aquatic applicator), Eve Dixon (JCNWCB Coordinator and licensed aquatic applicator), and Alicia Aguirre (JCNWCB licensed aquatic applicator) also took part in knotweed surveys or treatment in multiple watersheds.
- The Hood Canal Salmon Enhancement Group, led by Mendy Harlow, (licensed aquatic applicator), treated on the Little Quilcene River and other sites further south on the Hood Canal.
- The Skokomish Indian Nation, led by Randy Lumper, treated on the Big Quilcene River.
- A WCC crew, led by Owen French, helped with treatments on Snow Creek and the Big Quilcene River

3. Invasive Species Surveyed or Treated

Bohemian knotweed (*Polygonum bohemicum*) was the dominant knotweed species of concern. The next most common species was giant knotweed (*Polygonum sachalinense*). Only a few sites contained Japanese knotweed (*Polygonum cuspidatum*). Himalayan knotweed (*Polygonum polystachyum*) was looked for but not found on a previously-treated site. A small population of Himalayan knotweed was treated within Olympic National Park.

4. Data Collection & Equipment

- Electronic data is collected on a Trimble GEO XT instrument, using the “Data Dictionary” developed by the Olympic Knotweed Working Group (OKWG) and using *Pathfinder* software for post-processing.
- The Data Dictionary contains the following required fields: Agency Name, Collector, GIS Projection Reference, Site ID, Species of Knotweed, Cluster Type, Average Stem Height, Stem Count, Phenology, Site Type and Action.
- The following fields are optional: Herbicide, Surfactant, Treatment, Ownership, Canopy, Substrate, Plant Erosion Potential, Site Erosion Potential, Area, Unit, and Comments. Date, and Time fields autofilled.
- All participants in the Olympic Knotweed Working Group used the same data dictionary or sections thereof so that data taken in different places by different people could be grouped, summarized and mapped (For an explanation of the terms used in the Data Dictionary and an example, see Appendices II and III.)
- West end crews were issued comprehensive spreadsheets of all known infested parcels and paper maps indicating location. When electronic data was not collected crews used these sheets to record site status (treatment or null survey) and date visited. This information, combined with that on the spray records, was manually entered into shape files.

5. Landowner Contacts and Agreements

- We converted data points from our surveys into shapefiles, added them as layers to the county parcel map and extracted landowner information.
- We solicited Landowner Agreements by phone, letter, face-to-face contact or email.
- We used the standard Landowner Permission forms produced by WSDA (see Appendix IV for an example). CCNWCB staff explained to landowners that they could cancel the agreement at any time.
- If re-survey or re-treatment was necessary on a property with an existing Agreement we wrote to the landowner ahead of time to let them know that crews would be returning to their property.
- We checked ownership of all properties where we had an agreement. If ownership had changed we wrote to the new owners and asked if they would sign a new agreement, sending them a copy of the Frequently Asked Questions for Landowners with Knotweed document. (See Appendix V for a sample letter and Appendix VI for Frequently Asked Questions for Landowners with Knotweed.)
- We maintained an Excel spreadsheet for knotweed landowners on each watershed, with contact information, site address and date the Agreement was signed.
- At the start of the field season we updated and provided Field Copies of the knotweed spreadsheets with site address, contact information and maps for the crews.
- Staff worked on Landowner Agreements from February through September. (See Appendix III for a Table of Landowner Agreements).

6. Permits

- CCNWCB obtained an NPDES permit from WSDA for all water ways of concern.
- Crews followed all posting and notification requirements as outlined in the permit.
- Total amounts of herbicide used by CCNWCB crews were submitted on-line to WSDA at the end of the treatment season.
- We submitted to WSDA copies of Pesticide Application Records pertaining to aquatic sites.

7. Treatment, Equipment, and Rate

Treatments took place from June 2nd through September 30th

Two types of treatment were used—herbicide application and experimental digging. Digging was used **only** after sites had been treated with herbicide for several years and treatments had reduced plant numbers and size to less than six stems, each approximately less than one foot tall. Crew made on-site decisions about the appropriate herbicide prescription.

Three methods of herbicide application were used—injection, foliar and wipe, as follows:

Injection—injecting undiluted herbicide directly into the stem

Equipment consisted of JK Injection Systems hand injection guns.

Rate applied was 3-5 mls of 100% solution per cane (no surfactants or dyes added). Glyphro, Aqua Master or AquaNeat, all glyphosate-based formulations, were used.

- Crews could chose to inject canes greater than ½ inch in diameter, except on sites where doing so would have exceeded the maximum legal herbicide use per acre.
- We injected into the lower internode
- We used short needles and if we encountered pressure while trying to inject we punched a relief hole in the stem and injected herbicide below the relief hole.
- We marked injected canes with a spot of paint to prevent treating the same cane twice.

Foliar—spraying plants that were too small to inject; or where plant density was great enough to exceed allowable rates per acre with injection

Equipment consisted of low pressure, Solo Backpack Sprayers, 4 gallon capacity

Rate applied varied, but was generally either a 6% solution of Glyphro, Aqua Master or AquaNeat, or a 4% solution of a glyphosate-based product with 1% of an imazapyr-based product, either Habitat or Polaris AQ. We also added 1-2% of Agri-Dex or Competitor surfactant and 0.5-1% of Blazon Blue (marker dye).

Wipe—applying herbicide to the surface of the leaves and stems with a foam paint brush. Effective when treating small sprouts or when there is a need to be highly selective.

Rate a 33% solution with 10% surfactant, by volume, (as allowed by label)

- This method was seldom used in 2009 because it is so labor-intensive, but was used in areas where spraying may have caused concerns about safety.

8. Records

- Crews filled out a Pesticide Application Record, as developed by the WSDA for knotweed, for each herbicide treatment.
- Crews also recorded when knotweed was **not** found on previously-treated sites, or when plants were dug.
- Crews recorded acres treated on the Pesticide Application Record. For the purpose of this report, the total acres treated in each watershed were calculated simply by adding the acres treated on each Record from that watershed.

OUTREACH

We did less formal outreach in 2009 than previously. The knotweed brochure was available in Extension Offices and the Hood Canal Visitor Center and our crews handed out information to landowners and any people who asked about their work.

As we moved into more densely populated areas, such as Peabody Creek in Port Angeles, we were treating on properties with renters which necessitated additional outreach before treating.

An interactive knotweed section was added to CCNWCB's web page towards the end of 2008. Landowners or others can now report knotweed sightings online. Based on the number of lower priority sightings we received, we intend to be more specific about our program's response to reports. In riparian areas we will forward the information to a program actively working in that waterway. For terrestrial sites we will provide technical support and supplies for the landowners to treat themselves, or write encouraging them to do so.

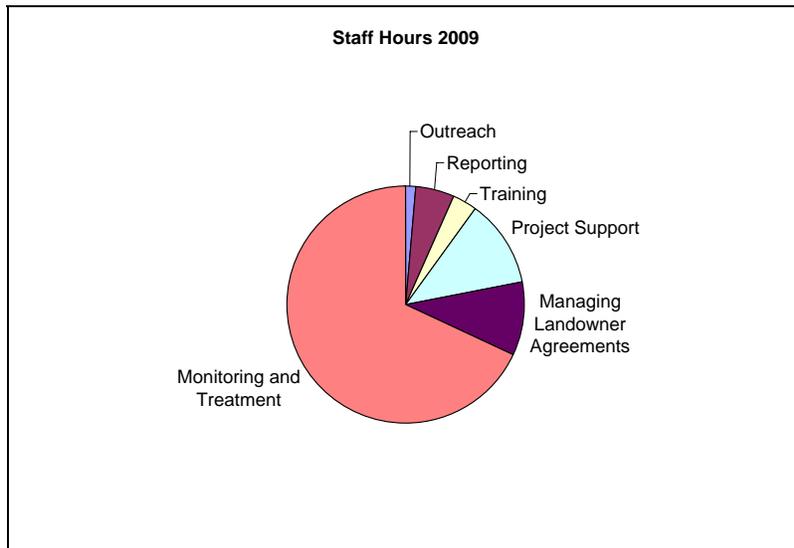
FUNDING

These projects were funded by: Washington State Department of Agriculture (WSDA), US Forest Service Forest Health Protection Fund, Clallam County Noxious Weed Control Board, National Fish and Wildlife Foundation and separate funding administered by the Quileute Tribe and 10,000 years institute.

STAFF HOURS

This section reports only on hours worked by CCNWCB staff. Staff spent a total of 2,976 hours on knotweed projects in 2009. Staff hours were categorized:

- **Survey** includes driving time and data collection ("survey" means looking in new areas)
- **Monitoring and Treatment** includes driving time, time spent looking for plants, actual application periods, setup before, and cleanup afterwards ("monitoring" means checking already-treated sites)
- **Project Support** includes driving time, providing spreadsheets to the crew, general crew oversight, applying for permits, and acquiring and maintaining supplies and equipment
- **Landowner Permission** includes researching land ownership, preparing spreadsheets, writing to, phoning or emailing landowners, driving time, time taken to establish an agreement with the landowner, and re-contacting landowners when crews will be on their property.
- **Outreach** includes driving time, time spent preparing presentations or printed materials for handout and mailings, posting notices, travel time to and from a presentation, the presentation itself along with question periods afterwards, and any follow-up with citizens/agencies afterwards.
- **Reporting** includes reviewing Pesticide Application Records, compiling data, reporting herbicide use and preparing an Annual Report.
- **Training** includes time spent training crew in data collection, treatment methods, and any other necessary job tasks



CCNWCB 2008 STAFF HOURS							
Survey	Monitoring and Treatment	Project Support	Managing Landowner Agreements	Outreach	Reporting	Training	Total Hours
0	2026	350	300	40	160	100	2976

Clearly the majority of our time was spent out in the field looking for knotweed and treating it.

Many other agencies contributed to the implementation of the summarized accomplishments. These hours are not included in the totals given above.

PARTICIPATING GROUPS

- Clallam County Noxious Weed Control Board
- Jefferson County Noxious Weed Control Board
- US Forest Service (Olympic Region)
- Clallam Conservation District
- The Quileute Tribe
- The Lower Elwha Klallam Tribe
- Jamestown S’Klallam Tribe
- 10,000 Years Institute
- The Washington State Department of Transportation (WSDOT)
- The Olympic National Park—North Cascades Exotic Plant Management Team
- Hood Canal Coordinating Council
- Hood Canal Salmon Enhancement Group
- Skokomish Indian Nation
- Washington Department of Natural Resources (WDNR)
- East Jefferson WCC crew

OBSERVATIONS AND CONCLUSIONS

- Two West-end Clallam residents were hired for the third year as crew. This has many benefits—they are knowledgeable of the area and specific knotweed sites, travel time is reduced and they personally know many local residents. However, coordinating and supervising the activities of a crew living and working 60-100 miles from the office in Port Angeles continues to be challenging.
- At the start of the season we created a new spreadsheet check list for the crew, to ensure that all sites in original baseline surveys, their treatments and status, were accounted for. This resulted in better documentation of null surveys and enabled us to prioritize the use of crew time during the season.
- Now that the bulk of our applications are re-treatments, the treatment window narrows to perhaps just 6-8 weeks. Finding and training a good crew for such a short time will be difficult.
- The Clallam County Noxious Weed Control Board's decision to require knotweed control on the Big and Hoko Rivers was successful. Each river had one landowner unwilling to accept treatment. One was completely willing once it became a requirement; the other was still unwilling until faced with the possibility of enforcement action. In both cases the knotweed was treated.
- Crew reported no visible plants on 117 parcels (out of 418); most were terrestrial sites (with high probability to infest priority areas). See Appendix III for details. This is promising; however, these null surveys do not necessarily indicate that knotweed at these locations has been eradicated. In some cases crew may have monitored too early in the season, or were not accustomed to searching for tiny emerging plants in overgrown patches.
- Very few new sites were reported in the West end of Clallam County, indicating that the biggest sites have been discovered, and the program must re-focus its strategy to long term re-infestation prevention that must include landowner involvement. To reflect that change, we moved from a "patch" based record keeping system, to a parcel based one.
- Digging may not be as effective as we had hoped. Staff from two different organizations experimented with digging very small plants but reported such an extensive root system was still attached that they were not certain it was all removed.
- Field crew did not take electronic treatment points, because most points already existed and satellites were often difficult to obtain; office staff created treatment layers based on spray records and field notes.
- The family that has been controlling their knotweed exclusively by pulling/digging for the past three years continued to dig. They believe digging has been effective in preventing spread but now say they may never completely eliminate knotweed from their property through manual control.
- County policy banning herbicide use on county roads still hampers effective treatment.
- Our program has progressed over time, from gaining community trust, to tackling large infestations over a wide area, to searching over large areas for small plants. We are concerned about taking on too much, especially since we cannot be sure of continued funding. In many sites, we have reached our goal to minimize knotweed impacts to the environment. However, there is always the threat of re-infestation.
- Increasing landowner involvement, particularly on terrestrial sites, would free us up to focus on other areas such as Ennis Creek that need more resources and are higher priority.
- We are finding that all knotweed projects need to more carefully consider maximizing landowner involvement from the beginning.

RECOMMENDATIONS

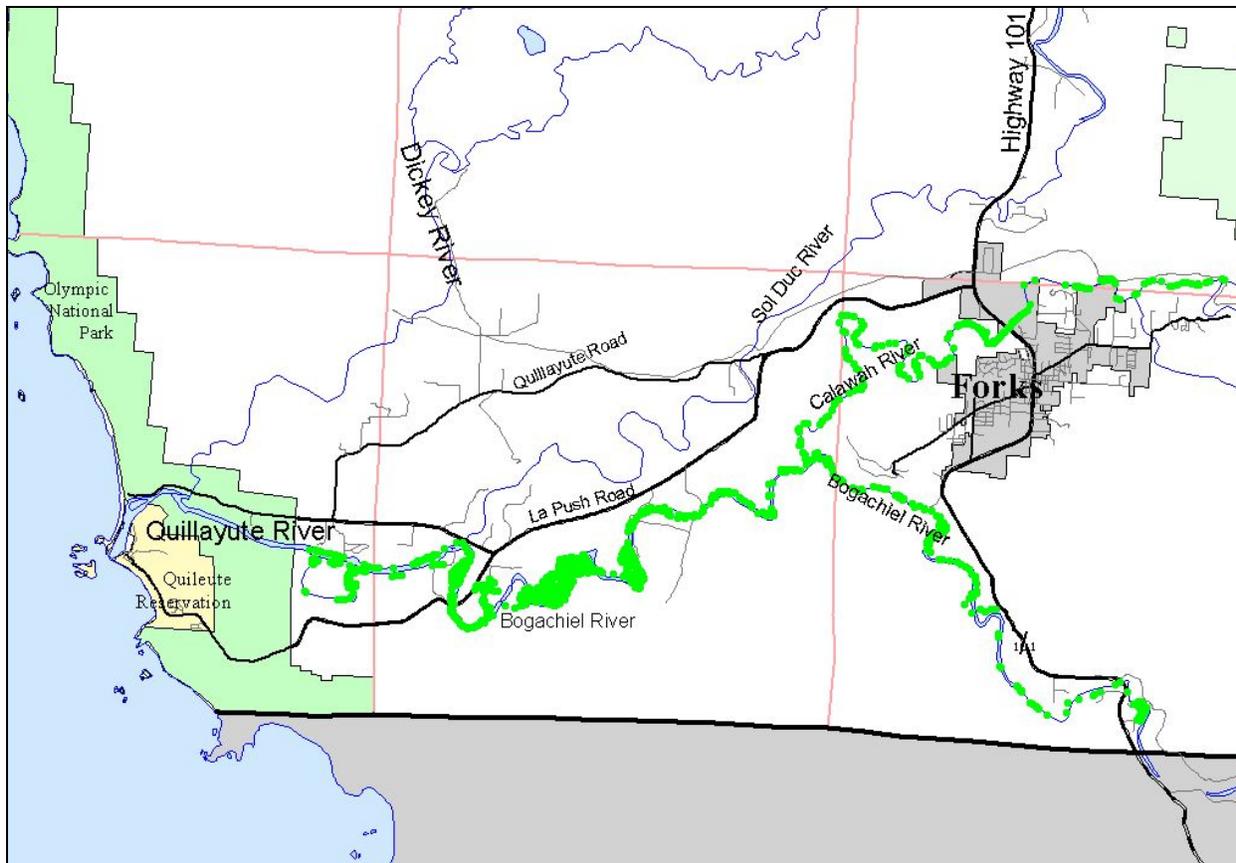
- Ensure follow-up on all known knotweed sites, being especially diligent to search for small plants that could re-infest treated areas as well as looking out for new sites.
- Finish updating CCNWCB baseline shape files for each watershed and get complete information from other agencies to create cross-jurisdictional, Peninsula-wide baselines.
- Improve training for both field and office staff on equipment use and data management. For example, clip GIS layers to the right size and load onto a GPS unit with ArcPad, so that the crew can update data on each knotweed patch out in the field. This would enable a more direct comparison from year to year and enable us to better assess the efficacy of our work.
- Consider whether there are sufficient new sites to occupy crew early in the season; otherwise, form a multi-tasked crew that can work exclusively on knotweed in late summer. For CCNWCB, this will likely mean move towards using a more centralized crew, based in the Port Angeles office.
- Consider requiring knotweed control in the Clallam River, Sekiu River and in the city of Forks where there are only a few sites that couldn't be treated due to lack of permission.
- Work with both Clallam and Jefferson Counties to get permission to treat roadside knotweed sites.
- Maximize landowner involvement by shifting to them as much responsibility for monitoring and re-treatments as is legally allowable and feasible. Specifically, contact landowners with knotweed in the towns of Sekiu, Clallam Bay and Forks (comprising 98 parcels) and ask them to monitor and control their own knotweed. Other sites that are close to water could be monitored by the landowner and we could schedule re-treatments at the most effective time.
- Avoid raising unrealistic landowner expectations and minimize weed board involvement in future projects by emphasizing working partnerships with landowners, PRIOR to paid crew treatments. This can be accomplished through outreach, workshops and limited field support. Landowner stewardship is the long term strategy for effective knotweed control.

PROJECT ACTIVITIES BY WATERSHED

QUILLAYUTE RIVER SYSTEM

Crews

Treatment— The Quileute Tribe crew, led by Garrett Rasmussen, Marsha Key and Rafael Ojeda (CCNWCB), and the North Cascades Exotic Plant Management Team with the National Park Service



Bright green dots indicate knotweed sites surveyed in 2006 on the Quillayute, Bogachiel and Calawah. Data for the Dickey is not available.

For the purpose of this report the Quillayute system includes the Calawah, Bogachiel, Quillayute and Dickey, along with their tributaries. The Sol Duc and its tributaries are dealt with separately. The entire Quillayute system is popular for fishing. The rivers host the healthiest stocks of wild winter steelhead in the Pacific Northwest, with as many as 19,000 fish returning in some years. These rivers also support large runs of Chinook and coho salmon. There are no Threatened or Endangered species within the Quillayute watershed. The Quileute Tribe is endeavoring to preserve the ecosystem in its current, functioning, state believing this to be easier and more cost-effective than restoring a system once it is degraded. Knotweed elimination is an important factor in preserving habitat for fish species. It is also important for elk and deer and other species that forage on the floodplain, where knotweed is out-competing native vegetation. Frank Geyer, biologist with the Quileutes, has observed that elk and deer do not actively feed on knotweed.

• **Dickey River**

The Dickey is a large, low gradient river, draining 108 square miles, characterized by sandy bank soils and extensive off-channel fish habitat and riparian areas. The mainstem Dickey River flows for 8 miles from the confluence of the East and West Forks, joining the Quillayute River approximately one mile from the Quillayute's mouth on the Pacific at La Push. Knotweed infestation levels in the Dickey before treatment began were possibly the worst on the Olympic Peninsula. Surveys indicated the source was probably an old homestead approximately a quarter of a mile upstream of the East and West Fork confluence.

In 2002 the Dickey system was chosen as a first priority for knotweed control because of the known (although extensive) confinement of knotweed infestations to the lower reaches, and the importance of the Dickey River to the Quileute Tribe's fishery.

In 2003 and 2004 the Quileute Natural Resources (QNR) treated over 4.5 miles of stream and associated off channel and riparian areas (417,000 knotweed stems on 135 sites).

In 2005 QNR monitored and retreated each site as necessary. Additionally, the North Cascades Exotic Plant Management Team with the National Park Service treated the remaining mile of knotweed within the Park boundary at La Push.

In 2006 QNR worked on knotweed control on the Dickey from June to October. Lauren Urgensen, a University of Washington Graduate student studying knotweed impacts and control, had established plots along the Dickey as part of her study. QNR worked with her by treating certain plots and by staying out of others. They also helped the Olympic National Park in 2006 in their efforts to control knotweed within their ownership in the lower Dickey River.

