Olympic Invasives Working Group
2019 Annual Report

Bohemian knotweed on the sand spit at the mouth of the Hoko River.

Report Prepared by

Clallam County Noxious Weed Control Board

A patch of knotweed contiguous to a previous treatment site (dead stalks visible in the foreground) that CCNWCB staff was finally able to treat in 2019 with new permission.

Report prepared by
Shea McDonald
Cathy Lucero
Clallam County Noxious Weed Control Board

January 2020

223 East 4th Street Ste 15
Port Angeles WA 98362
360-417-2442
clucero@co.clallam.wa.us
http://www.clallam.net/weed/projects.html

This report can also be found at http://www.clallam.net/weed/annualreports.html

CONTENTS

Maps, Tables, and Appendices

MAPS:

TABLES:

APPENDICES:

Bohemian knotweed growing along upper Ennis Creek near Port Angeles, Wa.

EXECUTIVE SUMMARY

Project Goal

The goal of this project is to protect the natural resources, ecosystem functions and land values in the Olympic Peninsula from the negative impacts of invasive knotweed and other non-native plants.

Project Overview

The Olympic Invasives Working Group (OIWG) is a loose-knit consortium of governments, tribes, non-profits and private landowners working together to eliminate knotweed and control invasive plants across the Olympic Peninsula. The group facilitates large-scale efforts to control invasive weeds through training, collaboration and planning across organizational or jurisdictional boundaries. This report gives a broad overview of the work across the entire Olympic Peninsula, provides historical perspective and also serves as a repository of information for the future.

2019 Overview

All of the OIWG entities continued to focus on the elimination of invasive knotweeds; however many entities have broadened their focus to include additional non-native species during the course of their work. Entities reported their annual work accomplishments to the CCNWCB and details are included in the body of this report. The county weed boards provided coordination and support within each county. The OIWG collaborated to determine priority watershed, invasive species, and identify opportunities to work cooperatively to achieve large-scale goals.

This year the following entities reported treatment/survey and landowner statistics: Clallam County Noxious Weed Control Board, Quileute Tribe, Makah Tribe, 10,000 Years Institute, Lower-Elwha Klallam Tribe, North Olympic Salmon Coalition, Washington Conservation Crops, Hood Canal Salmon Enhancement Group, and the Mason County Noxious Weed Control Board submitted survey/treatment and landowner statistics. The North Coast/Cascade Exotic Plant Management Team (National Park) submitted GIS treatment data only.

2019 Project Activities Summary-per County

(See Table I with watershed details by county, starting on page 59)

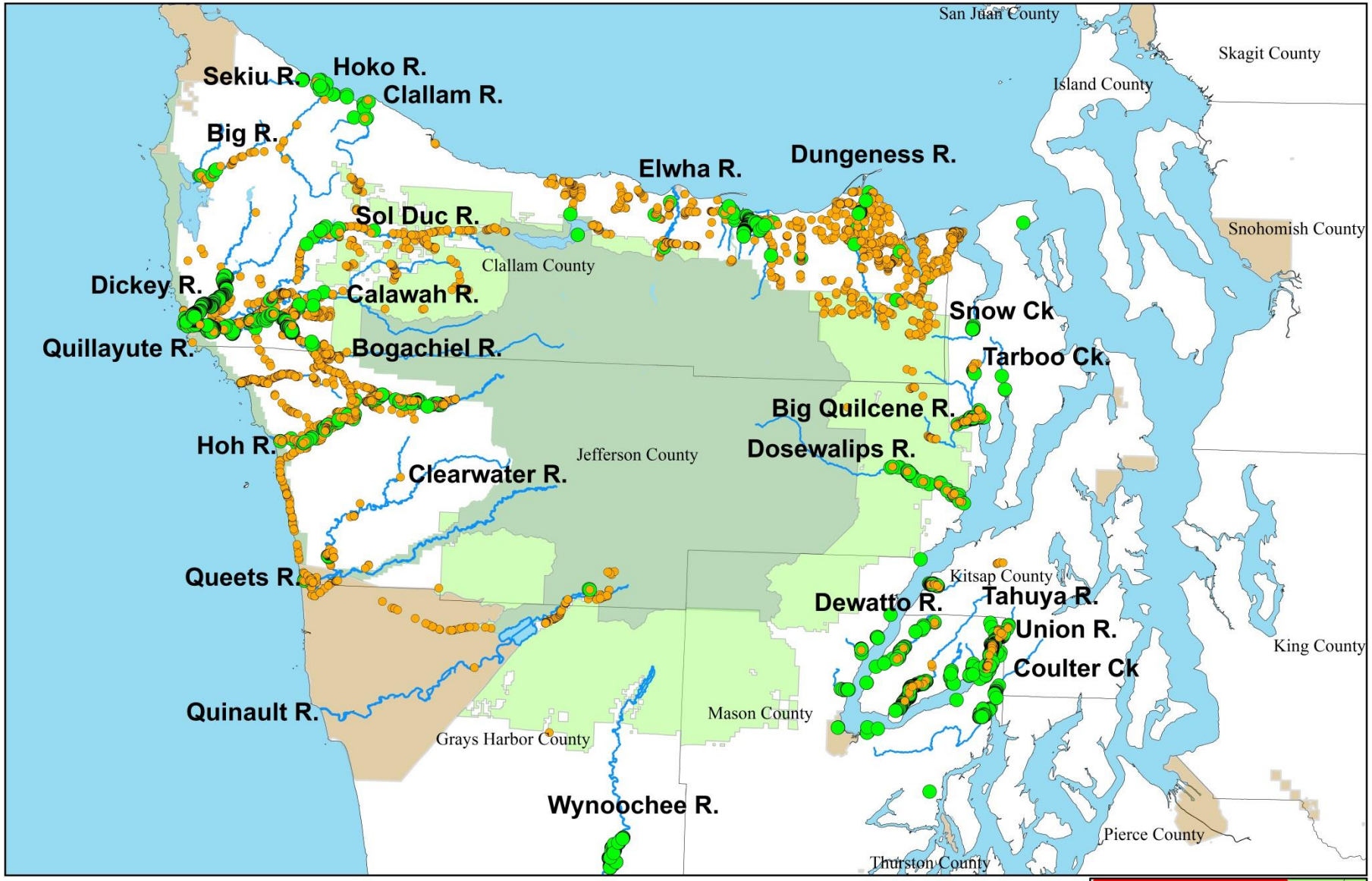
- In Clallam- **7** entities on **19** waterways managed **290** landowner agreements and obtained **108** new agreements. Knotweed and other invasives were treated across more than **894.5** acres over **198.3** river and road miles.
- In Jefferson- **5** entities on **9** waterways managed **126** landowner agreements and obtained **29** new agreements. Knotweed and other invasives were treated across **1,216.8** acres over **182.4** river and road miles.
- In Mason- **3** entities on **12** waterways managed **335** landowner agreements and obtained **45** new agreements. Knotweed and other invasives were treated on over **63.9** acres over **36.6** river and road miles.
- In Kitsap County- **2** entities on **1** waterway managed **8** landowner agreements and obtained **0** new agreements. Knotweed was treated on **0.6** acres over **1.35** river miles.
- In Grays Harbor- **2** entities on **2** waterways managed **21** landowner agreements and obtained **15** new agreements. Knotweed and other invasives were treated on **141.6** acres over **52.4** river and road miles.

2019 Observations and Recommendations

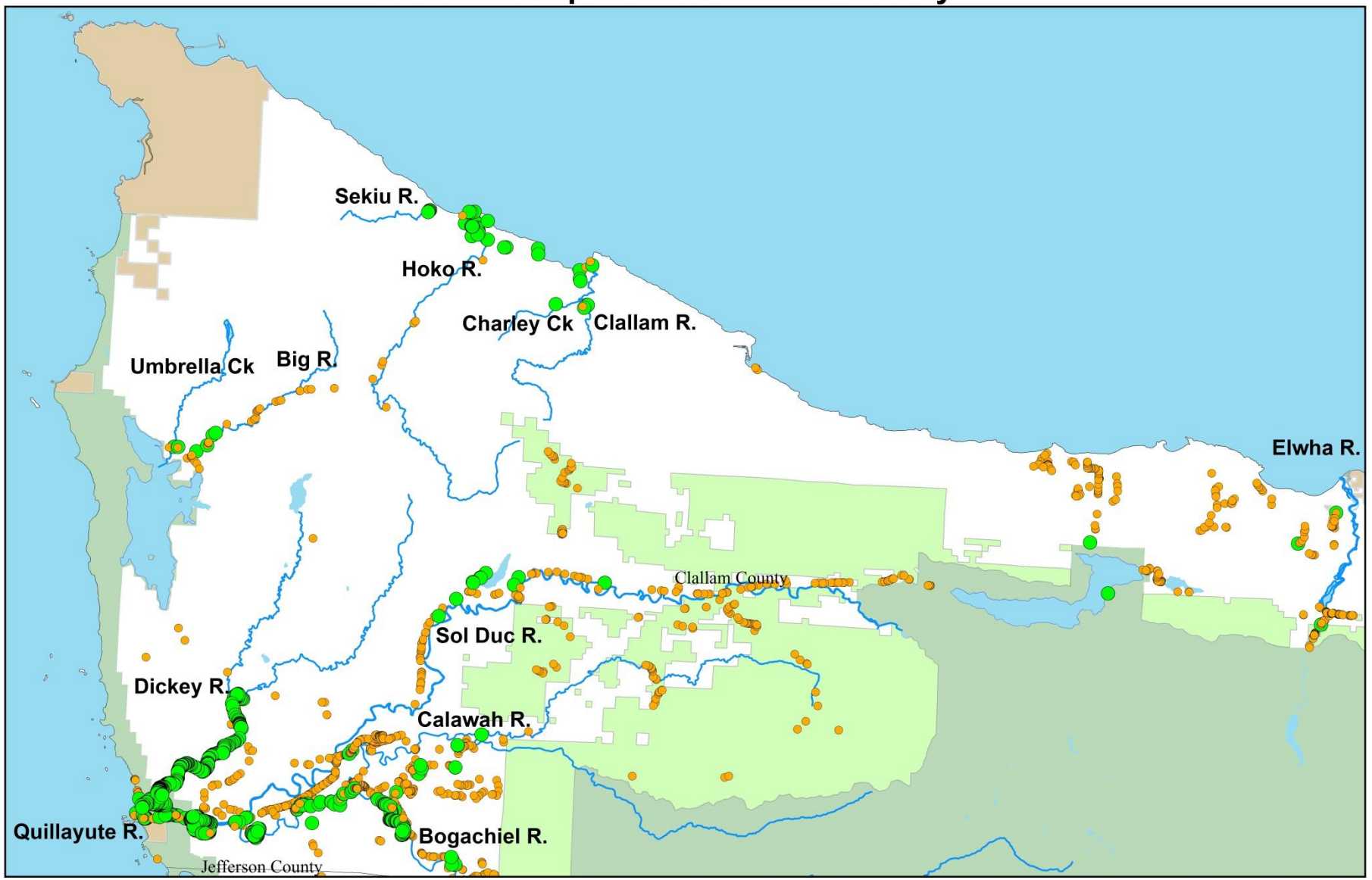
- Partners continue to report successful control of knotweed across the Olympic Peninsula but continue to report newly found infestations. Surveyors should include areas beyond the river channel and areas that obscure infestations.
- Face-to-face interactions and site visits were valuable to obtain landowner permissions. Managers and crews should promote positive interactions in the field during surveys or treatment activities.
- Infestations of knotweed and invasive species on roadsides and areas outside of the riparian areas may act as sources or vectors; many partners have expanded their efforts to roadsides and upland areas. Partners should further collaborate and engage with entities to control source infestations.
- Partners should be sure to actively share infestation information across watersheds.

2019 Funding: Projects summarized in this report were funded by: Washington State Department of Agriculture (WSDA), the Washington State Department of Natural Resources-aquatic resource division, Washington State Legislature (WCRI), Washington State Noxious Weed Control Board, Clallam County Noxious Weed Control Board, Mason County Noxious Weed Control Board, the Salmon Recovery Funding Board, US Fish and Wildlife Service, National Conservation Resource Service, and separate funding administered to the Quileute Tribe (EPA and BIA).

