Olympic Knotweed Working Group
2008 Report,
Prepared by
Clallam County Noxious Weed Control Board

Knotweed in Sekiu, 2008 (photograph by Marsha Key)

In fond memory of Chuck DeVaney, who passed away in the spring of 2008.
We all miss you.

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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 10.) 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.

2008 OVERVIEW

We monitored all previously-treated 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 focus 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 all crews took fewer electronic data points this year, which made it more difficult to assess the effectiveness of previous years' treatments. However, crews reported that no knotweed was seen on 19 previously-treated terrestrial sites with high potential to infest riparian areas.

Previous treatments have greatly reduced plant size so herbicide use has declined dramatically in just 2 years. 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 mass mailing about knotweed, sent to all west end residents in December 2007, increased public awareness of knotweed.

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.

2008 ACCOMPLISHMENTS

In 2008 CCNWCB, working with the Olympic Knotweed Working Group (OKWG),

- Managed **167 existing Landowner Agreements**, solicited and obtained **42 new Landowner Agreements** and helped **195 landowners** by monitoring, treating or re-treating knotweed
- Surveyed, treated, monitored or re-treated approximately **140 miles** of rivers or streams, approximately **18 miles** of road and approximately **72 sites** in Sekiu, Clallam Bay, Forks or Port Townsend
- Worked with **9** other OKWG participants, including a mix of federal, tribal, state and local entities
- Used or distributed **92 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 established an online knotweed report form

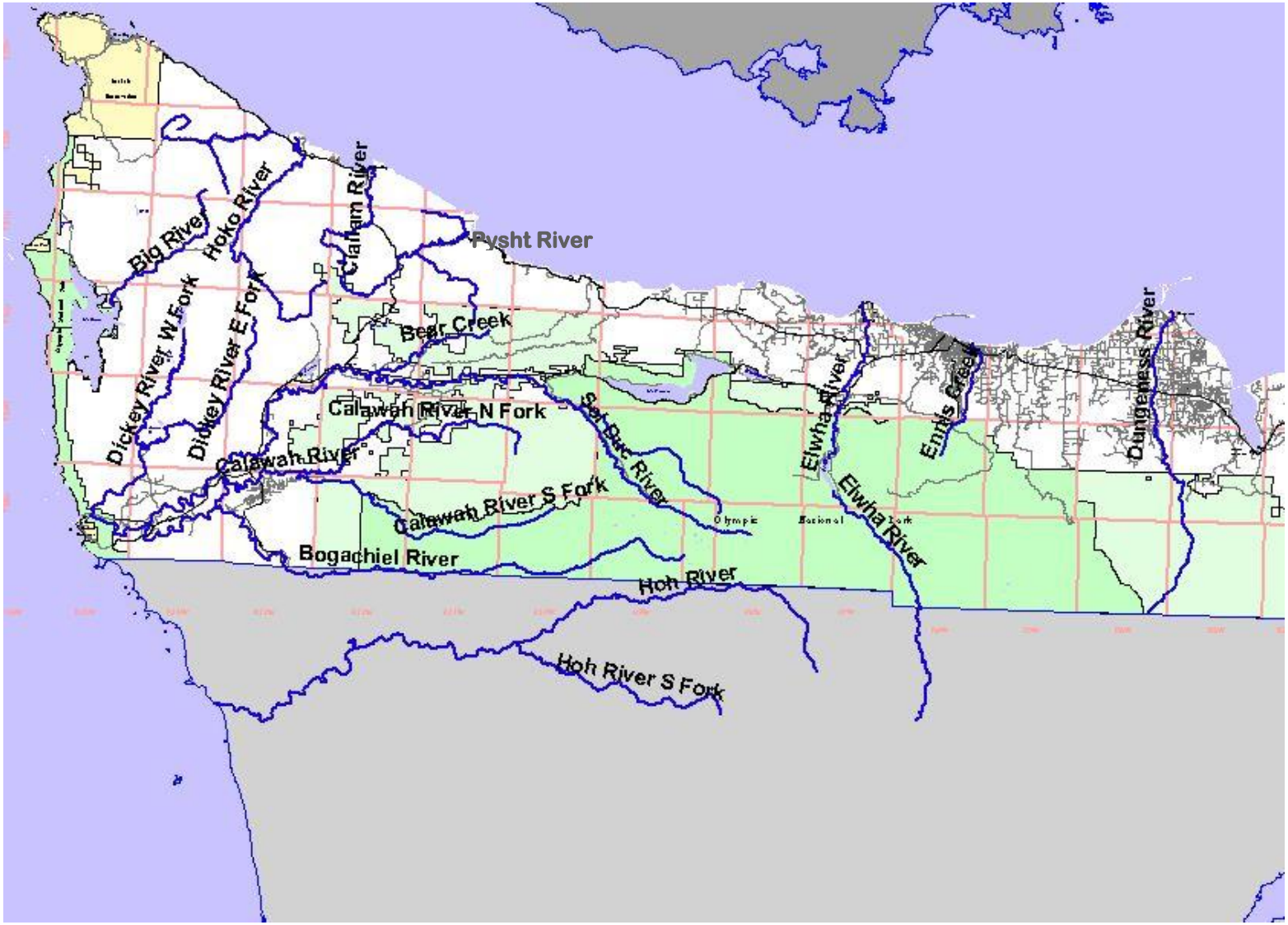
STAFF HOURS

CCNWCB staff spent a total of 2,665 hours on knotweed projects in 2008. 62% 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.

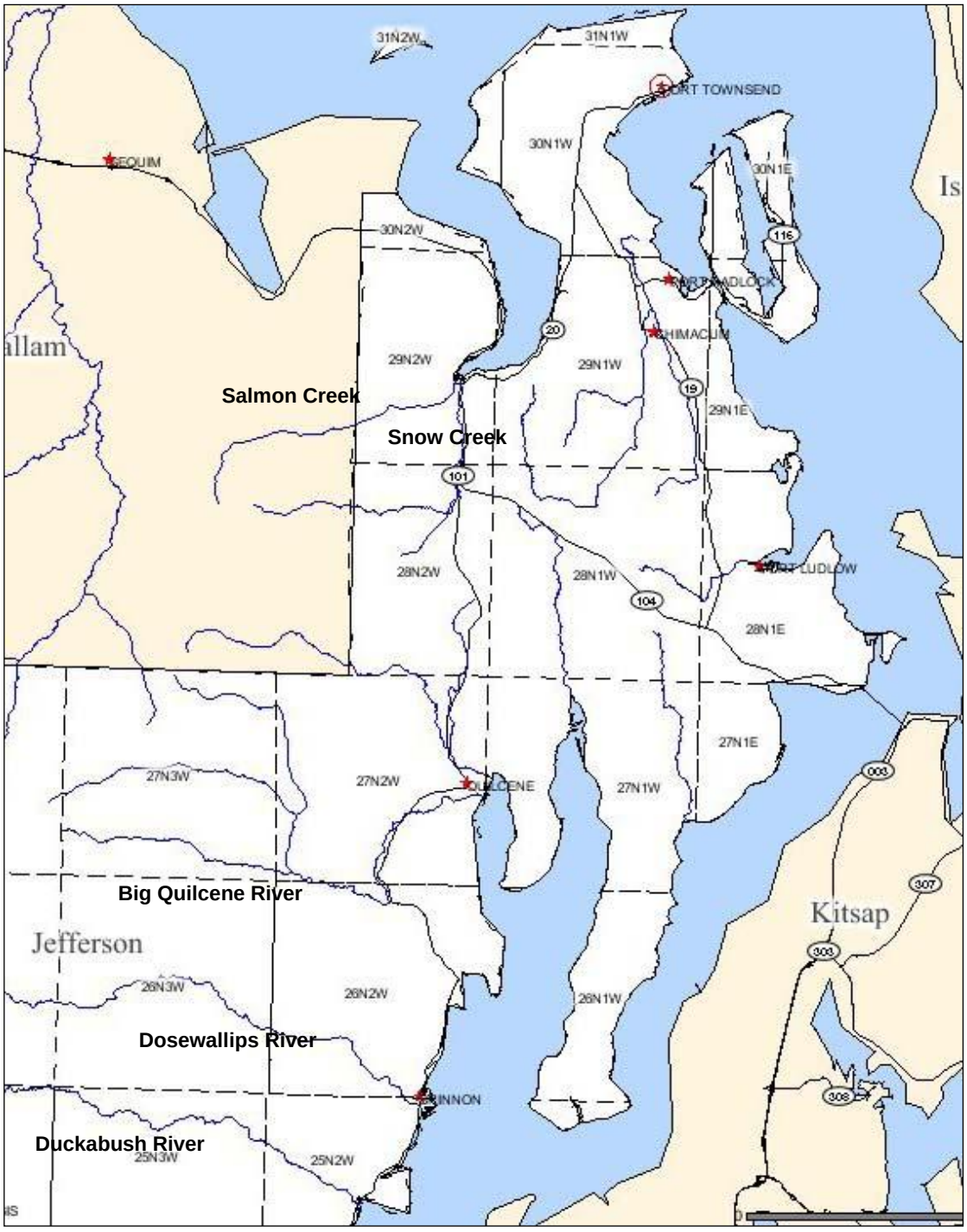
FUNDING

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

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 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, supports the work of other group members and also attempts to "fill in the gaps" by controlling knotweed in areas not otherwise covered.

2008 OVERVIEW

CCNWCB hired a two-person crew to work on knotweed control in the west end of Clallam County for four months, and funded another small crew to work on projects in east Clallam County and Jefferson County**.** These crews frequently worked with other crews, especially if an aquatically-licensed operator was needed, or when mixing crews was more efficient in terms of travel time. We continued to monitor and treat knotweed in all previously treated areas and surveyed and treated sites on the Big Quilcene River, Spencer Creek and in Port Townsend 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, Hoh and Clallam 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 (at least 21), covering almost all of both Clallam and Jefferson Counties. In 2008 OKWG partners surveyed, monitored, treated or re-treated 142 miles on different rivers or creeks. They also treated knotweed sites in Sekiu, Clallam Bay, Forks and Port Townsend and on Highway 112, totaling 83 acres. The larger scale of work makes coordination and record-keeping far more complex, involving more staff time.

The focus of our work has changed from surveys and first-time treatment of knotweed to re-treatment of known infestations. Because of this shift all crews took fewer electronic data points this year, which made it more difficult to assess the effectiveness of previous years' treatments. However, herbicide use has declined dramatically because in most watersheds crews are now treating only small amounts of re-growth, not large stands. More time now is spent in searching for small plants that in actually treating. Because our ultimate goal is elimination of knotweed, on some sites we tried digging small plants that had been treated with herbicide for several years. We will be interested in assessing the effectiveness of this in 2009.

Crews reported that no knotweed was seen on 19 previously-treated sites in Sekiu and Clallam Bay and on Highway 112. It was more difficult for them to determine if there was no knotweed on previously-treated sites in waterways, because parcels there are less clearly defined and because winter floods change the appearance of the landscape. We continue to find new knotweed sites even in previously surveyed areas, highlighting the fact that single year surveys are insufficient and that subsequent follow-up for several seasons had become a minimum requirement.

We did a great deal of outreach in the program's early years, including a mass mailing to landowners in the west end of Clallam County and many landowners now know about knotweed and its impacts and are pro-active in removing it or preventing its spread. Consequently, less outreach seemed necessary this season.

All participants in the program were saddened by the death of Charles (Chuck) DeVaney, in the spring of 2008. Chuck was a resident of Sekiu who had worked for the program for two years. He was personally acquainted with many west end residents and was instrumental in getting landowner agreements and in working with landowners to control their own knotweed on terrestrial sites. He is greatly missed, both for his work and his unfailing humor.

2008 SUMMARY

This list summarizes work accomplished in 2008 and reported to CCNWCB by all members of the Olympic Knotweed Working Group (OKWG), particularly in Clallam and Jefferson Counties.

- Managed **167 existing Landowner Agreements**. [Clallam County Noxious Weed Control Board (CCNWCB) and Jefferson County Noxious Weed Control Board (JCNWCB)]
- Solicited and obtained **42 new Landowner Agreements** [CCNWCB and JCNWCB].
- Many of these agreements covered multiple parcels. We are currently managing agreements on **450** parcels (CCNWCB)
- Helped **188 private landowners** by monitoring, treating or re-treating knotweed (CCNWCB)
- Directly treated land owned by **8 public entities** including **1** federal agency (USFS), **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 **1** county (Clallam) (CCNWCB)
- Treated or re-treated **4 miles** (50 acres) of the Dickey River [Quileute Tribe]
- Treated over **16 miles** (900+ acres) on the Bogachiel River [Quileute Tribe and CCNWCB]
- Treated **10.5 miles** (100+ acres) on the Calawah River [Quileute Tribe]
- Treated **2 miles** (170 acres) on the Quillayute River [Quileute Tribe and The Olympic National Park—North Cascades Exotic Plant Management Team].
- Monitored and re-treated **12.3 miles** of the Big River [Makah Tribe and CCNWCB].
- Treated or re-treated **5 sites** on the Reservation [Makah Tribe].
- Monitored and re-treated approximately **18 miles** of the Hoko-Ozette Road [Makah Tribe and CCNWCB].
- Treated **0.03 miles (2 acres)** on the Sekiu River [CCNWCB].
- Re-treated sites on **4 miles** of the Hoko River [Makah Tribe and CCNWCB].
- Monitored, treated or re-treated **50 sites** in the Sekiu-Clallam Bay area and on Highway 112 [CCNWCB].
- Monitored and re-treated **4 miles** of the Clallam River [Lower Elwha Klallam Tribe and CCNWCB].
- Controlled **4 sites** on the Pysht River [Merrill & Ring, Burdicks and CCNWCB].
- Treated or re-treated **45 miles** of the Sol Duc River [Quileute Tribe and CCNWCB].
- Treated or re-treated **3 miles** of Lake Creek, **2 sites** on Lake Pleasant and **4 sites** in the nearby community of Beaver. [CCNWCB].
- Monitored, treated or re-treated **22 sites** in Forks [CCNWCB]
- Treated **1 mile** on Valley Creek and **1 mile** of Ennis Creek [CCNWCB].
- Treated or re-treated **8 miles** on the Dungeness River [Jamestown S'Klallam Tribe].
- Surveyed **4 miles** of the Big Quilcene River, **1 mile** of Penny Creek and **4 miles** of Snow Creek [Hood Canal Coordinating Council and CCNWCB]
- Treated or re-treated **3 miles** (5 acres) on the Dosewallips and Duckabush Rivers [CCNWCB and JCNWCB]
- Treated **1 mile** (23 acres) on the Big Quilcene River [CCNWCB and JCNWCB]
- Treated or re-treated **1 mile** (4 acres)on Snow Creek [CCNWCB and JCNWCB]
- Treated **1 mile** (5 acres) on Spencer Creek [CCNWCB and JCNWCB]
- Treated approximately **2 acres** in Port Townsend [CCNWCB and JCNWCB]
- Monitored and re-treated **15 miles** of the Hoh River [10,000 Years Institute].
- Coordinated a spring and a fall meeting of the OKWG [CCNWCB]
- Prepared knotweed brochures and mailed them to about 4,000 landowners in the west end of Clallam County [CCNWCB and Clallam Conservation District]
- Spoke about knotweed at 2 outreach events in Forks [CCNWCB]
- Distributed herbicide to other Olympic Knotweed Working Group (OKWG) members. All members of the OKWG used a total of approximately **92.331 gallons** of herbicide. (See Appendix I for a table of herbicide use)

2008 PROJECT PROCEDURES

1. Surveys and Monitoring

- Surveys and monitoring were conducted from June 4th to October 4th, on foot or by boat.
- Boats with trained rowers were supplied by the Quileute Tribe.

2. Project Teams

- Teams were typically comprised of 2-4 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), Jay Nolan and Bonnie Eyestone made up another CCNWCB team which worked in east Clallam County and east Jefferson County.
- The Quileute Tribe crew, led by Greg Urata (licensed aquatic applicator) and the Makah Tribe crew, led by Tony Pascua (licensed aquatic applicator), worked on west end watersheds and the CCNWCB west end crew sometimes split up and worked with the Tribal crews when doing so was more efficient.
- The Lower Elwha Klallam Tribe crew, led by Mok Sampson, worked on the Clallam and Elwha Rivers
- Jill Silver (100,000 Year Institute) and Allison Fawcett (private contactor) (both licensed aquatic applicators) and Scott Depew and the Olympic Corrections Department Crew all 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 Big, Sol Duc, Dickey and Quillayute Rivers
- The Jamestown S'Klallam Tribe Crew worked on the Dungeness River
- Cathy Lucero (CCNWCB Coordinator and licensed aquatic applicator), Eve Dixon (JCNWCB Coordinator and licensed aquatic applicator), Fowler Stratton (CCNWCB) and Luke Cherney of the Hood Canal Coordinating Council also took part in knotweed surveys or treatment in multiple watersheds.