In 2007 the Quileutes did a follow-up treatment along the entire stretch from the East/West Fork confluence to the National Park Boundary. This included at least eight miles of riparian area along the river covering some estimated 140 acres of previously treated sites.

In 2008 QNR treated some single plants in the upper five miles of river. The lower 4.5 miles still had plants remaining from the research plots established by Lauren Urgensen which the Quileutes refrained from treating. Lauren's research was concluded in 2008.

In 2009 the Quileutes followed up with treatments on the Dickey, helped at times by the CCNWCB crew. The crew treated the research plots, using almost 17 gallons of herbicide. The crew noticed new plants emerging late in the season, after they had sprayed.

• **Calawah River**

Both the North Fork and South Fork of the Calawah River originate in the Olympic National Park. They converge close to the town of Forks and the Calawah flows into the Bogachiel on the west side of Forks. The Calawah is 31 miles in length, with a drainage basin of 133 square miles.

In 2006 the Quileutes surveyed the Calawah, recording 344 sites, all downstream from the North Fork-South Fork confluence.

In 2007 the Quileutes treated approximately 202 acres of land on the Calawah River. Most of this was giant knotweed and responded well to treatment.

In 2008 the Quileutes found very few surviving plants. Bohemian knotweed in terrestrial areas of the Calawah was treated.

In 2009 the Quileutes again monitored and re-treated the Calawah, finding a few large patches that had possibly been overlooked in previous years. Only 1.59 gallons of herbicide were used.

• **Bogachiel River**

The Bogachiel River joins with the Sol Duc, forming the Quillayute, about 4 miles from the town of La Push where the Quillayute empties into the Pacific Ocean. The Bogachiel is 46 miles in length, with a drainage basin of 154 square miles.

In 2006 the Quileutes surveyed the Bogachiel, recording 1336 sites. Knotweed infestation on the Bogachiel was so extensive it was not attempted immediately and attention was focused on the Dickey.

In 2008 the Quileutes began comprehensive treatment of knotweed on the Bogachiel, treating several times from River Mile 16.5 (believed to be the upstream source of knotweed) down to the Bogachiel Fish Hatchery at RM 9. The Quileutes successfully applied to US Fish and Wildlife Service for funding to enable two more years of treatment.

In 2009 the CCNWCB provided grant match by assisting the Quileutes with treatments on the Bogachiel. The combined crew spent 8 or 9 days working together and the Quileutes spent well over a month working alone, covering only about two and a half miles, the infestations being so dense. Over 77 gallons of herbicide were used.

• **Quillayute River**

Although the Quillayute has the largest drainage area on the Peninsula (629 square miles) it is only 5 ½ miles long and approximately half its length is in the coastal strip of the Olympic National Park.

In 2008 the Quileute Tribe treated knotweed on the Quillayute River for the first time. Most treatments were done in response to landowner requests but some were on land owned by the Tribe.

In 2009 the CCNWCB crew spent approximately 3 days treating knotweed on the Quillayute, at and around the Quillayute River Park, owned by Clallam County.

The North Cascades Exotic Plant Management Team with the National Park Service treated 0.515 acres of knotweed on both the Quillayute and the Dickey, within the Olympic National Park.

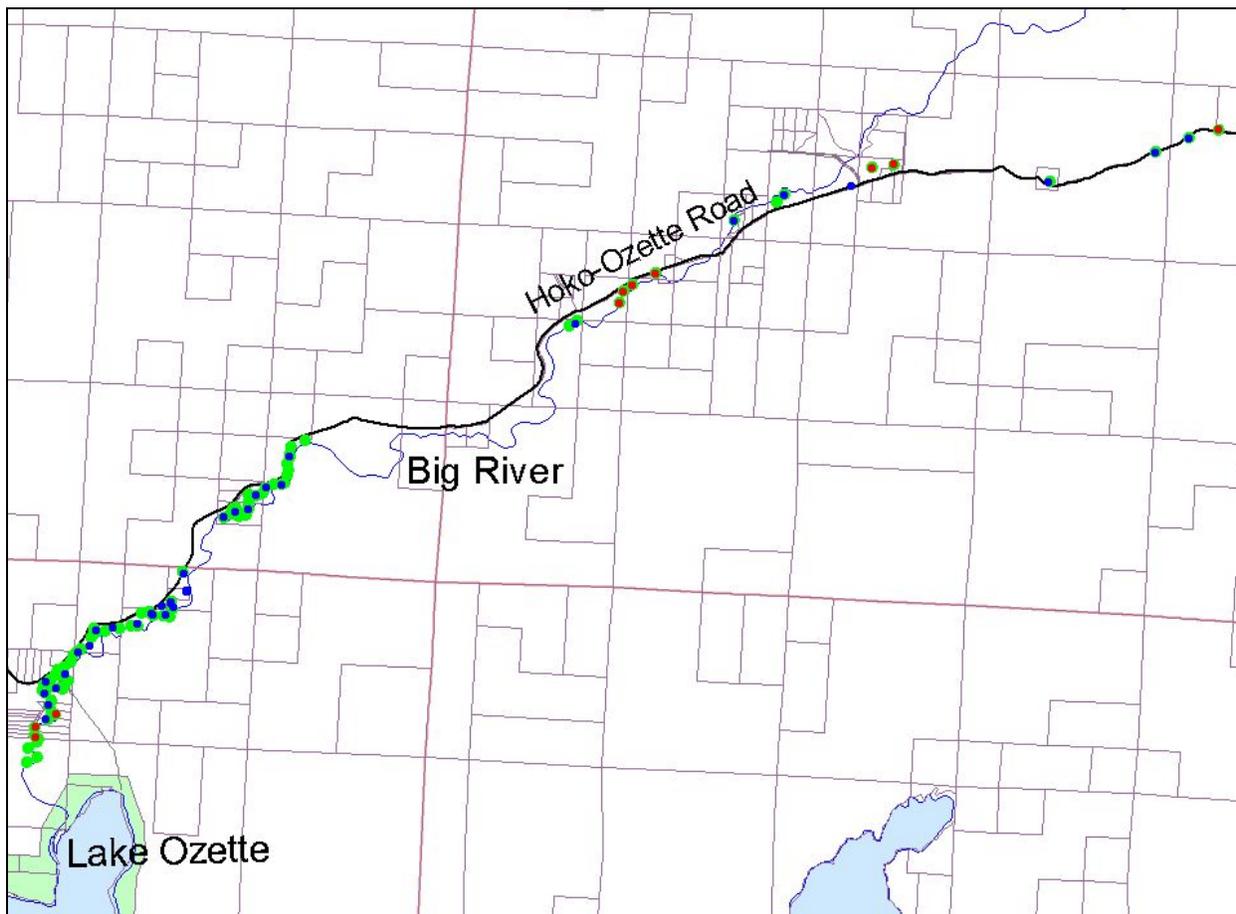
Summary Of 2009 Treatments On the Calawah, Bogachiel, Quillayute and Dickey, Rivers			
River	Years Treated	Acres Treated	Herbicide Used (gallons)
Calawah	3	110	1.59
Bogachiel	2	693	77.34
Quillayute	2	40	1.7
Dickey	7	95	18
Total		938	98.63

For more information about the Quillayute River System, please contact Frank Geyer at (360) 374-2027 or frank.geyer@quileutenation.org

BIG RIVER AND HOKO-OZETTE ROAD

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB), and the North Cascades Exotic Plant Management Team with the National Park Service



Bright green indicates sites surveyed and recorded in 2007. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file.

• BIG RIVER

The Big River is one of several large, low elevation, low gradient streams that drain into Lake Ozette, the third largest natural lake in Washington. Lake Ozette empties through the Ozette River into the Pacific Ocean. The Ozette Basin is approximately 88 square miles and Lake Ozette itself lies within the Olympic National Park in western Clallam County. Major land uses within the Big River watershed include timber production, agriculture, recreation and wildlife preservation (in Olympic National Park).

The Ozette basin supports stocks of coho, sockeye, and kokanee (resident) salmon, small numbers of Chinook and chum salmon, steelhead and cutthroat trout (sea-run and resident), as well as many other native and exotic fish. Sockeye salmon were listed as Threatened under the Endangered Species Act in 1999. It is believed that knotweed infestations, by displacing native vegetation and all of its benefits, are impacting both spawning sites and habitat for juvenile salmonids.

Local residents report that knotweed infestations have been present on the Big River since the 1940s but before 2002 it was not present in significant quantities. By 2004 knotweed had spread to become an extensive monoculture along some of the stream banks. The North Cascades Exotic Plant Management Team has been treating knotweed in the Olympic National Park since 2004, when knotweed first became established within the National Park boundary.

• HOKO-OZETTE ROAD

Because the Hoko-Ozette Road closely follows the Big River for approximately six miles, and at times comes within a few feet of it, knotweed surveys and control work were undertaken there and considered as part of the Big River project.



Hoko-Ozette Road in 2005

Of the 100 plus knotweed sites along the Hoko-Ozette Rd, there were only three where the County's no-herbicide ban applies and the sites cannot be chemically treated. However, untreated, these three sites could re-infest the entire roadway and the river, especially with the use of roadside mowing.

Treatment

In 2004 approximately ½ mile of knotweed on the Big River was chemically treated as a pilot project.

In 2005 treatment began in earnest; approximately 14.95 miles of the Hoko-Ozette Road were surveyed and over 100 separate sites were treated. 1.8 miles of the Big River were treated or re-treated. CCNWCB applied for and was awarded a grant from the National Fish and Wildlife Foundation (NFWF) to treat knotweed.

In 2006 the Makah Tribe surveyed six miles of the upper Big River (including one mile of Boe Creek) and in June the same year a Clallam County crew inventoried the knotweed infestations in approximately six miles of the lower Big River. The Makah surveyors found 16 knotweed sites and the CCNWCB recorded 635 individual points, all thought to be Bohemian knotweed. Early in 2006 CCNWCB hired a five-person local crew who worked with the Makahs, treating or re-treating 12 miles of the Big River and 18 miles of the Hoko-Ozette Road, using 65.39 gallons of herbicide.

In July 2007, CCNWCB re-surveyed the Big River. During the winter of 2006-2007 the river had moved considerably within its flood plain and quite a lot of flooding occurred. Because of the flooding and movement of the river it was difficult or even impossible to find individual sites that had been recorded in 2006. Also, although there has been much discussion within the OKWG as to what constitutes a "site" there is still no clear consensus on how a "site" is determined. Further, the knotweed infestations had been reduced considerably by the treatments given in 2006. For all of these reasons, a different method for determining sites was used in 2007. Fewer readings were taken and they were taken approximately 150 feet apart, or where there was a clearly discernible gap of at least 50 feet between plants. Seventy-nine sites were recorded in July 2007. These sites were obviously larger in area and each one encompassed multiple sites from the previous year. This survey is still being used as a baseline survey. Only 5.14 gallons of herbicide were used in 2007—a reduction of 90%.

In 2008 the Makah crew, assisted by CCNWCB, re-treated all known sites on the Big River and the Hoko-Ozette Road. North Cascades Exotic Plant Management Team with the National Park Service treated within their jurisdiction, in the lower portion of the river. Even though more acres were covered, herbicide use was reduced by 50% from the previous year.

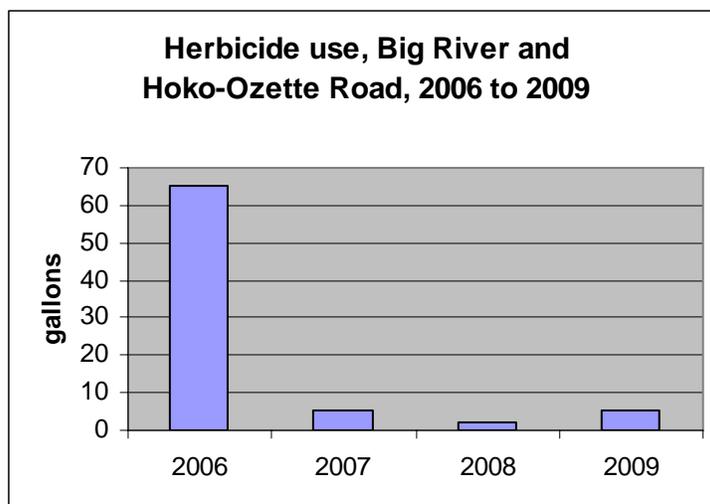
In 2009 the Makah Tribe, who had previously done a large amount of surveying and treating of knotweed on the Big River, had no funding for knotweed work. Consequently, the CCNWCB crew worked on the Big River in addition to many other west end waterways. North Cascades Exotic Plant Management Team with the National Park Service treated within their jurisdiction, in the lower portion of the river, treating just 0.001 acre.

Most of the work done in 2009 was re-treatment of previously treated sites, with one exception. One landowner who had refused permission to treat for many years finally signed a Landowner Agreement form and allowed the crew to inject knotweed on his property. This agreement was not achieved easily. Many years of treatment had reduced most knotweed infestations considerably and we knew that plants from the property of the unwilling landowner could easily re-infest the entire river. A similar situation existed on the Hoko and early in 2009 the Clallam County Noxious Weed Control Board decided to require knotweed control on both the Big and Hoko Rivers. The Big River landowner still did not want to comply, mainly due to concerns about herbicide impacts. When faced with the possibility of enforcement he consented to stem injections or wipe treatments to avoid potential harm to his cats from spraying. Our crew spent two days injecting on that site, using 3.5 gallons of herbicide.

Treating this site for the first time increased the overall herbicide total. Otherwise, the area treated and the amount of herbicide used in 2009 were both very similar to the figures from 2008, although we would have expected a decrease in herbicide use. We think that the primary reason that herbicide use did not decline from 2008 to 2009 is that the last surviving stands of knotweed are very hard to kill. Some sites had large amounts of healthy re-growth, mostly around 4 feet tall, despite have been treated for several years. All plants found were re-treated. Seven parcels had no remaining knotweed

Herbicide Use, Big River and Hoko-Ozette Road (gallons)				
	2006	2007	2008	2009
Parcels Visited/All known			30/42 (est)	39/43
Acres Treated		28	57	57
Aqua Neat or Glypro injected:		1.24	0	3.5
AquaNeat or Glypro sprayed:		3.3	1.876	1.3
Habitat (imazapyr) sprayed:	0	0.6	0.305	0.32
Total Herbicide:	65.39	5.14	2.181	5.12

Note: The term "visited" is used, rather than "treated" because in many cases crews looked for plants but did not find them. "Acres Treated" were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used



The rise in herbicide use in 2009 was caused by large amounts of herbicide being injected on a site where the owner had previously refused to give permission. Given the lack of data and inconsistencies of our data collection, decline in herbicide use is probably one of the best indicators of decline in knotweed plant mass and efficacy of treatments.

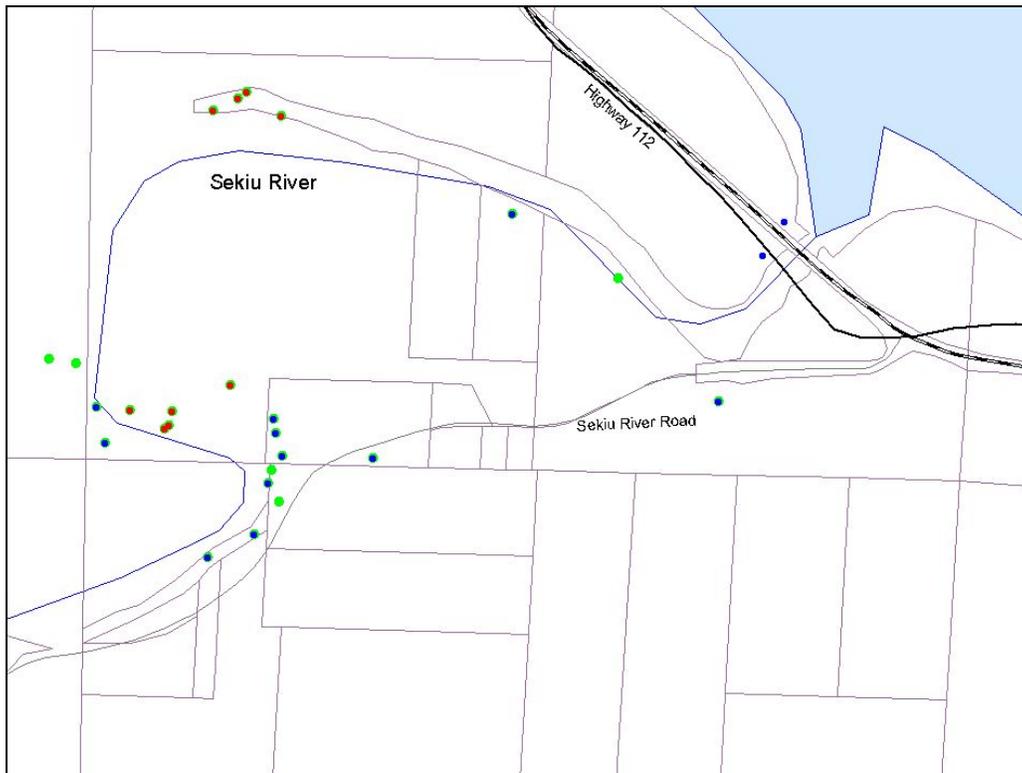
SEKIU RIVER

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Location of the Sekiu River



Bright green indicates sites surveyed and recorded in 2006. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat.

The Sekiu is a low gradient coastal river with many small forested, scrub-shrub and emergent wetlands scattered throughout. It flows into the Straits of Juan de Fuca about 10 miles east of the Makah Reservation. Much of the land in the watershed is zoned for commercial forestry. Chinook, coho and chum salmon have been recorded in the Sekiu River, as well as winter steelhead and cutthroat.

In 2006 it had a dense, yet discrete infestation of knotweed stretching less than a mile from the mouth. The Makah Tribe treated 26 patches ranging from three canes to well over 200. The treated area covered 4.7 acres. A fairly large infestation on one property was not treated due to lack of permission.

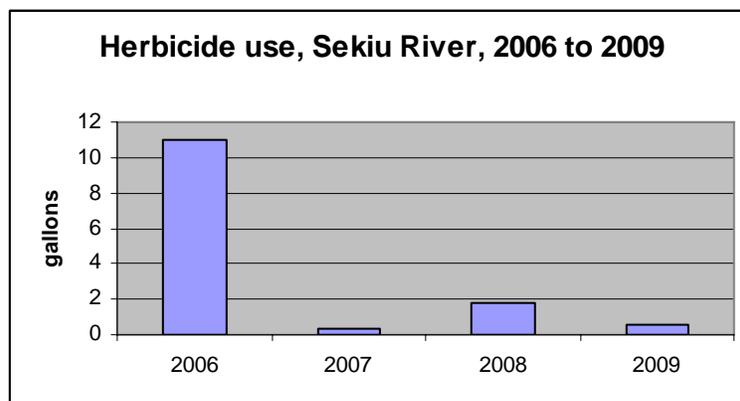
In 2007 only four treatments were performed. Two sites, including a new site near the mouth of the river, were treated by CCNWCB. Two other sites were treated by the Makahs.

In 2008 only one treatment was made—the landowner who had refused permission in 2006 signed a Landowner Agreement and CCNWCB treated the site. This appears to have been the only site treated in 2008, possibly due to a lack of communication between the CCNWCB and the Makahs.

In 2009 almost all known sites on the Sekiu River were re-treated by the CCNWCB crew; the Makahs did no knotweed control work off reservation. The site which was treated for the first time in 2008 showed approximately 75% reduction in size. The crew found and treated a new site on land owned by Washington State Parks. Two landowners still have not given permission for treatment and obtaining permission from them should be a priority next year.