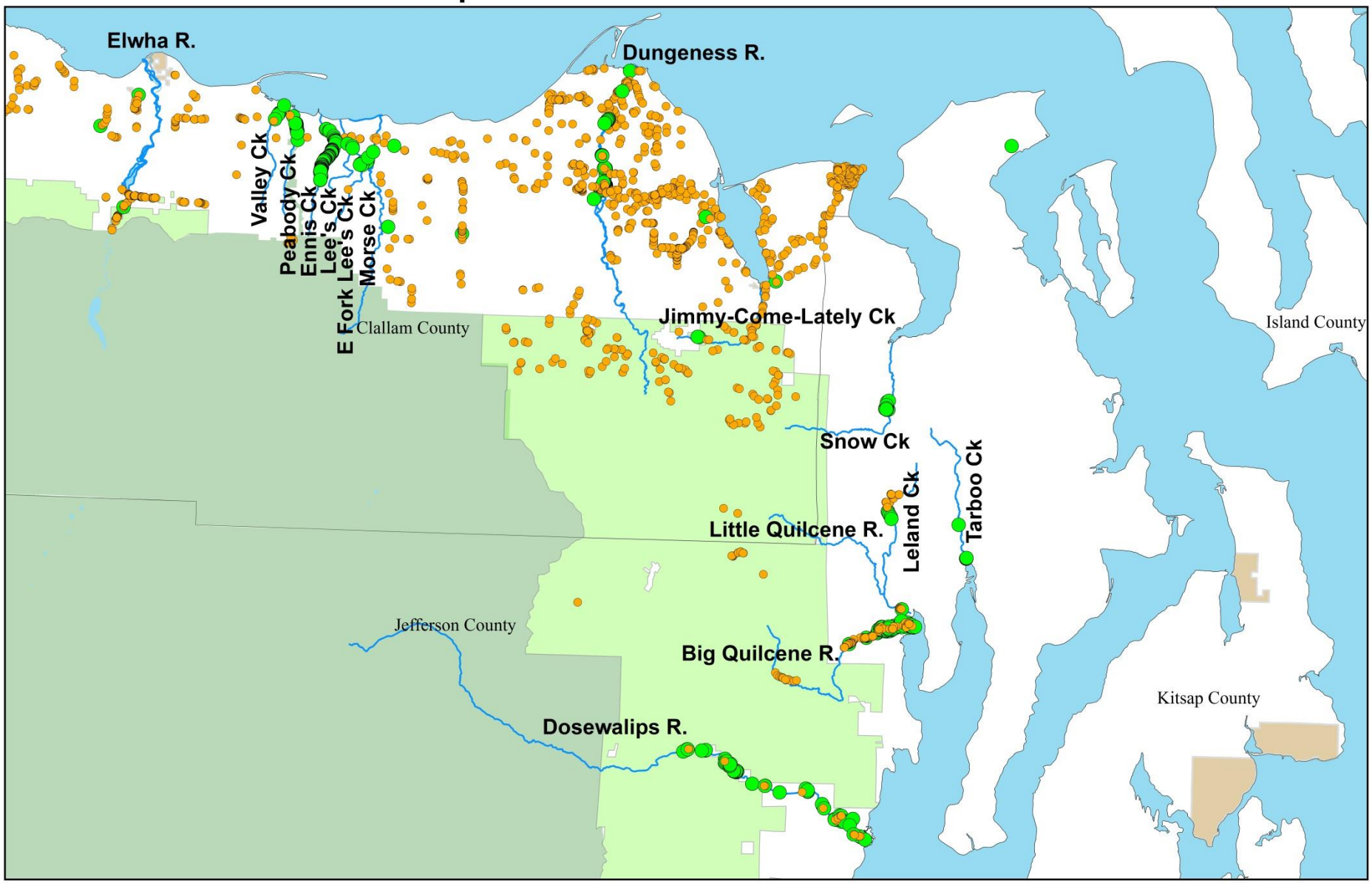
Overview Map of the Olympic Peninsula



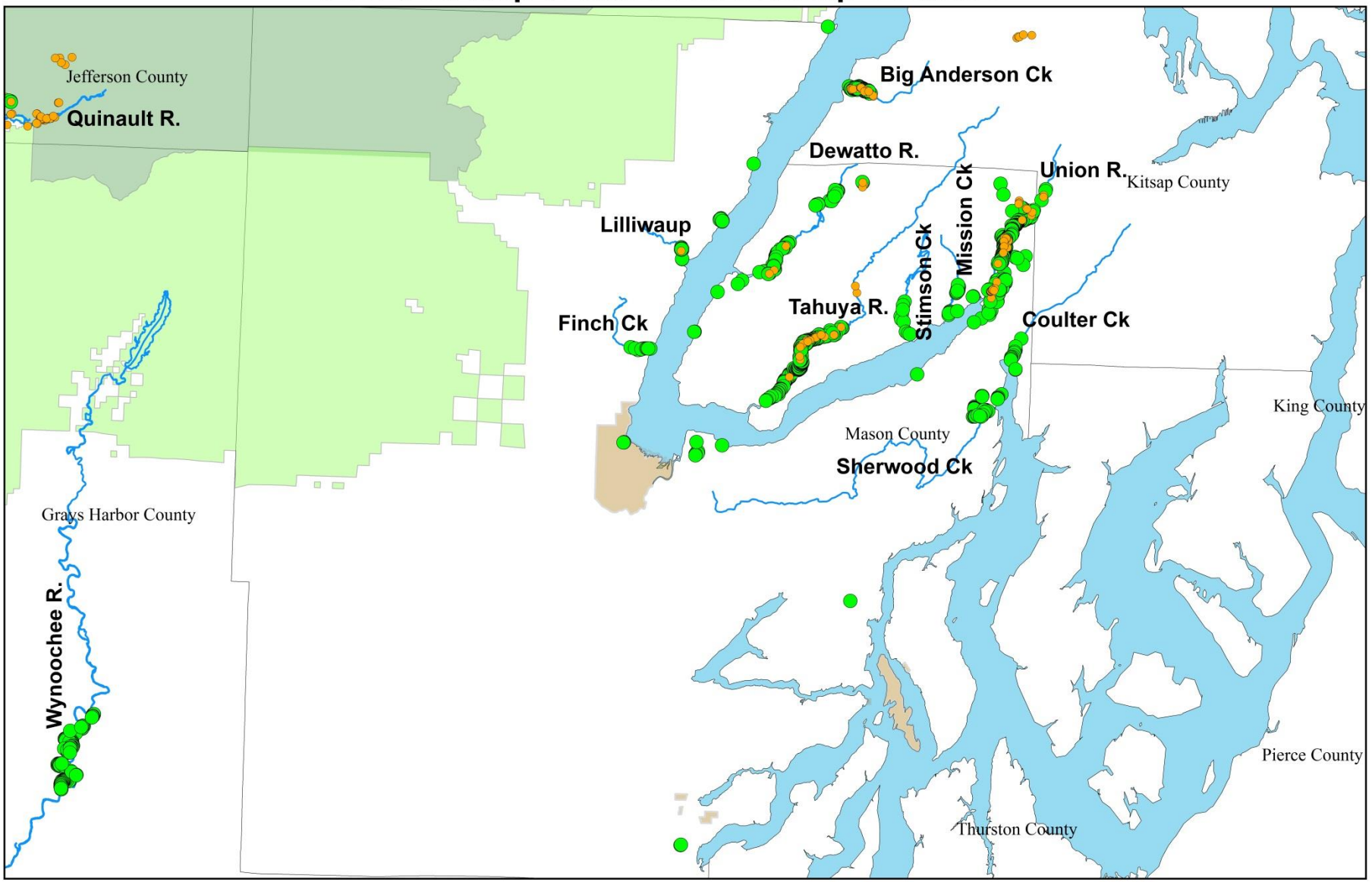
Overview Map of West Clallam County



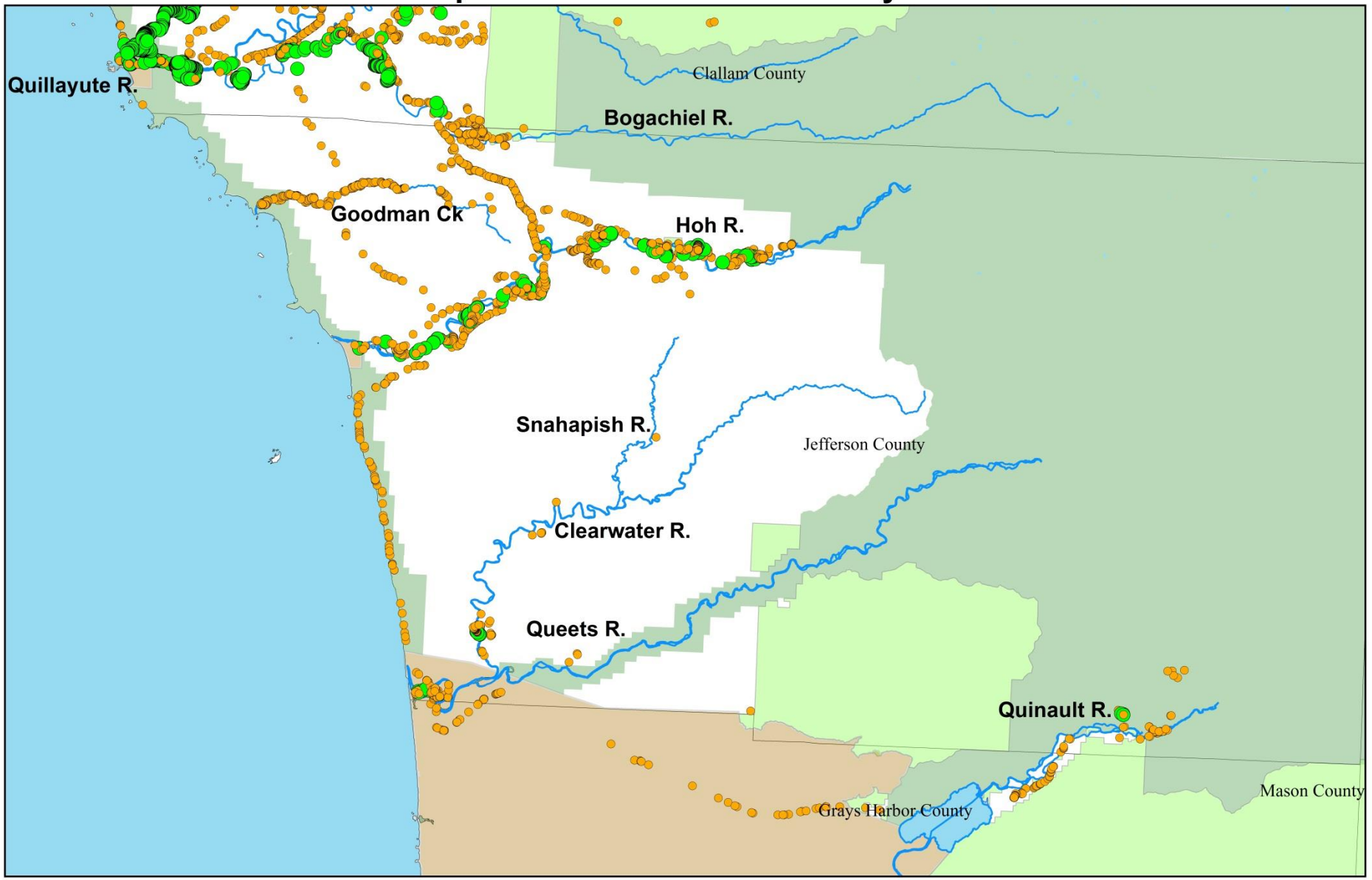
Overview Map of East Clallam and East Jefferson Counties



Overview Map of Mason and Kitsap Counties



Overview Map of West Jefferson and Grays Harbor Counties



Invasive species

- Knotweed (spp)
- Other Species
- 2019 Treated Rivers

Land Ownership

- Tribal
- Olympic National Forest
- Olympic National Park

0 2.5 5 10 Miles

N

PROJECT DESCRIPTION

Project Goal

The goal of this project is to protect the natural resources, ecosystem functions and land values in the Olympic Peninsula from the negative impacts of invasive knotweed and other non-native plants. Project areas are chosen for their high significance to fish and wildlife or the natural resource value to the public or tribes.

Project Overview

The Olympic Invasives Working Group (OIWG) is a loose-knit consortium of governments, tribes, non-profits and private landowners working together to eliminate knotweed and control invasive plants across the Olympic Peninsula. The group was initially formed in 2005 to facilitate large-scale, collaborative efforts to control riparian knotweed and has developed to include the control of additional invasive weeds. The group meets twice a year to exchange information, strategize control work across organizational or jurisdictional boundaries, and host training seminars.

Clallam Noxious Weed Control Board (CCNWCB), as the de facto group leader, coordinates the meetings and supports the group in various ways, including; acquiring landowner agreements, distributing herbicide, coordinating projects, and in some cases supplying a licensed aquatic applicator on site. CCNWCB's role is to "fill in the gaps" to control invasive weeds in areas not otherwise covered and educate the public on the impacts of invasive plants and best management techniques.

Our partners have sought and received independent funding and the control of knotweed and invasive plants continues to expand in all four Peninsula Counties. This report attempts to give a broad overview of work occurring across the entire Olympic Peninsula as information is provided. This report serves as a repository and we have tried to collect as much information about these projects as possible. A brief summary giving historic perspective is included, as available, to show the changes and progress the made over time.

2019 PROJECT ACTIVITIES

Landowner Contacts and Agreements - (as reported to CCNWCB) All landowners were contacted in person, by letter/email or phone prior to 2019 season treatments.

Clallam County

- Clallam County Noxious Weed Control Board (CCNWCB) - managed **255 Landowner Agreements**, including **89 new** Landowner Agreements.
- North Olympic Salmon Coalition (NOSC) managed **12 Landowner Agreements**, including **6 new** Landowner Agreements.
- Quileute Tribe-Natural Resources (QNR) managed **14 Landowner Agreements**
- Makah Tribe-Natural Resources (Makah) managed **15 Landowner Agreements**, including **3 new** Landowner Agreements.
- Lower Elwha Tribe (LEKT) did not report Landowner Agreements.
- The 10,000 Years Institute (10KYI) managed **34 Landowner Agreements,** including **14 new** Landowner Agreements on the Quillayute watershed.

Jefferson County

- Hood Canal Salmon Enhancement Group (HCSEG) managed **97 Landowner Agreements**, including **25 new** Landowner Agreements.
- 10KYI managed **27 Landowner Agreements**, including **1 new** Landowner Agreements.
- Specific information regarding Jefferson NWCB landowner contact activity is not available.

Mason County

- Mason County Noxious Weed Control Board (MCNWCB)-managed **177 Landowner Agreements,** including **33 new** Landowner Agreements.
- HCSEG managed **152 Landowner Agreements**, including **13 new** Landowner Agreements.

Kitsap County

- HCSEG managed **8 Landowner Agreements,** including **12 new** Landowner Agreements.
- Specific information regarding Kitsap NWCB landowner contact activity is not available.

Grays Harbor County

- Grays Harbor NWCB managed **11 new Landowner Agreements**.
- 10KYI managed **10 Landowner Agreements**, including **4 new** Landowner Agreements.

Survey and Treatment*:*

This list summarizes knotweed and invasive control work accomplished in 2019 by members of the Olympic Invasives Working Group (OIWG) as reported to CCNWCB.

Each county is ordered geographically in a clockwise direction, starting in southwest Clallam County, and locations treated within each county are similarly organized. River miles include both sides of the river bank, if surveyed and/or treated, and acreage is defined as area surveyed and/or treated. For more detailed information, see specific watershed narrative or summary in Table I.

Clallam County

- **City of Forks/Mill Creek**: Treated **0.5 acres** for knotweed [QNR].
- **Dickey River:** Retreated **7.9 miles** (**4 acres**) for knotweed [QNR, CCNWCB], **3.2 road miles** (**0.01 acres**) for knotweed and invasive species [CCNWCB].
- **Calawah River:** Treated **49.4 miles** (**18.5 acres**) for non-knotweed invasives [10KYI].
- **Bogachiel River:** Retreated **58.8 miles** (**214 acres**) for knotweed and invasive species [10KYI].
- **Quillayute River:** Treated **9.25 miles** (**21.5 acres**) for knotweed and invasive species [QNR, CCNWCB], treated **6.6 road miles** (**5 acres**) for non-knotweed invasives [10KYI].
- **Sol Duc River:** Treated **39.9 miles** (**0.005 acres**) for knotweed and invasive species [10KYI], treated **0.25 miles** (**0.7 acres**) for knotweed and invasive species [QNR].
- **Big River:** Rereated **0.5 miles** (**0.8 acres**) for knotweed and invasive species [Makah Tribe], treated **6.6 road miles** (**0.06 acres**) for knotweed and invasive species [CCNWCB]
- **Hoko River:** Treated along **2.8 miles** (**.02 acre**) for knotweed [CCNWCB], treated **0.08 acre** for knotweed [Makah Tribe].
- **Clallam River:** Treated **0.1 acre** for knotweed [Makah Tribe], **0.75 road miles** (**0.4 acres**) for knotweed and invasive species [CCNWCB].
- **Lake Creek/Lake Pleasant:** Treated **0.28 acres** along **1.2 road miles** for knotweed [CCNWCB].
- **Deep Creek:** Treated for knotweed [LEKT].
- **Elwha River:** Treated for knotweed and invasive species on **578.14 acres** [Lower Elwha Klallam Tribe], **1.75 road miles** (**3.7 acres**) for knotweed and invasive species [CCNWCB].
- **Valley Creek:** Treated **0.9 miles** (**0.15 acres**) for knotweed, purple loostrife, and common teasel [CCNWCB].
- **Peabody Creek:** Treated **0.92 miles** (**0.6 acres**) for knotweed [CCNWCB].
- **Ennis Creek:** Treated **2.8 miles** (**2.1 acres**) for knotweed [CCNWCB].
- **Lee's and East Fork Lee's:** Treated **2.83 miles** (**0.01 acre**) for knotweed [CCNWCB].
- **Morse Creek:** Treated **0.034 acres** for knotweed [CCNWCB].
- **Bell Creek:** Retreated **0.25 miles** (**9.7 acres**) of nearby terrestrial land for non-knotweed invasives [WCC, CCNWCB].
- **Dungeness River:** Treated **1.2 miles (32.39 acres)** for knotweed and invasive species [NOSC, WCC], treated **0.5 miles (2 acres)** for knotweed [CCNWCB, WCC].
- **Bell Creek:** Retreated **0.25 miles** (**9.7 acres**) of nearby terrestrial land for non-knotweed invasives [WCC, CCNWCB].
- **Clallam County Sites within WRIA 18, 19, 20:** Treated high priority invasive species, including knotweed along **233 miles** (**274 acres**) of Clallam County roads.