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.

4. Data Collection & Equipment

- We collected electronic data on a Trimble GEO XT instrument, using the "Data Dictionary" developed by the Olympic Knotweed Working Group (OKWG) and used *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.)
- Crews did not always record electronic data at previously-treated sites. They did note plant density and size on the Pesticide Application Record.
- Crews did not record electronic data at new sites when too few satellites were available. Paper notes provided location on these occasions.

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). In this document the landowner allows crews to treat and monitor knotweed on their property for up to five years. The landowner, WSDA and its agents (CCNWCB) also agree to hold each other harmless in the event of any accident. 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 1-4 days 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 prepared Field Copies of the knotweed spreadsheets with site address, contact information and maps for the crews.
- Staff worked on Landowner Agreements from February though September.
  (See Appendix VII 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 also submitted to WSDA copies of Pesticide Application Records pertaining to aquatic sites.

7. Treatment, Equipment, and Rate

Treatments took place from June 4th though October 1st.
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). Glypro, 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 Glypro, 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 2008 because it is so labor-intensive, but was used in areas where spraying may have caused public concerns about safety.

8. Records

- Crews filled out a Pesticide Application Record, as developed by the WSDA for knotweed, for each herbicide treatment. (See Appendix VIII for a sample Pesticide Application Record)
- Crews did not usually record when knotweed was **not** found on previously-treated sites, or when plants were dug but did present this information verbally or by email.
- 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 Report from that watershed.

OUTREACH

In December 2007 CCNWCB partnered with the Clallam Conservation District to re-format the Knotweed Brochure and the Control Recommendations for Knotweed, print 10,000 copies of the brochure and 2,000 copies of the Recommendations, and mail the brochure, along with a letter, to every landowner west of the Elwha River in Clallam County. (See Appendices IX and X and XI for the new brochure, the letter and the Control Recommendations). People who thought they had knotweed on their property were encouraged to contact one of the OKWG members. Several landowners took advantage of this, and crews treated their knotweed. (The National Fish and Wildlife Foundation funded this outreach through the Community Salmon Fund)

The brochures were also distributed to other OKWG members. CCNWCB, as the lead entity of the OKWG, has always tried to" fill in the gaps" by treating areas that other groups were not treating. This letter and mailing was part of that effort.

We coordinated a well-attended West End Weed Meeting in Forks on May 31st in Forks. Cathy Lucero (Clallam County Noxious Weed Control Coordinator) gave a presentation on noxious weeds in general. Marshall Udo (Washington State Knotweed Coordinator) and Jill Silver (10,000 Years Institute) spoke about knotweed, its impacts and statewide and local efforts to eradicate it. Eve Dixon (JCNWCB) and Allison Fawcett (contractor with the 10,000 Years Institute) also attended and were available to answer questions.

Cathy Lucero gave a presentation to the West End Business Association in Forks on July 23rd, which addressed knotweed as well as other problem weeds.

An interactive knotweed section was added to CCNWCB's web page. Landowners or others can now report knotweed sightings online

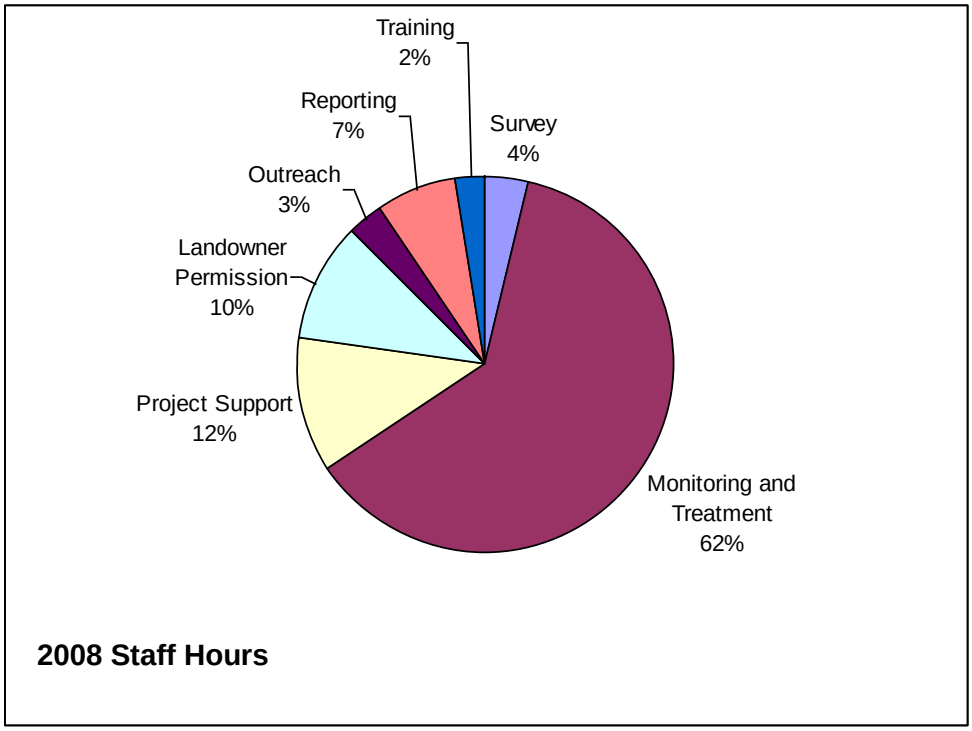
FUNDING

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 Makah and the Quileute Tribes.

STAFF HOURS

This section reports only on hours worked by CCNWCB staff. Staff spent a total of 2,665 hours on knotweed projects in 2008. 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**	**Landowner Permission**	**Outreach**	**Reporting**	**Training**	**Total Hours**
100	1582	300	260	80	180	64	2566

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 Makah Tribe
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
Quilcene Federal Fish Hatchery

OBSERVATIONS AND CONCLUSIONS

- Most landowners agreed to sign the Landowner Agreement allowing us to treat their knotweed. Four landowners who had refused in previous years, finally allowed us to treat. We believe this is a reflection of a program that has matured over the past 3 years, allowing us to establish a solid reputation locally.
- At least four watersheds (out of twenty-one) still have one landowner who refuses to sign an agreement because of concerns about herbicide safety or opposition to government intrusion. This is a problem because knotweed left untreated upstream will re-infest other downstream properties. The issue of whether the Weed Board can require these landowners to control all propagating knotweed parts must be clarified immediately.
- Previously treated sites had no plants greater than 3 feet tall, most were considerably smaller.
- Crew reported no visible plants on 19 of 74 terrestrial sites with high potential to spread to riparian area, (one fourth) which have been treated for two or three years. No such riparian sites were reported. This may be due in part because it is more difficult to determine the exact extent of each riparian point. We believe that complete control will be easier to achieve on terrestrial sites. This may be in part because many terrestrial sites are more likely to be stationary, (not being moved by water.)
- Several new sites were discovered. Repeat surveys are absolutely critical for finding overlooked plants.
- Because the majority of our applications this year were made to areas treated in previous seasons, crews did not generally take fresh data points which would have provided a complete infestation assessment of each site. Instead, crew often summarized number and size of canes on Pesticide Application Records, along a stream corridor. This made it difficult to compare the effectiveness of 2007 treatments from previously individualized points. However, a summary of Pesticide Application Records shows continued reduction in herbicide use. This is possibly the best indicator that overall knotweed mass has been reduced.
- Crews failed to take null survey points, although they verbally reported where no knotweed was found. Finding no plants is a new phenomenon. Next year we will provide crews with a complete list of sites and require updated point information for each.
- We "experimentally" dug a couple of sites which had been treated for three or four years with herbicide and had only a few spindly plants remaining**.** A side by side comparison of treating epinastic plants with herbicide versus digging will be reviewed next year.
- The family that has been controlling their knotweed exclusively by pulling/digging, for the past three years, estimates that it will take at least an additional four years of work.
- On some sites where knotweed plants are gone or almost gone, old canes on the ground seem to be hindering natural re-vegetation.
- 2 West-end Clallam residents were hired for the third year as crew. This has many benefits—they are knowledgeable with the area and specific knotweed sites, travel time was reduced and they personally know many local residents. However, coordinating the activities of a crew living and working 60-100 miles from the office in Port Angeles was difficult at times. This contrasted sharply

with 2 other crew that operated out of Port Angeles (directly out of the CCNWCB office) and were dispatched to various parts of Clallam and Jefferson county as needed and funding allowed.
- County policy banning herbicide use on county roads still hampers effective treatment.
- Due to the loss of much valued crew member Chuck DeVaney, we did not move closer to our goal of transitioning to increased "do-it-yourself" treatments by landowners where knotweed populations are now small or not right near water. If digging experiments are successful, or where herbicide applications would not get into water, we hope to increasingly turn over responsibility to individual landowners.

RECOMMENDATIONS

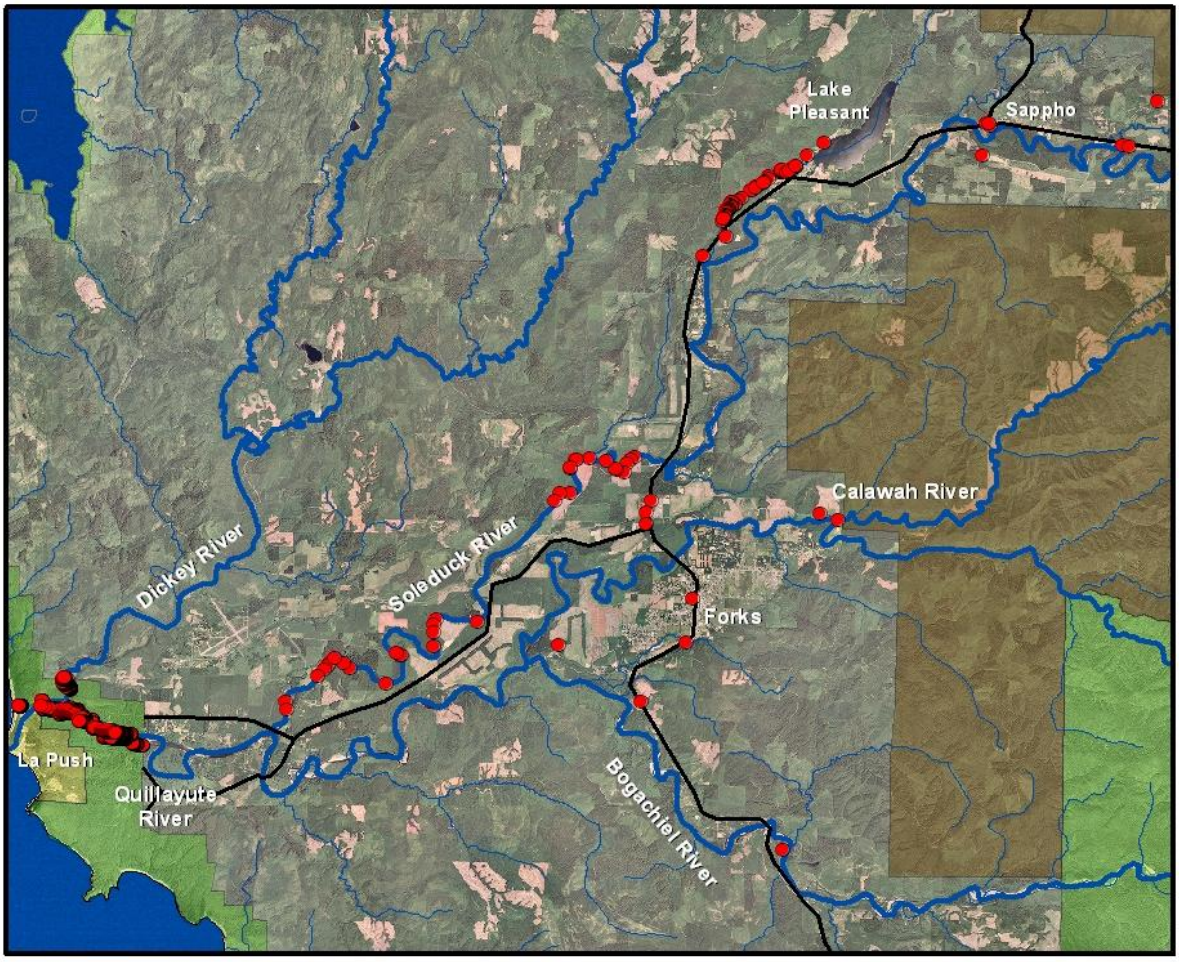
- Continue trying to get Landowner Agreements from the few "holdouts".
- Continue to re-survey and re-treat all known knotweed sites, being especially diligent to search for small plants that could re-infest treated areas as well as looking out for new sites
- Ask crews to report on all activity—especially finding no plants on previously-treated sites and digging of small plants. Consider creating a new spreadsheet check list to ensure that all sites in original baseline surveys, their treatments and status, are accounted for.
- Be more consistent about checking in with crews and having them report on their activities.
- Assess the effectiveness of digging plants that have been chemically treated for several years and have only small amounts of bio-mass remaining.
- Work with both Clallam and Jefferson Counties to get permission to treat roadside knotweed sites.
- Consider making knotweed control mandatory in some watersheds, where populations are already much diminished.
- Work with the Washington State Noxious Weed Control Board to re-define "control", or with the Washington State Department of Agriculture to re-classify knotweed as an aquatic weed, for which the definition of "control" is more stringent, including "to prevent the dispersal of….fragments".
- Re-focus efforts to loan tools and equipment and give help to landowners wanting to treat their own knotweed.

PROJECT ACTIVITIES BY WATERSHED

QUILLAYUTE RIVER SYSTEM

Crews

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



For the purpose of this report the Quillayute system includes the Calawah, Bogachiel, Sol Duc, 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.

• **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 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 and will be monitored in 2009.

• **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. Knotweed infestations on the Bogachiel are extensive and will require a major control effort over several years.

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. They also treated some areas in the lower watershed as far as the confluence with the Sol Duc in response to requests from landowners. Although these treatments are already showing some results, the Quileutes know that successfully eradicating knotweed from the Bogachiel will take many years and they have submitted a grant request to US Fish and Wildlife Service for funding to enable two more years of treatment.

• **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. Money is available for treatment next season and more work will be done. The North Cascades Exotic Plant Management Team with the National Park Service treated 1.45 acres of knotweed on both the Quillayute and the Dickey, within the Olympic National Park.

• **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 will monitor them next year. The lower 4.5 miles still have plants remaining from the research plots established by Lauren Urgenson which the Quileutes refrained from treating in 2008. Lauren's research was concluded in 2008 and the patches will be extensively treated in 2009.