Herbicide Use, Sekiu River (gallons)				
	2006	2007	2008	2009
Parcels Visited/All Known			1/11	10/11
Acres Treated		1.78	2	16
AquaNeat injected:		0.1	1.7	0
AquaNeat sprayed:		0.18	0.06	0.487
Habitat (imazapyr):	0	0.02	0.007 (Polaris)	0.122
Total Herbicide:	11	0.3	1.767	0.609

Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used

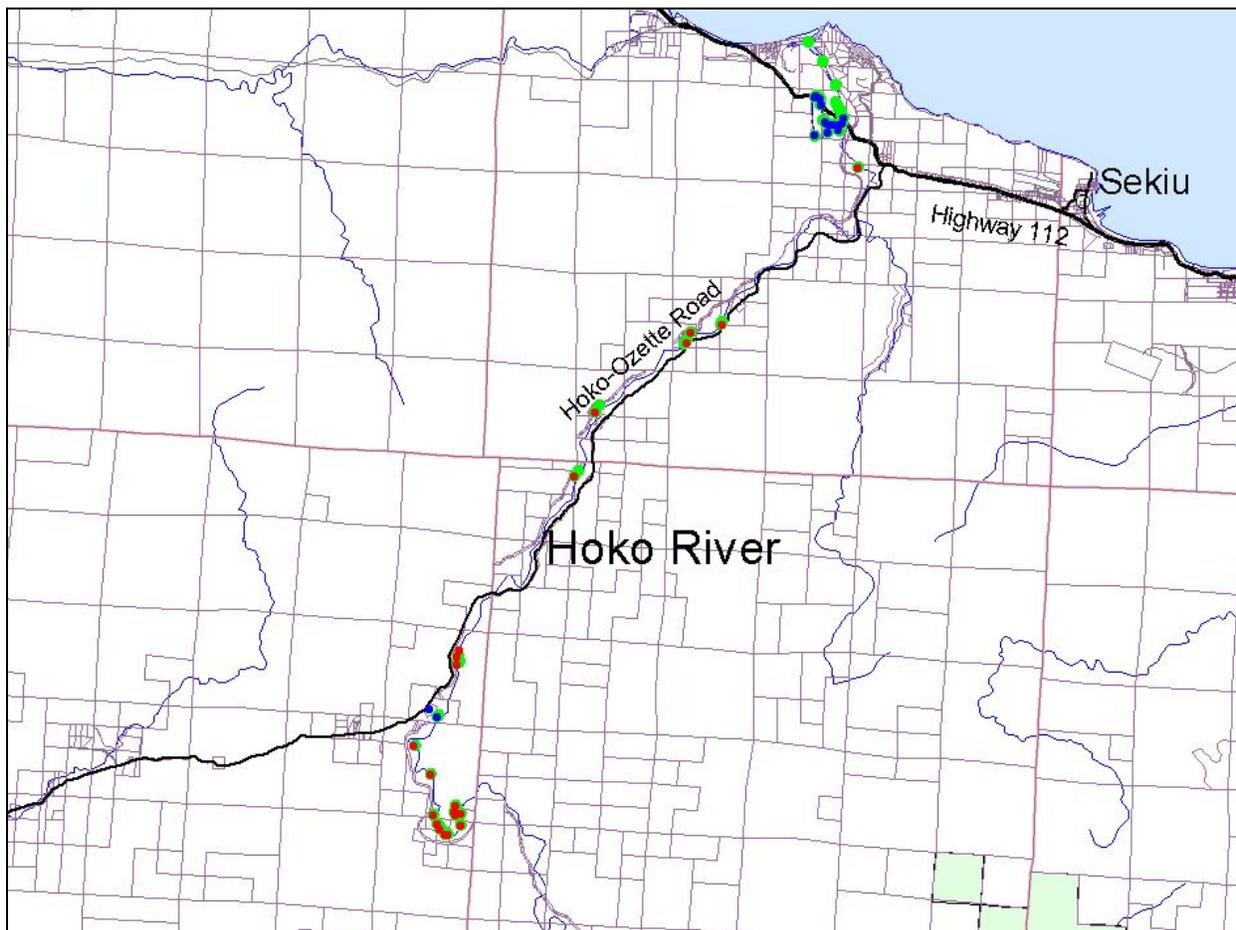


Herbicide use increased in 2008 because a new site was treated, using 1.78 gallons of herbicide. It declined again in 2009 because all applications were re-treatments and all were foliar spray, not injection.

HOKO RIVER

Crew

Treatment— Marsha Key and Rafael Ojeda (CCNWCB)



Bright green indicates sites surveyed and recorded in 2006. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat and, as mentioned below, crews did not treat the mouth, partly because of difficult access.

The Hoko River flows into the Straits at Eagle Point, about a mile and a half east of the Sekiu River. There is a small residential community known as “The Vista” near its mouth, and Washington State Parks owns a considerable amount of land, also near the mouth, which will eventually become a State Park. The Hoko River supports runs of Chinook, coho, chum and winter steelhead.

In early June of 2006 the Makah Tribe conducted a float survey on approximately 12 river miles of the Hoko. Giant knotweed was the dominant species found, mostly in sporadic patches, which were treated by the Makahs the same year.

In June 2007 the Makahs re-surveyed and continued treatment. Because of the steepness of the river banks, crews had to be ferried by boat from the mouth.

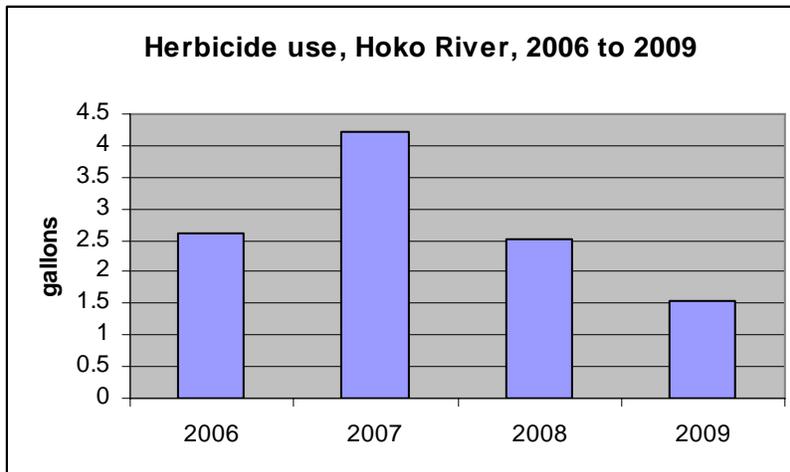
In 2008 the Makahs continued herbicide treatment on the Hoko River. Knotweed plants were still present but were smaller. No plants were large enough to inject. As the table below shows, a larger area was treated but less herbicide was used. One landowner was still unwilling to have us treat, due to concerns about the effects of herbicides on animal and human health.

In 2009 knotweed control was made mandatory on the Hoko River, as well as the Big River. The landowner who had previously refused treatment was quite willing once control became mandatory.

Crew sprayed or injected approximately a gallon and half of herbicide on that site, monitored and re-treated most of the other sites. No plants were found on several previously-treated sites, particularly those upstream from the Hoko-Ozette Road. Difficult access prevented crews from re-treating sites near the mouth.

Herbicide Use, Hoko River (gallons)				
	2006	2007	2008	2009
Parcels Visited/All Known			25/32 (est)	23/32
Acres Treated		5.82	17.16	12
AquaNeat injected:		1.63	0	1.218
AquaNeat sprayed:		2.52	2.27	0.26
Habitat (imazapyr):		0.075	0.246	0.063
Total Herbicide:	2.6	4.225	2.516	1.541

Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used. The number of known sites changed because “known sites” indicates those with landowner permission to treat, and more landowner permissions were forthcoming in 2009



Total herbicide use was reduced in 2009 even though 1.5 gallons were used on one site that was treated for the first time. Most other known sites were visited but few plants were found. Most of the knotweed on the Hoko is giant knotweed and it may have responded better to previous treatments.

SEKIU, CLALLAM BAY AND HIGHWAY 112

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Bright green indicates known sites, recorded in different years over the course of the project. Blue indicates treatment in 2009, red indicates no plants and pink indicates that plants were dug. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat

- Sekiu and Clallam Bay are small coastal towns about two miles apart, consisting mostly of fishing resorts and residential properties. Knotweed in the Sekiu and Clallam Bay area has a long history, dating back to 1930. Knotweed has long been associated with the coming of the railroad, although it is not clear whether it was planted intentionally or came as a contaminant.

- Highway 112 runs west-east near the shoreline and crosses the Sekiu, Hoko and Clallam Rivers. The Hoko-Ozette Road, which heads south-west from Highway 112, runs very close to both the Hoko River and the Big River. Both these roads serve as significant vectors of knotweed through movement of plant fragments in the course of road maintenance and related activities.

By 2004 there were large stands of knotweed in both towns and along Highway 112. Many of the infestations were in or close to water (Straits of Juan de Fuca). Some residents found the knotweed stands overwhelming and desired to eradicate it from their community.

In 2006 CCNWCB hired local residents to educate landowners about knotweed and collect permission forms. The Makah Tribe and CCNWCB treated in Sekiu and Clallam Bay. The community was appreciative of the help given by CCNWCB and our efforts in this area helped pave the way when approaching landowners in other areas.

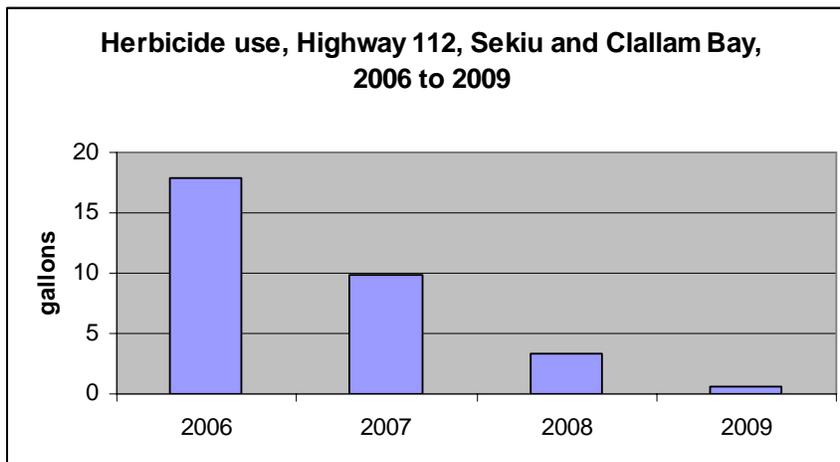
In 2007 the Makahs and CCNWCB re-surveyed the entire area. They observed a tremendous decrease in the number and size of canes in both towns. However, several new sites were noted in 2007. Some of these were very small ones that had simply been overlooked in previous years, in some cases the knotweed had spread onto neighboring property and in yet other cases crews realized the knotweed was actually on more parcels than they had previously realized. This highlights one of the major differences between working in towns such as Clallam Bay, Sekiu or Forks, with small parcels and many landowners, and working on rivers where most parcels cover many acres. We acquired nineteen new Landowner Agreements and the crew treated knotweed. Staff worked with landowners in Sekiu and Clallam Bay who wanted to control their own terrestrial knotweed.

In 2008 crews monitored known sites and re-treated as necessary. They also found several new sites, obtained Landowner Permission and treated. On 19 out of 50 sites no knotweed was found. (For the purpose of this report a parcel is looked on as a site.) Our efforts to engage landowners in treating their own knotweed were set back by the unfortunate death of Charles DeVaney, the staff member who had been mainly responsible for that aspect of the project.

In 2009 the CCNWCB crew monitored and re-treated all known sites. On 33 out of 68 parcels no knotweed was found. On two parcels, plants were so small they were dug. Remaining knotweed populations in Clallam Bay and Sekiu are now very small. We plan to encourage landowners to be responsible for monitoring and control of terrestrial sites in 2010.

Herbicide Use, Highway 112, Clallam Bay and Sekiu (gallons)				
	2006	2007	2008	2009
Parcels Visited/All Known			55/67 (est)	67/68
Acres Treated		25	45	26
Aqua Neat injected		3.5	1.945	0
Aqua Neat sprayed		6.06	1.224	0.45
Habitat (imazapyr):		0.23	0.29	0.155
Total Herbicide:	17.9	9.79	3.459	0.605

Note: The term "visited" is used, rather than "treated" because in many cases crews looked for plants but did not find them. "Acres Treated" were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.

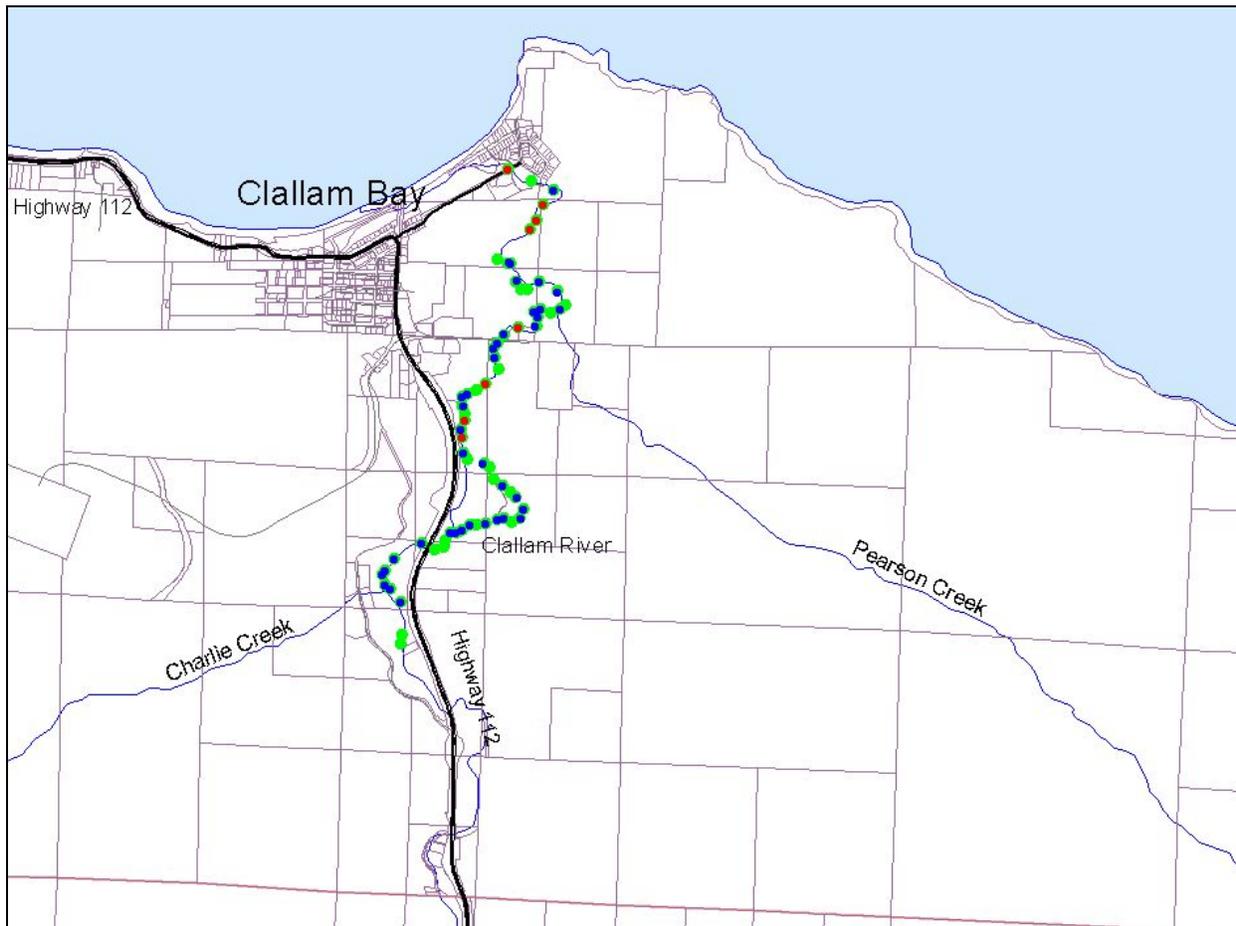


Herbicide use in the whole area decreased steadily from 2006 to 2009.

CLALLAM RIVER

Crew

Treatment—Marsha Key (CCNWCB) and the Lower Elwha Klallam Tribe crew



Bright green indicates sites surveyed and recorded in 2006. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat.

The Clallam is a low-gradient river, flowing into the Straits at the town of Clallam Bay. It is a unique system in that sand and gravel frequently block the mouth of the river. This phenomenon can cause flooding and can trap anadromous fish behind the gravel bar with no way to escape to the safety of the ocean, making them easy prey. In 1998 a channel was excavated to allow fish to escape. It was effective but was only a temporary solution. There is a popular County Park at the mouth, and also a large portion of land owned by Washington State Parks.

The Clallam River is about 13.4 miles long. Coho and winter steelhead spawn in the mainstem, and in several tributaries. Moderate numbers (500 or less) of chum have been observed in the lower mainstem.

The first reported sightings of knotweed on the Clallam River were around 1998 and it has spread rapidly since then (Mike McHenry, Lower Elwha fish biologist, pers. com), although it is likely to have been present, but unnoticed, for much longer.

In 2006 the Makah Tribe surveyed the lower portion of the Clallam River. Sixty-eight knotweed sites were recorded. 75% of sites had mostly canes over six feet tall, and 35% had more than 200 canes. It should be noted that in 2006, when this survey was done, the largest category available in the Data Dictionary was >200. In reality, many of the sites had 1,000, 2,000 or even more canes.

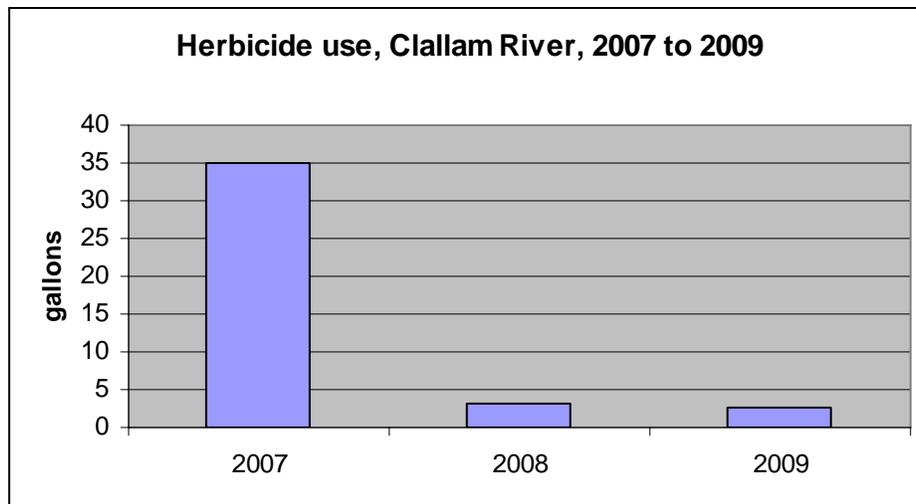
In 2007 funding from a NFWF grant with the Clallam Conservation District became available for the Lower Elwha Klallam Tribe to treat the knotweed on the Clallam River. This was done with the help of an aquatic licensed applicator from CCNWCB. Landowner agreements were solicited and 11 out the 14 landowners approached signed an agreement with us.

In 2008 the Lower Elwha Klallam Tribe again treated knotweed on the Clallam River, with the help of an aquatic licensed applicator from CCNWCB. Landowner agreements were already in place from 2007; one more was signed in 2008. Although roughly the same acreage was treated in 2008 as in 2007 (21.5 acres, compared with 26), herbicide use dropped tremendously, particularly in regard to the amount of herbicide injected.

In 2009 Clallam County Noxious Weed Control Board monitored and treated knotweed on the Clallam River. No knotweed was found on 6 parcels where it had been present in 2006 (when the survey was done), but some sites that had been treated for 2 years still had hundred of stems, either missed or inadequately treated in previous years. Two landowners still have not given us permission to treat; one of them is on the furthest upstream known knotweed site and we will continue trying to get permission.

Herbicide Use, Clallam River (gallons)			
	2007	2008	2009
Parcels Visited/Known Parcels	16/20	16/20	18/20
Acres Treated	26	21.5	55
AquaNeat injected:	32.95	0.52	0
AquaNeat sprayed:	2.14	1.34	2.05
Polaris (imazapyr):	0	0.34	0.53
Total Herbicide:	35.09	3.28	2.58

Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.