Jefferson County (Starting in East Jefferson)

- **Snow Creek:** Treated **1.2 miles** (**8.08 acres**) for knotweed and invasive species [NOSC, WCC].
- **Big Quilcene River:** Retreated **5.34 miles** (**0.3 acre**) for knotweed [HCSEG].
- **Little Quilcene River** and **Leland Creek:** Treated **2 miles** (**0.03 acres**) for knotweed [HCSEG].
- **Tarboo Creek:** Treated **0.003 acres** for knotweed [HCSEG].
- **Dosewallips:** Retreated **14 miles** (**0.07 acres**) for knotweed [HCSEG, WCC].
- **Queets River:** Retreated **45.2 road miles** and **2.2 river miles** (**5.1 acres**) for non-knotweed invasive species [10KYI, NCEPMT].
- **Clearwater River:** Treated **12.4 miles** (**88.21 acres**) for knotweed and invasive species [10KYI].
- **Snahapish River:** Retreated **9.5 road miles** (**0.05 acres**) for non-knotweed invasives [10KYI].
- **Goodman Creek:** Retreated **7.8 road miles** and **9.8 river miles** (**196 acres**) for non-knotweed invasives [10KYI].
- **Hoh River and Tributaries:** Retreated **43 road miles** and **30 river miles** (**918.7 acres**) for knotweed and invasive species [10KYI].

Mason County:

- **Dewatto River:** Retreated **7.12 miles** (**0.28 acres**) for knotweed [HCSEG].
- **Tahuya River:** Retreated **10.87 miles** (**0.83 acres**) [HCSEG].

- **Union River:** Treated **9.03 miles** (**1.68 acres**) for knotweed [HCSEG], treated **0.1 miles** (**2.55 acres**) for knotweed and invasive species [MCNWCB]
- **Mission Creek:** Treated **1.7 miles** (**6.25 acres**) [MCNWCB].
- **Town of Allyn/North Bay:** Treated **0.08 miles** (**0.4 acres**) for knotweed [MCNWCB].
- **Sherwood Creek/Anderson Creek**: Retreated **2.16 miles** (**5.07 acres**) for knotweed [MCNWCB].
- **Stimson Creek:** Treated **2.1 miles** (**4.25 acres**) for knotweed [MCNWCB, WCC].
- **Coulter Creek:** Treated **2.05 miles** (**8.25 acres**) for knotweed [MCNWCB].
- **Finch Creek:** Retreated **1.1 mile** (**8.9 acres**) for knotweed [MCNWCB].
- **Mason County Sites within WRIA 14, 15, 16:** Treated **2.46 miles** (**25.33 acres**) for knotweed and invasive species [MCNWCB].

Kitsap County

- **Big Anderson Creek:** Retreated **1.35 miles** (**0.06 acres**) for knotweed [HCSEG, WCC].

Grays Harbor County

- **Wynoochee River:** Treated **7.25 miles** (**103.75 acres**) for knotweed and invasive species [GHCNWCB].
- **Ocean Shores:** Treated **0.2 mile** (**0.04 acres**) for non-knotweed invasives [10KYI].
- **Quinault Watershed:** Treated invasive species along **44.9 road miles** (**27.81 acres**) for knotweed and invasive species [10KYI].

Public Agencies Assisted

In Clallam and Jefferson Counties—treated land owned by **2 federal entities** (US Forest Service and Olympic National Park), **4 state agencies** (WA State Parks, WA Department of Natural Resources, WA Department of Fish and Wildlife, WA State Department of Transportation), and **4 local governments** (City of Port Angeles**,** City of Forks, Clallam County, and Jefferson County).

Data Management and Documentation:

- CCNWCB collected waypoints and tracklogs with Garmin GPS equipment, and/or collected and submitted site information using smartphone functions and WSDA IForm.
- CNWCB collected as much partner data as possible and submitted all shapefiles to WSDA to be added to their state-wide database.
- CCNWCB maintained the Knotweed Projects Database.
- The CCNWCB applied for National Pollution and Discharge Elimination System (NPDES) permits and completed all necessary reporting. Each entity treating near water obtained and reported under individual NPDES permits.

Outreach and Training:

Spring OIWG attendees at the Jamestown S'Klallam Tribal campus gather for a group

- The CCNWCB continued to coordinate meetings of the Olympic Invasives Working Group. These meetings are a forum for exchanging information and ideas, networking and pooling resources. They also help us identify future needs, data gaps, obstacles and solutions to problems. The meetings help licensed applicators accrue required education credits with topics that best serve their needs, thus ensuring a higher level of professionalism. Meetings have expanded and attract a more diverse audience every year. As a function of this group interaction, we have identified the need to control additional invasive plant species of special concern. Therefore, depending on the members' need, we include information about the threats of other invasives and control measures to encourage a multi-species strategy.

2019 Olympic Invasive Working Group meetings: From upper left, clockwise, Jon Jennings, from the Department of Ecology summarizes proposed changes to WA's NPDES, Dr. Steven Seefeldt summarizes weed control trials in Alaska, Dana Coggan of Kitsap NWCB discussing developments in State regulation of aerial foliaring, Ross Goodwin discussing WA DNR forest practice rules on herbicide use.

Our spring and fall meetings were hosted by the Jamestown S'Klallam Tribe at the beautiful Cedar Room situated on Sequim Bay. Over 100 participants attended each meeting, including representatives from 5 Native American Tribes, 5 Federal agencies, 9 State agencies, 2 State Universities, 7 different counties and multiple county departments, 5 non-profits, and many private businesses such timber or restoration. A total of twelve pesticide credits were offered for the over 40 applicators who attended both meetings. Workshop evaluations highly rated the overall program and felt future workshops would be valuable.

- Staff updated the **Clallam County Noxious Weed Control Board's** website, including several pages on knotweed—the minutes of meetings of the Olympic Invasives Working Group as well as PowerPoint presentations as they were available.
- CCNWCB staff highlighted our knotweed program and distributed information at **17 educational events.**

2019 PROJECT PROTOCOLS

1. Surveys and Monitoring
CCNWCB surveys, treatments and monitoring took place from April 15th through October 14th. Surveys were conducted by foot and by boat.

2. Project Teams
Teams were comprised of a minimum of one licensed aquatic applicator (LAQ), and typically 2-6 crew members.

- **The Quileute Tribe Natural Resources crew (QNR)**, led by Sarah Riutzel (LAQ), the Quillayute and Dickey Rivers.
- **The Makah Tribe (Makah)** led by Shannon Murphy (LAQ), treated knotweed sites on the Makah Reservation, Big River and the Clallam River in the vicinity of Clallam Bay/Sekiu.
- **The Clallam County NWCB crew (CCNWCB)**, consisting of Cathy Lucero (LAQ), James Knape (LAQ), Shea McDonald (LAQ), Natalie Beatty (LAQ), and Tyler Clouse (LAQ) worked on Valley, Peabody, Ennis, Lees, and Morse Creeks, the Dungeness, Hoko, Quilayute, Dickey, and Big Rivers, as well as roadsides and quarries with knotweed across Clallam County.
- **The North Cascades Exotic Plant Management Team** with the **National Park Service (NCEPMT)** was led by Collin McAvinchey (LAQ) and Sophie Wilhoit (LAQ). This crew treated a variety of locations across the state but specific information is not available.
- **The East Jefferson WCC with the North Olympic Salmon Coalition (NOSC),** led by Owen French, WCC crew lead (LAQ), worked on the Dungeness River and Snow Creek. Additional WCC crews led by Phil VanKessel worked on Dungeness River and Bell Creek on behalf of Clallam County and WDFW.
- **The Lower Elwha Klallam Tribe,** consisting of Kim Williams (LAQ), Allyce Miller, and Kenzie Taylor (LAQ) treated Deep Creek, Indian Creek and the Elwha River.
- **The Hood Canal Salmon Enhancement Group WCC crew (HCSEG)** lead by Alex Papiez (LAQ) treated on the Big and Little Quilcene, Dosewallips, Union, Tahuya and Dewatto Rivers, as well as Anderson Creek. Crew also conducted treatment roadside treatment on behalf of the Jefferson County Weed Board contracted work for the Jefferson County Road Department.
- **Mason County NWCB crew (MCNWCB)** consisting of Pat Grover (LAQ) and supported by a Puget Sound Corps treated invasives on Anderson, Mission, Coulter, Finch, Stimson and Sherwood Creeks, the Union River, as well as North Bay and the town of Allyn.
- **The 10,000 Years Institute (10KYI)**, led by Jill Silver (LAQ) worked in many watersheds including Queets, Quinault, and Quillayute, Calawah, Bogachiel, Sol Duc, Hoh, and Snahapish Rivers, Goodman Creek, Ocean Shores, and surrounding roads and highways.
- **The** Grays Harbor County Noxious Weed Control Board, led by Kiley Smith (LAQ) treated invasives along the Wynoochee River.

3. Invasive Species Surveyed or Treated
Bohemian knotweed (Polygonum bohemicum) was the dominant knotweed species of concern. The next most common species was giant knotweed *(Polygonum sachalinense).* Only a few sites contained Japanese knotweed *(Polygonum cuspidatum).* No Himalayan knotweed was reported this year. Depending on the funding source and project focus, crews treated infestations of over 40 other invasives species such as giant hogweed, butterfly bush, reed canarygrass, herb Robert, Canada thistle, perennial pepperweed, perennial sowthistle, poison hemlock, and yellow archangel.

4. Data Collection & Equipment
Electronic data is collected differently depending on funding and technical capacity of each group. Data collection parameters listed are those used by the CCNWCB; other entities may utilize different guidelines for their data collection. Some data collection systems used in 2019 are described below.

- A recreational grade GPS unit (Garmin 78 CX loaded with Hunt GPS maps) with track log enabled was used to keep track of null surveys (sites that crew visited but found no knotweed). Waypoints were gathered to mark sites where knotweed was found and treated. This data collection technique was utilized by CCNWCB; data of other entities that used this method in 2019 is not available.
- The CCNWCB and Mason County NWCB also used Washington State Department of Agriculture's data collection system using the cell phone app IForm, powered through ESRI. IForm was developed by the Washington State Department of Agriculture and allows for weed data points to be recorded and stored in an online server. Using iForm and its map accompaniment, ArcCollector, users are able to see previous weed data and treatment points. Weed data fields included species, infestation size, cover class,

ownership type, site type, status of control, as well as optional fields for notes and images. iForm data is available for local download and conversion into shape files. The version we use does not allow for the collection of track logs. Other entities may have used versions of ArcCollector without the use of iForm. Different entities collected different fields-which is not available at the time of this writing.

- A Trimble GEO XT instrument, using the "Data Dictionary" developed by the Olympic Invasives Working Group (OKIG) and using Pathfinder software for post-processing. A copy is available.
    - 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.
    - Information on entities that used this method in 2019 is not available.
- Waypoints collected with GPS units during surveys were converted into shapefiles, and added as layers to county parcel map.
- CCNWCB crews used the track log function in their GPS devices. Office staff downloaded the track logs to identify surveyed parcels that did not have knotweed.
- Herbicide use in watersheds from year to year has been tracked as data reported to us. In previous years, herbicide use has been used as a proxy for change in biomass to help measure treatment efficacy. Due to changes in herbicide rates and formulations, this is no longer as directly comparable in many cases. This method of measuring effectiveness is only used when we have the necessary treatment details to make a comparison. Herbicide quantity and active ingredient, when available, is included in the section "Project Activities by Watershed". Overall use will no longer be tracked in an appendix as in previous years.
- All survey and treatment data collected by Clallam County NWCB was added to a knotweed database. This database facilitates tracking of landowner contacts, agreement expiration, treatments, site status and monitoring. Beginning in 2014, treatments of additional invasive plants were included as a separate infestation record.
- The CCNWCB sends out a form to encourage uniform data collection (see Appendix II) that meets the WSDA's reporting standards, updated in 2014. There continues to be some reporting inconsistencies between entities.

  Definitions-per WSDA protocol as of 2017*, for all Clallam County NWCB records,*

  Examined acres-includes area searched and treated. Area was determined by the following formula: acres =length (of river corridor) in feet X width in feet of area searched /43560 (square feet in acre). Unless known to be otherwise, it was assumed that crews searched a minimum of a 50 foot corridor along the river.

  Treated acres-includes the gross area where plants were actually treated; does not include area searched in which plants were not found. Acres were determined from the length X width as above-taken from GPS track logs, waypoints, and foliar records.

  Solid acres-based on the average calibration of individual back pack foliarers which in 2017 averaged around 40 gallons/acre, we assumed that each gallon of mixed product would treat approximately 1000 sq feet. (Gallons of solution used per treatment X 1000)/43560 was the formula we used to calculate this total.

  Protected River Miles-was calculated by measuring the length of track logs in GIS.

5. Landowner Contacts and Agreement Management

- Landowner contact information was extracted from the county parcel database.
- Landowner Agreements were solicited by phone, letter, face-to-face contact or email.
- Standard Landowner Permission forms produced by WSDA were used and CCNWCB staff explained to landowners that they could cancel the agreement at any time.
- Landowners were contacted when the five year agreements were expiring.
- Property ownership was monitored so that new agreements could be signed when ownership changed.
- Landowners were contacted before their property was accessed for survey or treatment.
- Landowner information was entered into a knotweed database, including contact information, site information and dates of agreement signature and expiration. The knotweed database also held narratives of all contacts with landowners, survey and treatment dates, and herbicide usage.
- Staff acquired Landowner Agreements from January through October.

6. Permits

- CCNWCB obtained a NPDES permit from WSDA for waterways and species of concern.
- Crews followed all posting and notification requirements as outlined in the permit.

- The total amount of herbicide used by CCNWCB under an NPDES permit was submitted on-line to WSDA at the end of the treatment season.

7. Treatment, Equipment, and Rate- ***NOTE:*** Additional herbicides, rates and methods used to control non-knotweed invasives are not outlined here.

Foliar—may be used on any site; other options for specific uses are listed below.

Equipment- low pressure, 4 gallon backpack foliarers.

Application Rate-variable,

- Up to 1% of aquatic imazapyr solution, 1% surfactant, marker dye
- Up to 6% solution of aquatic glyphosate, 1% surfactant, marker dye
- Combination of up to 4% solution aquatic glyphosate and 1%imazapyr, 1% surfactant, marker dye

Application method- Foliar to wet.

Injection—uses may include small sites, during inclement weather or where knotweed is mixed with desirable species, or other sites where high selectivity is critical. Canes must be at least ½ inch in diameter.
(In 2019, the Hood Canal Salmon Enhancement Group and Mason County NWCB used this method for specialized applications).

Equipment- "JK Injection Systems" injection guns.

Application rate

- 3 ml of concentrated glyphosate per cane (no surfactants or dyes). Glyphosate formulations must be approved for this method.

Application method- Knotweed canes exceeding ½ inch in diameter are injected with herbicide in a lower internode using a short injection needle. If pressure is encountered, an additional hole is punched near the top of the internode to allow air to escape as herbicide is put in. Treated canes are marked with paint to prevent retreatment.

Wipe—for small sprouts or highly selective treatments
(In 2019, no entity reported use of this method).

Equipment-foam paint brush. .

Application Rate

- 33% glyphosate solution with 10% surfactant, by volume, (or as allowed by label)

Application method Wipe herbicide onto the surface of leaves and stems. Or, cut each cane to height of three feet, wipe all sides of stem.

8. Records

- Crews filled out a WSDA approved Pesticide Application Record for each herbicide treatment. We retain original copies of Pesticide Application Records, as required by law.