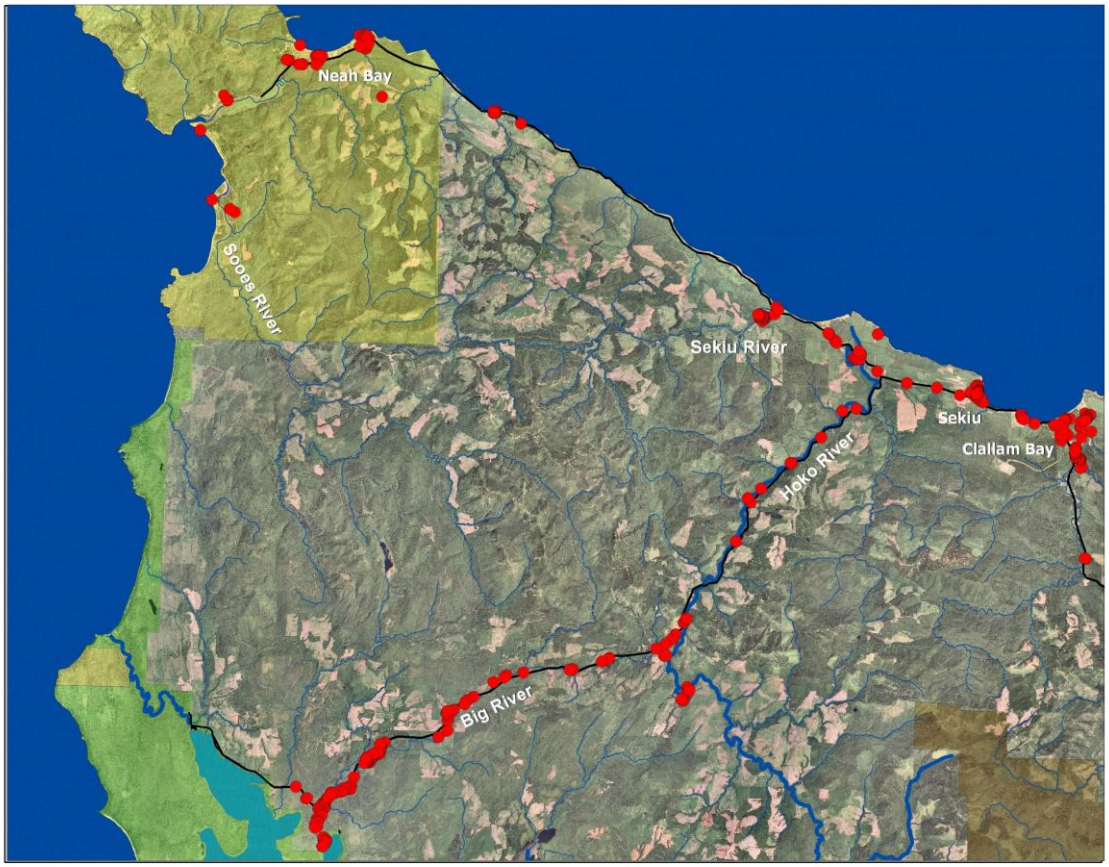
Summary Of 2008 Treatments On the Calawah, Bogachiel, Quillayute and Dickey, Rivers				
River	**Years Treated**	**Miles Treated**	**Acres Treated**	**Herbicide Used (gallons)**
Calawah	2	10.5	100+	2.31
Bogachiel	1	16	900+	33.88
Quillayute	1	2	170	6.77
Dickey	6	4	50	0.165
Total Herbicide				**43.125**

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—The Makah Tribe crew, led by Antony Pascua, Rafael Ojeda (CCNWCB), and North Cascades Exotic Plant Management Team with the National Park Service



• 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. It was particularly evident in the lower stretch of the river, including the portion of the river that lies within the Olympic National Park. 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

Knotweed along the road will continue to re-infest the river if it is not removed. Clallam County's roadside vegetation management policy does not allow for the use of herbicides but in many cases parcels of land on the roadway are actually owned by a private landowner and the County Attorney advised the Weed Board that if the landowner gave permission to treat then the intent of the policy would not be violated. Of the 100 plus knotweed sites along the Hoko-Ozette Rd, there were only three where the no-herbicide ban applied and the sites could not be treated. However, untreated, these three sites could re-infest the entire roadway.

Outreach

Prior to this project the local community had little understanding of knotweed, the means of its vigorous regeneration and its detrimental effects, although knotweed had obviously been present for many years. Many were willing to get rid of it once they became aware of its impacts and some homeowners had battled it unsuccessfully for years by mowing (it always came back!). However, many people had concerns about herbicide use and the effects herbicides would have on soil, water and other plants.

We held a public meeting and demonstrated the techniques of spot-spraying, injection and wipe. All of these methods minimize herbicide impacts on the environment and other plants and this helped to allay public concerns about herbicide use. We also let people know that current research indicates that, except in the case of very small infestations, herbicide is the most effective and possibly the only way to get rid of knotweed.

Until the initiation of this project, many landowners had been in the habit of cutting down knotweed canes on their property and throwing them in a trash pile, or even into the river. In either case there was a high risk of starting new infestations. By doing extensive public outreach the knowledge of these potential impacts is now widespread and the understanding of what ***not*** to do is widely accepted.

We worked hard to establish our reputation and build trust by maintaining a respectful attitude toward landowners and providing open communication about our work. Survey and treatment efforts were presented to the local community through newspaper bulletins, community meetings, brochures and posters, mailings, and personal contact. This community outreach directly benefited the project's success. Broad knowledge of the problem and what we were doing about it went a long way to creating local support while allaying concerns about the use of herbicide. Not only did this add to the efficiency of treating where and when it was needed, but also helped address concerns upfront, reducing the likelihood of contentious issues developing later on.

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. The Makah Tribe supplied a four to eight person crew; they worked with a CCNWCB employee, who also managed landowner agreements and public outreach. Four additional sites were found in the fall—the bright yellow fall color of knotweed made the plants more visible and aided in their discovery. .

Treatment in 2004 and 2005 was complicated by the fact that beaver dams were found on the Big River, constructed from knotweed. Some canes produced new growth in the dam and some washed downstream where there is a high likelihood that they produced new infestations. In 2005 a Joint Aquatic Resource Permits Application (JARPA) was obtained from WSDFW to dismantle and treat a beaver dam constructed of knotweed canes. Hopefully, eliminating knotweed sources will encourage beavers to revert to native materials for future construction projects.

By the fall of 2005 it was obvious that the knotweed infestation on the Big River, especially the lower portion, was so bad that that it would take a considerable amount of work to control or eliminate it. Consequently, CCNWCB applied for and was awarded a grant from the National Fish and Wildlife Foundation (NFWF) to help with the task.

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 the approximately six miles of lower Big River. The Makah surveyors found 16 knotweed sites and 635 were found by the CCNWCB. All knotweed plants found on the Big River were thought to be Bohemian knotweed

Early in 2006 CCNWCB hired a five-person crew. It seemed advisable to hire local people in order to help an economically depressed area and also to draw on local knowledge, so the jobs were advertised and interviews were held in the Big River/Lake Ozette area. The Makah Tribe also supplied a crew, varying in size from four to eight, who worked with the CCNWCB crew. The combined crew treated or re-treated 12 miles of the Big River and 18 miles of the Hoko-Ozette Road, using 65.39 gallons of herbicide.

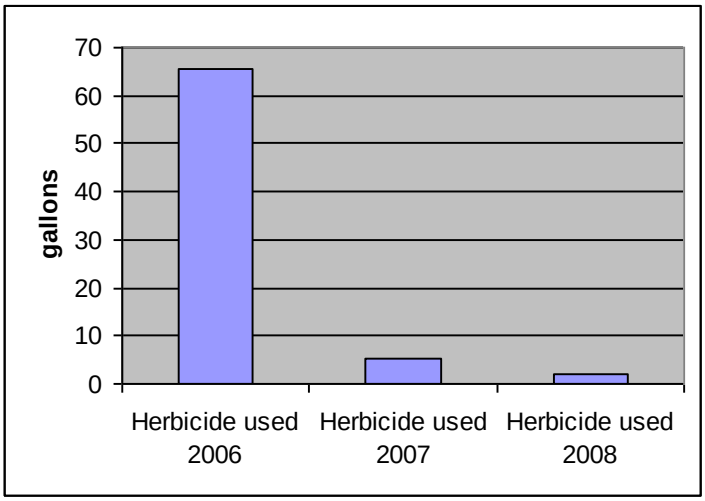
In July 2007, CCNWCB re-surveyed both the upper and lower portions of the Big River. During the winter of 2006-2007 the river had moved considerably within its flood plain and quite a lot of flooding occurred. Because of the flooding and movement of the river it was difficult or even impossible to find 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.

In August 2007 the Makah Tribe crew (with some help from CCNWCB) re-treated all of the sites that had been recorded in the July survey. The presence of knotweed had been much reduced. Fewer than 200 canes were big enough to inject (Jon Gallie, Makah Natural Resources, pers. com.), demonstrating a shift from a high percentage of large plants to a high percentage of small plants. Only 5.14 gallons of herbicide were used in 2007—a reduction of 90%.

In 2008 the Makah crew, assisted by Rafael Ojeda, 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%. 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.

Herbicide Use, Big River and Hoko-Ozette Road (gallons)			
	2006	**2007**	**2008**
Acres Treated	N/A	28	57
AquaNeat or Glypro injected:	N/A	1.24	0
AquaNeat or Glypro sprayed:	N/A	3.3	1.876
Habitat (imazapyr) sprayed:	0	0.6	0.305
Total Herbicide:	**65.39**	**5.14**	**2.181**

("Acres Treated" are 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.)

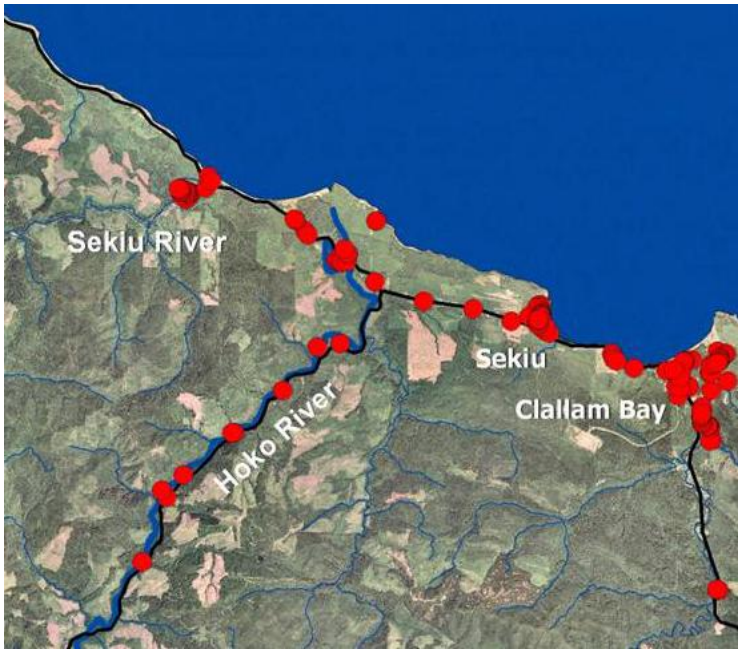


Decline in herbicide use on the Big River and the Hoko-Ozette Road, 2006 to 2008

SEKIU RIVER

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



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. Three patches located on one property were not treated in 2006 due to lack of permission. Treatment in 2006 was very successful. Many dead canes were observed during the fall of that year.

In 2007 only four treatments were necessary. 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.

Herbicide Use, Sekiu River (gallons)			
	2006	**2007**	**2008**
Acres Treated	4.7	1.78	2
AquaNeat injected:	N/A	0.1	1.7
AquaNeat sprayed:	N/A	0.18	0.06
Habitat (imazapyr):	0	0.02	0.007 (Polaris)
Total Herbicide:	**11**	**0.3**	**1.767**

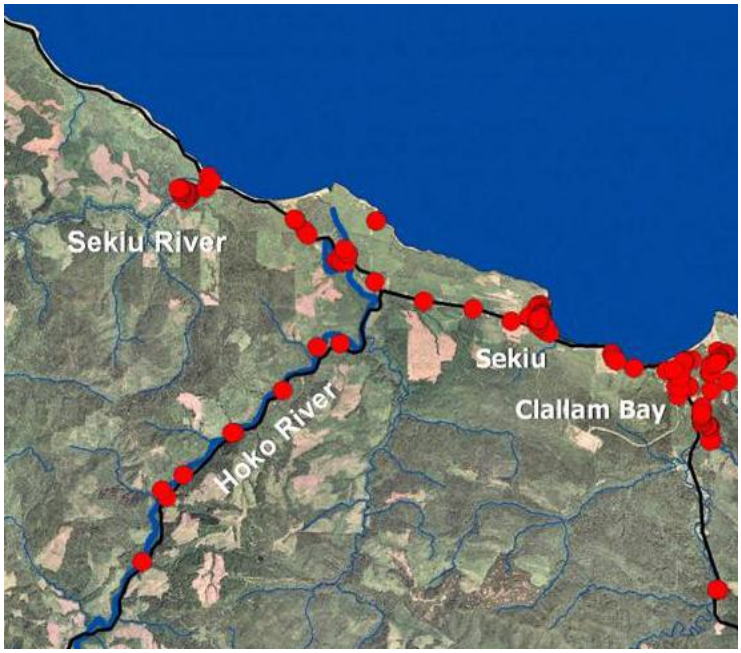
("Acres Treated" are calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area.)

Herbicide use declined considerably from 2006 to 2007 (11 gallons went down to only 0.3). More was used in 2008 because a new site was treated for the first time.

HOKO RIVER

Crew

Treatment—The Makah Tribe crew led by Tony Pascua, Rafael Ojeda (CCNWCB)



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 and CCNWCB 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.

Herbicide Use, Hoko River (gallons)			
	2006	**2007**	**2008**
Acres Treated	N/A	5.82	17.16
AquaNeat injected:		1.63	0
AquaNeat sprayed:		2.52	2.27
Habitat (imazapyr):		0.075	0.246
Total Herbicide:	**2.6**	**4.225**	**2.516**

("Acres Treated" are 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.)

SEKIU, CLALLAM BAY AND HIGHWAY 112

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)

• 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 parts 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 local residents found the knotweed stands overwhelming and desired to eradicate it from their community.

In 2006 CCNWCB hired local residents Steve Erickson and Charles DeVaney who educated landowners about knotweed and its effects on the environment. They also collected 36 signed permissions from landowners. The Makah Tribe and CCNWCB treated and re-treated 42 sites 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 of canes in both towns. After just one year of treatment most patches went from having 100-200 canes to 11-25. The canes that did return in 2007 were generally less than 3 ft tall, compared to their original 6-10 feet. 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. CCNWCB acquired nineteen new Landowner Agreements and the crew treated knotweed. Steve Erickson and Charles (Chuck) De Vaney continued to contact landowners, get Landowner Agreements when needed and educate the community about knotweed and our program. Charles DeVaney became an aquatic licensed applicator in 2007 and worked with landowners in Sekiu

and Clallam Bay who wanted to control their own terrestrial knotweed. He arranged for them to borrow our tools, supplied them with herbicide, instructed them in the correct methods and assisted with treatments. As knotweed populations decrease because of our efforts we would like to see more landowners take responsibility for monitoring and controlling the few small plants that remain.

In 2008 crews monitored known sites and re-treated as necessary. They also found several new sites, obtained Landowner Permission and treated. Four new sites were found in Sekiu, close to previously-treated large infestations on and near Sekiu Airport.

Sadly, Chuck DeVaney passed away in March of 2008. He was and still is much missed by us all. Because of his absence we did not make as much progress as we had hoped in regard to helping landowners control their own knotweed, a role which Chuck had taken on in 2007. This is the direction we would like the program to take and we will make every effort to steer it in that direction in 2009.

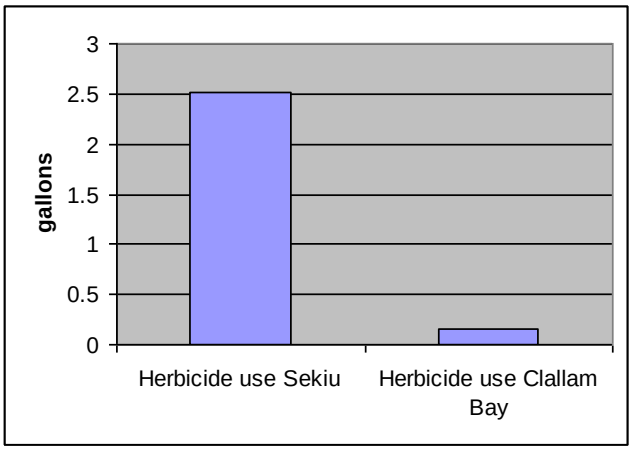
2008 treatments are summarized in the tables below. In compiling the tables a "site" was simply taken to be land owned by one owner and therefore covered under one Landowner Agreement. Information on Highway 112, Sekiu and Clallam Bay are presented separately, to highlight the differences between the two towns.

When knotweed control in the area was initiated in 2006 the largest infestations were in Sekiu; populations in Clallam Bay were much smaller. The tables show that this is still so. In 2008 we treated many more acres in Sekiu than in Clallam Bay, using much larger amounts of herbicide, and new sites were still being found. Populations in Clallam Bay, being smaller in the first place, have responded very well to treatment, indicating the benefits of controlling weed populations BEFORE they get large.