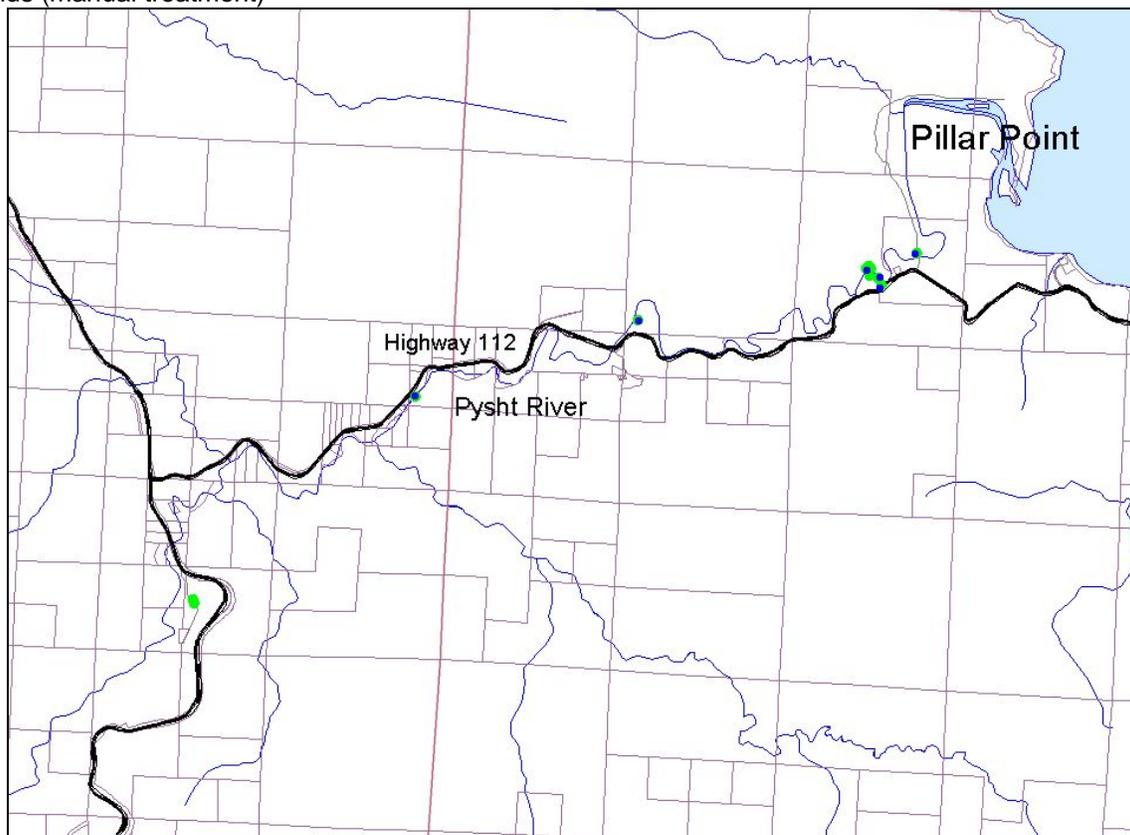


Herbicide use in the whole area decreased greatly from 2007 to 2008. Only a small decrease occurred from 2008 to 2009 because some previously-treated sites still had many remaining plants.

PYSHT RIVER

Crew

Treatment—Marsha Key (CCNWCB) and a crew hired by Merrill & Ring. Also the Burdick family and friends (manual treatment)



Bright green indicates sites surveyed and recorded in 2006. Blue indicates treatment in 2009.

The Pysht River is approximately 16.3 miles long and drains into the Straits of Juan de Fuca at Pillar Point, eight miles east of Clallam Bay. The Pysht supports coho and chum salmon and winter steelhead.

In 2005 knotweed on the Pysht was first observed and treated. No complete survey was taken that year, but two property owners notified CCNWCB of knotweed infestations. One of these owners was Merrill & Ring, which owns a large amount of land on the Pysht including a tree farm near the mouth. They were enthusiastic about controlling their knotweed and hired a crew to do the work, with help from CCNWCB.

The other landowners who came forward were the Burdicks, who had a knotweed infestation covering 80,000 square feet. In 2005 they started manually digging knotweed as an alternative to herbicide use.

In 2006 Merrill and Ring hired a crew who treated their knotweed sites with help from CCNWCB. The crew noticed good results from the previous year's treatments—one site of approximately 3,060 square feet had been covered with knotweed in 2005. By 2006 only 50 to 100 canes remained; they were about 3 feet tall. 5 separate sites were treated in 2006, including infestations of around 4,000 square feet on both sides of the Old Sappho-Pysht Highway.

The Burdicks continued digging or pulling and spent about 50 person-hours on the project. Over the summer, they reported growth of up to two feet a month. In October 2006, the area contained 150 small canes, the majority reaching approximately three inches. This represented considerable success and it seemed that the infestation was contained, and there was practically no chance of the knotweed getting into the river system.

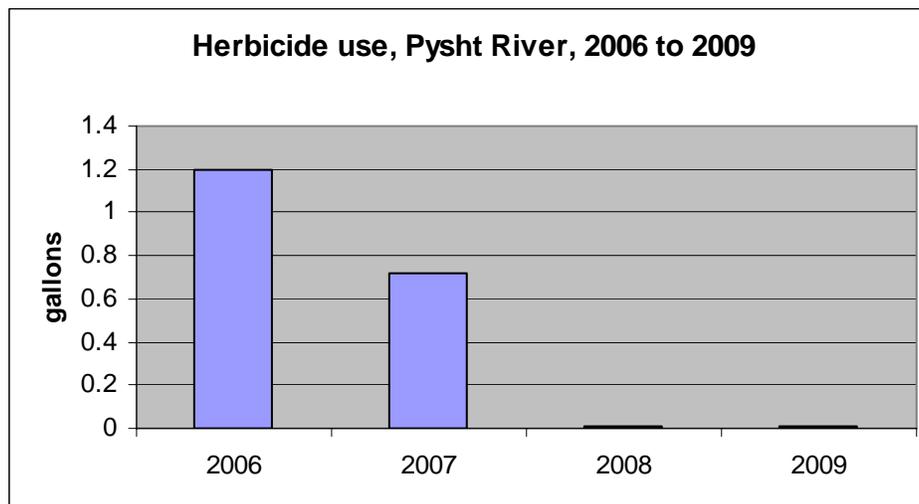
In 2007 Merrill and Ring again hired a crew who treated their knotweed sites with help from CCNWCB. The Burdicks observed considerable re-growth of their knotweed in the spring but they remained optimistic and pulling or digging continued; about 28 person-hours were dedicated to the project in 2007.

In 2008 CCNWCB again worked with a crew hired by Merrill and Ring; they treated three separate sites. Knotweed populations on Merrill & Ring properties had been greatly reduced; no knotweed remained on one side of the Old Sappho-Pysht Highway and only a handful of small plants were on the other side. Only one day was spent treating knotweed on the Pysht and very small amounts of herbicide were used.

The Burdicks visited their knotweed site four times with four people each time, monitoring and digging or pulling. The Burdicks feel that they are making progress but that complete control may take another four years. Disposal continues to be a problem for them. They would like to burn because pulled or dug plants have so much capacity for regeneration. On one occasion they observed about a foot of regrowth had occurred in six days on a pile of discarded material. New leaves were even opening. However, burning is not allowed in the summer and when the ban is lifted the site is difficult to access and the plants are so wet that burning them is difficult. They have decided to be content with covering piles with black plastic, but will cover them extremely well, because plants can sprout even inside the plastic. Older plants however, are decomposing under the plastic, even large root wads.

In 2009 an aquatic applicator from CCNWCB treated 6 or 6 small patches on Merrill & Ring property. The Burdicks continued digging, putting 16.5 man-hours into the project. They feel that they are gaining ground but may never completely eradicate knotweed from their property. They were concerned at finding a few outliers which may have sprouted from plants washed out of their piles of dug plants. They will be more diligent about covering the piles and watching for outliers in the future.

Herbicide Use, Pysht River, (gallons)				
	2006	2007	2008	2009
Gly Pro	N/A	0.72		
AquaNeat	N/A		0.00375	0.00375
Polaris	N/A		0.000937	0.000937
Total	1.2	0.72	0.4687	0.4687



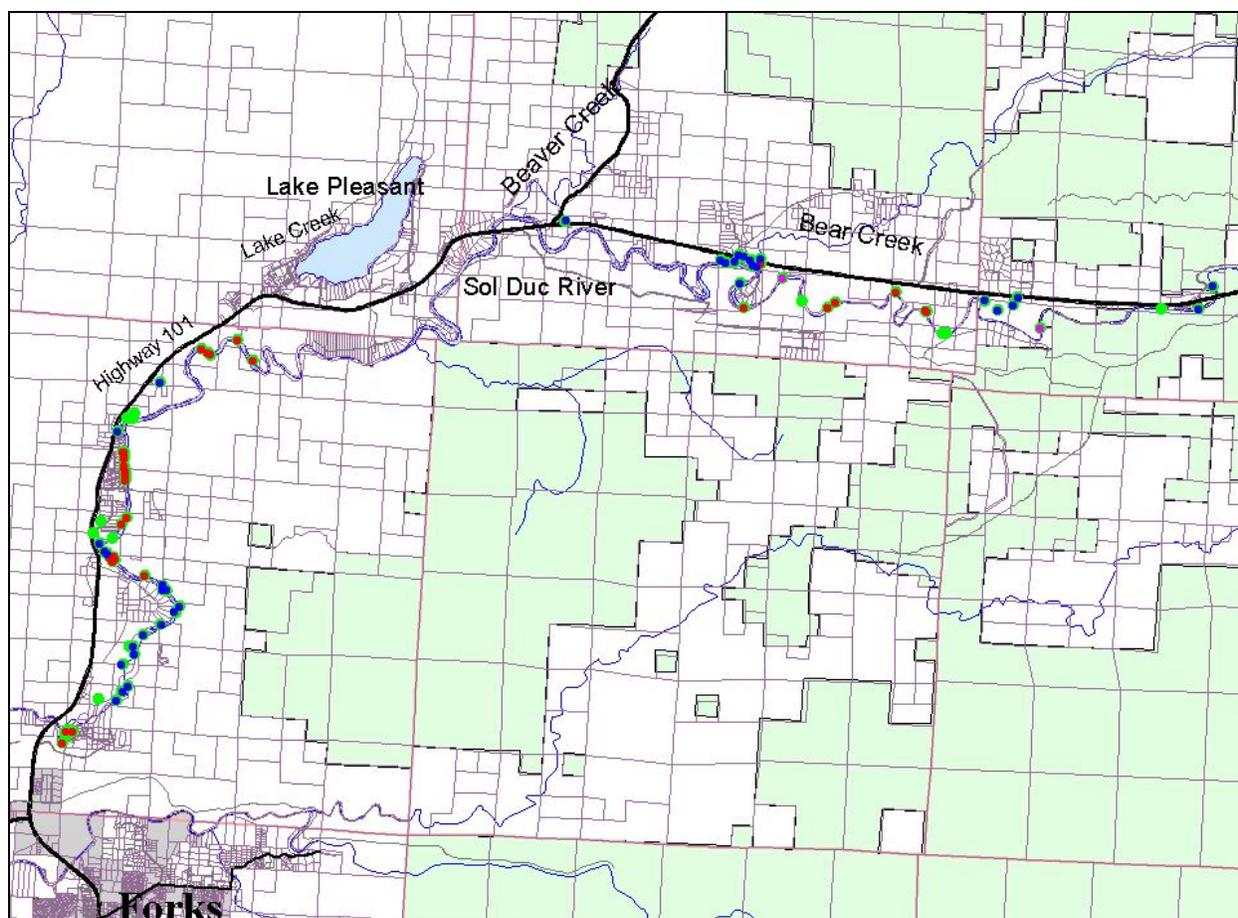
SOL DUC RIVER AND TRIBUTARIES

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB), the Quileute Tribe crew and the North Cascades Exotic Plant Management Team with the National Park Service

The Sol Duc sub-basin, within the Quillayute watershed, drains over 200 square miles. The Sol Duc River originates within Olympic National Park and stretches for nearly 20 miles before emerging from Park boundaries. It then runs for 45 miles until it joins with the Bogachiel, forming the Quillayute. It contains timber lands, agriculture, and residential development. The Sol Duc supports numerous salmonids such as chinook, coho, chum, sockeye, and steelhead, as well as cutthroat and rainbow trout. North Cascades Exotic Plant Management Team with the National Park Service treated a small patch of Himalayan knotweed (0.001 acres) in the upper part of the river. CCNWCB operated only in the mid and lower sections of the Sol Duc because the upper section is within the Olympic National Park. The mid and lower Sol Duc are dealt with separately because treatment on the mid Sol Duc has taken place for longer than treatment on the lower Sol Duc. Lake Creek is also discussed separately so it can be shown in more detail

• Mid Sol Duc



Bright green indicates sites surveyed, treated and recorded in 2006. Blue indicates treatment in 2009, red indicates no plants found in 2009 and pink indicates plants dug in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat.

Note that Lake Creek and Lake Pleasant are discussed separately and those sites are not shown here.

In 2005, Clallam County Noxious Weed Control Board (CCNWCB) conducted a float survey on the mid section of the Sol Duc River (from the Park boundary to Whitcomb-Diimell boat launch on Highway 101). The Snider Work Center was the furthest upstream site found.

In 2006 CCNWCB solicited and obtained 29 landowner permissions from landowners in the mid-section of the Sol Duc. Only one landowner would not give permission to use herbicide. Treatment of the mid-section took place in September and October, mainly on foot except that one day the Quileute Tribe provided a boat and rower to treat sites that could not be accessed by foot. Seventy-one separate sites were treated. All plants treated were Bohemian except for one giant knotweed site and a Himalayan knotweed site near Sappho (the only known Himalayan knotweed on the Peninsula). Knotweed was noted on Bear Creek for the first time.

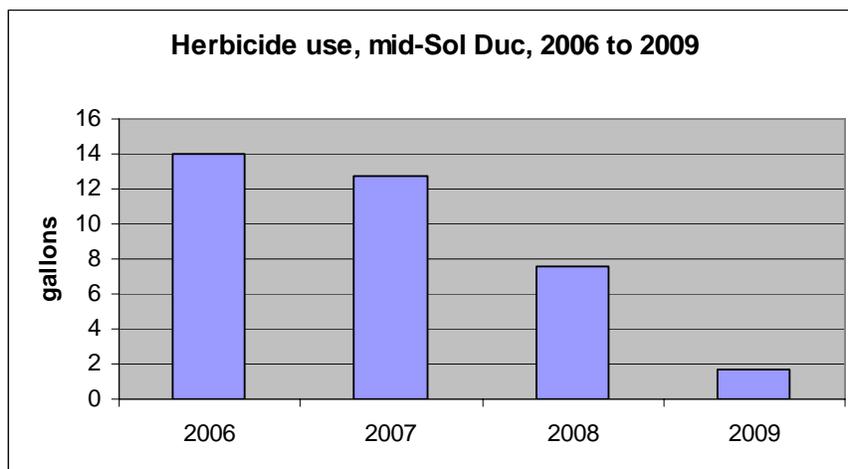
In 2007 a combined Quileute/CCNWCB crew monitored and re-treated as necessary all of the sites in the mid-Sol Duc. The one landowner who had refused permission in 2006 did allow the crew to treat knotweed on his property from the river. This was an important step, because it was the largest site on the Sol Duc. Crews reported that knotweed was much reduced—sites that had consisted of 200 to 400 canes were down to 20 or 30. Some spray records reported 90% control from the previous year’s treatment. Crew also treated the sites on Bear Creek for the first time and spent several days treating a site in Sappho, owned by Rayonier, on both sides of Highway 101.

In 2008 a combined Quileute/CCNWCB crew re-treated the entire river. This was the third year of treatment on the mid Sol Duc and plants were greatly reduced in size and number. Very few sites had plants over five feet tall and epinastic growth was observed in some sites, as a result of previous year’s treatments. No Himalayan knotweed, which had been re-treated in 2007, was visible. Herbicide use declined, despite almost 5 gallons being used on sites on Wisen Creek that were treated for the first time in 2008.

In 2009 the 2-person CCNWCB crew worked alone on the mid Sol Duc. Three years of treatment had greatly reduced knotweed populations and the crew reported that on 36 parcels, (out of 62), no knotweed was found. We obtained a new landowner agreement for a site on Bear Creek and the crew injected 30 plants there and sprayed another 40. Other sites on Bear Creek were re-treated, 140 or so plants still remaining (some epinastic). The Rayonier-owned parcels at Sappho still had at least 800 plants, mostly less than 3 feet tall and many epinastic. About 200 plants still remained on Hillstrom Road and were treated. Wisen Creek was treated again—herbicide use there dropped from more than 6 gallons to less than 1. Very few plants were found on any sites other than the ones mentioned.

Herbicide Use, Mid Sol Duc River (gallons)				
	2006	2007	2008	2009
Parcels Visited/All known			58/66 (est)	65/67
Acres Treated		48	63	59
AquaNeat injected		3.83	2.205	0.095
AquaNeat sprayed		8.045	4.385	1.302
Polaris AQ	0	0.85	1.036	0.325
Total Herbicide	14.05	12.725	7.626	1.722

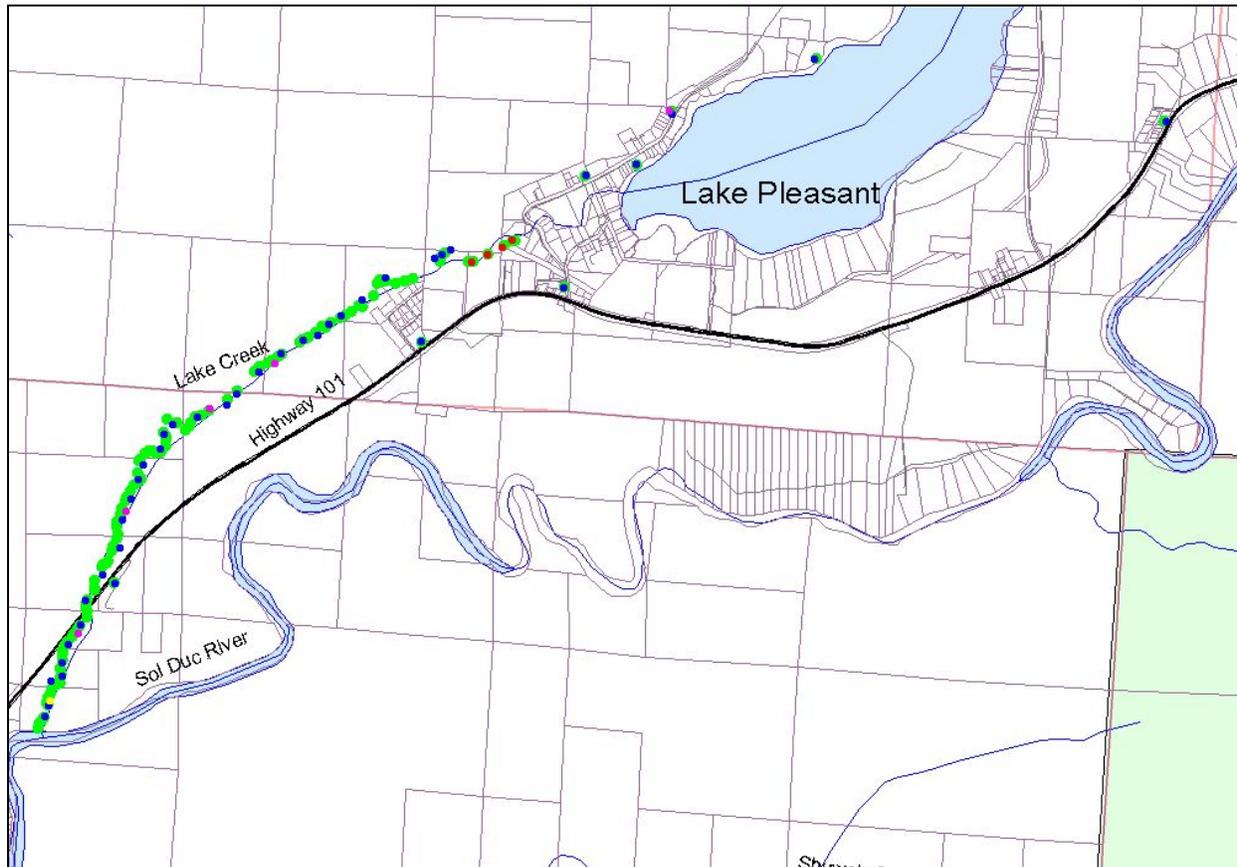
Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.



• Lake Creek, Lake Pleasant and Beaver

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Bright green indicates sites surveyed in 2006. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat.

Lake Creek is one of the major tributaries to the Sol Duc and it contains some of most productive coho habitat in the Quillayute system; these coho include a unique, resident population. All of the sockeye in the entire Quillayute system spawn in Lake Pleasant, which they access via Lake Creek.

Major knotweed infestations had been seen on Lake Creek for several years and during the 2006 season some control work was done on the lower portion of Lake Creek and on two properties near Lake Pleasant. Both the Lake Pleasant sites were significant in size and had plants over six feet tall.

In 2006, the Quileutes surveyed Lake Creek and recorded 106 sites. Almost half of the sites had canes taller than six feet, and 41% had 200 or more canes. However, ">200" was the highest category available in the Data Dictionary at that time (more categories were added later). In some cases the surveyor wrote a better estimate of the number in the "Comments" column. Fifteen sites were estimated to have between 200 and 1,000 stems; ten were estimated to have 1,000 to 2,000 and 11 were thought to have over 2,000.