OBSERVATIONS AND CONCLUSIONS

- Peninsula-wide activities are incorporated into this report to show the level of effort and collaboration that has been generated to combat the threat knotweed and other invasive species pose to our natural resources.
- Partners continue to report successful knotweed control across the Olympic Peninsula. Partners used one or several different control techniques and herbicides, depending on site conditions. The majority of knotweed treatments included a foliar application of imazapyr (1% solution) with surfactant (1% solution); additional treatment techniques included stem-injection glyphosate (100% solution), foliar application of glyphosate (1.5%-4% solution), and to a very limited extent, foliar application of aminopyralid (0.125% solution) and triclopyr (1% solution).
- Partners reported "discovering" patches of knotweed at varying distances from historical locations of larger patches.
- Partners reported obtaining landowner permissions for locations previously not surveyed or treated which were crucial to successful control of knotweed across the entirety of a river system. Building relationships by face-to-face interactions with landowners and site visits contributed significantly to obtaining these permissions over time.
- CCNWCB reported aminopyralid was effective for the control of small scotch broom (<1.5 ft. tall) but ineffective on larger plants; the herbicide was also minimally effective to control sulfur cinquefoil, spurge laurel and common tansy and was ineffective, by itself, for control of common fennel and hairy white-top.
- The 10KYI reports that seed collection for reed canarygrass, tansy ragwort, and common tansy at small sites continues to be an important prevention method.
- MCNWCB reported an 82% reduction in solid acres of knotweed treated in 2019 compared to 2018, on systems that had 3-5 years of previous treatment.
- HCSEG reports that they are seeing reductions in volume and density of knotweed across the eight river systems they treat.
- The Makah tribe reported that knotweed infestations along Big River were so minimal in 2019 that they only treated at restoration sites, compared to treating a large section of the river for the last 3 years.
- Most partners reported that they are either developing a revegetation plan or seeing positive results from post-treatment revegetation efforts at infestation sites.
- Partners reported that access to boats and ATVs can be very beneficial for surveys and treatment of knotweed and other invasive species.
- Partners increasingly use smartphone applications and cloud-based data as an efficient way to share information between partners and build collaboration.
- Track logs from the GPS units still provide extremely valuable information about where crews went, areas that were missed, and to track null surveys (parcels where no knotweed was found). Tracklogs on smartphone applications have been less utilized by partners and are more challenging to record and maintain.
- Invasive plants of highest concern other than knotweed vary greatly by partner and river system, but all partners report the need and benefit to treat additional species during the course of knotweed control activities.
- The CCNWCB completed the third season of the Clallam Road Department Integrated Weed Management Plan (IWMP) and the knotweed treatment was of highest priority. Crew treated knotweed infestations on 10 county roads and five county pits. Additionally, the IWMP contains "weed-free" requirements for all Clallam County Road department activities and contracts, to help prevent the spread of knotweed and invasive plants.
- Partners acknowledged the control of invasive plants adjacent to river corridors, such as road right-of-ways and culverts, were significant treatment areas for the overall success of control efforts, and the collaboration within the working group has increased comprehensive control efforts for many river systems.
- Partners continue to report successes with revegetation plans where knotweed has been controlled.
- The State's knotweed program continues to be indispensable. In addition to providing base funding, it has helped provide permitting and technical advice to jump start other programs. The Olympic Invasives Working Group continues to draw a diverse membership and MANY other groups now participate in knotweed control Peninsula wide. The Weed Boards are invested in supporting these groups and interested residents county wide. In many cases this WSDA funding is being used to leverage other grants.

2020 PROJECT PRIORITIES INCLUDE

(as identified by individual partners):

In **West Clallam County**

- The highest priority is the Quillayute River system because it contains the most heavily infested reaches. The QNR, CCNWCB, 10KYI and the NCEPMT should combine resources to treat these areas.
- Revisiting sites on the Hoko and Sekiu Rivers where large knotweed infestation were treated in prior years.
- The CCNWCB will collaborate with and assist the Makah Tribe where needed.
- Acquire landowner permissions and re-survey in Charley Creek.

In **Central Clallam County**

- Continue surveys and treatments upstream on Ennis Creek and coordinate with NCEMPT and ONP for sites within the National Park boundary
- Revisit Peabody Creek sites and treat as needed.
- Identify and treat additional knotweed infestations on county road right-of-ways.

In **East Clallam County**

- Coordinate with Jamestown S'Klallam Tribe and NOSC for surveys and treatments on the Dungeness River.

In **East Jefferson County**

- HCSEG plans to continue upriver surveys on the Dosewallips River and treat as needed.
- HCSEG, Jefferson County, USFS and Washington State Parks should collaborate on surveys, treatments and revegetation plans.
- NOSC and the WCC have surveyed the entire Snow Creek watershed and are working their way down the river from the upper most infestation. Reaching non-communicative land owners will be a priority in 2020.

In **Kitsap County**

- HCSEG will resume treatments on the Big Beef Creek system.
- HCSEG plans to change their survey and treatment approach on the Big Anderson River from a "bottom up" to "top down" in order to increase effectiveness in the upper reaches.

In **Mason County**

- Renewal of a majority of permissions in Anderson, Coulter, Finch, and Sherwood Creeks, and along the shore of North Bay, that expired in 2019 is of high priority in order to sustain the progress made to date.
- HCSEG found a large infestation of knotweed on Lilliwaup Creek below the falls in 2019 and will begin outreach this winter and spring and conduct treatment on the lower reach in 2020.
- HCSEG is working on an invasive weed flyer specific to each river, and will mail these to riverside landowners. These flyers will include identification, life history, and control methods for each weed.

In **Grays Harbor County**

- GHCNWCB will continue outreach and treatments on the Wynoochee River.
- QIN priorities were not available at the time of the writing.

In **West Jefferson County**

- Recommendations from 10KYI include increasing emphasis on invasive weed awareness and control in gravel mines and incorporating weed prevention in best roadside management practices.
- The 10KYI will also focus on collaboration with Jefferson County Road Department to treat herb Robert on roadsides, and treatment of invasive plants in quarries and rock sources.

RECOMENDATIONS

- Conduct pre-season communication and planning with other project managers to promote more cross boundary project opportunities.
- Update Best Management Practice documents. Consult with other knotweed control programs and WSDA before publication.
- Share GPS data collection tools, protocols and to take advantage of any technology updates.
- Discuss reporting protocols. Update *data request form* and make use of standardized formulas to normalize data received from partners. The added ability to record, view and track data using smartphone technology is a great benefit to partners and field crews. The ability to create custom data fields and tracking methods is extremely useful; however shared data must include sufficient definitions.
- Share relevant data including maps with "public view" capability to improve in-field awareness of project areas and where work is being conducted.
- Perform Early Detection and Intervention of additional invasive species in conjunction with knotweed treatments where there is sufficient time and resources.
- Poll working group members for a needs assessment.
- Continue to incorporate information about other invasives in our working group meetings.
- Continue updating the CCNWCB web page to include information highlighting work by partners, including contact information.
- Encourage and support more training by Ecology for WCC crews who are increasingly utilized for invasive plant control projects.
- Continue to engage and encourage timber companies to increase their involvement in monitoring, prevention and treatment of terrestrial sites, especially rock sources.
- Seek contracting standards that include control and prevention of invasive plant species.
- Increase outreach with hunters, fishers and other recreationists for Early Detection, Rapid Response of invasive species.
- Continue treatment of invasive species within the developed Clallam County Integrated Weed Management Roadside Program. Many county roads are in close proximity to riparian areas and can be a source of invasive plants to spread into riparian corridors.

PARTICIPATING GROUPS

Clallam County Noxious Weed Control Board
Clallam County Road Department
Clallam County Department of Community Development
Clallam County Conservation District
Clallam County Public Utility District
City of Port Angeles
Grays Harbor Noxious Weed Control Board
Grays Harbor County Road Department
Jefferson County Noxious Weed Control Board
Mason County Noxious Weed Control Board
Mason Conservation District
Snohomish County Noxious Weed Control Board
WA State Department of Natural Resources, Aquatic Resource Division, regional foresters, Natural Lands Management
WA State Department of Ecology
WA State Department of Transportation
WA State Department of Agriculture
WA State Department of Fish and Wildlife
Washington State University
US Forest Service
US Fish & Wildlife Service
USFWS National Marine Refuge
Olympic National Park
US Department of Agriculture
N. Cascades Exotic Plant Management Team/NPS
US Natural Resource Conservation Service
Jamestown S'Klallam Tribe
The Lower Elwha Klallam Tribe
The Makah Nation
The Quileute Tribe
The Quinault Indian Nation
10,000 Years Institute
North Olympic Land Trust
Hood Canal Coordinating Council
Hood Canal Salmon Enhancement Group
North Olympic Salmon Coalition
Pacific Coast Salmon Coalition
East Jefferson WCC
Puget Sound Corps
Green Crow Timber
Merrill and Ring Timber

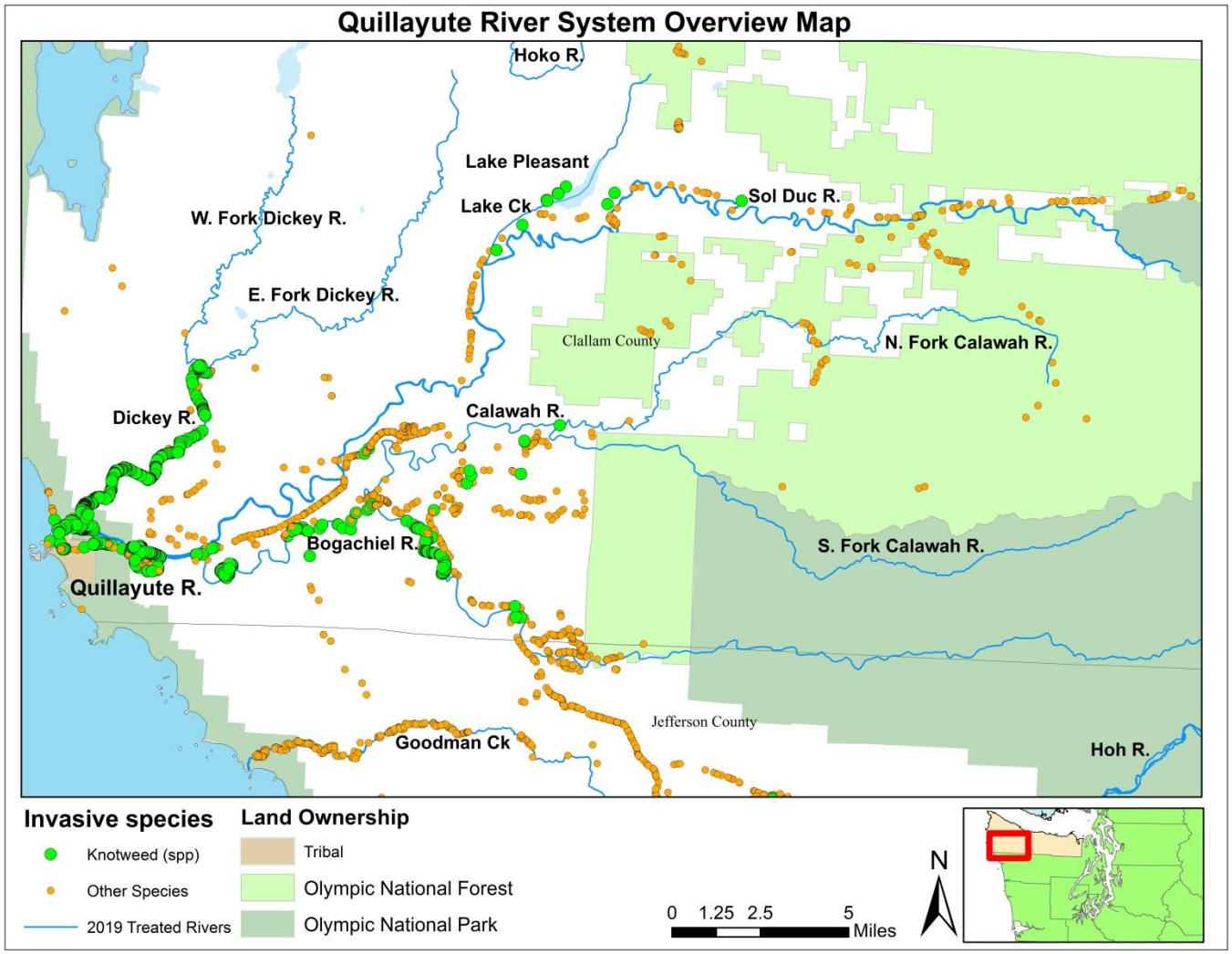
See Appendix III for contact information

FUNDING

Projects summarized in this report were funded by: Washington State Department of Agriculture (WSDA), the Washington State Department of Natural Resources-aquatic resource division, Washington State Legislature (WCRI), Washington State Noxious Weed Control Board, Clallam County Noxious Weed Control Board, the Salmon Recovery Funding Board, US Fish and Wildlife Service, Natural Resources Conservation Service, and separate funding administered to the Quinault Indian Nation and the Quileute Tribe (EPA and BIA).

PROJECT ACTIVITIES BY WATERSHED

CLALLAM COUNTY



Quillayute River System

The Quillayute system includes the Sol Duc, Calawah, Bogachiel, Quillayute and Dickey, along with their tributaries. The entire Quillayute system is popular for fishing. The rivers host the healthiest stocks of wild winter steelhead in the Pacific Northwest. 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 works to preserve the ecosystem in its current, functioning state as a more cost-effective endeavor 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, Deputy Director/TFW Program Manager of Quileute Natural Resource Department has observed that elk and deer do not actively feed on knotweed and that elk have returned to calve on restoration areas previously infested with knotweed.