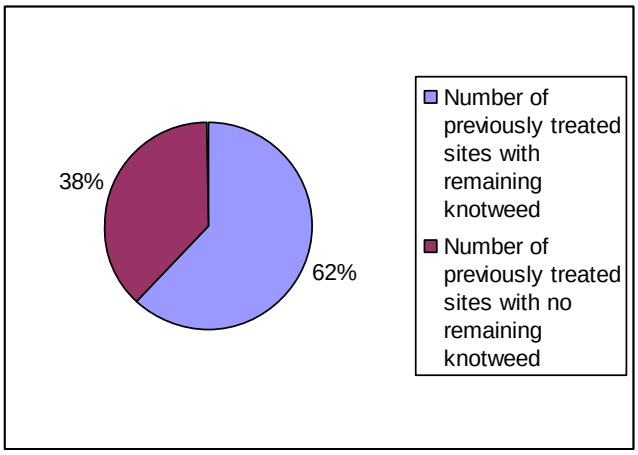
Summary Of 2008 Treatments on Highway 112, Including Bullman Beach		
Total number of previously treated sites—**14**	Sites **with** remaining knotweed—**12**	Sites with **no** knotweed—**2**
New sites found 2008	1	
Acres treated	12	
AquaNeat injected	0.125 gal	
AquaNeat sprayed	0.545 gal	
Polaris sprayed	0.136 gal	
Total Herbicide	**0.806 gal**	

Summary Of 2008 Treatments in Sekiu		
Total number of previously treated sites—**16**	Sites **with** remaining knotweed—**9**	Sites with **no** knotweed—**7**
New sites found 2008	4	
Acres treated	31	
AquaNeat injected	1.71 gal	
AquaNeat sprayed	0.647 gal	
Polaris sprayed	0.16 gal	
Total Herbicide	**2.517 gal**	

Summary Of 2008 Treatments in Clallam Bay		
Total number of previously treated sites—**20**	Sites **with** remaining knotweed—**10**	Sites with **no** knotweed—**10**
New sites found 2008	0	
Acres treated	1.95	
AquaNeat injected	0.11 gal	
AquaNeat sprayed	0.032 gal	
Polaris sprayed	0.008 gal	
Total Herbicide	**0.15 gal**	



Comparison of 2008 herbicide use in Sekiu and Clallam Bay (Sekiu includes 4 new sites)

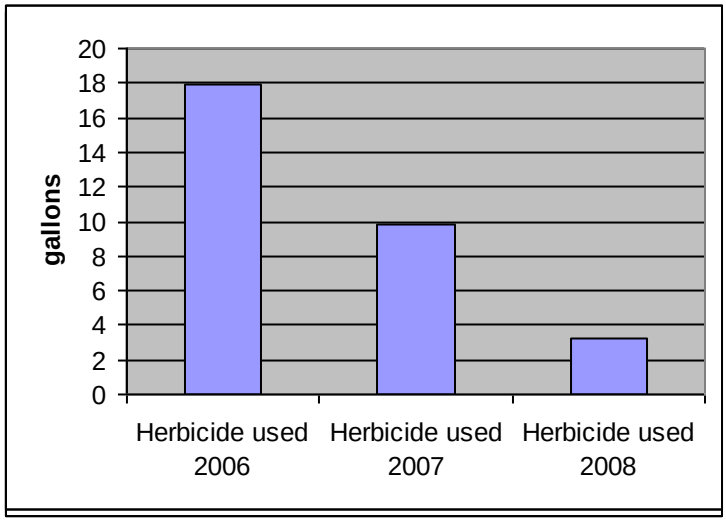


Percentage of previously-treated sites in the Highway 112-Sekiu-Clallam Bay area with no remaining knotweed in 2008

Herbicide use in the whole area was considerably reduced from 2007 to 2008, as shown in the table below. 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. This decline occurred despite the fact that 1.5 gallons of Aquaneat was used on one site alone, a new site in Sekiu discovered by crews in 2008.

Herbicide Use, Highway 112, Clallam Bay and Sekiu (gallons)			
	2006	**2007**	**2008**
Acres Treated	N/A	25	45
AquaNeat:		9.56	2.99
Habitat (imazapyr):		0.23	0.29
Total Herbicide:	17.9	9.79	3.28

("Acres Treated" are 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.)

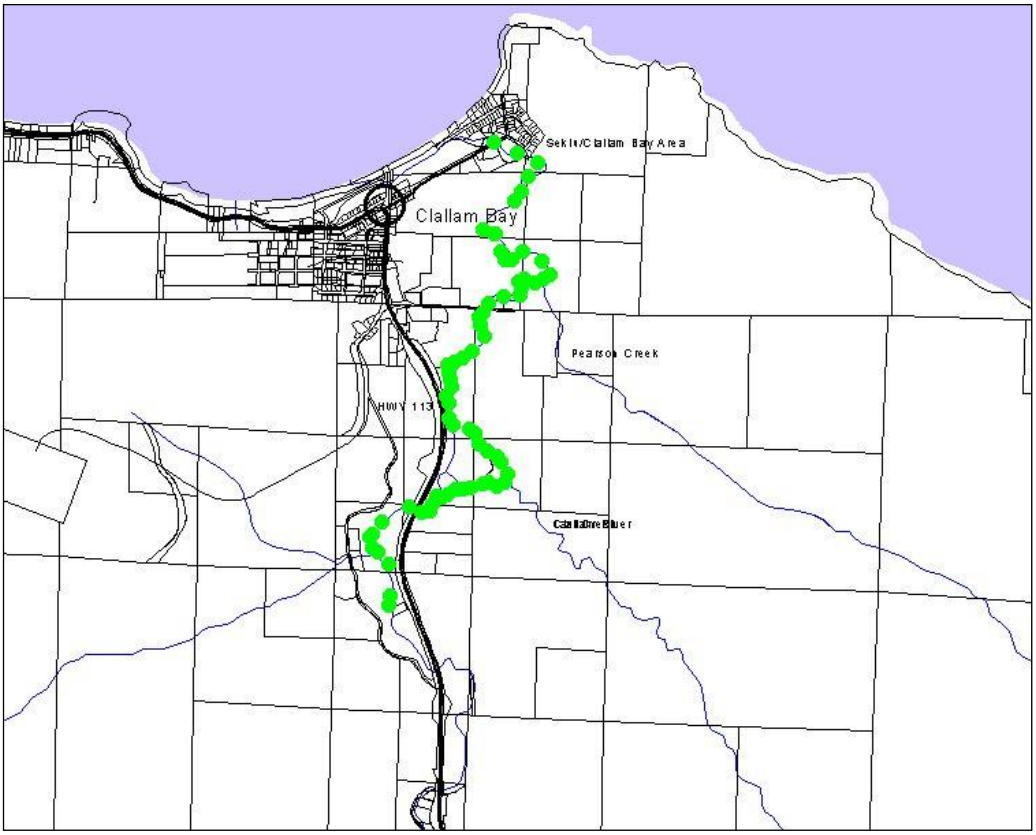


Comparison of herbicide use in the Highway 112-Sekiu-Clallam Bay area, 2006 to 2008

CLALLAM RIVER

Crew

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



Knotweed Sites on the Clallam River

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

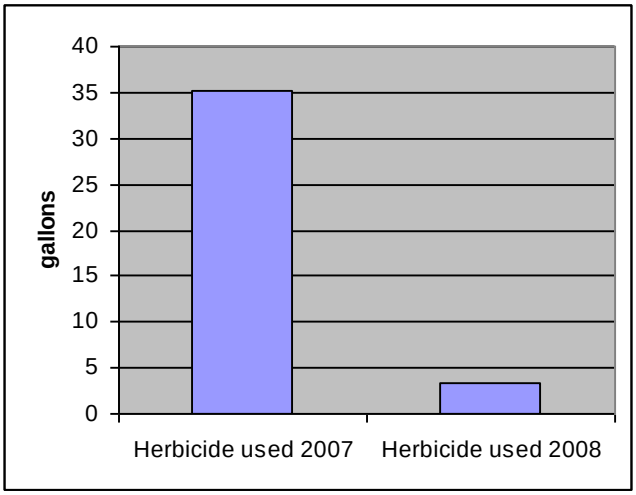
In 2007 funding from a NFWF grant with the Clallam Conservation District became available for the Lower Elwha Klallam Tribe to treat the knotweed on the Clallam River. This was done with the help of an aquatic licensed applicator from CCNWCB. Landowner agreements were solicited and 11 out the 14

landowners approached signed an agreement with us. Existing agreements with Rayonier Timberlands and Washington State Parks were extended to allow us to treat their parcels on the Clallam River.

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.

Herbicide Use, Clallam River (gallons)		
	2007	**2008**
Acres Treated	26	21.5
AquaNeat injected:	32.95	0.52
AquaNeat sprayed:	2.14	1.34
Polaris (imazapyr):		0.34
Total Herbicide:	**35.09**	**3.28**

("Acres Treated" are 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.)



Comparison of herbicide use on the Clallam River, 2007 to 2008

PYSHT RIVER

Crew

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

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 Marsha Key. 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.

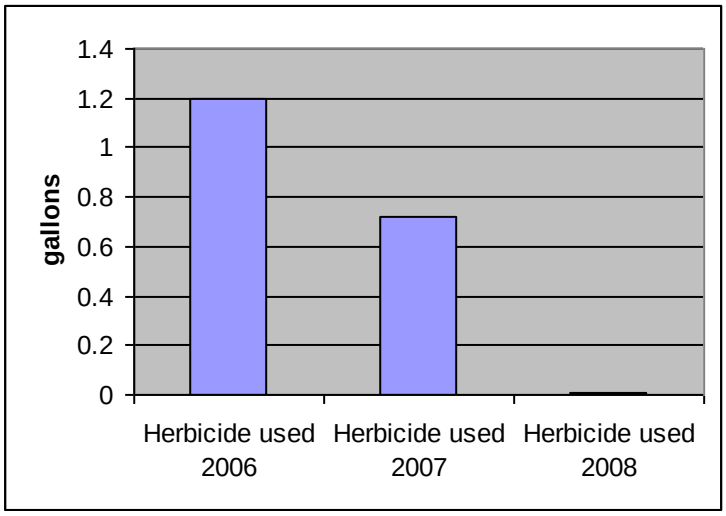
In 2007 Merrill and Ring again hired a crew who treated their knotweed sites with help from Marsha Key. CCNWCB employees Steve Erickson and Chuck DeVaney surveyed the Pysht in 2007 but found no knotweed sites other than those already known.

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 Marsha Key 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.

Herbicide use, Pysht River (gallons)			
	2006	**2007**	**2008**
Gly Pro	N/A	0.72	
AquaNeat	N/A		0.00375
Polaris	N/A		0.000937
Total	**1.2**	**0.72**	**0.004687**



Comparison of herbicide use on the Pysht River, 2006 to 2008

SOL DUC RIVER AND TRIBUTARIES BEAR CREEK AND WISEN CREEK (LAKE CREEK IS DESCRIBED IN A SEPARATE SECTION)

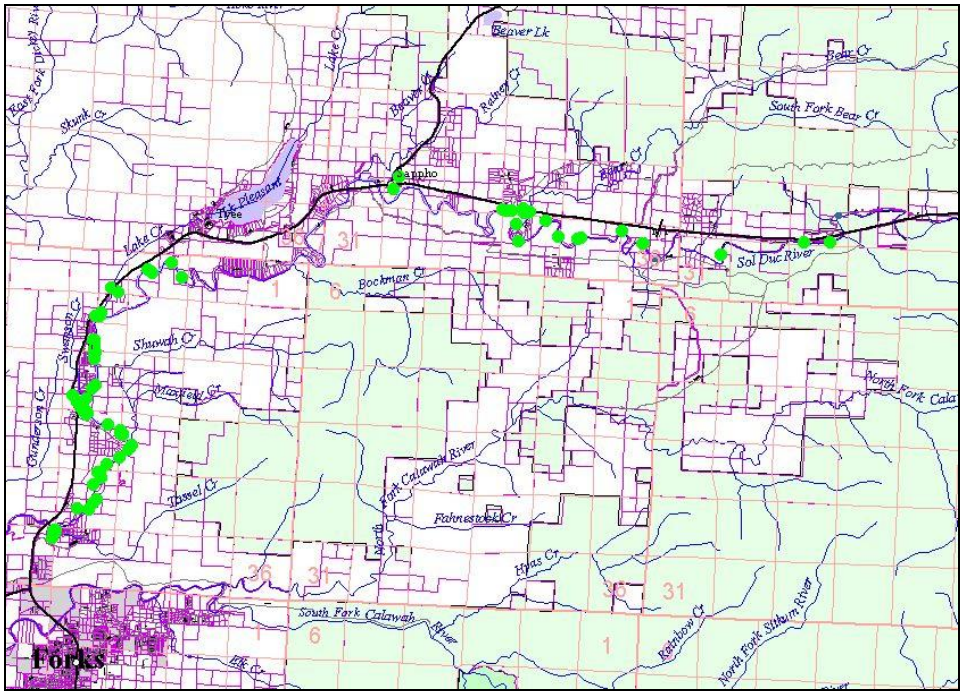
Crew

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 cutthrout and rainbow trout. North Cascades Exotic Plant Management Team with the National Park Service did some treatments 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.

• Mid Sol Duc

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). Forty-six sites were recorded. All of them were characterized as having stems five feet or more in height, but the majority of sites were not large—ten to 50 stems was average. The Snider Work Center was the furthest upstream site found.



Knotweed Sites on the Mid Sol Duc

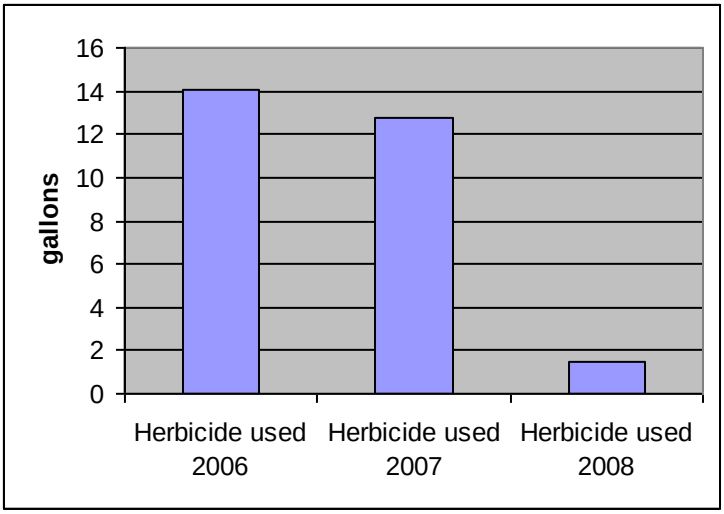
In 2006 CCNWCB solicited and obtained 29 landowner permissions from landowners in the mid-section of the Sol Duc. Only one landowner would not give permission to use herbicide. Treatment of the mid-section took place in September and October, mainly on foot except that one day the Quileute Tribe provided 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. CCNWCB dug epinastic plants on two sites and we will monitor the success of this method in 2009. No Himalayan knotweed, which had been re-treated in 2007, was visible. Herbicide use declined considerably, as the table below shows. As mentioned in regard to other watersheds, our crew did not retake data points in 2008; given this lack of data, decline in herbicide use is probably the best way of assessing the effectiveness of previous years' treatments.

Herbicide Use, Mid Sol Duc River (gallons)			
	2006	**2007**	**2008**
Acres Treated	N/A	48	63
AquaNeat injected		3.83	0.375
AquaNeat sprayed		8.045	0.905
Polaris AQ		0.85	0.166
Total Herbicide	**14.05**	**12.725**	**1.446**

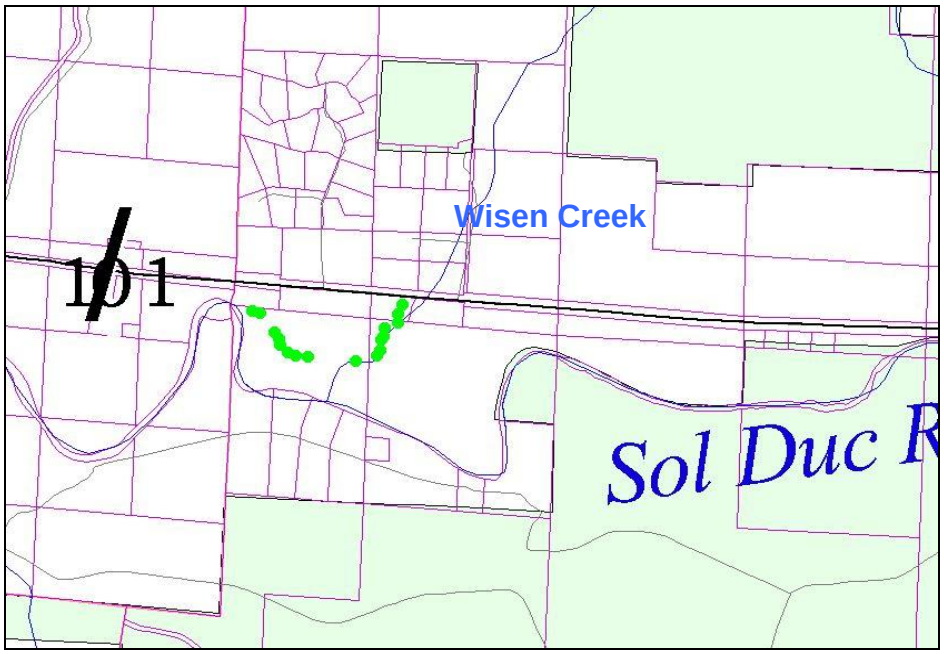
(In 2008 "Acres Treated" were calculated simply by adding together the acreage on all of the Pesticide Application Records and may vary depending on whether the applicator recorded strictly the area treated or the whole infested area. The discrepancy between acres treated in 2007 and in 2008 may be due to different counting methods being used in those two years.)