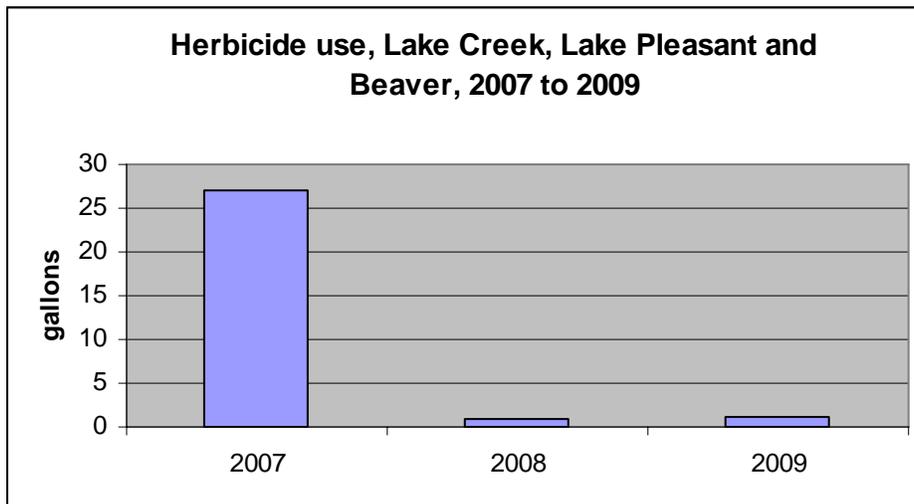
In 2007 the CCNWCB crew treated all of the sites on Lake Creek identified in the 2006 survey. They also treated some additional sites on Lake Pleasant as well as a site in the nearby community of Beaver.

In 2008 the same team monitored all sites and re-treated as necessary. Two new sites were treated on Lake Pleasant.

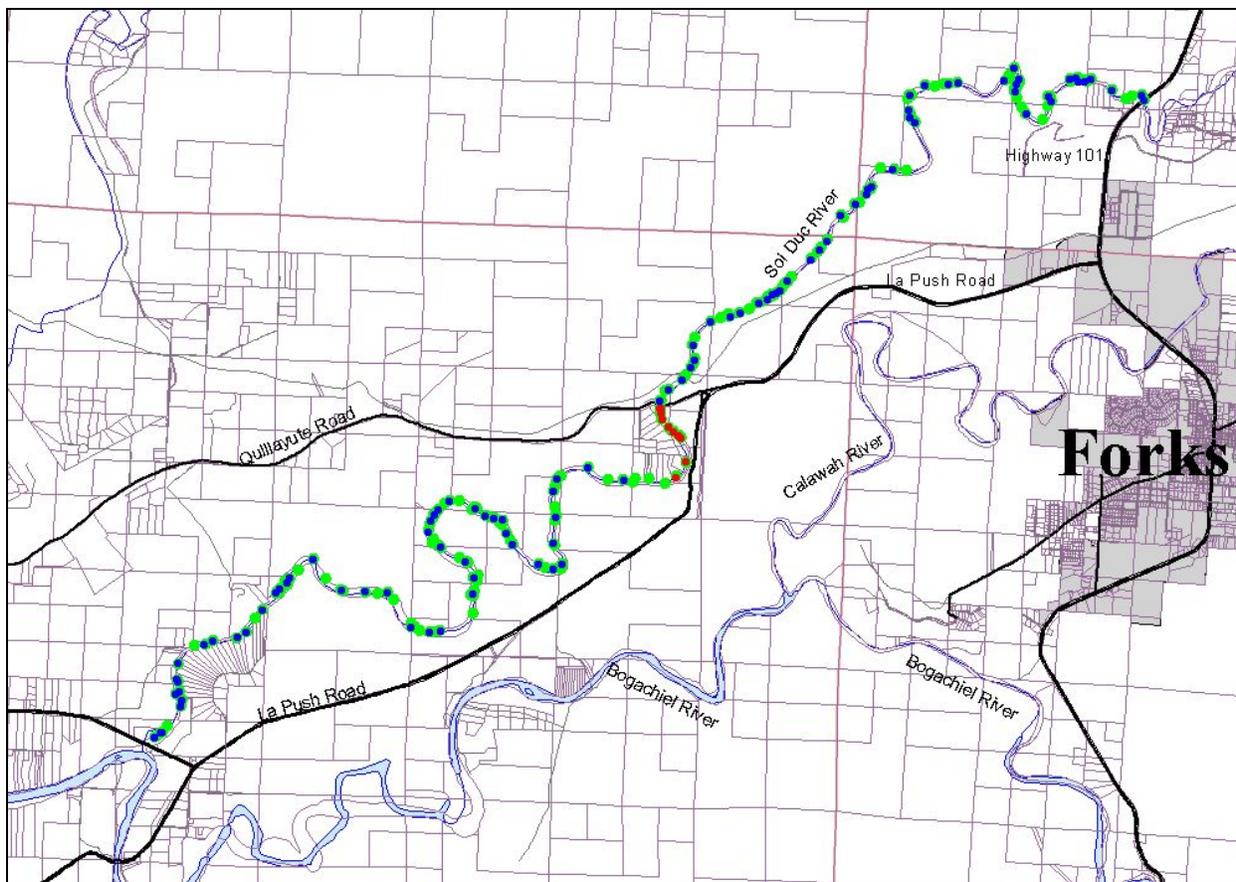
In 2009 treatment continued. Although this was the third year of treatment, herbicide use increased slightly, mainly because the crew treated Lake Creek in August and September, when plants had been able to reach full size.

Herbicide Use, Lake Creek, Lake Pleasant and Beaver (gallons)			
	2007	2008	2009
Parcels Visited/All known		25/25	25/25
Acres Treated	38	60	52
AquaNeat injected	15.93	0.23	0
AquaNeat sprayed	11	0.47	0.853
Polaris AQ	0.16	0.12	0.209
Total Herbicide	27.09	0.82	1.062

Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.



Lower Sol Duc



Bright green indicates sites surveyed in 2006. Blue indicates treatment in 2009 and red indicates no plants found in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat

In June 2006 the Quileute Tribe surveyed the lower section of the river (from Whitcomb-Diimell to the confluence with the Bogachiel). They recorded 447 sites. Almost half the sites had canes taller than six feet. 15% of sites had 200 or more canes; however, ">200" was the highest category available in the Data Dictionary at that time (more categories were added later). Some sites had many more the 200, possibly even thousands of canes. More than half of the sites recorded in the lower Sol Duc were identified as giant knotweed, in contrast to the mid-section, which was virtually all Bohemian.

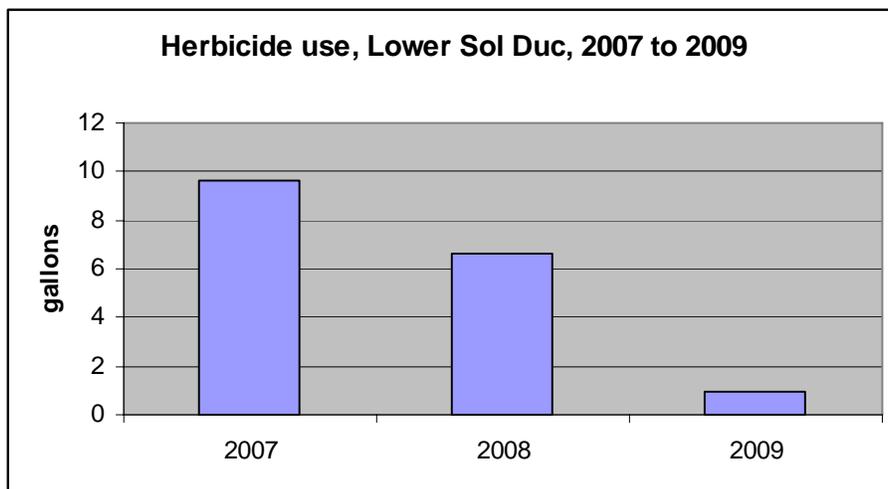
In 2007 CCNWCB acquired six new Landowner Agreements for work in the lower portion of the river. A combined CCNWCB/Quileute crew treated all known sites on the lower Sol Duc. Rafts were used to facilitate access.

In 2008 the combined CCNWCB/Quileute crew monitored and re-treated all sites on the lower Sol Duc. Crew did not re-take data points there in 2008 because of time constraints and lack of satellites. A crew member made notes on maps which show that the largest site treated had 600 stems and on several sites the plants treated were under 3 feet in height, indicating that the first year's treatments were moderately successful in reducing the size and numbers of knotweed plants. Crew found knotweed plants that had been treated in 2007 still flourishing on islands in the river near the Sol Duc-Bogachiel confluence and found plants in wooded areas of the floodplain which had been overlooked in 2007.

In 2009 the Clallam County Noxious Weed Control Board crew and the Quileutes spent 3 days in June treating the lower Sol Duc. All plants found were less than 5 feet tall and considerably less herbicide was used than in the previous year, but it is very likely that some re-growth occurred after the treatments were finished.

Herbicide Use, Lower Sol Duc River (gallons)			
	2007	2008	2009
Parcels Visited/All known		20/26 (est)	26/26
Acres Treated	17	45	30
AquaNeat injected	1.125	0	0
AquaNeat sprayed	8.187	6.2	0.79
Polaris AQ:	0.344	0.166	0.155
Total Herbicide	9.656	6.67	0.945

Note: The term “visited” is used, rather than “treated” because in many cases crews looked for plants but did not find them. “Acres Treated” were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.



Herbicide use decreased again in 2009 but, as discussed above, this may be because treatment was early in the year and not all plants had emerged.

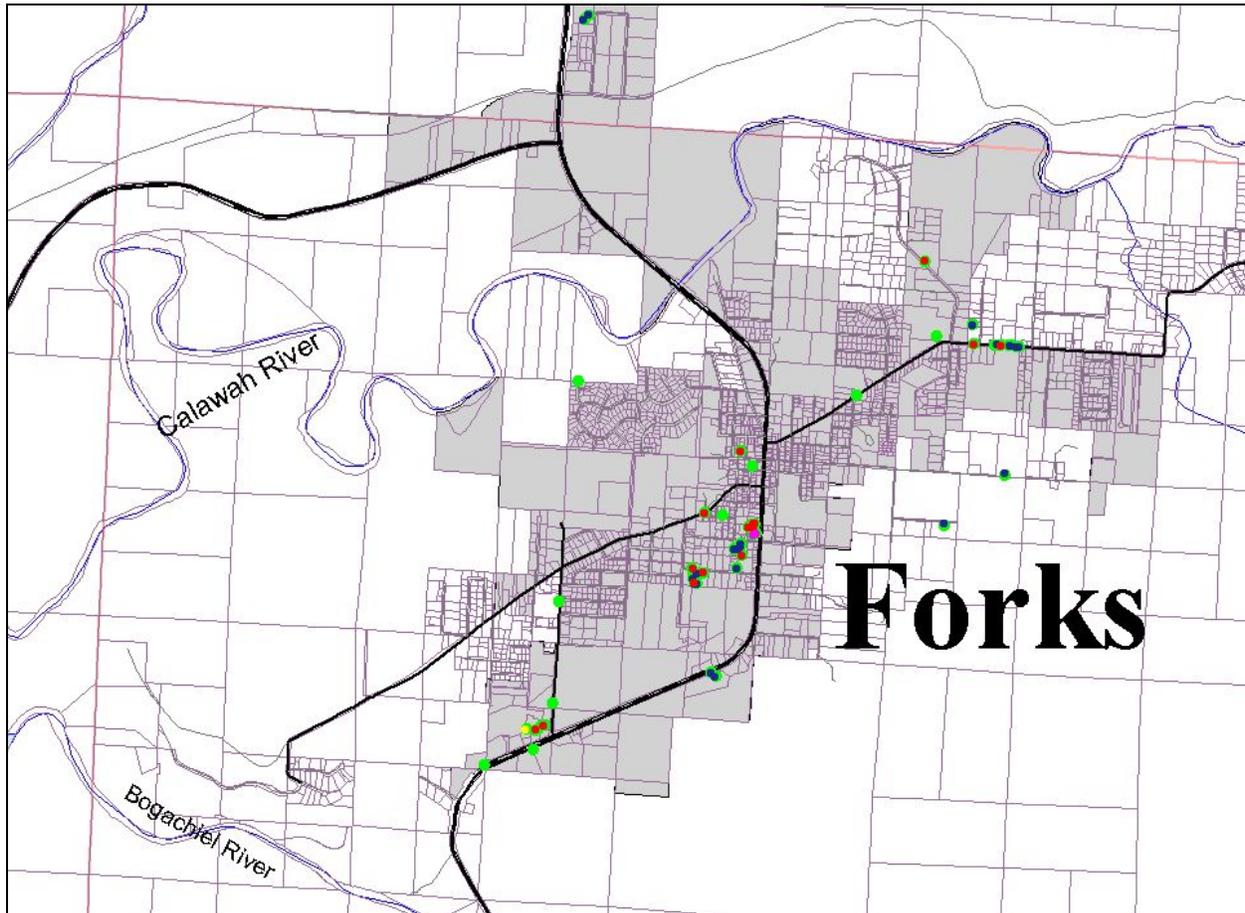
All known knotweed infestations in the Sol Duc River from the Olympic National Park boundary to the Sol Duc’s confluence with the Bogachiel have now been treated for three (lower Sol Duc) or four (mid Sol Duc) consecutive years. A considerable decline in bio-mass has been observed and many sites have no visible knotweed plants.

Treatment has also taken place in several tributaries, most notably Bear Creek, Wisen Creek and Lake Creek. It is hoped that treatment of the tributaries known to have knotweed will prevent re-infestation. As with all our watersheds, monitoring and re-treatment are vital. If small areas of re-growth are left unchecked, all the time and money spent treating knotweed over the last four years will have been wasted.

FORKS

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Bright green indicates sites surveyed, treated and recorded in 2006. Blue indicates treatment in 2009, red indicates no plants found in 2009 and pink indicates plants dug in 2009. Because virtually all our work this year was re-treatments crews did not take electronic data points. Office staff created shape files, based on spray records and notes made by field crews, not based on a previous baseline shape file. There are some sites we do not have permission to treat.

Knotweed has been observed in the city of Forks for several years and it is of concern because Forks is close to both the Calawah and the Bogachiel. One tributary to the Bogachiel passes through Forks and close to some of the knotweed sites. The Calawah and Bogachiel are major waterways in the Quillayute System. Both rivers have knotweed which the Quileute Tribe is trying to eradicate and there is fear of re-infestation if the Forks sites go unchecked.

In 2006 CCNWCB became aware of a large Bohemian knotweed infestation in a gravel pit at the County Shop in Forks. We treated the site twice in 2006. In June the same year the Quileutes surveyed knotweed in Forks and recorded 51 sites. 47% of the knotweed stems seen in Forks were taller than six feet and many of the sites (41%) had more than 200 canes. However, since ">200" was the highest category available in the Data Dictionary at that time, some patches may have been larger. (More categories were added to the Data Dictionary later, so surveys taken from 2007 onwards are more representative.)

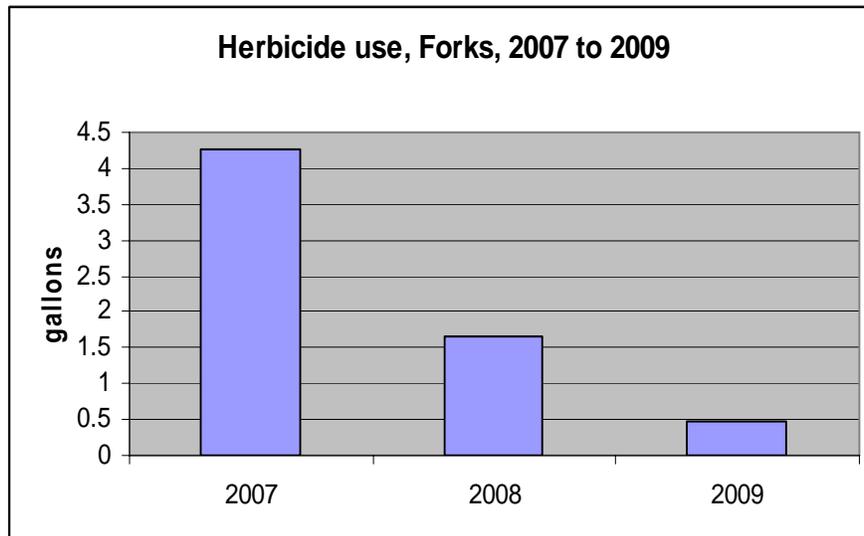
In 2007 a herbicide training was held in Forks and as a practical exercise several crews went out and treated at least 10 of the knotweed sites. Monitoring, treatment and re-treatment continued throughout the summer. CCNWCB crews and the Quileutes treated Forks sites on several occasions, including the County Shop, Rayonier Gravel Pit, Forks Industrial Park and several other commercial sites in and around Forks

In 2008 all sites were monitored and re-treated as necessary. Several new sites were discovered and new Landowner Agreements obtained. Land parcels in Forks are mostly small, residential parcels. Consequently, a knotweed infestation may cover 3 or 4 different parcels and the crews sometimes experienced difficulties in knowing exactly which property plants were on. In some cases plants were determined to cover more properties than we had Landowner Agreements for and we had to try to get more. Several completely new sites were found during the summer and we had to solicit new Landowner Agreements and were not always successful in obtaining new Agreements in time for that year's treatment.

In 2009 we continued to treat knotweed in Forks, treating one new site and monitoring and re-treating where necessary. The crew reported that 15 (out of 30) parcels had no remaining knotweed and all other sites are reduced in size and number of stems. One landowner with a large infestation still has not given permission to treat. Working with this landowner next year should be a priority.

Herbicide Use, Forks (gallons)			
	2007	2008	2009
Parcels Visited/All known		28/30	28/30
Acres Treated	38	18.5	20
AquaNeat injected	1.48	0.847	0
AquaNeat wiped	0	0.044	0
AquaNeat sprayed	2.75	0.579	0.383
Polaris AQ	0.02	0.192	0.085
Total Herbicide	4.25	1.662	0.468

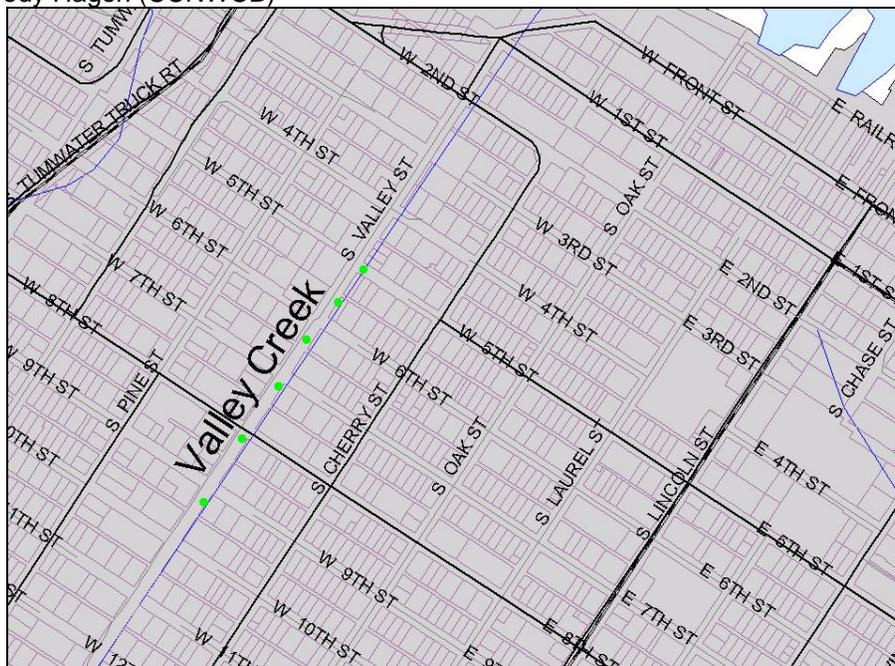
Note: The term "visited" is used, rather than "treated" because in many cases crews looked for plants but did not find them. "Acres Treated" were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.



VALLEY CREEK

Crew

Treatment—Cody Hagen (CCNWCB)



Knotweed on Valley Creek, treated in 2009

Valley Creek is a small stream which empties into the Port Angeles Harbor. Salmon and steelhead have probably been extinct from the creek since the late 1940's, when the final sections of the approximately 2,000-foot culvert at the mouth were installed. Recent surveys of fish in this system revealed numerous resident cutthroat trout up to 11 inches in length.

The section of the creek by Valley Street has been heavily infested with knotweed for some time and treatment has been ongoing for several years.

In 1999 CCNWCB and the Boy Scouts manually removed knotweed from a small section of the road and revegetated the area with native plants. This treatment was temporary; extensive re-growth occurred almost immediately.

2002 saw the culmination of a restoration project which brought the previously culverted section of the creek to the surface and established a small park at the estuary, but did not address the knotweed problem. By 2003 knotweed became established at the estuary.