2019: Work was conducted by multiple entities including QIN, CCNWCB and 10KYI.
Work conducted by the 10,000 Years Institute (10KYI) in the Quillayute Watershed occurred under their Pulling Together in Restoration project (PTIR), which focuses on prevention of spread by addressing sources, vectors, and pathways and removing seeds and propagules. 10KYI worked in collaboration with Clallam County's NWCB,

the Quileute Tribe, Olympic National Park, Olympic National Forest, WSDNR, WSDOT, the City of Forks, Olympic Natural Resources Center, Quillayute Valley School District, Forks Community Hospital, and seven private landowners (adding four). In order to best capture the contributions of the 10KYI; a narrative of their control work by species, across the watershed is included below:

- Knotweed – Treated a new patch (reported to the State NWB) on the south side of the Bogachiel River above SR 101 on private property, revisited the original large patch on the north side, conducted 13 miles of river float surveys and treatment from that point downstream on the Bogachiel River, surveyed and reported plants on roadsides in the City of Forks ahead of mowing, checked last year's treatment at the Forks High School and found no resprouts, retreated regrowth at a previously-treated patch at one residential site, and reported three sites, and treated two, along SR 101 in the Sol Duc watershed. Treated a large roadside patch of giant knotweed with imazapyr (1%) on the FS 29 Road, prior to roadside brushing.
- Tansy ragwort – Thousands of mature plants with and without flowers were pulled along roadways and in river floodplains and private properties, the flowerheads cut, bagged, and disposed of at West Waste, the local solid waste business. Crews conducted repeat surveys to respond to growth of rosettes into stalks, prior to seed production. Responded to local landowner requests to assist with dense patches in horse pastures – provided crew to model pulling and disposal. Will return to provide additional support in 2020.
- Reed canarygrass – Conducted seed collection to prevent spread via mowing and traffic at numerous sites along roads including SR 101, Cooper Ranch Road, Mary Clark Road, La Push Road, Mora Road, and Quillayute Road, and in the city of Forks. Mapped three sites and collected seeds at Rialto Beach. Agreements with Clallam County and WSDOT were developed but not completed in time for herbicide treatment in 2019, and early rain in September reduced treatment time at other locations.
- St. Johnswort – Some flower and seed collection took place on SR 101, Mary Clark and Cooper Ranch roads, and La Push Road, and more sites were mapped. This species is spreading, needs an aggressive and collaborative strategy to protect forest, pasture, and roadside habitats.
- Scotch broom – Contributed pulling, cutting, and treatment services to the Forks Community Garden on FC Hospital property, city of Forks at the airport and along Mill Creek, at the UW ONRC, on Undi Road in the upper Bogachiel, on Bogachiel and Quillayute river bars, at a local mill property in the Bogachiel, and pulled many small SB on federal, state, and county roadways.
- Everlasting peavine – Plants were mapped on SR 101, SR 110, county roads, and the FS 29 Road, and treated where permission was granted. This species has established large patches in the Sol Duc SR 101 corridor, is spreading with mowing, and needs a significant coordinated control effort to stop further spread down roads and into rivers (already BAD in the Sol Duc).
- Herb Robert – Conducted inventories and pulling on roadsides in the Calawah watershed for ONF and at the H to Z pilot thinning project on the Sol Duc. Conducted several pulling treatments along trails at the UW's ONRC. Pulled, and then treated patches at a private residential site, and encouraged continuous control by the landowner. Controlled wherever encountered.
- Yellow archangel – re-treated two patches at a private residential site, and encouraged the landowners to continue pulling, and care in disposal (no composting). Other residential sites have been reported, pulling encouraged, and treatment to be conducted in 2020.
- Giant reed (Arundo donax) – The only known site on the Olympic Peninsula was identified in 2018 during knotweed surveys alongside the upper Bogachiel river on private property. The patch was treated this year, along with yellow-flag iris.
- Butterfly bush– Spoke with the local nursery about selling butterfly bush – to no avail. Attempted to convince a landowner in the lower Bogachiel to replace her butterfly bush with California lilac without success, and anticipate an invasion from that plant.
- Orange hawkweed was inventoried on SR 110 and in the city of Forks at three locations. Flowers were removed prior to seeding on SR 110 by 10KYI and treatment applied by CCNWCB staff. In Forks, flowers/seeds were NOT removed before maintenance crews unexpectedly weed-whacked the sites. 10KYI is working with the City to work ahead of crews in 2020, but spread is expected.
- English holly was pulled where possible and cut-stump treated in several locations, or inventoried for future treatment in others.
- Bull thistle– Pulled flowering plants along Mora Road, SR 101, SR 110, Mary Clark and Cooper Ranch Road, and along the Olympic Discovery Trail.
- Himalayan and evergreen blackberry was cut-stump treated at the UW ONRC campus and along the Bogachiel River at several sites.

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 of the 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 Ocean at La Push. Knotweed infestation levels in the Dickey before treatment began were likely the worst on the Olympic Peninsula. The source was probably an old homestead approximately a quarter of a mile upstream of the East and West Fork confluence.

Brief Treatment history of the Dickey River

See previous year's reports for more detailed information

- Knotweed treatments have been performed every year since 2002.
- 2006-2008: Lauren Urgensen, a University of Washington Graduate Student, established plots along the Dickey to study knotweed impacts and control.
- 2012: crews noted the movement of tansy ragwort into bare ground where knotweed was treated.
- 2013: 7.5 miles (75 acres) of primarily Washington Department of Natural Resources (DNR) shoreline was treated for knotweed [Quileute Nation Natural Resources (QNR)].
- 2014: Infestations on Dickey were reduced by approximately 1/3 from 2014. 7.6 river miles were surveyed and/or treated by QNR and 0.7 acres were treated by the North Cascades Exotic Plant Management Team [NCEPMT].
- 2015: 7.07 River miles (3.8 acres) of knotweed were treated [QNR, NCEPMT, Clallam County Noxious Weed Control Board (CCNWCB)].
- 2016: 7 acres were surveyed and/or treated for knotweed [QNR, CCNWCB].
- 2017: 68 acres were surveyed and/or treated for knotweed [QNR].
- 2018: 7.9 river miles (58 acres) were surveyed and 0.9 acres were treated for knotweed [QNR]. Treated 3.8 miles (8 acres) along Mina Smith Rd, directly adjacent to the Dickey River, for yellow archangel and tansy ragwort [CCNWCB].

In 2019: QNR surveyed 7.9 river miles along the Dickey, searching nearly 30 acres and retreating knotweed on 4 acres. QNR Crew used 0.7 gallons of imazapyr (1%): approximately twice as much herbicide was used compared to the previous year but treatments occurred on an area 4.5 times larger. CCNWCB crew treated 3.2 road miles (0.01 acres) for yellow archangel and tansy ragwort along Mina Smith Rd, directly adjacent to the Dickey River. Treatments used 0.0003 gallons of aminopyralid (0.125%) and 0.002 gallons of triclopyr (1%).

In 2020: Continue treatments as time and resources allow. Treatments of other invasive species, like tansy ragwort, should be considered as knotweed infestations continue to decline.

Herbicide use-Dickey River (gallons)													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated*	140	50	95	101	NA	56	75	46	3.8	74	3.8	0.9	**4**
Total Herbicide	12.7	0.2	18	7.2	NA	2.9	4.3	2.4	2.9	1.2	1.4	0.3	**0.7**

* ***The discrepancy between acres treated in different years may be due to different counting methods being used.*** *Acres treated in 2007-2014 and 2016 are as reported but may be total acreage searched.*

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.

Brief Treatment history of the Calawah River

See previous year's reports for more detailed information

- 2006: A survey of Calawah found 344 knotweed sites of primarily giant knotweed [QNR].
- 2007-2013: The Calawah River was consistently treated [QNR]. Giant knotweed responded very well to treatments and infestations decreased significantly. See below for decreased herbicide usage.
- 2013-2017: Due to excellent response to treatments and in consideration of scarce funding, the Calawah was not treated.

- 2018: The 10KYI treated 3.12 river miles of the Calawah River for reed canarygrass, herb Robert, tansy ragwort and everlasting peavine. No knotweed was observed in their treatment area. Crews also expanded surveys and treatments to the A-Road, a significant nearby weed vector.

2019: The 10KYI made multiple treatments equivalent to 49.4 road miles along the Calawah River for English holly, evergreen blackberry, Himalayan blackberry, Scotch broom, and yellow archangel. No knotweed was observed in their treatment area. Treatments used 1.6 gallons of glyphosate (50% or 100%) for cut-stump treatments and 0.014 gallons of Imazapyr (1%) as foliar.

In 2020: Continue to survey and treat as needed.

Herbicide use-Calawah River (gallons)													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	202	100+	110	127	NA	65	64	-	-	-	-	0.6	**18.5**
Total Herbicide	11.1	2.3	1.6	0.2	NA	0.2	0.2	-	-	-	-	0.2	**1.6**

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.

Brief Treatment history of the Bogachiel River

See previous year's reports for more detailed information

- 2006: A survey of the river revealed 1,336 knotweed sites [QNR].
- 2008-2010: Sections of the Bogachiel River were treated by QNR, with assistance from CCNWCB.
- 2011: The entire river was retreated for the first time [QNR, CCNWCB].
- 2012-2013: 13 river miles (131 acres) of the Bogachiel River was surveyed and/or treated [QNR].
- 2014: An additional 13 river miles (343 acres) were treated [QNR].
- 2015: No treatments took place on the Bogachiel due to funding constraints.
- 2016: 11.96 miles (77 acres) were treated [QNR, NCEPMT, CCNWCB].
- 2017: 12.9 miles (198.5 acres) were treated; purple loosestrife discovered [QNR, NCEPMT, CCNWCB]. 10KYI treated off-channel for additional invasives including reed canary grass, herb Robert, scotch broom, tansy ragwort-acre and river mile totals were not available by watershed.
- 2018: 15.7 miles (249 acres) were treated for knotweed, Scotch broom, reed canary grass, yellow archangel, Himalayan blackberry, Canada thistle, and more. Crews reported some well-established bohemian knotweed patches with what appeared to be well developed, if not viable seeds, and the only infestation of giant reed (Arundo donax) on the Olympic Peninsula [10KYI].

In 2019: The 10KYI made multiple treatments equivalent to 46.2 road miles and 12.6 river miles (214 acres) of the Bogachiel River for a wide variety of invasive species including knotweed, Scotch broom, reed canary grass, yellow archangel, Himalayan blackberry, evergreen blackberry, Canada thistle, English holly, and yellow flag iris. Treatments used 0.7 gallons of imazapyr (1%), 0.4 glyphosate gallons (1-1.5%), and 3 gallons of glyphosate (25%, 50%, or 100% for cut-stump).

In 2020: The partnership of the CCNWCB, NCEPMT, and QNR should continue to treat the Bogachiel River as these infestations spread into the Quillayute River. Some of the heaviest infestations in Clallam County are found in this area. The 10KYI crews should continue to leverage treatment of multiple species in this watershed.

Herbicide use- Bogachiel River (gallons)													
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated*	4.1	900+	693	725	NA	131	131	343	-	77	198.5	10.55	**214**
Total Herbicide	0.65	33.88	77.34	62.1	NA	3.12	5.43	8.38	-	0.80	5.3	5.65	**4.06**

***The discrepancy between acres treated in different years may be due to different counting methods being used**. Acres treated in 2007-2016 are as reported but may be total acreage searched. 2017 totals only include those reported by QNR and CCNWCB.*

Quillayute River

Although the Quillayute has the largest drainage area on the Peninsula (629 square miles) the river itself is only 5.5 miles long and approximately half its length is in the coastal strip of the Olympic National Park. The Dickey, Bogachiel, Calawah, and Sol Duc all flow into the Quillayute River, making treatments along the entire Quillayute watershed extremely important.

Brief Treatment history of the Quillayute River

See previous year's reports for more detailed information

- 2008: The first treatments of the Quillayute River are performed, with 170 acres surveyed and/or treated [QNR].
- 2009: CCNWCB treated a county owned park situated along the Quillayute. An additional 40 acres of the river was treated [QNR].
- 2010: 0.9 acres of knotweed was treated [NCEPMT].
- 2011: Treatments on this river occurred, but were not reported [QNR].
- 2012: No treatments were reported on the Quillayute.
- 2013: 0.2 acres were treated [NCEPMT, QNR].
- 2014: Treatments on this river occurred, but were not reported [NCEPMT].
- 2015: 2.9 river miles of the mainstem Quillayute River was surveyed and/or treated [QNR, NCEPMT, and CCNWCB].
- 2016: The entirety of the Quillayute River was treated for the first time [QNR, NCEPMT, and CCNWCB].
- 2017:1.8 river miles, (8.2 acres) were treated for knotweed [QNR, NCEPMT, and CCNWCB]. 10KYI treated 103 road miles in the Quillayute River watershed for additional invasives including reed canary grass, scotch broom, and tansy ragwort.
- 2018: Treated 2.5 river miles (6.4 acres) of the Quileute River for Scotch broom, reed canarygrass, tansy ragwort and everlasting peavine [10KYI]. No knotweed was found in their treatment area.

In 2019: The Quileute Tribe, with assistance from CCNWCB crew, made two treatments equivalent to 9.25 river miles (21.5 acres) for knotweed, Scotch broom, evergreen blackberry, Himalayan blackberry, Canada thistle, herb Robert, spotted jewelweed, tansy ragwort, and bittersweet nightshade. Treatments used 3.5 gallons of imazapyr (1%) and 1 gallons of glyphosate (6%). 10YKI treated 6.6 road miles (5 acres) along the Quileute River for Scotch broom. Treatments used 0.16 gallons of glyphosate (50%) for cut-stump treatment.

In 2020: The partnerships developed to treat this river system should be maintained, especially considering the evidence of success through decreased herbicide use and acreage treated. Additional invasive treatments and native plantings should be investigated to prevent emergence of other weed species.

Herbicide use-Quillayute River (gallons)													
	2007	2008	2009	2010	2011	2012	2013	2014 **	2015	2016	2017	2018	**2019**
Acres Treated	N/A	170	40	0.5	NA	0	0.2	0	5	193*	8.2	6.4	**26.5**
Total Herbicide	N/A	6.8	1.7	0.6	NA	0	0.1	0	1.9	14.4	3.1	2.04	**4.5**

**Treated acreage was not reported in 2016. Surveyed acres are included instead.*

*** Treatments occurred in 2014 but were not reported.*

Sol Duc River and tributaries

The Sol Duc sub-basin, within the Quillayute watershed, drains over 200 square miles. The Sol Duc River originates within Olympic National Park and stretches for nearly 20 miles before emerging from Park boundaries. It then runs for 45 miles until it joins with the Bogachiel, forming the Quillayute. It contains timber lands, agriculture, and residential development. The Sol Duc supports numerous salmonids such as Chinook, Coho, chum, sockeye, and steelhead, as well as cutthroat and rainbow trout.

Brief Treatment history of the Sol Duc River

See previous year's reports for more detailed information

- 2005: A float survey of the middle Sol Duc was conducted. Most sites were Bohemian knotweed [Clallam County Noxious Weed Control Board [(CCNWCB)].
- 2006: A survey of the Lower Sol Duc revealed 447 knotweed sites that were primarily giant knotweed [The Quileute Tribe (QNR)]. Treatments were performed on the Middle Sol Duc [CCNWCB].
- 2007-2010: Treatments of the Sol Duc River were performed by multiple entities. The North Cascades Exotic Plant Management Team (NCEPMT) treated knotweed within Olympic National Park (ONP) boundaries while QNR and CCNWCB treated the Middle and Lower Sol Duc.
- 2011: No treatments on this river were reported.
- 2012: 26.6 river miles of the Middle Sol Duc were surveyed for treatment [QNR].
- 2013: For the first time, no knotweed was found on the section of the Sol Duc within ONP boundaries [NCEPMT]. 155 acres of the Lower Sol Duc were surveyed for treatment [QNR].
- 2014: 0.005 acres of knotweed was treated within ONP boundaries [NCEPMT].
- 2015: The middle Sol Duc was surveyed for treatment. Low water levels prevented treatments in the lower reaches of the river [QNR, CCNWCB].
- 2016: 28.81 river miles of the Sol Duc were treated as well as 3 acres on Wisen Creek, a tributary of the river [QNR, CCNWCB].
- 2017: 4.27 river miles of the Middle Sol Duc, Lake Pleasant waterfront and Wisen Creek (1.3 acres) were treated for knotweed [QNR]. County ROW adjacent to Lake Pleasant that contain knotweed was treated for the first time under an integrated weed management plan [CCNWCB].
- 2018: 11.4 river miles (82.57 acres) treated for reed canarygrass, herb Robert, and Canada thistle. No knotweed was found in the treatment area [10KYI].

In 2019: 10KYI treated 39.9 road miles (0.005 acres) for knotweed, reed canarygrass, Scotch broom, herb Robert, tansy ragwort, St. John's wort, foxglove, and Canada thistle. Treatments used 0.003 gallons of imazapyr (1%). In addition to chemical control, crews included a manual focus to remove herb Robert plants and reed canarygrass seeds.

In 2020: Surveys, and follow up treatments in the Sol Duc River, Wisen Creek and associated tributaries.

Herbicide Use, Lower Sol Duc River (gallons)													
	2007	2008	2009	2010	2011	2012*	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	17	45	30	35	-	n/a	155	0.005	-	221**	1.3**	1.1	**0.005**
Total Herbicide	9.7	6.7	1	1.3	-	n/a	1.1	n/a	-	1.8	0.5	0.7	**0.003**

** Treatments occurred in 2012 but were not reported.*

***ncludes treatments on Middle and Lower Sol Duc.*

Lake Creek and Lake Pleasant

Brief Treatment history of Lake Creek and Lake Pleasant

See previous year's reports for more detailed information

- 2012: A complete survey of Lake Creek and Lake Pleasant was conducted [CCNWCB]. Most infestations were light and treated where permission was granted.
- 2013-2014: Lake Creek and Lake Pleasant were not treated due to low infestations.
- 2015: A single terrestrial knotweed infestation was treated near Lake Pleasant [CCNWCB].
- 2016: No treatments occurred.
- 2017: 0.5 acres of knotweed (2.5 road miles) was treated on West Lake Pleasant road along with other high priority invasive species. [CCNWCB].
- 2018: There were no follow-up surveys and treatments in this area this year.