Comparison of herbicide use on the mid-Sol Duc River, 2006 to 2008

• **Wisen Creek**

Wisen Creek is a Sol Duc tributary on which a large knotweed infestation was seen in 2007, partly on one private property and partly on DNR land. Some treatment occurred on the DNR parcels, but the private landowner refused to give permission to treat. In 2008 he changed his mind and allowed crews to treat on his property. Wisen Creek was heavily infested and the crew spent several days there in September and early October, spraying or injecting 6.18 gallons of herbicide over a total of 36 acres.



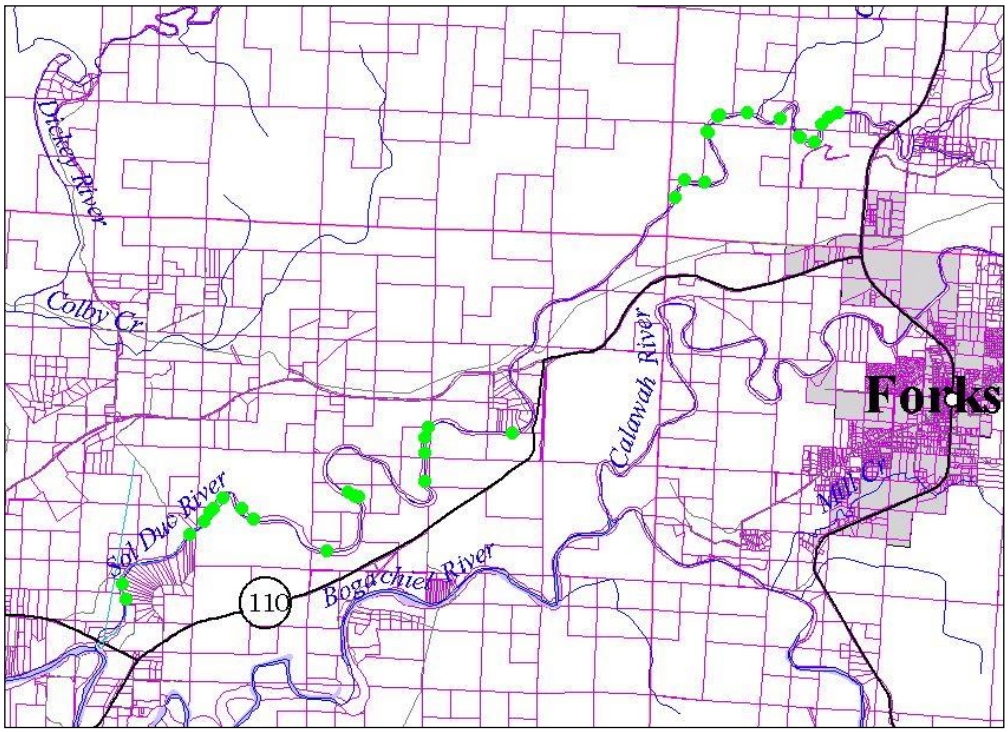
Knotweed sites on Wisen Creek, Treated 2008

Herbicide Use on Wisen Creek, 2008 (gallons)	
	2008
Acres Treated	82
AquaNeat injected :	1.83
AquaNeat sprayed	3.48
Polaris AQ	0.87
Total Herbicide	**6.18**

Some knotweed patches were so large that injection would have been too time-consuming or would have exceeded the legal amount of herbicide use per acre.

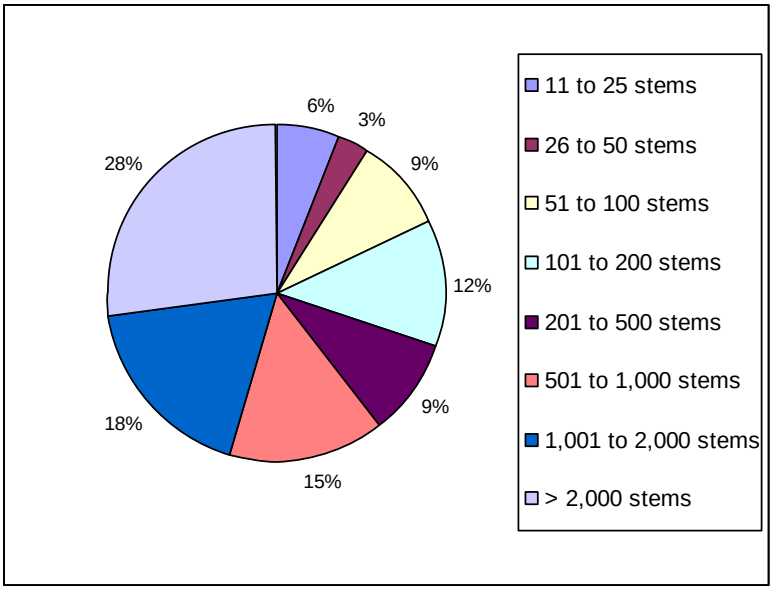
Lower Sol Duc

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.



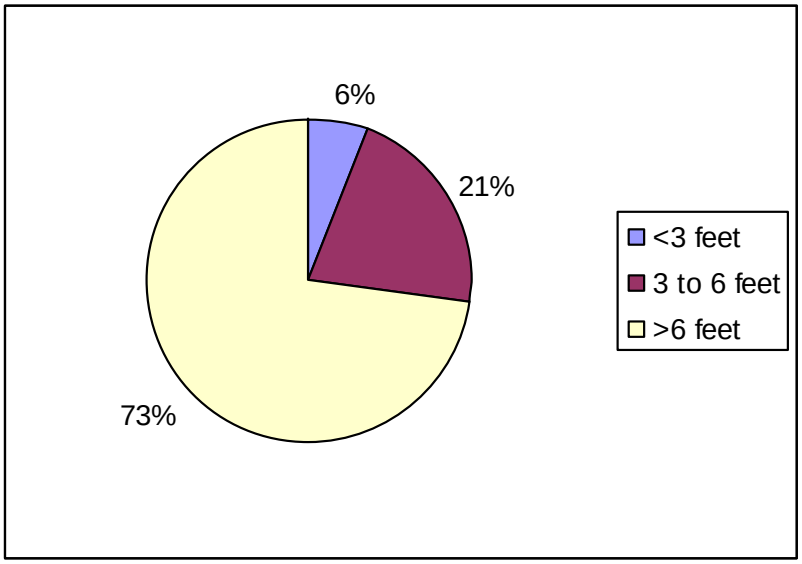
Knotweed Sites on the Lower Sol Duc

In 2007 CCNWCB acquired six new Landowner Agreements for work in the lower portion of the river. A large amount of the land there belonged to Rayonier or Bloedel and additional parcels were added to existing agreements. A combined CCNWCB/Quileute crew treated all known sites on the lower Sol Duc. Rafts were used to facilitate access. The crew recorded data points as they treated. Because new categories had by then been added to the Data Dictionary this information is probably more realistic than the previously-gathered data. Or it may simply show that when fewer sites are recorded, each site has more canes! However, the same crew treated again in 2008 so it is helpful to look at their data from 2007 in order to compare. 33 sites were recorded, 9 (28%) of which contained over 2,000 stems and 6 of which (18%) contained between 1,000 and 2,000 stems.



Stem Count, Lower Sol Duc Knotweed 2007

24 out of the 33 sites (73%) had canes over 6 feet tall. This parameter is comparable between years because it is not affected by the way in which crews determine a "site"



Stem Height, Lower Sol Duc Knotweed 2007

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

Herbicide use in the lower Sol Duc was decreased by about one-third from 2007 to 2008. 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.

Herbicide Use, Lower Sol Duc River (gallons)		
	2007	**2008**
Acres Treated	17	45
AquaNeat injected	1.125	0
AquaNeat sprayed	8.187	6.2
Polaris AQ:	0.344	0.166
Total Herbicide	**9.656**	**6.67**

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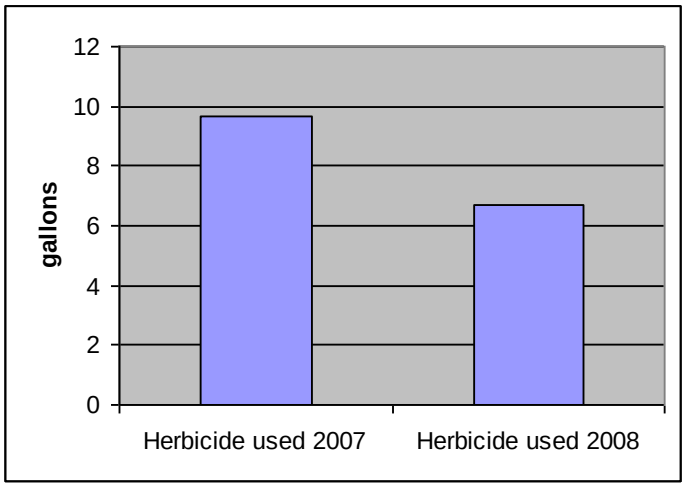


Comparison of herbicide use on the lower Sol Duc River, 2007 to 2008

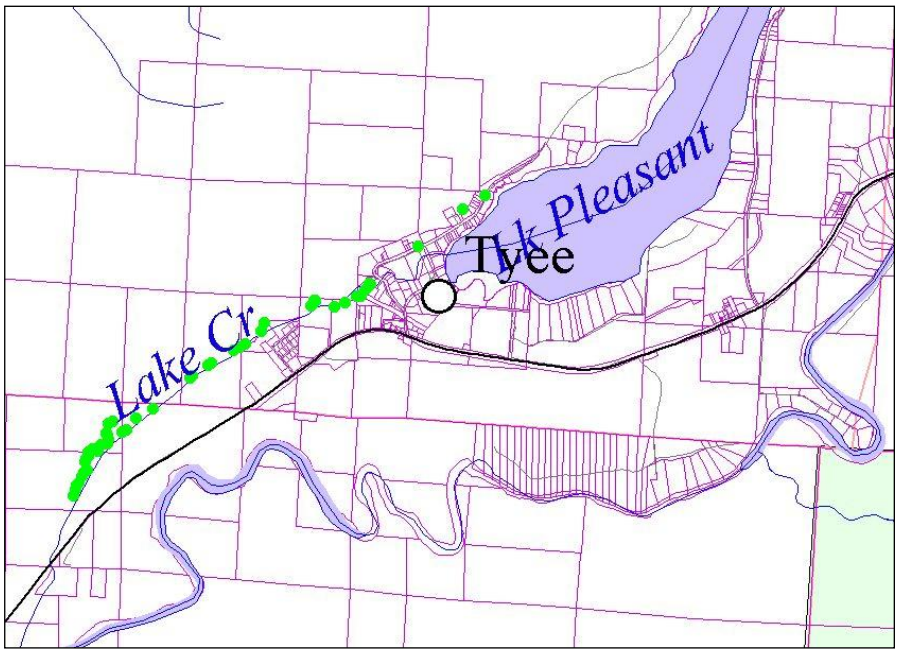
All known knotweed infestations in the Sol Duc River from the Olympic National Park boundary to the Sol Duc's confluence with the Bogachiel have now been treated for two (lower Sol Duc) or three (mid Sol Duc) consecutive years. A considerable decline in bio-mass has been observed. Our crew estimated that in 2008 approximately 20% of the knotweed plants on the Sol Duc were in the 5 to 6 foot range. Some of these had not been treated previously either because they were not found or because of difficulty of access. 20% of plants were estimated at around 3 feet in height and the remaining 60% were less than 3 feet.

Treatment has also taken place in several tributaries, most notably Bear Creek, Wisen Creek and Lake Creek (discussed in a separate section). 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 three years will have been wasted.

LAKE CREEK, LAKE PLEASANT AND BEAVER

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Knotweed Sites on Lake Creek and Lake Pleasant

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 October, 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.

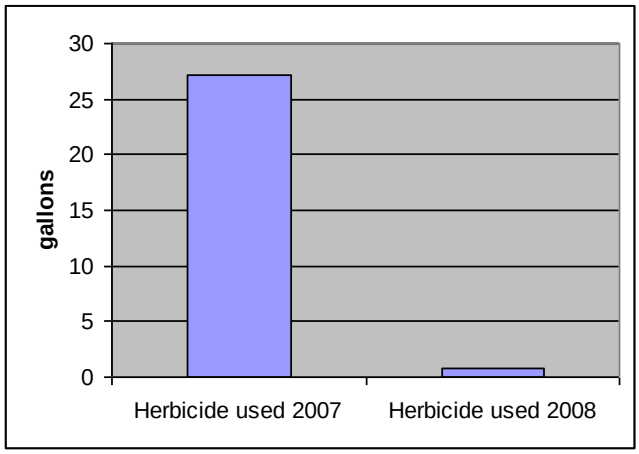
In 2007 the CCNWCB crew treated all of the sites on Lake Creek identified in the 2006 survey. They also treated some additional sites on Lake Pleasant as well as a site in the nearby community of Beaver.

In 2008 the same team monitored all sites and re-treated as necessary. One new site was treated on Lake Pleasant. Our crews did not take data points when working on previously-treated sites, so a direct comparison of plant size and extent between 2007 and 2008 cannot be made. However, most of the pesticide application records characterize plants on the treated sites as "re-growth from shoots" and "1 to 5 feet" and the crew reported that plant size was much diminished. 60 acres were treated in 2008, compared to 38 in 2007, but herbicide use declined tremendously—from **27 gallons in 2007 to less than one gallon in 2008,** for a larger area. Given the lack of data and inconsistencies in data collection, decrease in herbicide use is probably the best indicator of declining plant mass.

Knotweed on Lake Creek in 2008, After 1 Year of Treatment

Herbicide Use, Lake Creek, Lake Pleasant and Beaver (gallons)		
	2007	**2008**
Acres Treated	38	60
AquaNeat injected	15.93	0.23
AquaNeat sprayed	11	0.47
Polaris AQ	0.16	0.12
Total Herbicide	**27.09**	**0.82**

(In 2008 “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 2007 and in 2008 may be due to different counting methods being used in those two years.)

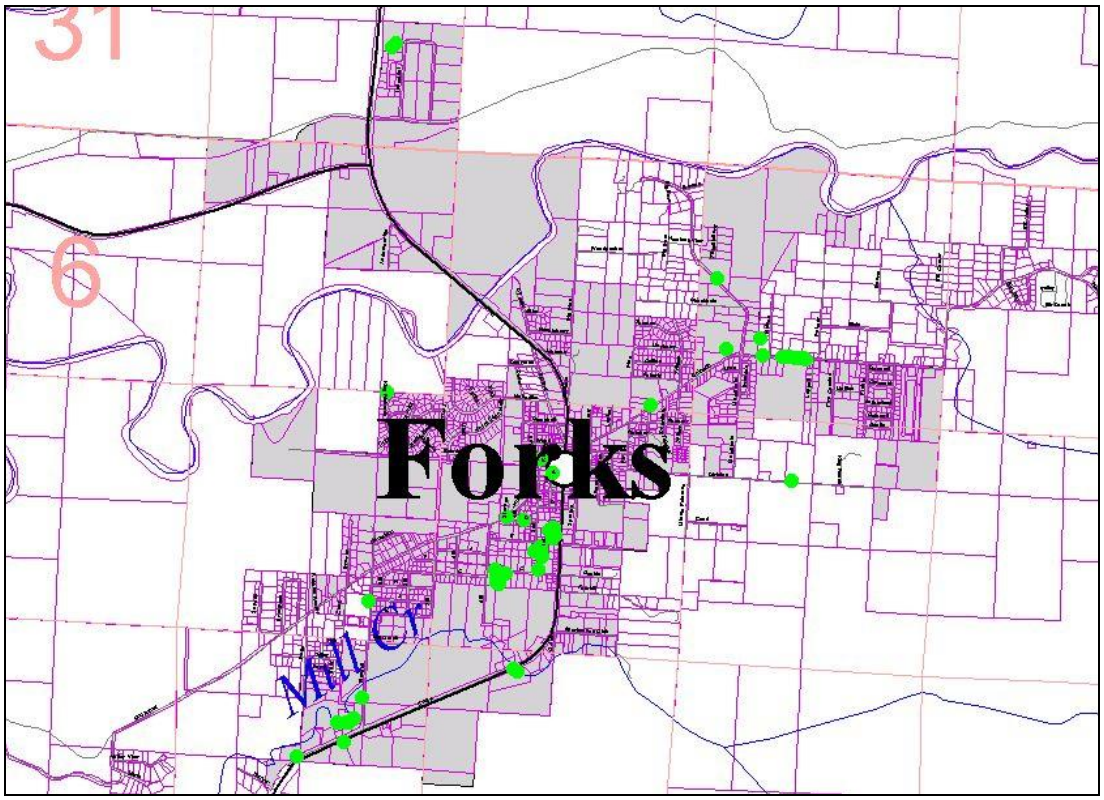


Comparison of herbicide use on Lake Creek,
Lake Pleasant and in Beaver, 2007 to 2008

FORKS

Crew

Treatment—Marsha Key and Rafael Ojeda (CCNWCB)



Forks Knotweed Sites

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.