In 2006 Valley Creek, being very close to the CCNWCB office, was useful as a training ground for new employees. Portions of the site were visited three times in the season and were injected or sprayed with 2.3 gallons of herbicide.

In 2007 CCNWCB re-treated the Valley Creek site, spraying or injecting 1.52 gallons of herbicide.

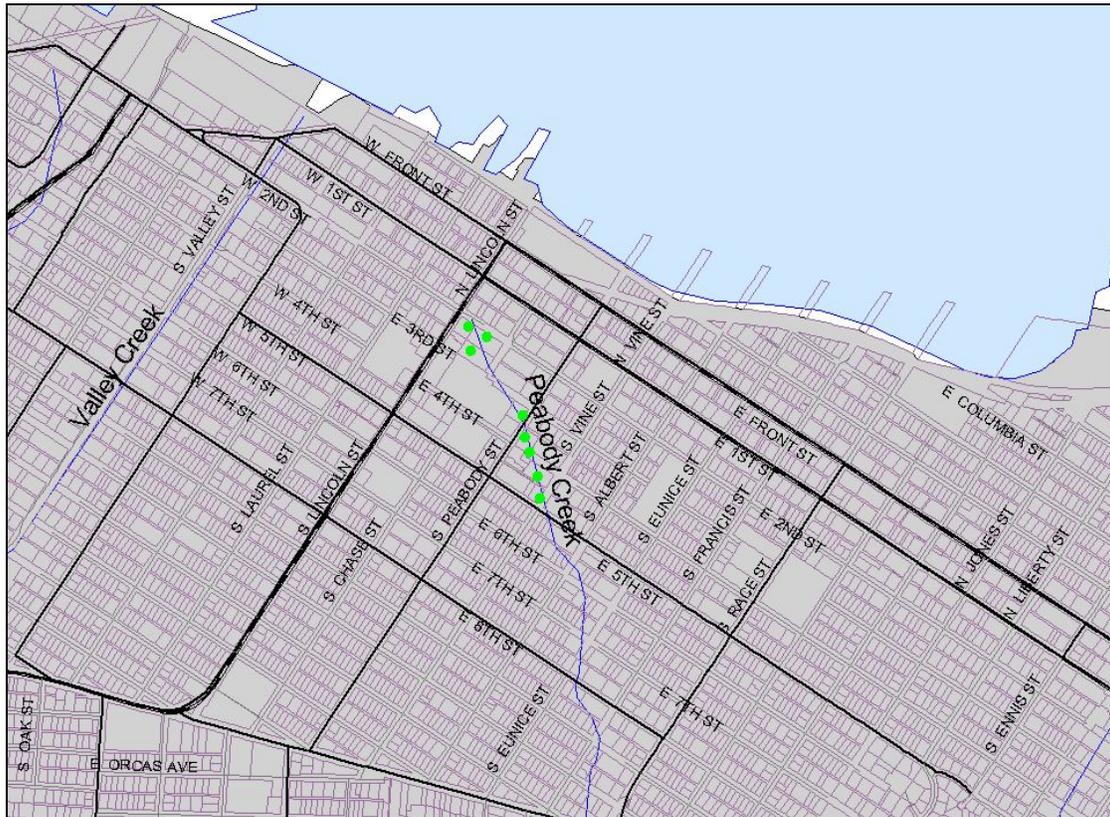
In 2008 CCNWCB treated roughly two acres, including a first-time treatment of the estuary, injecting a total of 0.0625 gallons of Aquaneat.

In 2009 CCNWCB treated the Valley Creek site again (not the estuary), using 0.023 gallons of AquaNeat and spending one day digging.

PEABODY CREEK

Crew

Treatment—Cathy Lucero, Cody Hagen, Bonnie Eyestone, Andy Hokit, Greywolf Nattinger and Eibhlinn Cowan-Kuist (CCNWCB)



Knotweed on Peabody Creek, treated in 2009

Peabody Creek is a small urban stream, draining a watershed of 2.6 square miles, with its headwaters in the northern part of the Olympic National Park. Some logging has occurred in the upper watershed but good stands of mature timber still remain. The 4.8 mile long stream flows through heavily urbanized areas of Port Angeles. Sewage was historically discharged directly into Peabody Creek and large quantities of stormwater are still directed into it. Coho and possibly chum salmon were observed historically but are thought to be extirpated. Currently only cutthroat trout are known to utilize Peabody Creek.

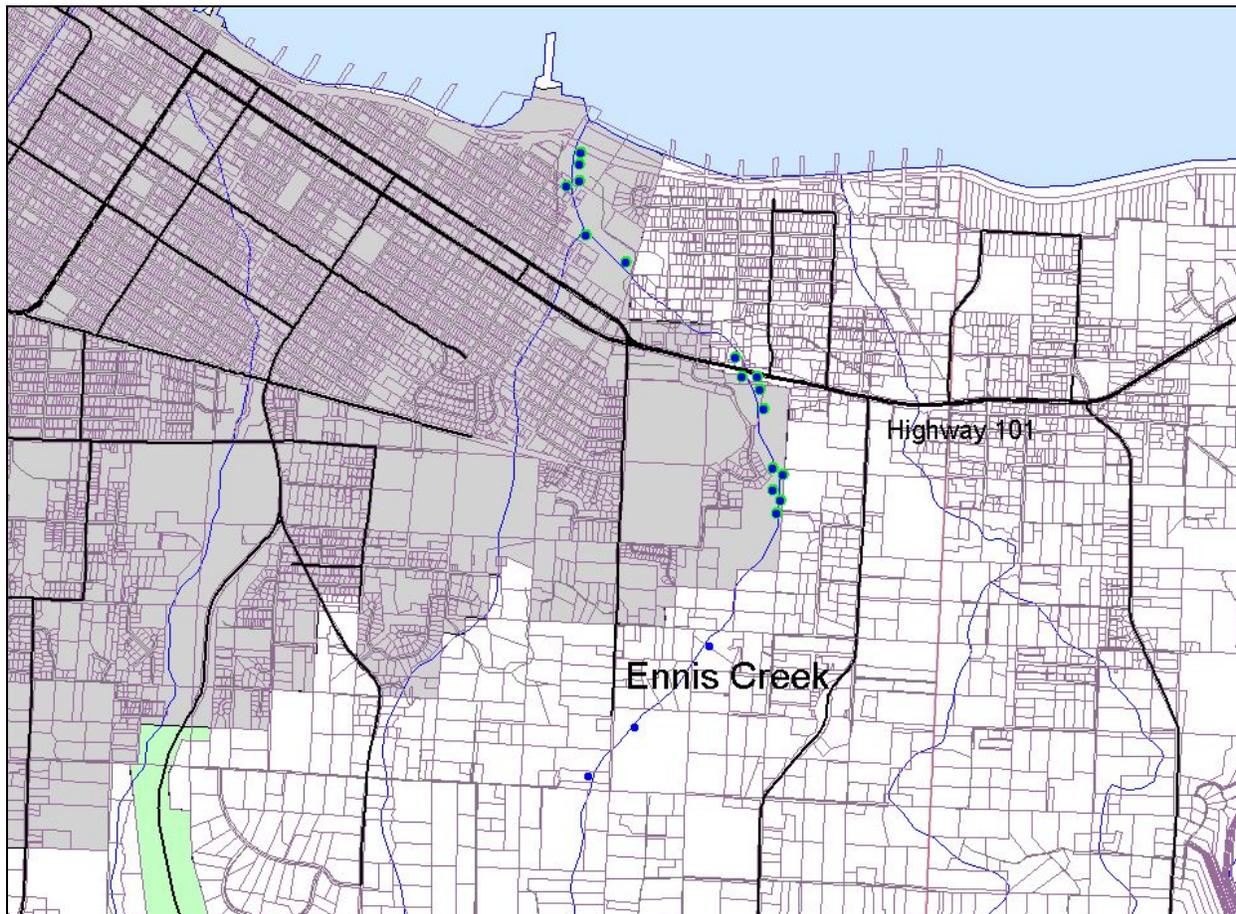
Peabody Creek is close to the Clallam County Noxious Weed Control Board office and employees often notice stands of knotweed on or close to the creek. In 2009 we asked for and received permission to treat from 4 landowners whose property covered about ½ mile of the creek, within the City of Port Angeles. We do not at this point know how far upstream knotweed occurs.

Herbicide use, Peabody Creek (gallons)	
	2009
Acres Treated	7.89
AquaNeat sprayed	1.98
Total Herbicide	1.98

ENNIS CREEK

Crew

Treatment—Cathy Lucero, Cody Hagen, Bonnie Eyestone, Andy Hokit, Greywolf Nattinger and Eibhlinn Cowan-Kuist (CCNWCB)



Bright green indicates sites surveyed in 2006. Blue indicates treatment in 2009. Office staff created these shape files, based on spray records and notes made by field crews.

Because the headwaters of Ennis Creek are at 6000', in the Olympic National Park, it is significantly affected by both snowmelt and runoff. This type of system typically has the highest stock diversity of anadromous fish. Historically Ennis Creek supported stocks of coho, steelhead, and chum. Currently coho stocks are highly degraded. Steelhead and cutthroat numbers are higher.

The lower reaches of Ennis Creek flow through urban areas of Port Angeles where water quality is impacted by stormwater runoff. An old Rayonier mill site is at the mouth of Ennis Creek and this portion of the creek has been rocked, channelized and the riparian corridor highly degraded. The old mill site has had a significant knotweed infestation for many years.

In 2007 CCNWCB and the Lower Elwha Klallam Tribe treated the lower portion of Ennis Creek and some sites on the adjacent Discovery Trail. 0.68 gallons of herbicide was sprayed or injected.

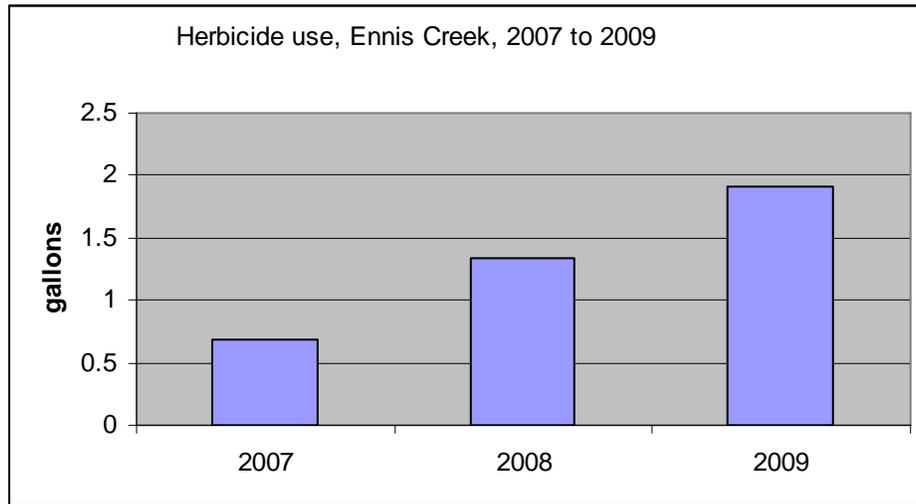
By 2008 an additional Landowner Agreement had been procured from the owners of several acres of land on Ennis Creek, south of Highway 101, with heavy knotweed infestations. In 2008 we thought that this site may be the highest upstream knotweed infestation on Ennis Creek. The CCNWCB crew treated this site, and also re-treated sites owned by Rayonier and the City of Port Angeles. A total of 1.34 gallons of Aquaneat was sprayed or injected over 6 acres of Ennis Creek.

In 2009 treatment continued. We received a report of knotweed at least half a mile upstream from where we thought the furthest upstream point was. We contacted that landowner and received permission to treat. This new information created the need for a full survey of the creek. This was difficult for two reasons. First, Ennis Creek flows through a deep ravine with steep sides and difficult access. Second, there are many landowners on the creek and getting permission from them all to survey has been difficult. Contacting or re-contacting them all is another priority for 2010.

We believe the source of Ennis Creek knotweed is an old botanical garden, situated where the Olympic National Park now is. The North Cascades Exotic Plant Management Team with the National Park Service treated 0.001 acres of knotweed on a tributary to Ennis Creek, within the National Park

Knotweed on the Waterfront Trail in Port Angeles was also treated in 2009

Herbicide Use, Ennis Creek (gallons)			
	2007	2008	2009
Acres Treated		6	7.5
AquaNeat injected :		1	0
AquaNeat sprayed		0.34	1.91
Polaris AQ		0	0
Total Herbicide	0.68	1.34	1.91



Herbicide use increased as more parcels were treated

DUNGENESS RIVER

The Dungeness River, which is in the eastern portion of WRIA 18, drains 198 square miles. The mainstem extends 31.9 miles and its primary tributary, the Gray Wolf River, adds another 17.4 miles. There are an additional 256 miles of tributaries in the basin. Historically, the Dungeness was highly productive and diverse containing 11 individual salmonid populations. The Dungeness has experienced significant decreases in stock productivity levels and has been the subject of extensive habitat restoration and conservation for many years. In many cases, the Jamestown S'Klallam Tribe, in partnership with other local agencies has been instrumental in implementing restoration efforts.

In 2004, the Jamestown S'Klallam Tribe located the uppermost knotweed infestation in the Dungeness mainstem. With some technical assistance from the CCNWCB, the tribe surveyed and treated 8.3 river miles of the Dungeness and most of the adjacent flood plain areas for knotweed. 1,272 sites were located and treated in 2004-2005; most of these sites were very small. It appeared that over 95% of known knotweed sites had been eliminated.

In 2006, Jamestown S'Klallam Tribe continued monitoring and treating knotweed on 8.3 miles of the river. A total of 357 sites were treated along the Dungeness with a median cane density of 1,808 stems. This is a decrease from median cane densities of 8,616 in 2005, and 17,067 in 2004.

In 2007 the Tribe continued to monitor and re-treat over approximately 400 acres of floodplain along 8 river miles. Only 127 plants were found in 2007 with a median cane density of 631 stems, requiring less than two gallons of herbicide to treat.

In 2008 the Tribe monitored and re-treated the same area. 322 plants were found with a median cane density of 1,340 stems, requiring 1.5 gallons of herbicide to treat. That is an increase from the median cane density of 631 found in 2007. Although the majority of occurrences were small (2-5 stems per plant); that is still over twice as many stems found in 2008 as in 2007. Herbicide application in 2006 and 2007 was mostly foliar because most stems were too small to inject and it is possible that foliar applications alone may not be as effective as injection, or injection and foliar. Also, late fall or early winter flood events may have transported live fragments downstream to new sites.

In 2009 the Tribe did not survey or treat for knotweed. They focused their attention on other invasives, particularly butterfly bush.

For more information, please contact Hilton Turnbull at (360) 681-4603 or hturnbull@jamestowntribe.org.

OVERVIEW MAP OF EAST JEFFERSON COUNTY

Because the following seven sections concern sites in East Jefferson County, an overview map of the east portion of the county is repeated here

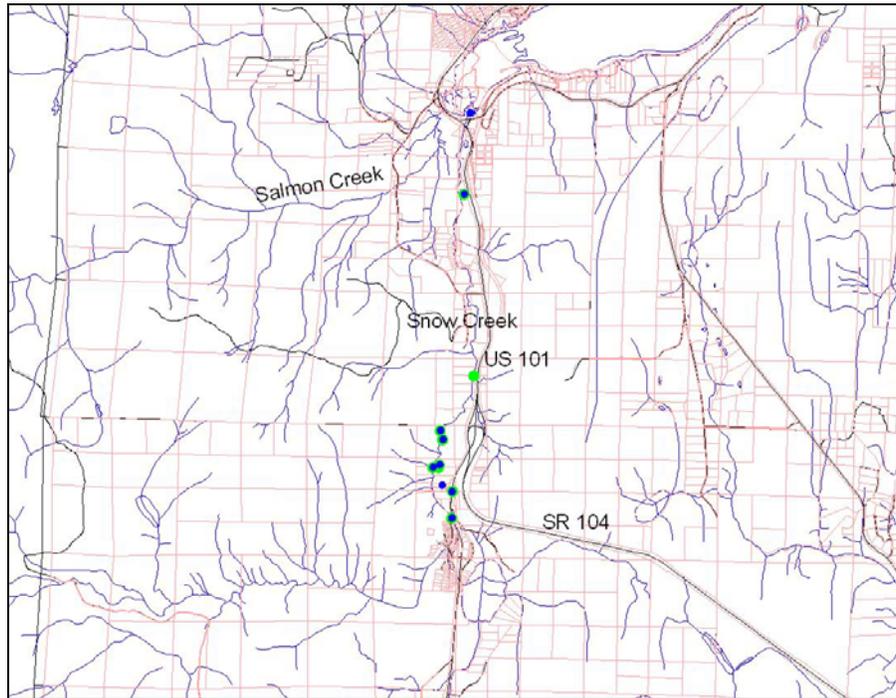


Knotweed control in Jefferson County increased in 2009, compared to previous years, and new partnerships were formed. Jefferson County Noxious Weed Control Board worked for the first time with the Hood Canal Salmon Enhancement Group, the Skokomish Indian Nation and a WCC crew that was hired in October, shared by several county agencies and non-profits, to work on riparian projects in East Jefferson.

SNOW CREEK AND SALMON CREEK

Crews

Treatment—Cody Hagen, Eve Dixon and Alicia Aguirre (CCNWCB/JCNWCB) and the East Jefferson WCC crew, led by Owen French.



Bright green indicates known knotweed sites. Blue indicates treatment in 2009.

Snow Creek and Salmon Creek both flow into the south end of Discovery Bay, where a lumber mill operated until the 1950s. Habitat for salmonids and other species has been seriously impacted for many years because thousands of cubic yards of scrap wood blocked tidal flow. Ammonia and sulfur have been leaching into the water, degrading water quality. A restoration project was started in July, 2008, and was completed by the end of that year. The wood waste was removed, along with five derelict buildings, exposing the old marsh surface and restoring the original tide level. Native marsh vegetation is expected to return in three to four years.

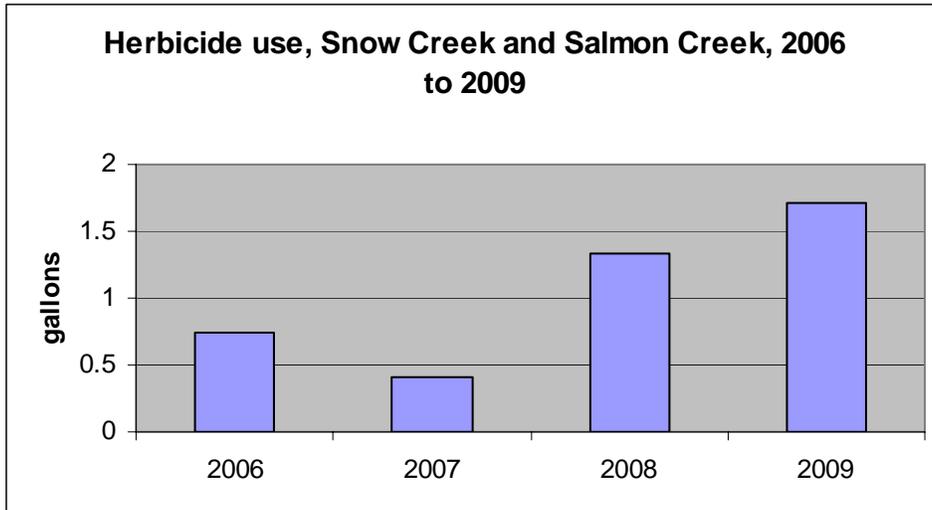
In 2006 Clallam and Jefferson Noxious Weed Control Boards began treating knotweed on Snow and Salmon Creeks. Three sites were treated on Snow Creek and one on Salmon Creek.

In 2007 we monitored and re-treated as necessary. We also located two more sites, acquired Landowner Agreements and treated. Towards the end of the 2007 we acquired a Landowner Agreement to treat a large infestation visible from Highway 101, above Snow Creek.

In 2008 we treated that site, monitored all other known sites and re-treated as necessary. Two more sites were found and Landowner Agreements obtained.

In 2009 we re-treated all known sites on Snow Creek and the small site on Salmon Creek (only 2 stems remained). Landowner permission was finally obtained for a small site near the mouth of Snow Creek (first seen in 2007) and it was treated in October. We are still unsure as to how much knotweed is on Snow Creek or how far upstream it extends. A full survey would be appropriate but some landowners on the creek are resistant.