In 2019: CCNWCB surveyed 1.2 road miles and treated 0.25 acres for knotweed. Treatments used 0.02 gallons of imazapyr (1%).

In 2020: Continue to survey county roadsides adjacent to riparian areas, roadsides near Lake Creek and Lake Pleasant, as well as the lake itself, as part of the Clallam County Road Department's Integrated Weed Management Plan. Revisit parcels along Lake Creek where CCNWCB has permission agreements, or has treated in the past, for treatments as needed.

Forks

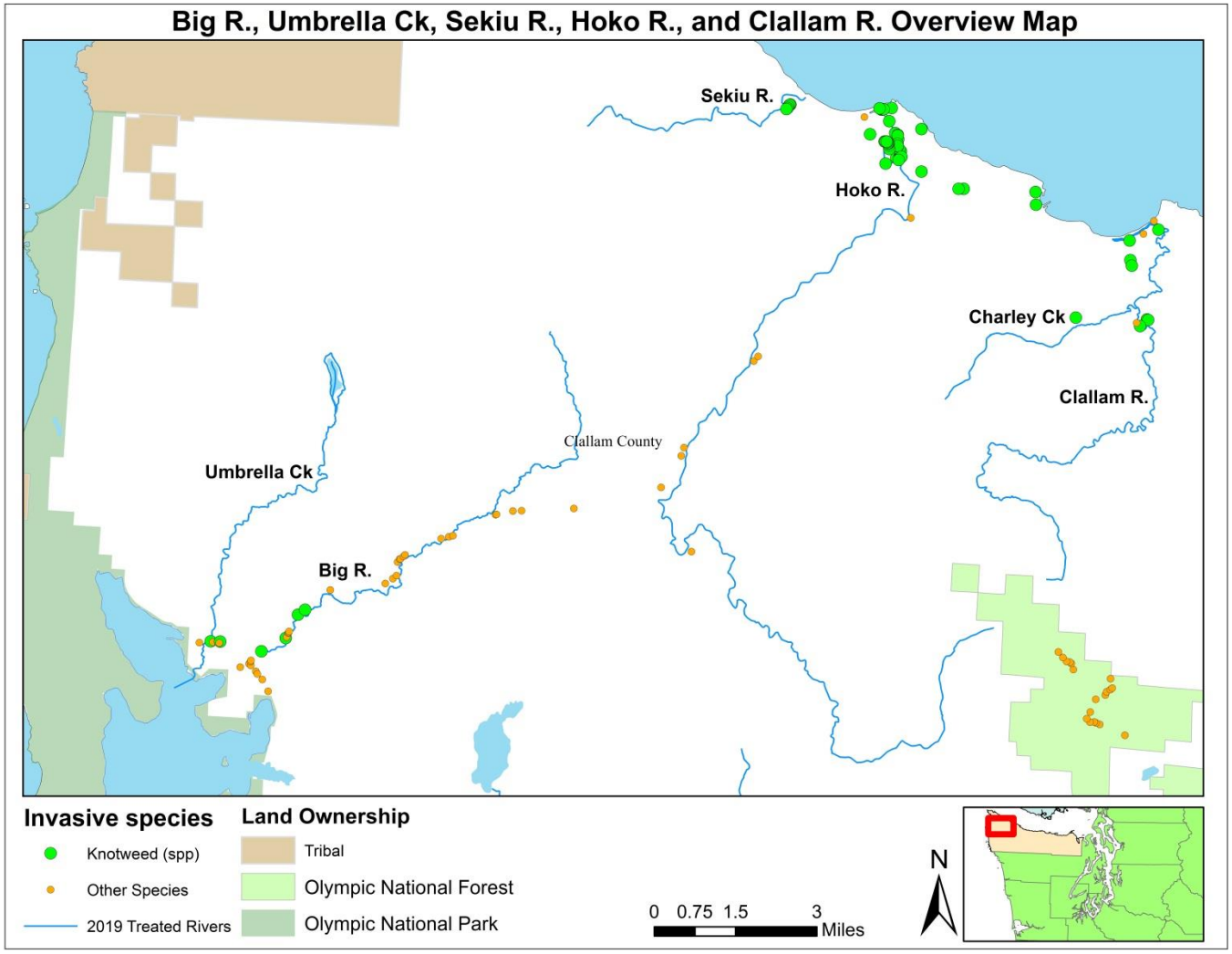
Knotweed in the city of Forks is of concern because the town is close to the Calawah and a tributary of the Bogachiel. The Calawah and Bogachiel are major waterways in the Quillayute System that could be re-infested by knotweed within private property and roadsides in Forks.

Brief Treatment history of Forks
See previous year's reports for more detailed information
2006-2009: Treatments of knotweed on private property was conducted [CCNWCB, QNR].
2010-2012: No invasives treatments were reported in Forks.
2013: 3 acres of privately owned property were treated [QNR].
2014-2016: No treatments were reported, though some may have been performed.
2017: The 10KYI treated multiple non-native species within the City of Forks (ROW, private and public owners)
2018: The 10KYI treated one patch of knotweed at a residential property in the city of Forks at the request of the owner.

In 2019: 10KYI reported that knotweed on Mill Creek, at the Forks High School, and on SR 101 at Undi Road did not re-sprout. One patch of knotweed at a residential property in the city of Forks was treated at the request of the owner. There were additional sites identified in Forks on residential land and adjacent ditches that require access agreements to be treated.
In 2020: With the close proximity of the Calawah and Bogachiel, gaining additional permissions for knotweed and butterfly bush within Forks city limits should be prioritized for this treatment area.

For more information about the Quillayute River System, please contact:
Sarah Riutzel, Timber-Fish-Wildlife Tech III, (360) 640-2108, sarah.riutzel@quileutenation.org
OR
For more information about non-knotweed species treatments on the Quillayute River System or within the City of Forks, please contact:
Jill Silver, 10,000 Years Institute, 360-385-0715, jsilver@10000yearsinstitute.org

Big River, Umbrella Creek, Sekiu River and Hoko-Ozette Road



Brief Treatment history of Big River and Hoko-Ozette Road

See previous year's reports for more detailed information

- 2009: Control of knotweed was made mandatory on the Big River [Clallam County Noxious Weed Control Board (CCNWCB)].
- 2011: High priority sites were treated [CCNWCB].
- 2012: 4 miles of the Big River were surveyed and/or treated. The CCNWCB noted a reduction in infestations from the previous year.
- 2013: Infestations at the mouth of the river were treated [North Cascades Exotic Plant Management Team (NCEPMT)].
- 2014: 4.6 river miles were surveyed and/or treated [CCNWCB].
- 2015: Treatments of the Hoko-Ozette road were first reported [Makah Tribe]. One privately owned site on Big River was treated [CCNWCB].
- 2016: 8.24 miles of Big River was treated as well as 11.4 miles of the Hoko-Ozette Road [Makah Tribe].
- 2017: 6.6 miles (19.56 acres) of the Big River treated for invasives [Makah Tribe]. The Tribe completed a complete survey for knotweed (none) but treated other non-native species.
- 2018: 6.6 miles (109 acres) of the Big River treated for invasive species [Makah Tribe]. Treated 17.9 miles of the Hoko-Ozette Road as well as the County portion of Swan Bay for knotweed and other invasives [CCNWCB].

In 2019: The Makah retreated 0.8 acres for knotweed at restoration sites along the Big River using 0.0029 gallons of glyphosate (4.6%)/imazapyr (0.78%) mix. The CCNWCB treated along the entire Hoko-Ozette Road, including the 6.6 road miles next to the Big River, as well as the County portion of Swan Bay, for knotweed, tansy ragwort and herb Robert. The CCNWCB combined manual and herbicide treatments using a total of 0.01 gallons of aminopyralid (0.125%), 0.08 gallons of triclopyr (1%) and 0.009 gallons of imazapyr (1%) herbicide.

In 2020: CCNWCB will continue to survey and treat along the Hoko-Ozette Rd as part of the Clallam County Road Department's Integrated Weed Management Plan.

Herbicide Use-Big River-Hoko Ozette Rd (gallons)*								
	2006	2007-2010	2011-2014	2015	2016	2017	2018	**2019**
River Acres Treated Road Acres Treated	60	Less than 60 each yr	Less than 25 each yr	0.1	n/a	19.6	17.1 35.2	**0.8** **.06**
Glyphosate inj	65	5	0.5	0.2	n/a	n/a	n/a	**n/a**
Glyphosate foliar	0	7.9	0.1	0	n/a	1.1	0.8	**0.03**
Imazapyr foliar	0	1.8	0.8	0	n/a	0.2	0.06	**0.009**
Aminopyralid**	-	-	-	-	-	-	0.05	**0.01**
Triclopyr **	-	-	-	-	-	-	0.01	**0.08**
Total Herbicide	65	14.7	1.4	0.2	n/a	1.3	1.02	**0.13**

**This table has been consolidated to accommodate additional data while preserving enough information to see the downward trend the more detailed annual data showed for both infestations and herbicide quantities. See previous report for annual treatment detail.*
***aminopyralid and triclopyr were used for roadside treatments only.*

Hoko River

Brief Treatment history of the Hoko River
See previous year's reports for more detailed information

- 2009: Control of knotweed was made mandatory on the Hoko River by the CCNWCB.
- 2012: All known knotweed on the Hoko River was treated, except for lower tidal regions where a float survey may be needed [CCNWCB].
- 2013-2015: Due to the small amount of re-growth from 2012 treatments, no treatments were performed.
- 2016: The East Jefferson Washington Conservation Corps (EJWCC) treated 1.5 river miles of the upper Hoko River.
- 2017: Knotweed treatment along Hoko-Ozette Road-(reported in Big River data) [Makah]
- 2018: Due to low infestations level, no treatments on Hoko River this year.

In 2019: The CCNWCB float surveyed and treated .02 acre of knotweed along 2.8 river miles of the lower Hoko River, using 0.12 gallons of imazapyr (1%). The Makah treated two sites near the Hoko River (0.08 acres) using 0.12 gallons of glyphosate (0.78%) and 0.02 gallons of imazapyr (4.6%).

In 2020: The CCNWCB will revisit sites treated in 2019 to assess effectiveness and retreat as needed, and coordinate with the Makah Tribe to survey or treat other sites along the Hoko River.

Sekiu River

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.

Brief Treatment history of the Sekiu River
See previous year's reports for more detailed information

- 2006: 26 patches of knotweed were treated [Makah Tribe].
- 2007-2010: Less than 10 sites total were treated by the Makah Tribe and CCNWCB. In 2010, control of knotweed was made mandatory on this river by the CCNWCB.

- 2011: Sites that had only 1-2 recurring treatments were targeted and re-treated [CCNWCB].
- 2012: All known knotweed sites were treated. On most parcels very few plants remained but two parcels, totaling 10 acres had large infestations that were treated for the first time [CCNWCB].
- 2013: Efforts focused on the two parcels discovered in 2012. Treatments were incomplete, but reduced herbicide usage (see below) indicated a significant decrease in the infestation [CCNWCB].
- 2014: Sites with difficult access were treated using canoes.
- 2015: No treatments were performed.
- 2016: Properties where re-growth was observed were retreated [Makah Tribe].
- 2017-2018**:** Due to the low infestations levels in the Sekiu River, no treatments were performed on this system.

In 2019: CCNWCB surveyed and treated along 1.3 road miles (0.25 acres) of Sekiu Rd for knotweed and yellow archangel. Treatments used 0.005 gallons of imazapyr (1%).

In 2020: Reactivate landowner permissions, resurvey, and retreat historic sites.

Herbicide Use-Sekiu River (gallons)* **								
	2006*	2007-2010	2011-2014	2015	2016*	2017	2018	**2019**
Inspected/ Known Parcels	N/A	n/a	10/11	0/14	0/14	0/14	0/14	**n/a**
Acres Treated	N/A	Less than 17 each yr.	Less than 6 each yr	-	n/a	-	**-**	**0.25**
Glyphosate injected	n/a	3.9	0.5	-	n/a	-	**-**	
Glyphosate foliar	n/a	0.9	0.2	-	n/a	-	**-**	
Habitat or Imazapyr (imazapyr) foliar	n/a	0.2	0.5	-	n/a	-	**-**	**0.005**
Total Herbicide	11	5.02	1.1	-	n/a	-	**-**	**0.005**

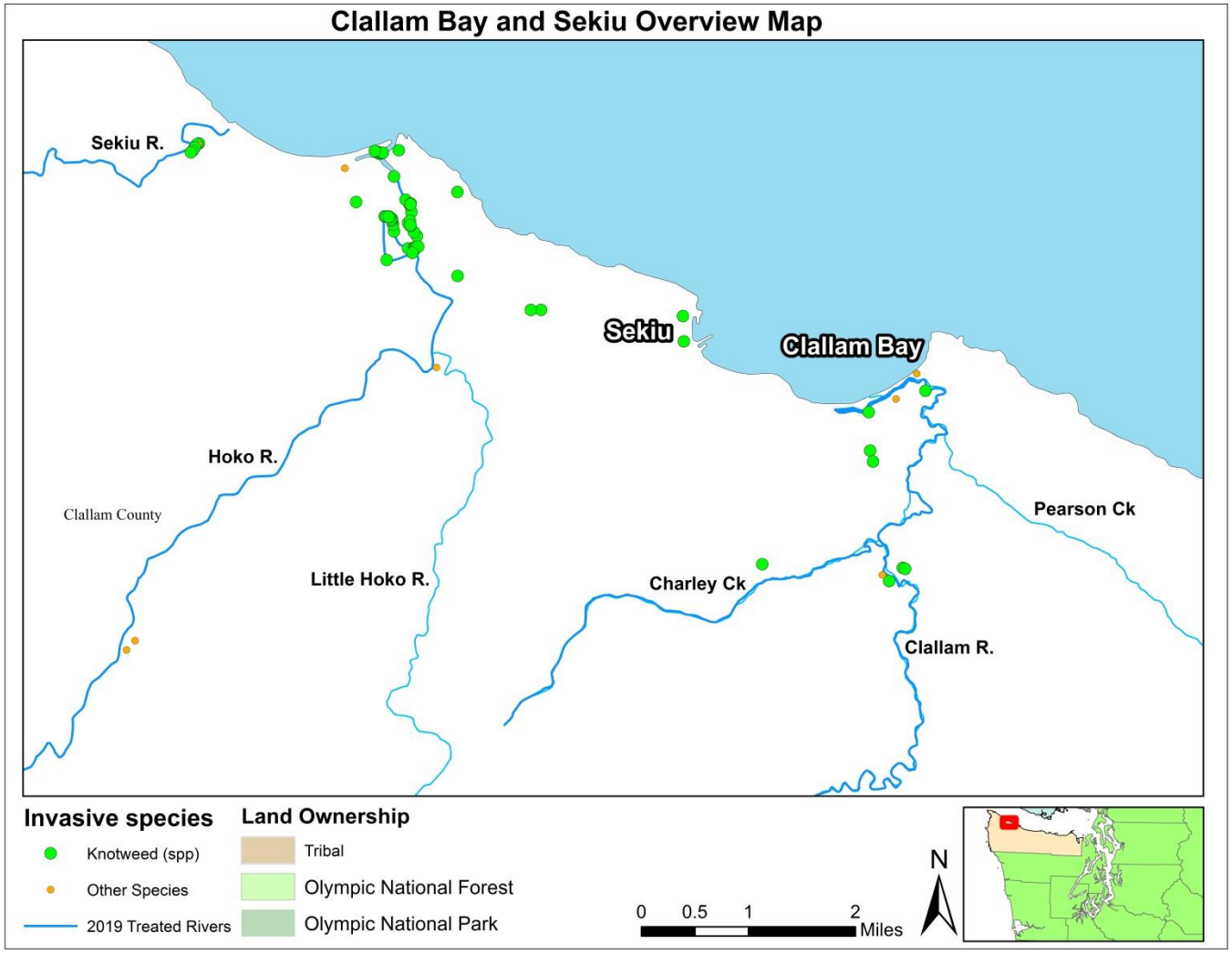
** Treatments took place in 2006 and 2016 but data was not reported.*
*** Herbicide formulations and application methods were not provided for this report in 2014.*
****This table has been consolidated to accommodate additional data while preserving enough information to see the downward trend the more detailed annual data showed for both level of knotweed infestation and herbicide quantities. See previous report for annual treatment detail.*

For more information about Big River and treatments in the surrounding area, please contact: Shannon Murphie, Wildlife Biologist, 360-645-3229, shannon.murphie@makah.com.