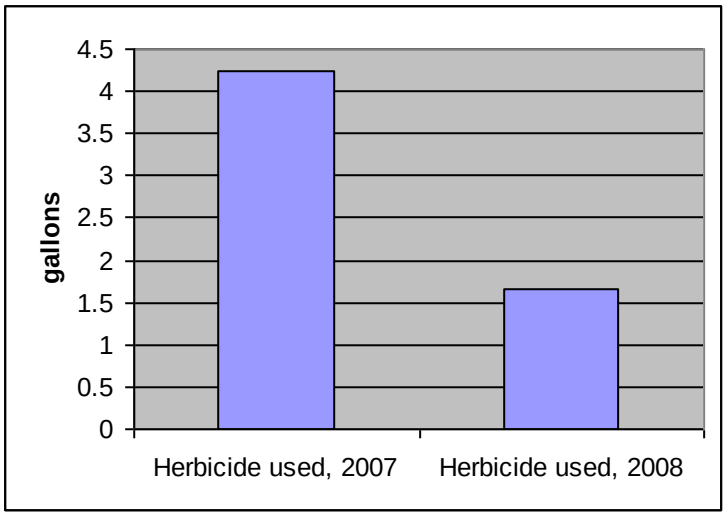
Consequently, a knotweed infestation may cover 3 or 4 different parcels and the crews sometimes experienced difficulties in knowing exactly which property plants were on. In some cases plants were determined to cover more properties than we had Landowner Agreements for and we had to try to get more. 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 this year's treatment.

One landowner on a remote site on the edge of Forks called to ask if we could treat her knotweed. This was very fortunate because the site was close to a creek that flows into the Sol Duc and it is unlikely we would have discovered the site unless the owner had called.

Despite finding and treating new sites, total herbicide use in Forks was reduced from 4.25 gallons in 2007 to 1.607 gallons in 2008

Herbicide Use, Forks (gallons)		
	2007	**2008**
Acres Treated	38	18.5
AquaNeat injected	1.48	0.847
AquaNeat sprayed	2.75	0.579
AquaNeat wiped	0	0.044
Polaris AQ	0.02	0.192
Total Herbicide	**4.25**	**1.662**

(In 2008 "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 2007 and in 2008 may be due to different counting methods being used in those two years.)

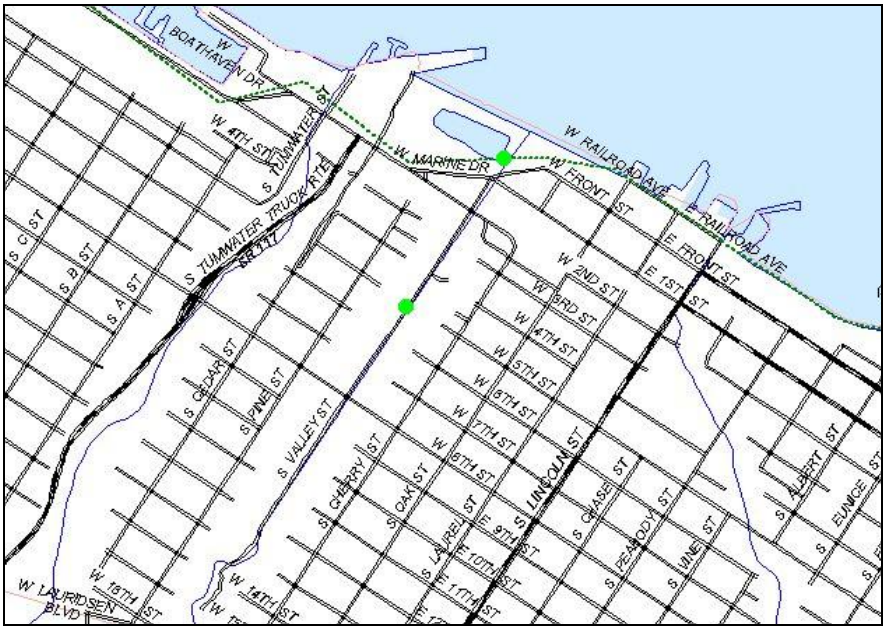


Comparison of herbicide use in Forks, 2007 to 2008

VALLEY CREEK

Crew

Treatment—Cody Hagen, Jay Nolan and Bonnie Eyestone (CCNWCB)



Knotweed Sites on Valley Creek

Valley Creek is a small stream which empties into 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.

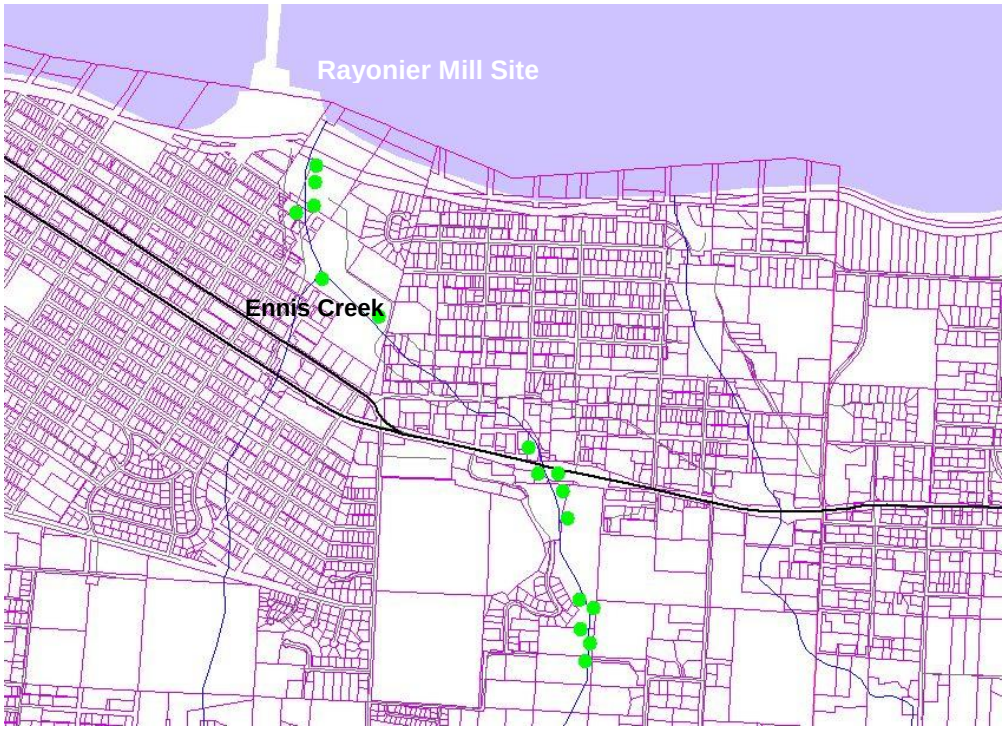
In 2007 CCNWCB re-treated the Valley Creek site, spraying or injecting 1.52 gallons of herbicide.

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

ENNIS CREEK

Crew

Treatment—Cody Hagen, Jay Nolan and Bonnie Eyestone (CCNWCB)



Knotweed Sites on Ennis Creek

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 had been rocked, channelized and the riparian corridor highly degraded. The old mill site has had a bad knotweed infestation for several 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. 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 1.405 gallons of Aquaneat was sprayed or injected over 7 acres of Ennis Creek.

DUNGENESS RIVER

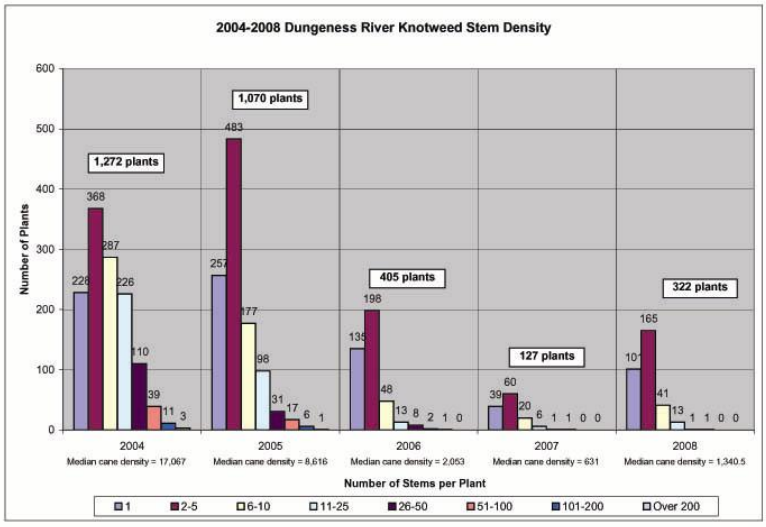
The Dungeness River, which is in the eastern portion of WRIA 18, drains 198 square miles. The mainstem extends 31.9 miles and its primary tributary, the Gray Wolf River, adds another 17.4 miles. There are an additional 256 miles of tributaries in the basin. Historically, the Dungeness was highly productive 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.

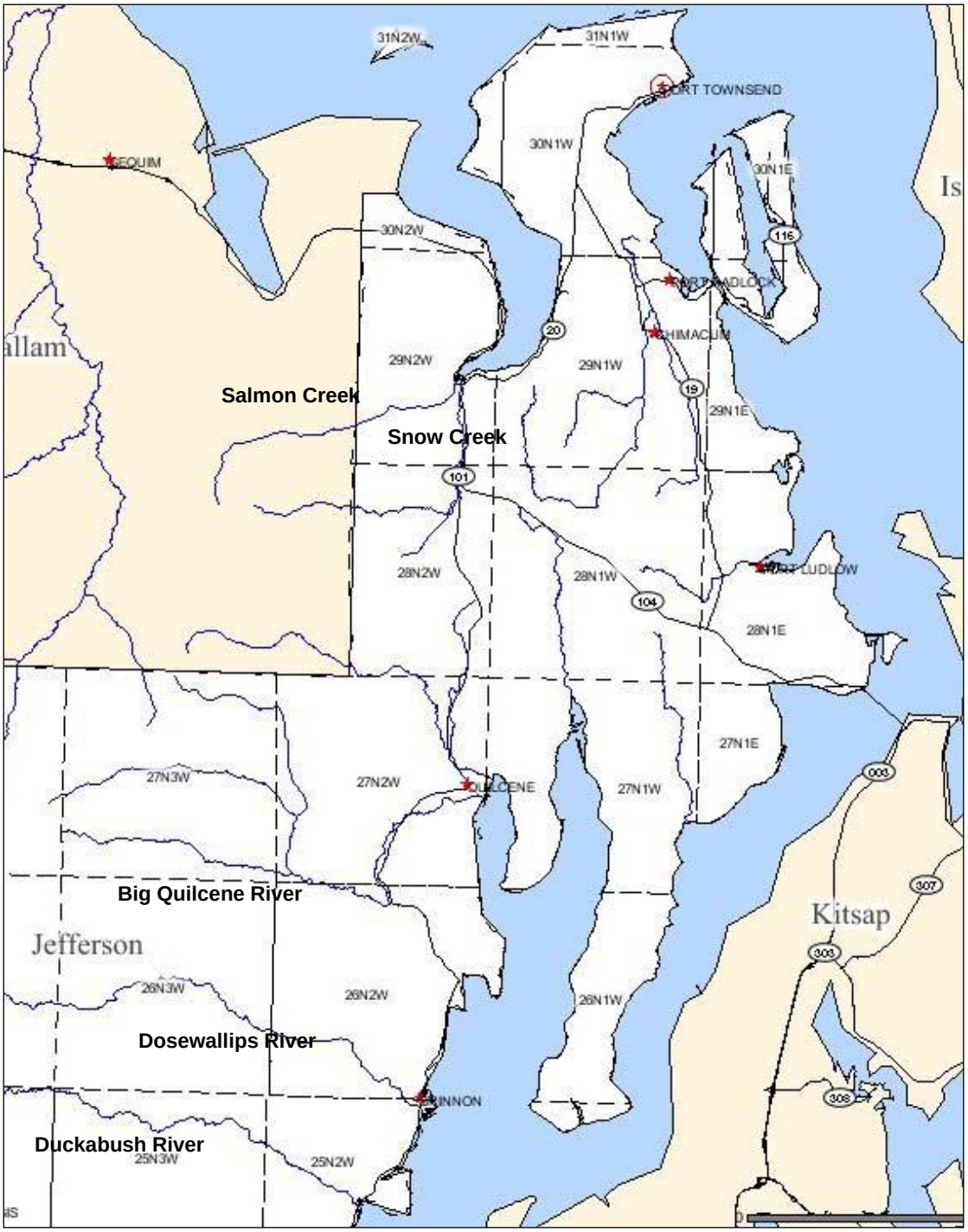
In 2008 the Tribe monitored and re-treated the same area. 322 plants were found with a median cane density of 1,340 stems, requiring 1.5 gallons of herbicide to treat. That is an increase from the median cane density of 631 found in 2007. Although the majority of occurrences were small (2-5 stems per 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. .



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

OVERVIEW MAP OF EAST JEFFERSON COUNTY

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



SNOW CREEK AND SALMON CREEK

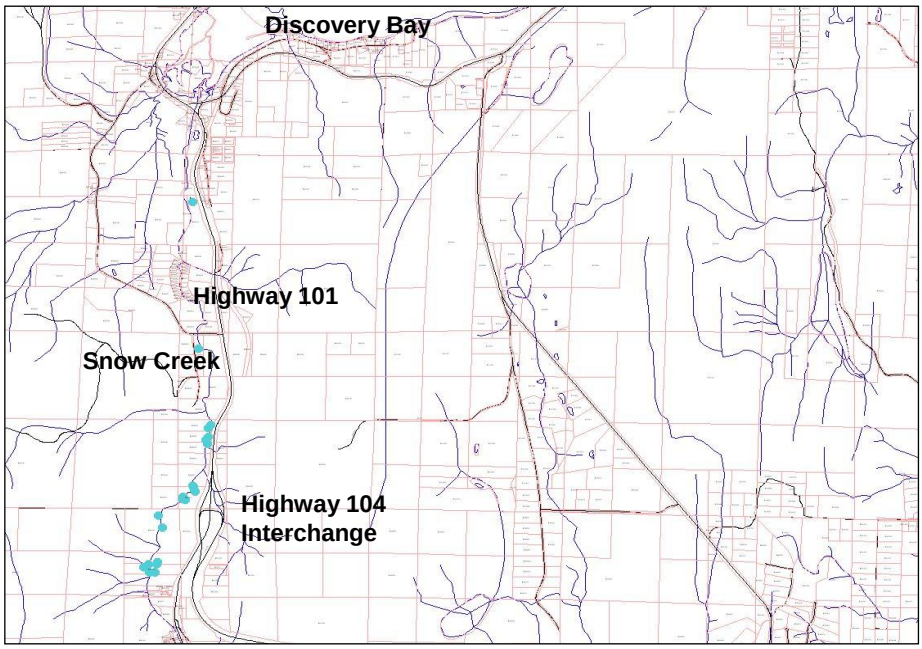
Crews
Survey—Luke Cherney (Hood Canal Coordinating Council)
Treatment—Cody Hagen, Eve Dixon, Jay Nolan and Bonnie Eyestone (CCNWCB)

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 is expected to be completed by October 2008. The wood waste is being 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 CCNWCB and Jefferson County Noxious Weed Control Board (JCNWCB) 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 an infestation between Highway 101 and Snow Creek.

In 2008 we treated that site, monitored all other known sites and re-treated as necessary. Later in 2008 a staff person from the Hood Canal Coordinating Council, believing there to be undetected knotweed on Snow Creek, spent a day surveying and found several more populations. Getting Landowner Agreements and treating these populations will be a priority in 2009.