Herbicide Use, Snow Creek and Salmon Creek (gallons)				
	2006	2007	2008	2009
Acres Treated	0.5	1	4.35	11
AquaNeat injected :	0.71	0.369	0.3	0
Aqua Neat wiped	0	0.039	0	0
AquaNeat sprayed	0.035	0	1.03	1.714
Total Herbicide	0.745	0.408	1.33	1.714

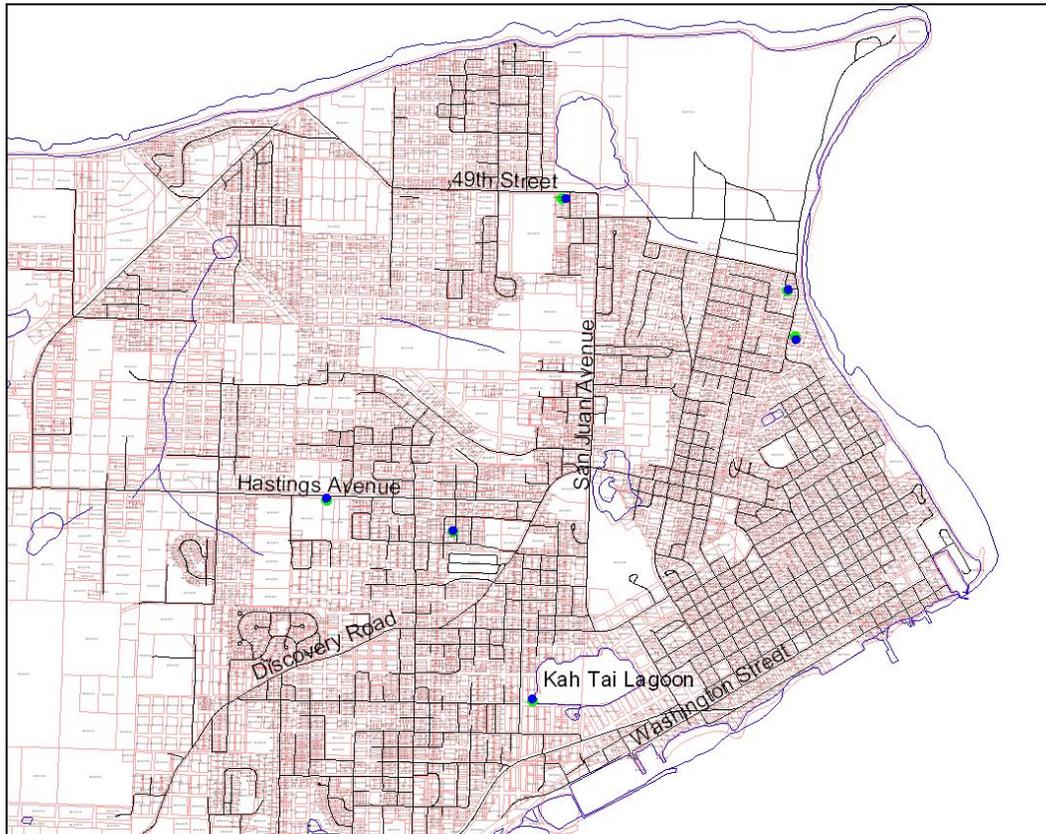


Herbicide use has increased as more sites are being found and treated.

PORT TOWNSEND

Crew

Treatment—Eve Dixon and Alicia Agiurre (JCNWCB)



Bright green indicates known knotweed sites. Blue indicates treatment in 2009.

A knotweed infestation of approximately 0.75 acres has been present for many years at an entrance to the Kah Tai Lagoon Park in Port Townsend. It is highly visible to the public and, being adjacent to the lagoon, winter floods create a potential for plant parts to be moved off site. In the spring of 2008 the Jefferson County Weed Board asked the City of Port Townsend for permission to chemically treat the Kah Tai knotweed. The City granted permission, despite their normal no-herbicide policy and asked the weed board to also treat several other knotweed patches on city-owned property.

All treatments conducted in Port Townsend were by injection or wipe, and notices were sent out to neighboring residents before treatment, explaining what we were doing and why, and that the chemicals we were using were safe when used correctly and responsibly. Public reaction was generally positive.

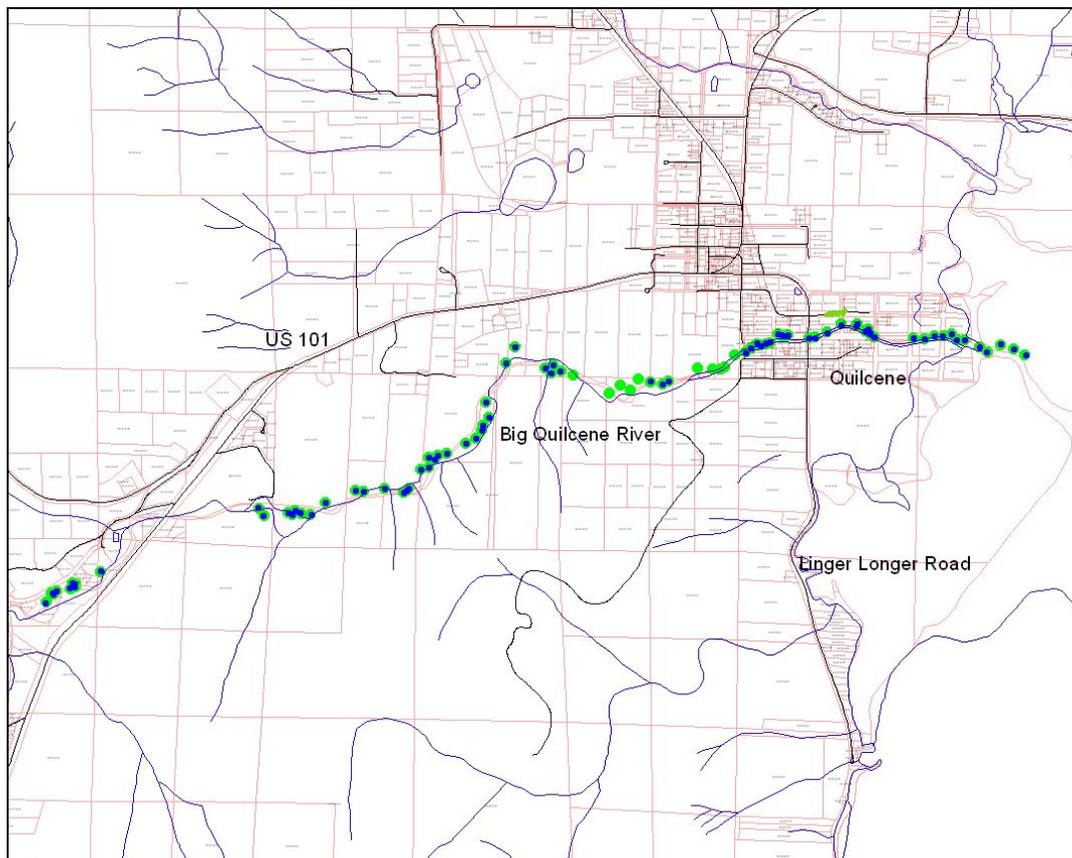
In 2009 re-growth had occurred on all sites. Some plants at the Kah Tai Lagoon were large enough to inject (the ones that could not be reached in 2008). These were injected. All others were too small and were sprayed with a small hand-held sprayer. Again, the small amount of public reaction was favorable.

Herbicide Use, Port Townsend (gallons)		
	2008	2009
Acres Treated	1.51	1.35
AquaNeat injected :	2.15	0.133
Aqua Neat wiped	0.062	0
AquaNeat sprayed	0	0.357
Total Herbicide	2.212	0.49

BIG QUILCENE RIVER

Crews

Treatment—Cody Hagen, Bonnie Eyestone, Andy Hokit, Eibhlinn Cowan-Kuist, Graywolf Nattinger (CCNWCB), Eve Dixon (JCNWCB), Randy Lumper, Jason Cook and Chris Clemens (Skokomish Indian Nation) and the East Jefferson WCC crew, led by Owen French.



Bright green indicates known knotweed sites. Blue indicates treatment in 2009.

The Big Quilcene River drains a basin of approximately 70 square miles, most of which is under federal ownership. The Big Quilcene mainstem is 19 miles long, with its headwaters located at a high elevation in the Olympic National Forest. The largest tributaries to the Big Quilcene are Townsend Creek, Tunnel Creek and Penny Creek. The headwaters of both Townsend Creek and Tunnel Creek are at high elevations and the entire length of both tributaries is on Olympic National Forest land. Penny Creek starts at a considerably lower elevation and flows through private and state-owned land. Penny Creek was included in our survey but Townsend Creek and Tunnel Creek were not.

The upper reaches of the Big Quilcene River are high gradient, highly confined channels. The City of Port Townsend has a diversion dam at River Mile 9; most of the water used in Port Townsend comes from the Big Quilcene.

The middle reaches between River Mile 5 and RM 2.5 are moderate gradient channels with widened floodplains. There is Federal Fish Hatchery at the confluence of the Big Quilcene River and Penny Creek, at River Mile 3.

Low gradient, unconfined channels characterize the lower 2.5 miles, while the lower mile meanders across a broad alluvial fan. The lower reaches of the Big Quilcene are a popular fishing area, the main species being chum and coho. Large stands of giant knotweed have been visible for many years on the alluvial floodplain at the mouth—one local resident remembers playing in the knotweed 40 years ago!

In 2008 JCNWCB and the Hood Canal Coordinating Council surveyed the river to determine how far upstream the infestation went. The furthest upstream knotweed found on the Big Quilcene mainstem was a little upstream from the Fish Hatchery. Dense populations were found half a mile downstream from the Hatchery and they continued intermittently to the mouth. One site was found on Penny Creek, about 3 miles upstream from its confluence with the Big Quilcene. The owner had been controlling it for many years but had not succeeded in eliminating it. No knotweed was found further upstream on Penny Creek.

Data points were added to ArcView and landowner information extracted. All landowners with knotweed were written to and about half of those contacted (13 out of 28) signed and returned the Landowner Agreement.

A knotweed crew from Clallam County spent four days injecting and spraying, starting with the furthest upstream location.

In 2009 work continued. All landowners with knotweed who had not already given permission were written to again and by mid-season all but two had signed the landowner agreement. We were especially pleased to get permission from Washington Department of Fish and Wildlife, to treat the large infestations near the mouth.

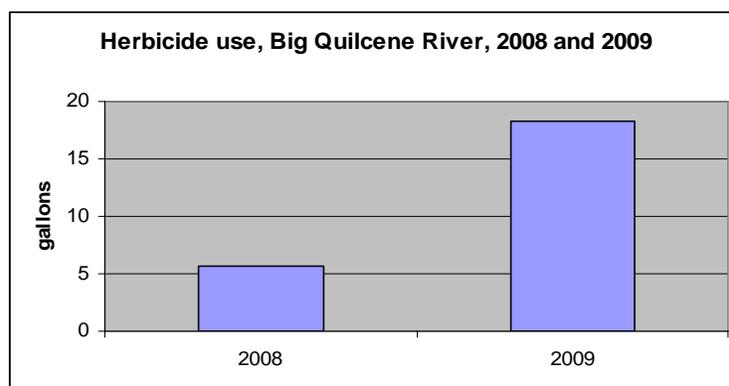
A crew from Clallam County Noxious Weed Control Board, consisting of three to five people, spent 7 full days on the Big Quilcene spraying knotweed. Previously treated sites were re-treated and the mouth and other sites were treated for the first time. Because knotweed patches at the mouth were so large the crew was unable to fully treat each patch, but “ringed” each one, treating all that they could reach from the outside.

Restoration work (engineered log jams and channel diversion) was begun in 2008 on land owned by the Skokomish Indian Nation, a little downstream from the Federal Fish Hatchery, on a site with knotweed. We were unsuccessful in getting permission to treat that site in 2008, but were able to treat in 2009, with help from a Tribal crew.

A valuable partnership was formed in 2009 when JCNWCB and several other groups, including North Olympic Salmon Coalition, Jefferson Conservation District, Hood Canal Coordinating Council and the Hood Canal Salmon Enhancement Group jointly hired a WCC crew for riparian work. The crew spent one day in early October spraying and injecting small knotweed sites on the Big Quilcene, including a County Park.

Some sites on the Big Quilcene are still untreated and almost all of those treated will need at least one re-treatment, especially because the larger ones were not fully treated but “ringed”. However, progress is being made.

Herbicide Use, Big Quilcene River (gallons)		
	2008	2009
Acres Treated	13	55.75
AquaNeat injected :	2.06	
AquaNeat sprayed	3.6	18.291
Total Herbicide	5.66	18.291

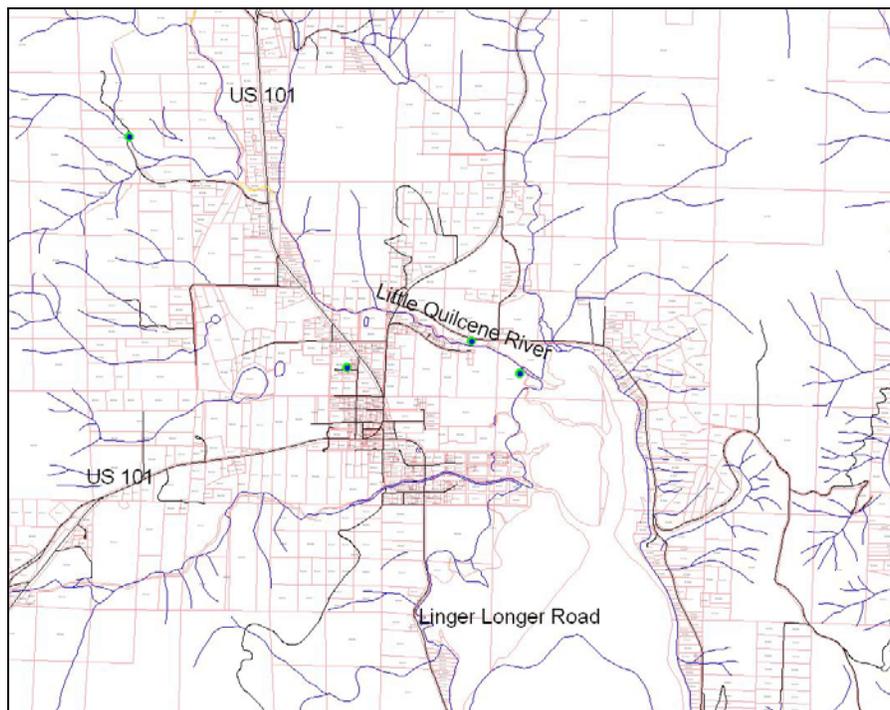


Herbicide use increased as more sites were treated

LITTLE QUILCENE RIVER

Crews

Treatment—Mendy Harlow, Julie Easton, Michelle McCallum (Hood Canal Salmon Enhancement Group), Eve Dixon (JCNWCB) and Luke Cherney (Hood Canal Coordinating Council).



Bright green indicates known knotweed sites. Blue indicates treatment in 2009.

The Little Quilcene River drains a basin of approximately 40 square miles. Its headwaters originate above 4,400 feet on the north slopes of Mount Townsend and its runoff is derived from both rainfall and snowmelt. The upper watershed is within the Olympic National Forest and is steeply dissected with high gradient, confined stream channels. The lower valley and the flood plain have been developed for domestic and agricultural use and timber harvest. The lower 0.8 miles have been diked and the banks armored to protect property in the floodplain. The Little Quilcene River discharges to Quilcene Bay approximately one mile north of the mouth of the Big Quilcene.

The estuary supports populations of chinook, pink, chum, steelhead, coho, sturgeon and cutthroat. However, the dike system, put in place nearly 100 years ago, has disturbed tidal function in the estuary. Sediment washed downstream has caused the formation of a “delta cone”—a build-up of sediment in the estuary that can bury the salt marsh—important to young salmon because it offers food and protection from predators.

The Hood Canal Salmon Enhancement Group (HCSEG) owns land near the mouth of the Little Quilcene and has mounted a large restoration effort in the estuary. 35,000 cubic yards of soil have been removed and the shoreline has been moved back 400 feet.

In 2009 HCSEG noticed knotweed growing near the mouth and asked JCNWCB for help in removing it. (Although they are well equipped and have their own licensed applicators, HCSEG’s NPDES permit did not cover work on the Little Quilcene.) Permission had to be obtained from another landowner near the mouth, and two other sites close to irrigation ditches that flow into the Little Quilcene were all treated on the same day.

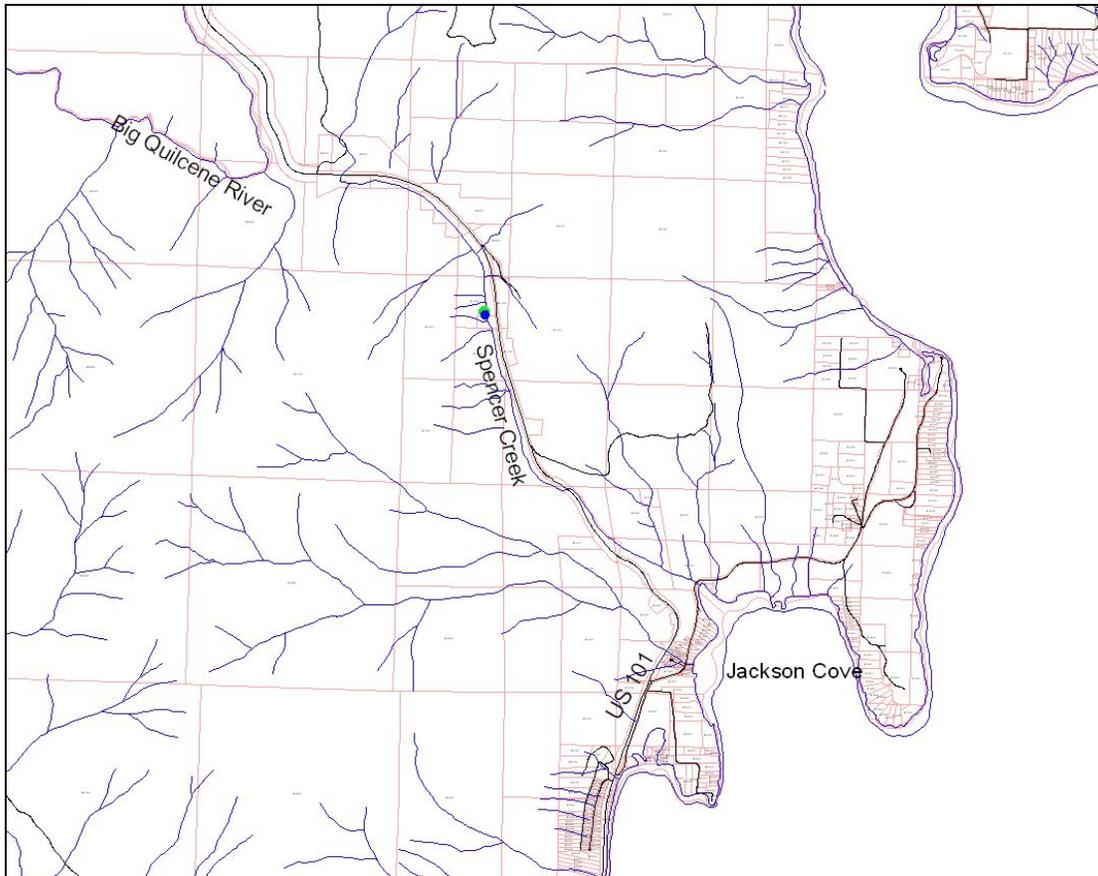
Herbicide use, Little Quilcene River (gallons)	
2009	
Acres Treated	5.25
AquaNeat sprayed	0.6
Total Herbicide	0.6

SPENCER CREEK

Crew

Treatment—Cody Hagen, Bonnie Eyestone, Andy Hokit and Eibhlinn Cowan-Kuist (CCNWCB)

Spencer Creek is a comparatively short waterway that flows into Jackson Cove in the northwest section of the Hood Canal. One residence on Spencer Creek (visible from Highway 101) had been known for several years to have a large knotweed infestation. The owner signed a Landowner Agreement at the end of 2007.



Bright green indicates known knotweed sites. Blue indicates treatment in 2009.

In 2008 the CCNWCB/JCNWCB crew spent approximately two full days on the Spencer Creek site.

In 2009 the CCNWCB crew spent another half day spraying knotweed on the Spencer Creek site. The site is so overgrown that access to plants is difficult and time-consuming. Plants there have not been fully treated and return visits will be necessary.