Or

Cathy Lucero, Clallam Noxious Weed Control Board, 360-417-2442, clucero@co.clallam.wa.us

Highway 112, Clallam Bay, and Sekiu



Highway 112

This highway runs west-east near the shoreline and crosses the Sekiu, Hoko and Clallam Rivers. This road is a significant vector of knotweed through movement of plant fragments in the course of road maintenance and related activities.

Sekiu and Clallam Bay

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 was introduced as a contaminant.

<u>Brief Treatment history of Highway 112, Sekiu and Clallam Bay</u>
See previous year's reports for more detailed information

- 2004: Surveys of Highway 112, Sekiu, and Clallam Bay revealed large infestations in or near riparian areas [CCNWCB].
- 2006-2012: Knotweed was treated in Clallam Bay, Sekiu, and nearby coastal bluffs. Details of treatments can be found in table below [CCNWCB].

- 2014: 5 new permissions of parcels with large infestations allowed for more treatments in the two towns [CCNWCB].
- 2015-2016: No treatments were reported.
- 2017: Limited treatments by both CCNWCB and Makah took place in this area, because of very limited infestations.
- 2018: The Makah obtained 3 new permissions and searched 9 acres for knotweed within the Clallam Bay/Sekiu and Clallam River, although most of the treatments occurred on the Clallam River.

In 2019: CCNWCB treated 0.55 acres in Clallam bay for knotweed and yellow archangel using 0.02 gallons of imazapyr (1%). The Makah Tribe treated 0.01 acres for knotweed on parcels in Clallam Bay and Sekiu using 0.06 gallons of glyphosate (4.6%) and 0.01 gallons of imazapyr (0.8%).

In 2020: The Makah Tribe has landowner permission to retreat parcel sites in 2020.

Herbicide Use-Highway 112, Clallam Bay and Sekiu (gallons)								
	2006	2007-2010	2011-2014	2015	2016	2017	2018**	**2019**
Acres Treated	n/a	As much as 45 each yr.	As much as 3 each yr.	-	-	1.6	n/a	**0.6**
Glyphosate injected	n/a	5.4	0.2	-	-	0	-	**-**
Glyphosate foliar	n/a	6.1	0.02	-	-	0.4	-	**0.06**
Imazapyr foliar	n/a	0.2	0.07	-	-	0.06	n/a	**0.03**
Total Herbicide	17.9	9.8	0.2	-	-	0.5	**-**	**0.09**

**Note: A site near the Sekiu airport and several along Hwy 112 were added in 2014. Much of the herbicide use in that year accounted for in those locations.*

***Details for these site was not broken out, but based on the number of sites shown on the map, was accounted for in full in the Clallam River section*

Clallam River

The Clallam River is a low-gradient river of approximately 13.4 miles that flows 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. 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. In order to temporarily relieve issues caused by flooding, a channel was excavated in 1998 to allow fish to re-enter the Straits. Much of the Clallam River is owned by Clallam County and Washington State Parks. Knotweed has likely existed on the river prior to its first sighting in 1998 and has rapidly spread since.

Brief Treatment history on the Clallam River

See previous year's reports for more detailed information

- 1998: The first report of knotweed was made on this river.
- 2006: The Makah Tribe surveyed the lower portion of the Clallam River.
- 2007-2010: Increased funding allowed the Lower Elwha Klallam Tribe the assist the CCNWCB in its treatments. In 2010, control of knotweed was made mandatory on this river by CCNWCB.
- 2011-2013: All parcels on the Clallam River were treated by CCNWCB and Lower Elwha Klallam Tribe. By 2013, knotweed infestations had decreased by 75% and a pioneer patch of yellow archangel was treated before it could spread.
- 2014-2016: Due to low infestation levels, the Clallam River was not treated.
- 2018: CCNWCB treated 0.2 acres for yellow archangel on Charlie Creek Rd. The Makah Treated 0.3 miles (2.3 acres) of the Clallam River for knotweed

In 2019: The CCNWCB treated 0.75 roadside miles (0.4 acres) for knotweed and yellow archangel along Charley Creek Road near its intersection with the Clallam River. The Makah treated 0.1 acres on parcels near the Clallam River for knotweed using 0.13 gallons of glyphosate (4.6%) and 0.02 gallons of imazapyr (0.8%).

In 2020: As time and resources allow, Clallam River and its nearby roadsides should be surveyed and treated for knotweed and other invasives of concern.

Pysht River

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. The Pysht River Estuary will be the subject of an extensive restoration project in partnership with the Lower Elwha Klallam Tribe, Merrill and Ring, Clallam County, North Olympic Salmon Coalition and other partners over the next few years.

Brief Treatment history on Pysht River

See previous year's reports for more detailed information

- 2005: Two property owners notified the CCNWCB of knotweed infestations, one of which was approximately 2 acres and was being manually controlled by the landowner.
- 2006-2010: Merrill and Ring hired a crew to treat knotweed alongside the CCNWCB. By 2010, the infestation was dramatically reduced and canes found were less than three feet tall.
- 2011: No treatments were conducted on Pysht due to funding constraints and low infestation levels.
- 2012: Merrill and Ring staff surveyed their property for knotweed and CCNWCB treated surveyed infestations.
- 2013: Surveys found no knotweed and the Psyht river was treated for other invasives [CCNWCB].
- 2014: 185 small stems were treated on Merrill and Ring property as well as a new infestation of burdock [CCNWCB]. The Puget Sound Corps (PSC) treated 6 acres farther upstream for invasives including reed canarygrass, herb Robert, Canada thistle, and holly.
- 2015: 6 acres were re-treated in 2014 for invasives [CCNWCB].
- 2016- **2019**: No knotweed work was performed on Pysht River and no entity reported any invasives treatment.

In 2020: The CCNWCB should conduct surveys to examine knotweed control on the Pysht River and offer assistance to landowners with knotweed infestations.

Deep Creek

Deep Creek drains 11,048 acres, and the elevation ranges from zero to 3,400 feet. It historically supported significant levels of Coho and chum production, with most of the chum salmon spawning in the lower three miles. Coho and winter steelhead spawners have been documented at river mile 3.7 and 3.1 respectively. Fall Chinook used to spawn in Deep Creek but according to Mike McHenry, fisheries biologist for the Lower Elwha Klallam Tribe, they have been extirpated.

Brief Treatment history of Deep Creek

See previous year's reports for more detailed information

- 2013: Deep Creek was surveyed and treated for knotweed and other invasives including Canada thistle, bull thistle, and fox glove [PSC].
- 2014-2017: Due to funding constraints, no work was performed in Deep Creek.
- 2018: LEKT treated 1.5 river miles using 1.22 gallons glyphosate (8%).

In 2019: The Lower Elwha Tribe conducted knotweed treatments but data was grouped with Elwha data.

In 2020: To be determined depending on partner resources.

Herbicide Use-Deep Creek (gallons)							
	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	0.5	-	-	-	0.5	5	**N/A**
Imazapyr foliar	0.03	-	-	-	0	N/A	**N/A**
Glyphosate foliar	0	-	-	-	0.2	1.2	**N/A**
Total Herbicide:	0.03	-	-	-	0.2	1.2	**N/A**

***Injection used on approximately 150 stems in 2017*

Salt Creek

Salt creek, with a river basin that drains 44.6 square miles, is a significant river system to restore due to its decreasing salmon habitats. Salt Creek and its tributaries provide important Coho salmon spawning and rearing habitat downstream of a passable dam at river mile 6.5. This same area used to support chum salmon and Chinook salmon was historically found farther downstream. Chum and Chinook salmon have not been documented in Salt Creek in recent years, most likely due to loss of large woody debris that supported salmon habitats. In the Salt Creek estuary, about 15 acres of tidal marsh has been lost to a road that cuts across the estuary and disconnects the salt marsh from the tidal-influenced reaches of Salt Creek. This impacts juvenile rearing of all salmonids produced from Salt Creek.

Brief Treatment history of Salt Creek

See previous year's reports for more detailed information

- 2013: Landowner Agreements from over 100 landowners on Salt Creek and one of its major tributaries with a history of knotweed, Nordstrom Creek were solicited. 19 permissions were obtained but only one parcel was treated [CCNWCB].
- 2014-2019: No entity reported work in this area this year.

In 2020: Following a consult with partners, obtaining permissions for surveying and treatment of Salt and Nordstrom Creeks may be a priority.

Herbicide Use,-Salt Creek (gal)							
	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	1	-	-	-	-	**-**	**-**
Imazapyr foliar	0.02	-	-	-	-	**-**	**-**
Total Herbicide	0.02	-	-	-	-	**-**	**-**

Elwha River

The Elwha is a river in transition. Two dams were removed in 2012, and the former reservoir lake-beds and river ecology are subject to intense research and restoration efforts.

Brief Treatment history of Elwha River

See previous year's reports for more detailed information

- 2011-2014: Lower Elwha Klallam Tribe (LEKT), Washington Conservation Corps (WCC), and North Cascades Exotic Plant Management Team with the National Park Service (NCEPMT) conducted invasive plant treatments that included very few knotweed treatments. Treatments focused primarily on reed canarygrass, which has exploded after two dam removals on this river.
- 2015: Crews noted a reduction in reed canarygrass infestations for the first time, after four years of treatments. A few knotweed patches were treated in early fall [LEKT].
- 2016: While other noxious weed treatments took place, this year was a rest year for knotweed [LEKT].
- 2017: LEKT along with a WCC crew searched 164 acres along the Elwha River and treated invasives including knotweed and other high priority species including purple loosestrife, meadow knapweed, and yellow flag iris. The NCEPMT also surveyed 3 miles of the Elwha River for treatment of non-knotweed invasive species.
- 2018: LEKT treated all noxious weeds along 3 river miles using 0.027 gallons glyphosate (8%). The CCNWCB re-treated meadow knapweed and other high priority noxious weeds along Olympic Hot Springs Road, from its start at Highway 101 until the Olympic National Park boundary.

In 2019: LEKT, with 4 days of assistance from the WCC, treated 578.1 acres for noxious weeds in the Elwha and its tributary, Indian Creek using 13.5 gallons of glyphosate, 2.3 gallons of triclopyr, and 1.2 gallons of aminopyralid. Reed canarygrass was the main targeted species while other treated species were: herb Robert, everlasting peavine, common ivy, St. John's wort, Scotch broom, common mullein, white sweetclover, old man's beard, Himalayan blackberry, Canada thistle, purple loosestrife, yellow flag iris, yellow archangel, and spotted jewelweed.

In 2020: LEKT will continue treatment for noxious weed control, especially spotted jewelweed, along Indian Creek, a tributary of the Elwha River. The CCNWCB will continue county right-of-way treatment to compliment river treatments.

Dry Creek

Watershed overview and treatment history not currently available

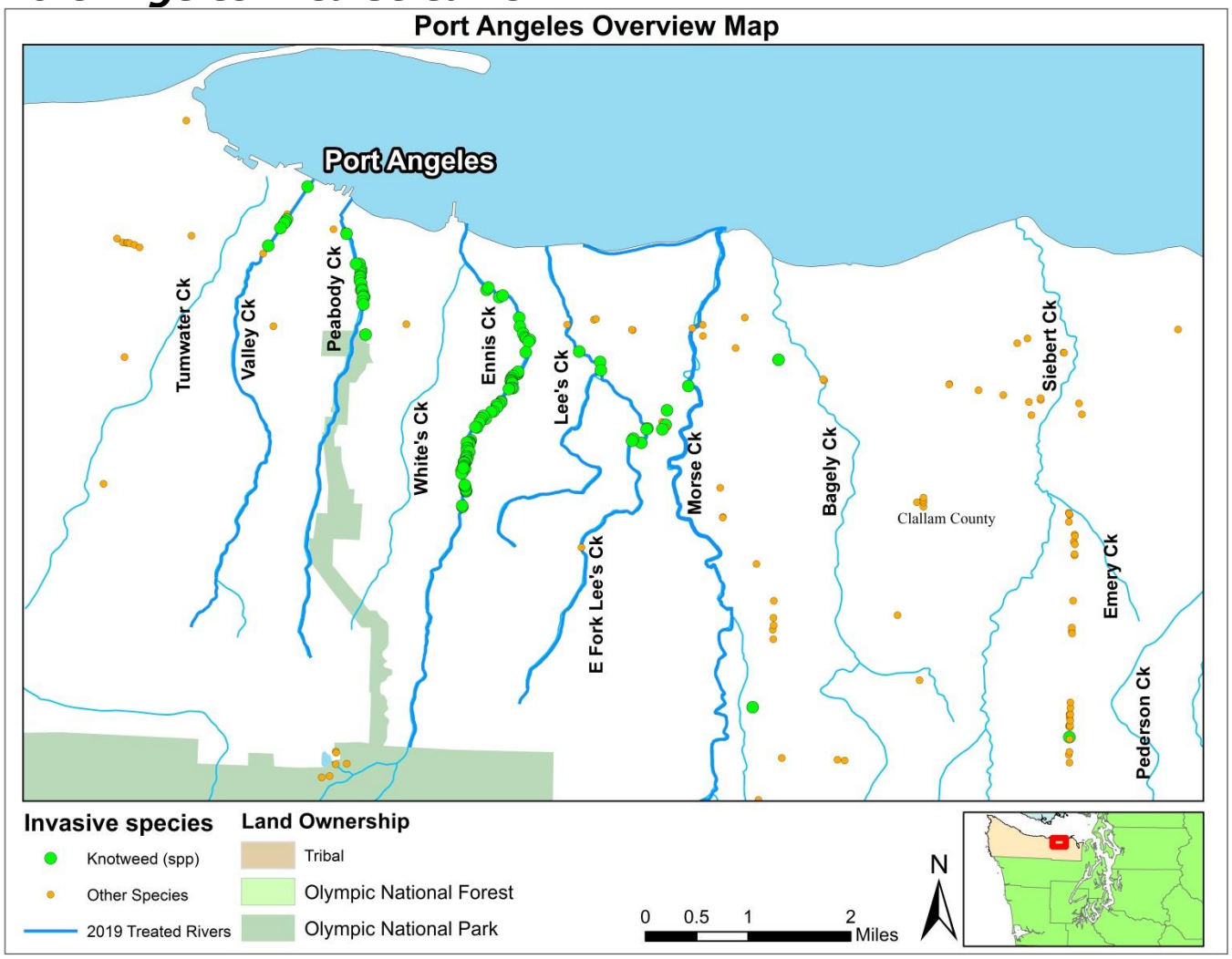
2018: This is the first year that any entity has reported treatments on Dry Creek. The Lower Elwha Klallam Tribe reported treating Himalayan blackberry and English ivy on behalf of one landowner. LEKT treated 0.3 river miles (2 acres) using 0.7 gallons of glyphosate (8%).