Knotweed Sites Found on Snow Creek, 2008, (not all treated)

Summary of 2008 Treatment on Snow Creek and Salmon Creek	
Acres Treated	4.35
AquaNeat Injected	0.3 gal
AquaNeat Sprayed	1.03 gal
Total Herbicide	**1.33 gal**

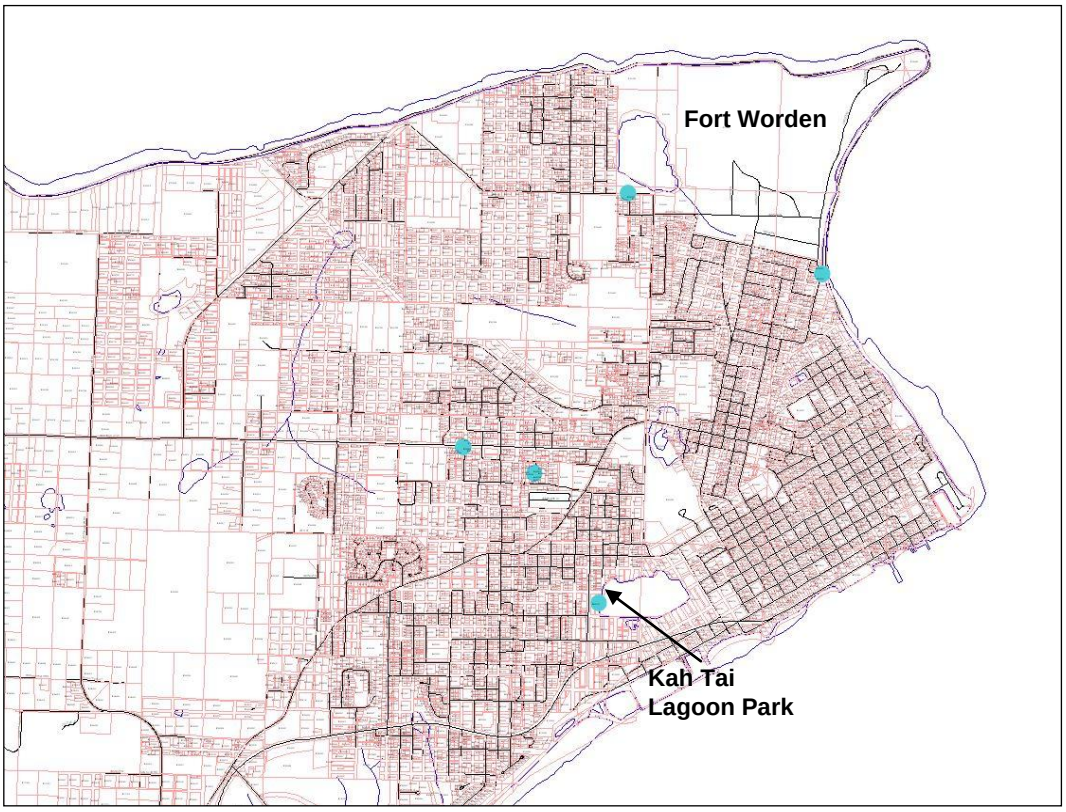
PORT TOWNSEND

Crew

Treatment—Eve Dixon, Fowler Stratton (CCNWCB, JCNWCB), Ron Sikes and Perry Spring (both volunteers)

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.



Knotweed Sites Treated in Port Townsend, 2008

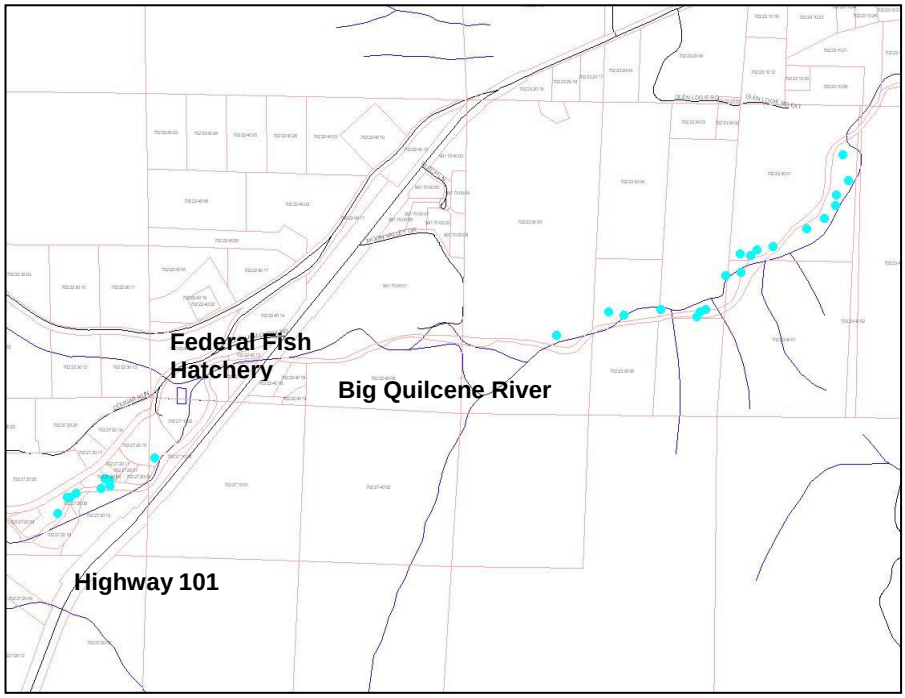
Summary of 2008 Treatment in Port Townsend	
Acres Treated	1.51
AquaNeat Injected	2.15 gal
AquaNeat Wiped	0.062 gal
Total Herbicide	**2.212 gal**

BIG QUILCENE RIVER

Crews

Survey—Luke Cherney (Hood Canal Coordinating Council) and Eve Dixon (CCNWCB/JCNWCB)
Treatment—Cody Hagen, Jay Nolan and Bonnie Eyestone (CCNWCB)

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.



Knotweed Sites Treated on the Big Quilcene River, 2008

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. The success of this treatment will be evaluated in 2009, and work will continue downstream. Knotweed infestations on the Big Quilcene are so immense that controlling them will take many years.

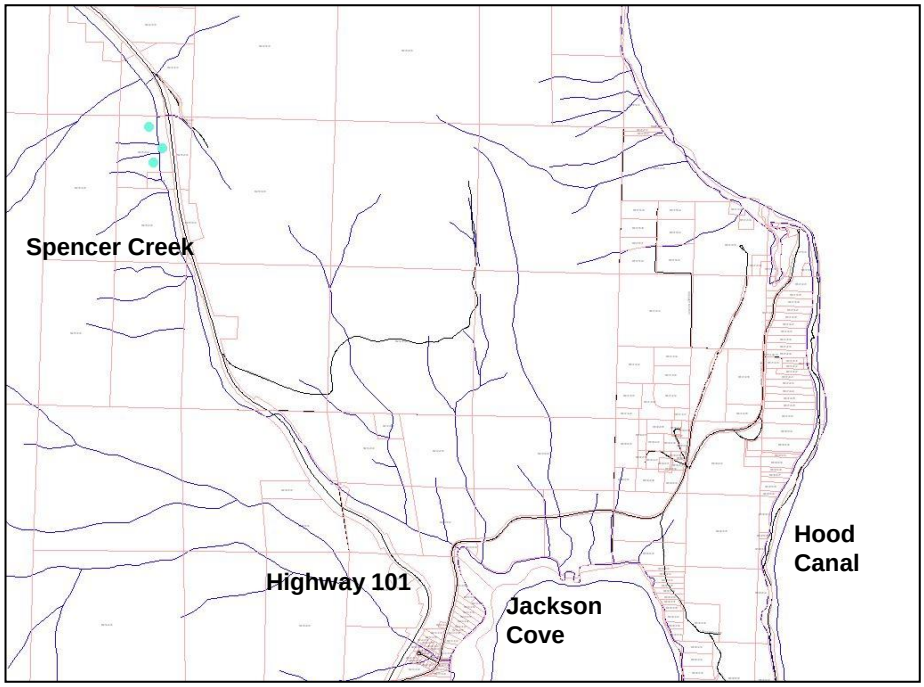
Summary of 2008 Treatment on the Big Quilcene River	
Acres Treated	13
AquaNeat Injected	2.06 gal
AquaNeat Sprayed	3.6 gal
Total Herbicide	**5.66 gal**

SPENCER CREEK

Crew

Treatment—Cody Hagen, Eve Dixon and Bonnie Eyestone (CCNWCB/JCNWCB)

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.



Location of Spencer Creek Knotweed Site

In 2008 the CCNWCB/JCNWCB crew spent approximately two full days on the Spencer Creek site but, like the Big Quilcene, it will take several years to control.

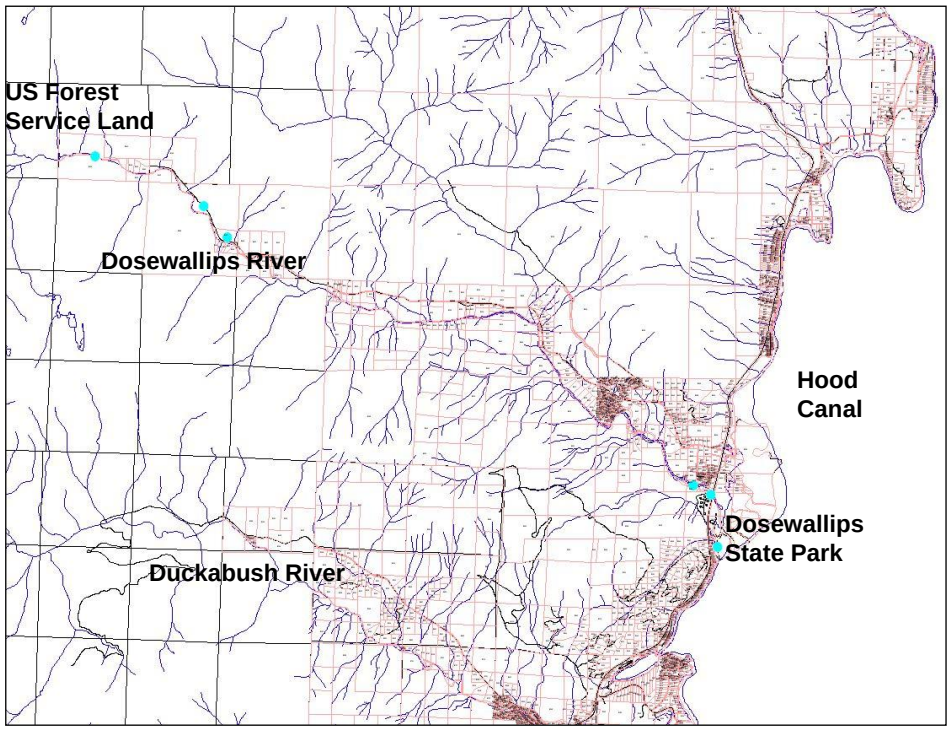
Summary of 2008 Treatment on Spencer Creek	
Acres Treated	5.75
AquaNeat Injected	0.5 gal
AquaNeat Sprayed	1.07 gal
Total Herbicide	**1.57 gal**

DOSEWALLIPS RIVER

Crew

Treatment—Cody Hagen, Eve Dixon, Jay Nolan and Bonnie Eyestone (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.



Knotweed Sites Treated on the Dosewallips River, 2008

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 in September, 2006, 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 in 2007 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 in 2007 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 was in fact several small sites that had not been controlled by park staff so after getting permission, the CCNWCB crew treated them. The Park Ranger told the crew that there was probably knotweed upstream on land owned by Jefferson County. Finding and treating that will be a priority in 2009. 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.

Summary of 2008 Treatment on the Dosewallips River	
Acres Treated	7.75
AquaNeat or GlyPro Injected	0.8 gal
AquaNeat Sprayed	3.12 gal
Total Herbicide	**3.92 gal**

DUCKABUSH RIVER

Crews

Treatment—Eve Dixon (JCNWCB)

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 AquaNeat

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 watershed planning group.

The Hoh River knotweed infestation initiated from a single source in 1998. By the end of 2003, 18,000 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. The Hoh Tribe provided funding for surveys and treatment in 2002 and 2003. 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, US Forest Service, Olympic National Park, and the 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. Equipment and supplies were provided by CCNWCB, and CCNWCB also provided crew to treat 8 river miles. Jefferson County's Department of Corrections was contracted with for a crew of 6-10 inmates who conducted the intensive grid-surveys of the wide river floodplain and adjacent terraces. 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 were treated in an area that had not been surveyed prior. A total of 2.4 gallons of AquaMaster was used on 4,551 canes in 2006.

In 2007, river miles 27 to 17 (913 acres) were surveyed and treated by 10,000 Years Institute. A total of 1.23 gallons of Aquamaster was used on the entire river 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 in partnership with the Hoh Tribe, landowners, the county NWBs, and ONP. Three 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). Two large bars in the lower river (Nolan and Cottonwood) were also surveyed and treated. Only 1 tiny plant was found at Nolan, and only 4 small plants at Cottonwood. The Jefferson County Department of Corrections crew was used again to intensively grid-survey and treat the wide floodplain. Unfortunately the available crew was smaller than in previous years (4-7 people) making it difficult to cover enough ground.

Most plants found in 2008 had only one or two stems and were under three feet. The majority of plants are Bohemian knotweed, but a few giant knotweed plants were observed this year, 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.

Summary Of 2008 Treatments on the Hoh River	
River Miles Treated	15
AquaMaster or AquaNeat Injected	0.0151 gal
AquaMaster or AquaNeat Sprayed	0.5645 gal
Polaris Sprayed	0.06382 gal
Total Herbicide	**0.64342 gal**

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 2008. In several areas a dramatic decline in herbicide use—up to 90%—occurred after just one year of treatment.

Organization	River or Location	Gallons Used 2006	Gallons Used 2007	Gallons Used 2008
Quileute Tribe	Quillayute, Dickey, Calawah & Bogachiel Rivers	101.5	43.97	43.125
CCNWCB and Makah Tribe	Big River and Hoko-Ozette Road	**65.39**	**5.14**	2.181
CCNWCB and Makah Tribe	Hwy. 112 and the Reservation	12.97	2.41	2.035
Makah Tribe	Sekiu River	10.98	0.3	1.767
Makah Tribe	Hoko River	2.6	4.23	2.516
CCNWCB and Makah Tribe	Sekiu and Clallam Bay	11.64	10.39	2.667
CCNWCB and Lower Elwha Klallam Tribe	Clallam River	0	**35.45**	**3.28**
CCNWCB	Pysht River	1.2	0.72	0.005
North Cascade Exotic Plant Management Team	Sol Duc (upper)	N/A	N/A	0.003
CCNWCB	Sol Duc River (mid)	14.05	12.725	1.446
CCNWCB	Sol Duc River (lower)	0	9.656	6.67
CCNWCB	Wisen Creek	0	0	6.18
CCNWCB	Lake Creek, Lake Pleasant and Beaver	0 (not separated out from Sol Duc)	**27.09**	**0.82**
CCNWCB	Forks	2.5	4.25	1.662
CCNWCB	Valley Creek	2.3	1.52	0.063
CCNWCB	Ennis Creek	0	0.68	1.405
Jamestown S'Klallam Tribe	Dungeness River	30	<2	1.5
JCNWCB	Snow Creek and Salmon Creek	0.3 (est)	1.95 (est)	1.33
JCNWCB	Port Townsend	0	0	2.212
JCNWCB	Big Quilcene River	0	0	5.66
JCNWCB	Spencer Creek	0	0	1.57
JCNWCB	Dosewallips and Duckabush Rivers,	2.7 (est)	6 (est)	3.935
10,000 Year Institute	Hoh River	2.36	1.23	0.643
TOTAL		**260.49**	**169.66**	**92.331**

Appendix II--Using the Data Dictionary

(This document was developed in 2006 for the Olympic Knotweed Working Group, in an attempt to standardize data collection, and was refined in 2007)

Using the Data Dictionary

Data is most consistent and sites most easily compared when collected by a single individual over an entire project, over multiple seasons. However, that may not always be possible, even on a single project, and certainly not likely for multiple projects. Therefore it is useful to collectively agree on what information to collect, and how to define each field. **One of the most problematic questions that remains is, "What constitutes a site?**" Is it based on a certain size, distance between target plant, changes in landownership, or purpose of data collection? (For example, the answer may differ depending on whether the site is being defined for inventory or treatment purposes).

The following is a draft "How To" document for the current ('08) Olympic Knotweed Working Group Data Dictionary. It is designed to help a collector know what to enter into each field. A "field" name will eventually become a column header in a database. Each entry under a field, will become one "cell" in that "field". The entries in all the fields will become a row, and together will form one record in the data base.