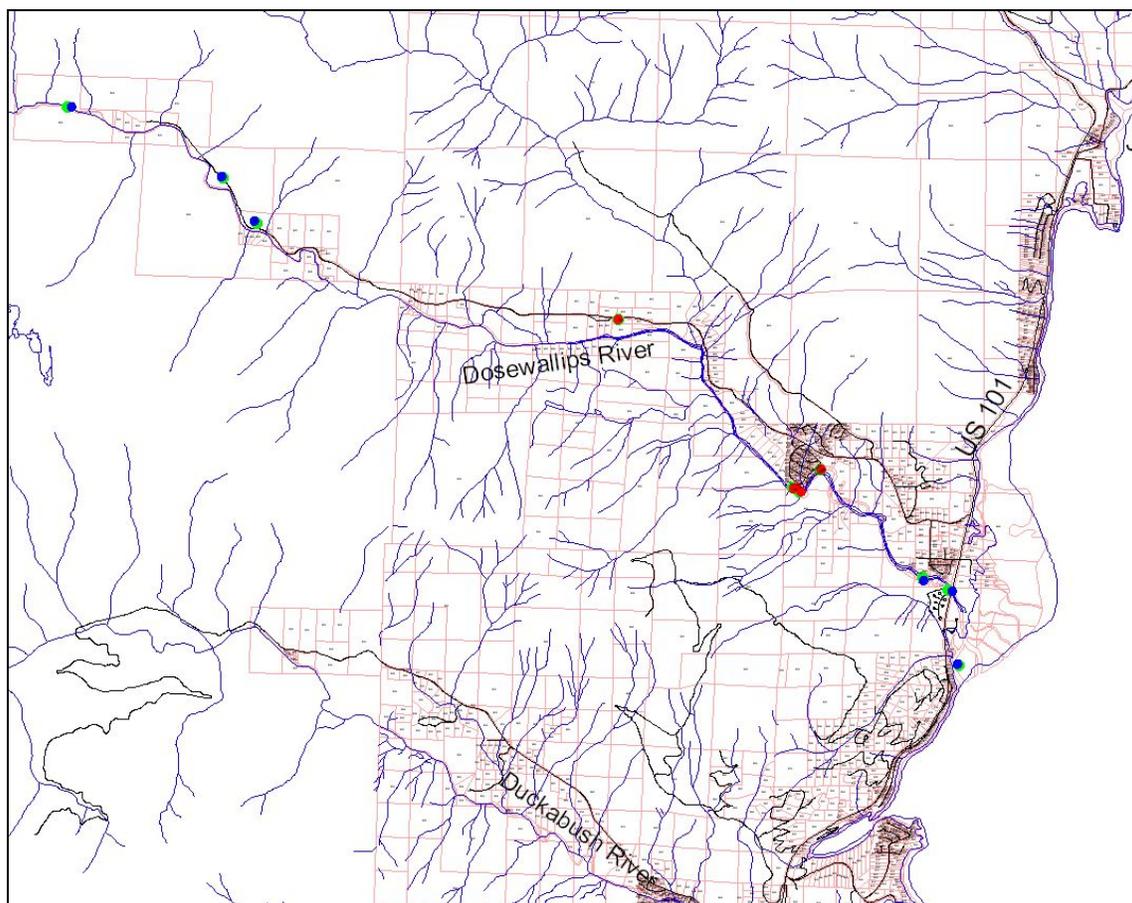
Herbicide Use, Spencer Creek (gallons)		
	2008	2009
Acres Treated	5.75	4
AquaNeat injected :	0.5	0
AquaNeat sprayed	1.07	0.7
Total Herbicide	1.57	0.7

DOSEWALLIPS RIVER

Crew

Treatment—Cody Hagen (CCNWCB)

The Dosewallips River is one of the largest rivers in Jefferson County. It flows east from the Olympic Mountains into the Hood Canal at the town of Brinnon. It drains approximately 130 square miles and includes close to 132 miles of streams and tributaries. Out of the 130 square miles, 93% is contained within the Olympic National Park and Olympic National Forest. Land use of the remaining 7% is rural residential, commercial, and private forested land. The Dosewallips River supports Chinook, steelhead and Hood Canal Summer Chum, the last of which are listed as Threatened under the ESA.



Bright green indicates known knotweed sites. Blue indicates treatment in 2009. Red indicates no plants found in 2009.

In 2006 Jefferson County Noxious Weed Control Board (JCNWCB) surveyed the Dosewallips. CCNWCB provided training, herbicide and equipment. They recorded eight knotweed sites and acquired seven Landowner Agreements. Many properties on the Dosewallips are vacation rentals or second homes, making landowner contact difficult. It was especially difficult to contact the owner of a knotweed site covering several acres, very close to the National Forest boundary. All sites with Landowner Agreements in place were treated, including a site at the Dosewallips State Park.

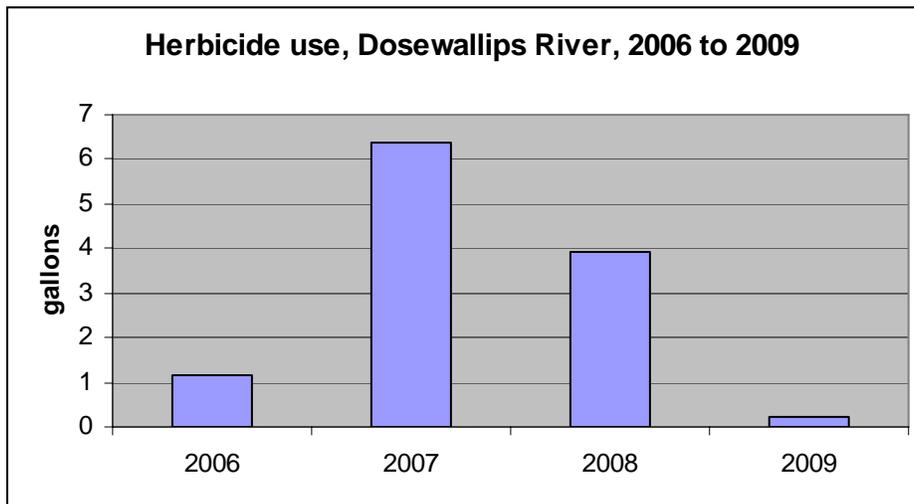
In 2007 contact was made with the owner of the large knotweed site and she was extremely willing to have her knotweed treated. This site was treated twice by a combined JCNWCB/CCNWCB crew. All other sites were monitored and treated as necessary, except for the Dosewallips State Park, because it was believed that park staff were treating it. Knotweed was seen on Forest Service land but could not be treated at that time because the agreement with the Forest Service did not allow herbicide use in the area.

In 2008 all previously-treated sites were re-visited and treated where necessary. Knotweed populations on the site near the Forest Service boundary were much reduced but will still take several years to eliminate. Another landowner will dig her few remaining plants. The Dosewallips State Park site was re-visited. It had not been controlled by park staff so after getting permission, the CCNWCB crew treated. The Forest Service allowed us to use herbicides on the Dosewallips for the first time and our crews treated two knotweed sites on FS land.

In 2009 we re-treated several sites, including the US Forest Service and Dosewallips State Park. All sites on the Dosewallips have now been treated for several years and knotweed plants are much reduced in size and number.

Herbicide Use, Dosewallips River (gallons)				
	2006	2007	2008	2009
Acres Treated	2	5	7.75	5.5
AquaNeat injected	0.77	3.175	0.8	0
AquaNeat sprayed	0.375	3.2	3.12	0.234
Total Herbicide	1.145	6.375	3.92	0.234

Note: The term "visited" is used, rather than "treated" because in many cases crews looked for plants but did not find them. "Acres Treated" were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in different years may be due to different counting methods being used.



DUCKABUSH RIVER

The Duckabush is one of the major waterways in Jefferson County, flowing into the Hood Canal a little south of the town of Brinnon.

In 2006 windshield and foot survey was conducted on the Duckabush River, starting within the U.S. Forest Service boundary where a vehicle had access on Duckabush River Road. Further downstream, a foot survey was conducted at the mouth. No knotweed plants were found.

In 2007 a landowner near the mouth of the Duckabush called to say he had knotweed. He signed a Landowner Agreement and JCNWCB treated the knotweed.

In 2008 JCNWCB re-treated the site. At least 20 plants remained but they were less than 3 feet tall and all were treated by the wipe method, using 0.015 gallons of Aqua Neat

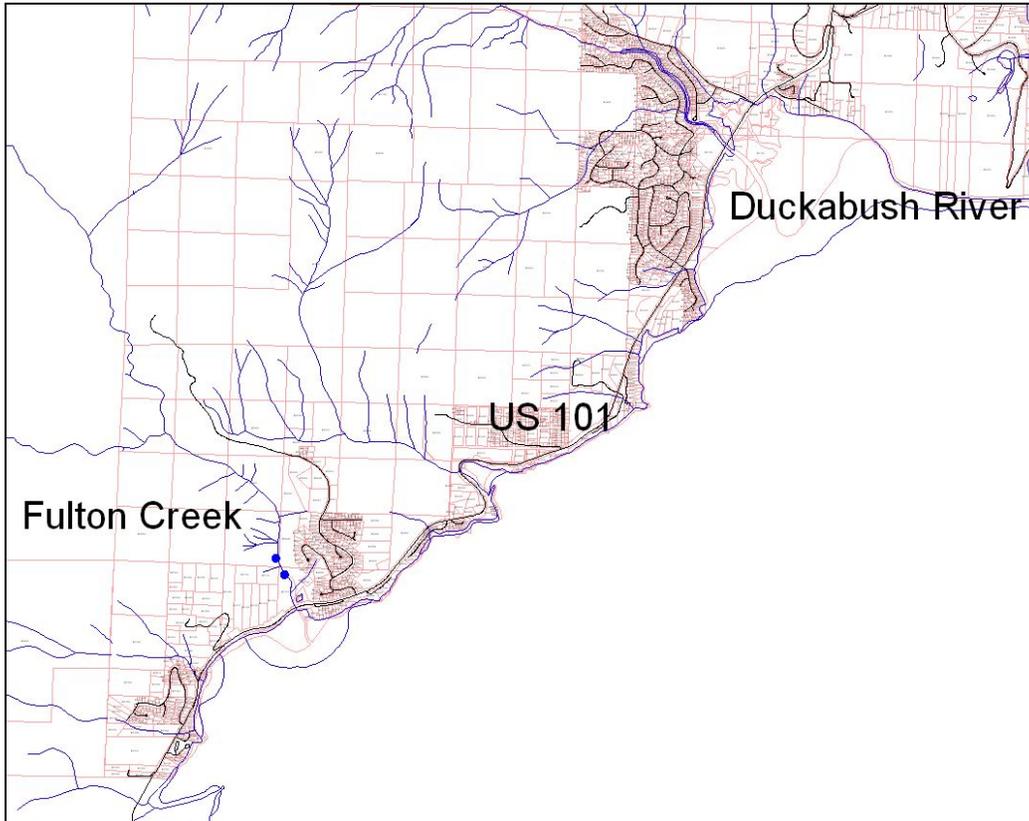
In 2009 no work was done on or near the Duckabush.

FULTON CREEK

Crew

Treatment— Cody Hagen, Bonnie Eyestone, Andy Hokit, Greywolf Nattinger and Eibhlinn Cowan-Kuist (CCNWCB)

In 2009 a landowner on Fulton Creek who had heard about our program called to ask if we could treat their knotweed. The landowner was, of course, happy to sign an agreement and the crew spent half a day treating it.



Location of Fulton Creek knotweed

Herbicide use, Fulton Creek (gallons)	
2009	
Acres Treated	1
AquaNeat sprayed	0.5
Total Herbicide	0.5

HOH RIVER

The Hoh watershed consists of 300 square miles and is famous for wild stocks of winter steelhead, fall coho, and spring/summer and fall run Chinook salmon. Loss of large woody debris in the mainstem river channel and tributaries has contributed to numerous riverine habitat impacts including sedimentation from riverbank erosion, as well as reduction of large pools. Restoration and maintenance of a functional mature riparian forest is considered a primary component of a salmon recovery strategy by the WRIA 20 salmon recovery and watershed planning groups.

The Hoh River knotweed infestation initiated from a single source in 1999. By the end of 2003, 18,585 canes in 1,247 sites widely dispersed over 20 river miles had been documented and treated, and more canes documented in the 10 river miles to the mouth. Subsequent follow-up surveys and re-treatments of the entire 30 mile river corridor in 2004 were conducted by the 10,000 Years Institute in partnership with the Hoh Tribe, and the Olympic National Park (ONP), with access provided by private landowners, the USFS and Department of Natural Resources.

In 2005 and 2006, the 10,000 Years Institute and the Hoh Tribe treated 29.8 miles of the river, down to the river mouth, where a small patch was treated by Olympic National Park staff. A crew from the State's Department of Corrections (DOC) conducted intensive grid-surveys under the supervision of 10,000 Years Institute in 2005. Additional equipment, supplies and a crew were provided by CCNWCB in 2006. Most of the plants found and treated were only 1-3 feet tall due to previous treatments. Five new sites with fairly large knotweed patches (100-200 ft²) were treated.

In 2007, river miles 27 to 17 (913 acres) were surveyed and treated by 10,000 Years Institute with a DOC crew. ONP re-treated the 1/3 acre patch at the river's mouth. A total of 1.23 gallons of Aquamaster was used on 2,468 canes. Data collected in 2007 supported the observation that the downward trend in size and distribution of the knotweed infestation continued from 2006.

In 2008, 10,000 Years Institute continued to work with a DOC crew, in partnership with the Hoh Tribe, landowners, the county NWBs, and ONP. Five upper river landowners signed updated agreements, making it possible to treat from river mile 30 to river mile 15 (with one small exception—Tower Creek was not surveyed due to lack of time). Unfortunately the available crew was smaller than in previous years (4-7 people), making it difficult to cover enough ground. Two large bars in the lower river (Nolan and Cottonwood) were also surveyed and treated where only 1 tiny plant was found at Nolan and 4 small plants at Cottonwood. Most plants found in 2008 had only one or two stems and were under three feet and total canes decreased to 2068. Most plants were Bohemian knotweed, but a few plants with very large leaves assumed to be giant knotweed were observed for the first time in the upper watershed. The 1/3 acre patch at the river's mouth on the north side of the river is giant knotweed. Most previously-treated sites did not have re-sprouting material.

In 2009 work continued, with a 5-person crew of field professionals and interns who searched intensively for knotweed plants on the river terraces, bars and log jams to RM 17. More large-leaved plants were observed. Herbicide use decreased along with a decrease in total plant mass. However, recently-sprouted plants were observed as late as mid-October—coming up through river-deposited substrates. The constant movement of plant parts and deposition by the river makes control difficult. One small 6" tall plant, when dug up in mid-October, turned out to be 3 separate plants with roots 3 feet deep and extending outwards for 3 feet.

Herbicide Use, Hoh River, (gallons)		
	2008	2009
Acres Treated in 15 River Miles	1093	1000
AquaMaster or AquaNeat Injected	0.0151	0.188
AquaMaster or AquaNeat Sprayed	0.5645	0.13
Polaris Sprayed	0.06382	0.043
Total Herbicide	0.64342	0.361

For more information about knotweed treatment on the Hoh River, please contact Jill Silver, 10,000 Years Institute, at (360) 385-0715 or jsilver@10000yearsinstitute.org.

Appendix I—Herbicide Use

The following table shows herbicide use in different watersheds from 2006 to 2009.

Organization	River or Location	Gallons Used 2006	Gallons Used 2007	Gallons Used 2008	Gallons Used 2009
Quileute Tribe & CCNWCB	Quillayute, Dickey, Calawah & Bogachiel Rivers	101.5	43.97	43.125	98.63
CCNWCB	Big River and Hoko-Ozette Road	65.39	5.14	2.181	5.12
CCNWCB	Sekiu River	10.98	0.3	1.767	0.609
CCNWCB	Hoko River	2.6	4.23	2.516	1.541
CCNWCB	Sekiu, Clallam Bay and Hwy 112	17.9	9.79	3.28	0.605
CCNWCB	Clallam River	0	35.09	3.28	2.58
CCNWCB and Merrill and Ring	Pysht River	1.2	0.72	0.005	0.005
CCNWCB	Sol Duc River (mid)	14.05	12.725	7.636	1.627
CCNWCB	Sol Duc River (lower)	0	9.656	6.67	0.945
CCNWCB	Lake Creek, Lake Pleasant and Beaver	0 (not separated from Sol Duc)	27.09	0.82	1.062
CCNWCB	Forks	2.5	4.25	1.662	0.468
CCNWCB	Valley Creek	2.3	1.52	0.063	0.023
CCNWCB	Peabody Creek	0	0	0	1.98
CCNWCB	Ennis Creek	0	0.68	1.34	1.91
Jamestown S'Klallam Tribe	Dungeness River	30	<2	1.5	0
JCNWCB & CCNWCB	Snow Creek and Salmon Creek	0.745	0.408	1.33	1.714
JCNWCB	Port Townsend	0	0	2.212	0.49
JCNWCB & CCNWCB	Big Quilcene River	0	0	5.66	18.291
JCNWCB & HCSEG	Little Quilcene River	0	0	0	0.6
JCNWCB & CCNWCB	Spencer Creek	0	0	1.57	0.7
JCNWCB & CCNWCB	Fulton Creek	0	0	0	0.5
JCNWCB & CCNWCB	Dosewallips and Duckabush Rivers,	1.145	6.375	3.92	0.234
10,000 Year Institute	Hoh River	2.36	1.23	0.643	0.361
TOTAL		260.49	169.66	92.331	139.995

Overall herbicide use increased in 2009, because 98.63 gallons were used in the Quillayute river system (77.34 on the Bogachiel alone). If the amount used on the Bogachiel was deducted from the 2009 total, a 33% decrease would be observed from 2008 to 2009.

Appendix II—Sample Letter for New Landowners (Prepared by CCNWCB)

July 21st 2009

Landowner
PO Box 000
Forks WA 98331

Dear Landowner,

In 2007 Mr Blank, the previous owner of your property on the Sol Duc River (parcel # 000000 000000), signed an agreement to allow Clallam County Noxious Weed Control Board staff to treat invasive knotweed on the property. Knotweed is a very aggressive, noxious weed taking over our streams and rivers. It permanently displaces native vegetation, destroys fish and wildlife habitat and reduces recreational opportunities.

We have been treating knotweed on the Sol Duc River and its tributaries for several years now, with considerable success, through a grant funded by the Department of Agriculture. We do not know if your property still has knotweed, but would like crews to be able to check it and re-treat as necessary.

Since the property has changed hands, we need your permission to treat any knotweed that might remain. For this reason we are asking you to sign the enclosed copy of the ***Permission to Enter Private Land and Waiver of Liability*** and fax or mail it back to us as soon as possible. I have also enclosed ***Frequently Asked Questions*** for landowners with knotweed on their property. If you have any questions or concerns please don't hesitate to call or email me.

Please fax or mail the Permission Form to:

Clallam County Noxious Weed Control Board
c/o Knotweed Coordinator
223 E. Fourth Street, Suite 15
Port Angeles, WA 98362-3015

FAX: 360-417-2414

Thank you for your cooperation,

Eve Dixon
Knotweed Coordinator
360-417-2442
edixon@co.clallam.wa.us

Appendix III—Table of all Landowner Agreements

Watershed	Existing Agreements	New Agreements, 2009	Number of Parcels	Parcels Visited 2009	Parcels with no Knotweed Reported in 2009	Acres treated 2009	Landowners Helped in 2009
Big River and Hoko-Ozette Road	19	1	43	39	9	57	19
Sekiu River	8	0	11	10	2	16	8
Hoko River	5	2	32	23	15	12	4
Sekiu, Clallam Bay and Highway 112	48	1	68	67	33	26	49
Clallam River	13	0	20	18	4	81	12
Pysht River	1	0	2	2	0		1
Sol Duc River	38	1	93	91	35	89	37
Lake Creek, Lake Pleasant and Beaver	10	0	25	25	3	52	10
Forks	22	3	30	28	11	20	22
Valley Creek	1	0	1	1	0	1.5	1
Peabody Creek	0	4	6	6	0	8	4
Ennis Creek	2	12	26	12	0	7.5	4
Snow Creek	8	1	10	9	0	11	8
Port Townsend	1	0	7	7	0	1	1
Big Quilcene River	16	2	29	25	0	56	16
Little Quilcene River	4	0	4	4	0	5	4
Spencer Creek	1	0	1	1	0	4	1
Dosewallips River	8	0	9	7	5	5.5	7
Fulton Creek	0	1	1	1	0	1	1
Total	205	28	418	376	117	261.5	209

Note that because some of our agreements cover multiple watersheds we have tried not to falsify the record by counting agreements twice. For example, if Rayonier has parcels in both the Big River and the Hoko River, that agreement has been counted just once, in the Big River.

Appendix IV— Photographs



Rafael Ojeda spraying knotweed in Sekiu



Knotweed in Sekiu after one year of treatment



Clallam County Knotweed Crew on the Big Quilcene River, with Giant Knotweed



Jefferson County Knotweed