Most fields in this data dictionary have drop down menus to avoid "typing" on GPS units and to speed data entry. While this standardizes and eliminates spelling or other errors, it can limit what a collector can enter in any given field. It is impossible to anticipate every potential need in the field, so use the comment field when the dropdown menu doesn't have what you are looking for or there is a need to note something unusual. Comments are great to tell exactly where to find a plant, or the way to the site. If you find you are having enter the same piece of information, add it to the drop down menu. **DO NOT** change the order of the fields, or how a field is spelled, as this will invalidate the ability to collate data from many projects without considerable additional effort.

Agency Name-typing in full name is best, abbreviation is OK. Set to autofill if possible. This is particularly necessary to identify the data's source and where it may be stored.

Collector-type in first and last name, or ALL initials-This is critical to identifying who collected the data originally.

Datum-This is information about how spatial information is being collected by a GPS (Global Positioning System) unit. It is vital to know exactly which system is being used to correctly place data points in a GIS (Geographic Information System) for any given user.
List the datum, (ellipsoid/projection, and coordinate system) eg. NAD27 or NAD83, UTMs or State Plane, and which zone so that we know what to convert from when we share the data between us. It should be set to autofill.
NAD27 is an older ellipsoid based on an arbitrary point in Kansas, and was used prior to international convention, which has moved to NAD83, based on the center of the earth's mass. However, the two systems cannot be directly correlated, so it can be difficult to accurately convert from one to the other. As for projection systems, national agencies tend to use UTMs, Washington State agencies tend to use State Plane, north or south. This is more information than you probably want to know. *However, we would prefer to that everyone collects in the standard that fits county GIS maps.* **The county uses NAD83, State Plane, North 4601, conic, statute feet.** Whatever you use, set this field to autofill, but it must agree with actual unit settings before going into the field. Don't let the crew alter these settings in the field.

Site ID-We have not agreed on how to create truly unique markers, but consider adding LB or RB to distinguish between left and right bank. Knowing left or right bank may be very important for access and would help clarify positions on small streams or on those days when it is hard to get a good reading.

Species-Distinguishing between species can be very difficult. Generally, list Bohemian, by default, if it is not obviously Japanese, or Giant. Himalayan is the easiest to distinguish from the other species. List as best you can. Unknown can be used for other species you wish to record-in that case, type species information in the comment field.

Cluster type-This is a confusing field. We took it to mean the average state of the site, as stem count will tell the number of actual canes. Record **individual**, if it appears that the site has mostly single canes. Record **cluster**, if it appears that most of the site is established clumps, that may be separated from each other, but not yet a monoculture. Record **group**, if it is a solid patch, with little to no space between clumps. Record **fragment** if it is a piece of plant, such as a root or cane, that has obviously dislodged from another plant and newly rooted. On a highly infested system, there may not be enough time to record fragment information. We have added **seedling** in case any are found. If a seedling is suspected, dig down carefully and look for any possible rhizome. A seedling may still have the two cotyledons (first little leaves) and likely a *fibrous* root coming from the surface. This spring we added **epinastic**, for symptomatic plants from previous year treatment.

Average height- Most sites have a mix of heights. Record what seems to be average height of plants in the whole site.

Stem count-Choose the range that includes the number of canes. There were originally 8 categories- We have added some larger categories, **201-500**, and **501-1000, 1001-2000, >2000** to fit the need of projects with greater infestation density.

Phenology-Indicates what stage of lifecycle, but is the AVERAGE state of the site. –Record **pre-bloom** before flowering is evident, record **bloom**, while flowers are seen, record **post-bloom** when most plants look like they have finished blooming.

Site Type-This is another confusing field to record. Riparian/gravel bar is the default setting. Choose the category that best suits the whole site. Don't split a site based on this field.
Riparian – Gravelbar- Includes areas within the river channel and just on the bank.
Riparian – Veg Highwater-Includes the level where most vegetation begins, or bank full width. Plants will be mainly on the bank.
Riparian – Floodplain-Includes areas where water *has* reached, or generally reaches during floods. Often there will be a flattened, possibly raised area, where vegetation is growing. This type of site can extend back into the woods. The floodplain will not always be obvious so it may be difficult to know where an area may have flooded in the distant past. Do the best you can.
Riparian – Other-This category can be used where nothing else seems to fit, it might include an old channel that you want to specifically call out or may merely be a wooded site that is near the water, but doesn't really fit previous categories.
Large Woody Debris-Use to indicate that most plants are found or obviously first established on, or were trapped by river debris, either in the channel, or to the side.
Field/Pasture-Use for site that is an open, grassy area or is used as a pasture.
Roadside-Includes sites that are next to roadways, trails, paths or in parking lots (or just at the end), includes ditches. If it is also RIGHT along a stream, may want to use riparian-other. Tracking this designation might help us note knotweed spread or persistence as a result of mechanical maintenance practices.
Developed-Includes sites for non-crop landuses-residential or commercial.
Forest-Use for sites not near water, but in forested area.

Action-Indicate whether this visit is strictly inventory or includes treatment (in that case choose treatment). **This is the end of fields to be filled in for inventory**. The remainder of an inventory record will default to none. If the site is treated, continue to fill the remaining fields. **This is also the last of required fields. All the rest are optional.**

Herbicide-Choose the product you are using. If not listed, choose other, and add the product to the comment field.

Surfactant-Choose none for injection, or choose the product you are using from the list. If not listed, choose other and note surfactant in the comment field.

Treatment type-Defaults to none. Choose from treatment type as appropriate. *Make sure to choose inject and foliar, if a site received both treatments at the time of filling out the record.* (Is this how it was filled out by everyone?)

Ownership-Type in the owner's name if you know it. (Type in private or public land, if that is all you know). Leave blank if it is unknown to you.

Substrate-This is an optional field. Choose the type of ground that best describes your general site. Most likely it will be a mix of several of the possible categories. Select **cobble** for areas that are mostly rocks. Select **gravel** for areas with marble sized rocks (or slightly smaller), but not sandy. Select **sand** for areas with few rocks, but still gritty soil. Select **fines** for areas that have smoother particles. Select **organic/clay** for sites with soils that clump in your hand, select **vegetated or LWD** for sites that are in LWD or are mainly vegetated, not bare ground.

Canopy-This refers to the amount of vegetation overhead and can really only be accurately measured with specific tools. Generally, select **open** when there is no vegetation overhead. Select **partly open** when there is some other vegetation, (besides knotweed), when you look overhead, but you can still easily see the sky. Select **mostly closed** when there is quite a bit of vegetation overhead, deciduous trees, etc, but you can still see the sky. Select **closed** when you look up and only see trees, and shrubs, not sky.

Plant Erode Potential-This field refers to the likelihood, in the collector's estimation, that the PLANTS (knotweed) can erode from this site. Is it likely that floodwaters will sweep this reach and carry plants downstream? Will ordinary winter water levels cover this area and carry plants downstream? Choose high if plant movement seems certain, medium if movement is likely, low, if it seems unlikely to be moved offsite by water -Q: *Should we allow plant erosion potential to include other forces besides water?*

High Site Erosion Potential-optional-This field is used to record areas where knotweed removal may temporarily increase the erosion potential of the site itself. This field may be useful to indicate where revegetation may be most appropriate. Answer yes or no.

Area-Estimate or measure the extent of the site infested by knotweed-*We have not yet agreed to gross or infested acreage-so I will assume it is a gross area.*

Unit-Indicate which unit of measurement is being used for the area. Eg, feet, acres, etc.

Comments-Enter comments as desired. *This field has been expanded to 50 charactors as there is some difficulty with software if it is extended beyond 50.*

Date-Autofills

Time- Autofills

Filename-Autofills, but can be typed in as desired. Good to choose date or river name.

Appendix III—Sample of Data Dictionary

Some fields are not shown, to facilitate getting the table on one page.

AVERAGE HEIGHT	STEM COUNT	PHENOLOGY	SITE TYPE	ACTION	SUBSTRATE	CANOPY	PLANT ERODE	HIGH ERODE	AREA	UNIT	COMMENTS	DATE YMD	TIME
>6 ft	>2000	Pre-bloom	Ripar-Veg Highwater	Treatment	Organic/Clay	Mostly Open	Medium	No	50000	ft2	right bank to y	7/3/2007	08:44:27am
3-6 ft	11-25	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	50	ft2	left bank	7/3/2007	08:59:26am
>6 ft	201-500	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	Yes	1800	ft2	right bank	7/3/2007	09:13:32am
3-6 ft	51-100	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	9000	ft2	midchannel right bank	7/6/2007	05:07:04am
3-6 ft	26-50	Pre-bloom	Riparian - Gravelbar	inventory-posttreat	Sand	Mostly Open	High	Yes	40	ft2	rght edge island tip	6/25/2007	02:49:09am
3-6 ft	6-10	Pre-bloom	Ripar-Veg Highwater	Treatment	Vegetated or LWD	Mostly Open	Medium	No	10	ft2	Under old logging bridge	6/20/2007	03:00:25am
3-6 ft	6-10	Pre-bloom	Large Woody Debris	Treatment	Cobble	Mostly Open	Medium	No	20	ft2	Under old l	6/20/2007	03:10:19am
3-6 ft	26-50	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	25	ft2	4-wheeler activity	6/20/2007	02:35:18am
>6 ft	201-500	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	4500	ft2	both banks ds logcutbank	6/25/2007	05:07:14am
3-6 ft	51-100	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	250	ft2	left edge	6/25/2007	05:38:23am
3-6 ft	26-50	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Closed	Medium	No	80	ft2	left edge	6/25/2007	08:45:22am
3-6 ft	26-50	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	20	ft2	right edge	6/25/2007	08:52:09am
3-6 ft	26-50	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	300	ft2	Just above logjam	6/21/2007	08:07:09am
3-6 ft	51-100	Pre-bloom	Large Woody Debris	Treatment	Vegetated or LWD	Mostly Open	Medium	No	2500	ft2	In & around logjam	6/21/2007	08:14:16am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	High	Yes	200	ft2	Above x-log left edge	6/21/2007	03:27:34am
3-6 ft	101-200	Pre-bloom	Ripar-Veg Highwater	Treatment	Organic/Clay	Mostly Closed	Medium	No	1000	ft2	Upstream from lrg map	6/21/2007	03:44:15am
3-6 ft	11-25	Pre-bloom	Ripar-Veg Highwater	Treatment	Organic/Clay	Mostly Closed	High	Yes	9	ft2	left bank	6/21/2007	08:54:37am
>6 ft	201-500	Pre-bloom	Ripar-Veg Highwater	Treatment	Sand	Mostly Open	High	Yes	7500	ft2	right edge	6/21/2007	09:16:38am
>6 ft	501-1000	Pre-bloom	Field/Pasture	Treatment	Organic/Clay	Open	Medium	No	4500	ft2	some on left bank	7/6/2007	01:52:00am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	High	Yes	2000	ft2	right bank	6/26/2007	02:40:51am
3-6 ft	201-500	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	1555	ft2	1/2 way point	6/26/2007	03:08:24am
>6 ft	>2000	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	25000	ft2	8000+ left bank	6/27/2007	03:13:47am
>6 ft	>2000	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	11000	ft2	3500+ both banks	6/27/2007	03:20:56am
>6 ft	1001-2000	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	High	Yes	15000	ft2	island	7/3/2007	04:17:16am
>6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Sand	Mostly Open	Medium	No	15000	ft2	Right bank midstream	7/3/2007	04:24:37am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Cobble	Mostly Open	High	Yes	2400	ft2	right bank midchannel	7/3/2007	04:35:43am
>6 ft	>2000	Pre-bloom	Ripar-Veg Highwater	Treatment	Organic/Clay	Mostly Open	Medium	No	10000	ft2	right bank mid 4500	7/3/2007	04:41:19am
>6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Organic/Clay	Mostly Open	Medium	No	1000	ft2	Right bank	7/9/2007	05:27:27am
>6 ft	501-1000	Pre-bloom	Riparian - Gravelbar	Treatment	Organic/Clay	Mostly Open	Medium	No	8000	ft2	Predom. right bank	7/9/2007	05:33:43am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	6500	ft2	Predom. left bank	7/9/2007	05:40:52am
>6 ft	>2000	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	15000	ft2	4500+ predom left bank	7/9/2007	05:47:18am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	Medium	No	2500	ft2	Right bank	7/9/2007	05:54:51am
3-6 ft	201-500	Pre-bloom	Riparian - Gravelbar	Treatment	Cobble	Mostly Open	High	Yes	5700	ft2	in stream	7/9/2007	05:59:08am
>6 ft	>2000	Pre-bloom	Riparian - Gravelbar	Treatment	Organic/Clay	Mostly Open	High	Yes	35000	ft2	4000 right bank	7/9/2007	06:06:44am
>6 ft	501-1000	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	45000	ft2	Rayonnier	7/9/2007	06:14:53am
3-6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	4500	ft2	Right bank	7/10/2007	03:41:04am
>6 ft	>2000	Pre-bloom	Riparian - Gravelbar	Treatment	Organic/Clay	Mostly Open	Medium	No	4500	ft2	Predom left 2500stems	7/10/2007	04:03:32am
>6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Cobble	Mostly Open	High	Yes	1500	ft2	logjam & rock	7/10/2007	04:57:59am
>6 ft	1001-2000	Pre-bloom	Riparian - Gravelbar	Treatment	Gravel	Mostly Open	High	Yes	8500	ft2	1600 predom. left bank	7/10/2007	05:03:40am
>6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Cobble	Mostly Open	High	Yes	5000	ft2	left bank &rghtbehind rock	7/10/2007	08:31:36am
>6 ft	101-200	Pre-bloom	Riparian - Gravelbar	Treatment	Cobble	Mostly Open	High	Yes	2500	ft2	Left bank & mid channel	7/10/2007	08:42:41am

Appendix IV—*Permission to Enter Private Land and Waiver of Liability*

(Standard document prepared by Washington State Department of Agriculture, for use when chemically treating knotweed)

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

July 21st 2008

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 VI—Frequently Asked Questions for Landowners with Knotweed
(Prepared by CCNWCB in 2006 and used since then)

Appendix VII—Table of all Landowner Agreements

Watershed	Number of Existing Agreements	New Agreements signed, 2008	Number of Parcels	Landowners Helped in 2008
Big River and Hoko-Ozette Road	18	0	51	18
Sekiu River	8	1	10	1
Hoko River	7	0	20	6
Sekiu, Clallam Bay and Highway 112	43	5	108	46
Clallam River	12	1	19	11
Pysht River	8	0	31	1
Sol Duc River	30	6	88	35
Lake Creek, Lake Pleasant and Beaver	10	1	25	11
Forks	14	5	23	19
Valley Creek	1	0	3	1
Ennis Creek	3	0	10	1
Snow Creek	4	3	11	7
Port Townsend	0	1	7	1
Big Quilcene River	0	15	23	22
Spencer Creek	0	1	1	1
Dosewallips and Duckabush Rivers	8	0	9	9
Hoh River	1	3	11	4
Total	**167**	**42**	**450**	**194**

Appendix VIII— Sample Pesticide Application Record

Appendix IX— Knotweed Brochure
(Updated in December 2007 and mailed to 4,000 landowners in west Clallam County.)

Appendix X—Letter Sent With Brochure to West End Landowners

Dear Landowner,

You may have heard of our efforts to control invasive knotweed species in rivers all over the Olympic Peninsula. But in case you haven't, we would like to enlist your help in finding and getting rid of knotweed wherever it may be hiding. Because of funding restraints, only landowners west of the Elwha River have been sent this letter.

Imported from Asia as an ornamental as early as the 1930s, knotweed has overrun many areas over the course of time. Four species of knotweed are currently listed by the state as noxious weeds because they have become so invasive and threaten both natural resources and land uses.

There are projects to eliminate knotweed on most major rivers in the west Olympic Peninsula. A full report of these and other knotweed control activities is available in our office.

Successful control and eradication of knotweed requires that knotweed does not spread from your property onto neighboring lands. Consider taking advantage of grant funding available this summer which can provide supplies, equipment, and expertise to help you treat your knotweed. If the knotweed is by water, a crew with an aquatic applicator's license and appropriate permits will come and treat it for you.

If you have knotweed, please do not cut or mow or before our crews come to treat it, or to help you treat it yourself. Cutting or mowing could make our treatments less effective, and may even cause the knotweed to spread.

Please help us help you! Talk to your friends and neighbors. Let us help you treat knotweed where you have it, and report knotweed where you see it, especially in remote areas or along rivers and creeks.

Be sure to check out the brochure to see what knotweed looks like and what you can do to eliminate it. Feel free to call us with questions at 360-417-2442. We look forward to hearing from you!

Sincerely,

Cathy Lucero
Clallam County Noxious Weed Control Coordinator

Appendix XI— Control Recommendations for Knotweed

Appendix XII— Photographs