2019: No treatments reported.

2020: Follow-up-Consult with LEKT for future plans.

For more information about the Elwha River and treatments in the surrounding area, please contact:
Kim Williams, LEKT Revegetation Field Supervisor, 360-457-4012 ext. 7499, Kim.Williams@elwha.org
Or
Cathy Lucero, Clallam Noxious Weed Control Board, 360-417-2442 of clucero@co.clallam.wa.us

Port Angeles Area Streams



Valley Creek

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

<u>Brief Treatment history in Valley Creek</u>

See previous year's reports for more detailed information

- 2010: The first treatments on Valley Creek were conducted [Puget Sound Corps (PSC)].
- 2011: Bridge construction blockages prevented treatments this year.
- 2012: The PSC and a streamkeeper team performed a full survey of Valley Creek.
- 2013: One previously treated knotweed site was retreated. The only known purple loosestrife site in Port Angeles, consisting of 15 plants, was discovered on Valley creek and treated [PSC].
- 2014: 1.4 river miles were treated for knotweed, purple loosestrife, teasel, herb Robert, and other invasives [PSC].
- 2015-2017: Due to limited PSC funding, no treatments were performed.
- 2018: No treatments on Valley Creek this year.

In 2019: CCNWCB surveyed 0.9 miles and treated on 0.15 acres for knotweed, purple loosestrife, and common teasel. Treatments used 0.03 gallons of imazapyr (1%), 0.03 gallons of triclopyr (1.5%), and .002 gallons of aminopyralid (0.125%). We mailed 3 permission requests and received 2 new landowner agreements.

In 2020: CCNWCB will revisit 2019 treatment sites and retreat as needed.

Peabody Creek

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

Brief Treatment history of Peabody Creek
See previous year's reports for more detailed information

- 2009: 4 landowners, totaling approximately 0.5 river miles, gave permission to the CCNWCB to treat knotweed.
- 2010: Sites from 2009 were retreated. Surveys were performed farther upstream, where large stands of knotweed were found [CCNWCB].
- 2011-2012: Funding uncertainties prevented treatments on this river.
- 2013: 0.5 miles from the mouth of Peabody creek were treated for knotweed [CCNWCB]. A citizen science volunteer restoration project, lead by the Feiro Marine Life Center, was instituted.
- 2014: One site owned by the City of Port Angeles was treated [CCNWCB].
- 2015: Citizen Science volunteers manually controlled invasive species of concern.
- 2016: 3.7 acres (0.43 river miles) of Peabody Creek were treated. Very few infestations were found [CCNWCB].
- 2017: Due to time constraints and low infestation levels, no work on Peabody Creek was performed.
- 2018: No work done this year.

In 2019: CCNWCB surveyed 0.92 miles, between 1st St. and Lauridsen Blvd., and treated 0.6 acres for knotweed using 0.05 gallons of imazapyr (1%). We mailed 18 permission requests and received 13 new landowner agreements.

In 2020: CCNWCB will revisit 2019 treatment sites and retreat as needed.

Ennis Creek

Because the headwaters of Ennis Creek are at 6000' in Olympic National Park, it is significantly affected by both snowmelt and runoff. Historically Ennis Creek supported stocks of Coho, steelhead, and chum; however, Coho stocks are highly degraded. The lower reaches of Ennis Creek flow through urban areas of Port Angeles where water quality is impacted by storm water runoff. An old Rayonier mill site at the mouth of Ennis Creek has been highly disturbed and is a long time historical knotweed site.

Brief Treatment history of Ennis Creek
See previous year's reports for more detailed information

- 2007-2010: Ennis Creek near the Waterfront Trail was treated [CCNWCB, North Cascades Exotic Plant Management Team (NCEPMT)].
- 2011: Ennis Creek within the Olympic National Park (ONP) boundaries were treated [NCEPMT].
- 2012: The majority of the lower reaches of Ennis Creek were treated [CCNWCB].
- 2013: Most known knotweed sites were retreated, with the exception of the Old Rayonier mill [CCNWCB, NCEPMT].
- 2014: 0.66 river miles of lower Ennis Creek was treated [CCNWCB]. 0.01 acres of Ennis Creek were treated within ONP boundaries [NCEPMT].
- 2015-2016: No treatments on Ennis Creek were reported.
- 2017: 1.7 river miles of Ennis Creek were treated using 0.1 gallons of imazapyr (1%) was used to treat 14 parcels (10 acres). Very low level infestations remain in these lower reaches [CCNWB].

- 2018: The CCNWCB retreated 0.1 river miles (0.3 acres) using 0.06 gallons of imazapyr (1%) of Ennis Creek. Treatment focused on a large knotweed patch just below power lines.

In 2019: The CCNWCB treated 2.8 river miles (2.1 acres) of Ennis Creek using 0.17 gallons of imazapyr (1%). We mailed 34 permission requests and received 10 new landowner agreements, including the parcel under the power lines which we weren't able to treat in 2018 (see photo on page 2).

In 2020: Resurvey 2019 treatment sites and retreat as needed. Continue surveys and treatments on upstream parcels we didn't survey in 2019.

Lees Creek (E Fork Lees Creek)

Lees Creek is a medium-sized stream, entering the Strait of Juan de Fuca just east of Port Angeles. It currently supports very low numbers of anadromous salmon, limited to a few returning Coho and steelhead. It is a "naturally closed channel" through the summer, as the mouth of the channel is isolated from the Strait of Juan de Fuca by natural sand spit during low flow periods. Lees Creek has been significantly altered from its historic condition. Fish passage is constricted; large woody debris is lacking and storm water negatively impacts water quality. No active restoration or improvement actions are known in the Lees Creek watershed.

Brief Treatment history of Lees Creek-East Fork Lees
See previous year's reports for more detailed information

- 2011: Surveys on Lees Creek discovered a small amount of knotweed, which was treated [CCNWCB].
- 2012: No treatments occurred.
- 2013: A large number of new landowner permissions allowed for treatments on 9 parcels for knotweed and yellow archangel [CCNWCB].
- 2014-2016: No treatments took place due to time and funding constraints [CCNWCB].
- 2017: 21 parcels along 1.32 river miles of Lees and East Fork Lees Creek (from mouth to 1.2 miles up Mt Pleasant Road) were surveyed for treatment. Two parcels on East Fork Lees Creek with significant knotweed were also treated. A total of 0.11 gallons of 1% Imazapyr was used on 10 parcels. [CNWCB]
- 2018: CCNWCB crew treated along 0.99 river miles on both Lees and East Fork Lees using 0.03 gallons of triclopyr (1%) and 0.02 gallons of imazapyr (1%) across 3.35 acres.

In 2019: CCNWCB surveyed 2.83 miles on Lee's and E Fork Lee's Creek and treated 0.006 acres for knotweed using 0.006 gallons of imazapyr (1%). We mailed 91 permission requests and received 7 new landowner agreements.

In 2020: Follow-up on upstream permissions for infestations noted on properties above power lines.

Morse Creek and Waterfront Trail

While no knotweed has been found directly on Morse Creek itself, several patches of knotweed have been found in adjacent areas along the Port Angeles section of the Waterfront Trail.

Brief Treatment history of Morse Creek and the Waterfront Trail
See previous year's reports for more detailed information

- 2013: Four miles of the Waterfront Trail were surveyed, and approximately 300 knotweed stems were treated. Yellow archangel was also treated on Morse Creek [CCNWCB].
- 2014- 2018**:** No treatments have occurred on Morse Creek.

In 2019: CCNWCB treated an adjacent parcel (0.03 acres) by request using 0.005 gallons of imazapyr (1%) and surveyed 0.15 miles downstream. We also pulled ~6-10 poison hemlock plants near the HWY 101 bridge.

In 2020: Revisit 2019 treatment site and survey downstream area around HWY 101 for knotweed and other invasive species.

Bagley Creek

Bagley Creek is a medium-sized independent drainage, entering the Strait of Juan de Fuca approximately 2 miles west of Green Point. Coho, fall chum salmon, and winter steelhead are the only identified anadromous fish known

to exist in Bagley Creek. The watershed has experienced widespread timber harvest and conversion to residential use.

Brief Treatment history of Bagley Creek

See previous year's reports for more detailed information

- 2011: 0.75 miles of Bagley Creek were surveyed and two patches of knotweed were treated [CCNWCB].
- 2012: The source of knotweed on Bagley Creek was identified. All but two landowners in the source area consented to treatments [CCNWCB].
- 2013: 0.75 miles from the mouth of Bagley Creek was treated [Puget Sound Corp (PSC)].
- 2014: 2013 sites were retreated [CCNWCB].
- 2015-2016: No treatments on Bagley Creek were conducted.
- 2017: 1.61 miles of Bagley Creek were surveyed for treatment. Roadside source patches south of Hwy 101 were treated for the first time, per the County Road Department's IWM plan. A total of 0.05 gallons of imazapyr was used to treat a total of 0.63 acres. Poison hemlock was noted and also treated at the roadside knotweed site. [CCNWCB].
- 2018: CCNWCB crew retreated 0.2 road miles (0.5 acres) using 0.01 gallons of triclopyr (1%) and 0.02 gallons of imazapyr (1%).

In 2019: No treatments on Bagley Creek were conducted.

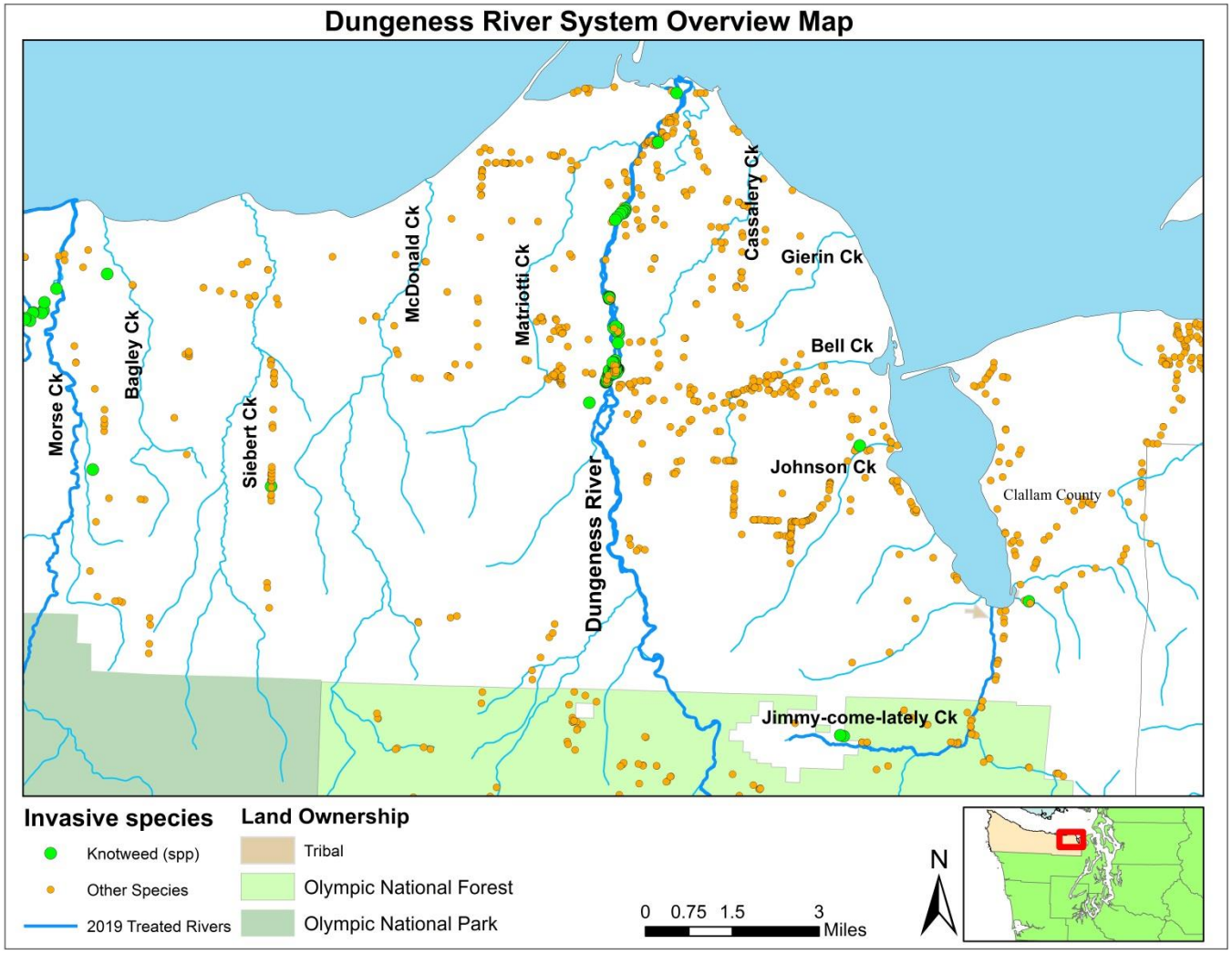
In 2020: No treatments planned at present.

Herbicide use, Port Angeles Area (gallons)							
Waterway	2013	2014	2015	2016	2017	2018	**2019**
Valley Creek	0.02	0.01	-	-	-	**-**	**0.06**
Peabody Creek	0.06	0.05	-	0.03	-	**-**	**0.05**
Ennis Creek	0.08	0.01	-	-	0.13	0.06	**0.17**
Lees Creek	0.001	0.2	-	-	0.05	0.01	**0.03**
East Fork Lees Creek	0.001	0	-	-	0.05	0.04	**0.03**
Morse and Waterfront	-	0.07	n/a*	-	-	-	**0.005**
Bagley Creek	0.04	0.001	-	-	0.05	0.03	**-**
Total	0.2	0.4	-	0.03	0.3	0.1	**0.3**

Note: Herbicide use for other noxious weeds is not included in this total.
**Manual treatments of the waterfront trail were performed in 2015.*

For more information regarding Port Angeles area streams, contact:
Shea McDonald, Noxious Weed Control Inspector, 360-417-2000 ext. 2703, smcdonald@co.clallam.wa.us

Dungeness River Watershed



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 is 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.

<u>Brief Treatment history of the Dungeness River</u>
See previous year's reports for more detailed information

- 2004-2008: Knotweed was treated on the Dungeness River. Specific information is not available [Jamestown S'Klallam Tribe].
- 2009-2012: No treatments of knotweed occurred. Other invasives, primarily butterfly bush, were targeted for treatments [Jamestown S'Klallam Tribe].
- 2013: Knotweed and butterfly bush were treated at two county parks along the Dungeness River. A Washington Department of Fish and Wildlife critical wetland near the Dungeness River was also treated [Puget Sound Corp (PSC)].

- 2014: 7 acres of private property on the Dungeness River was treated for knotweed and butterfly bush. 33.5 acres near the mouth of the Dungeness River, where knotweed was previously record, was found to be knotweed free and was treated for other species of concern [NOSC, PSC].
- 2015: 27.3 solid acres of invasive species were treated along the Dungeness River. Crews noted that use of an "EZ-Ject" on butterfly bush provided a high level of control [NOSC, Jefferson County Washington Conservation Corp (WCC), Jamestown S'Klallam Tribe, CCNWCB].
- 2016: Knotweed, scotch broom, and Himalayan blackberry were treated on 2 river miles [NOSC]. An additional 1.16 river miles along the Dungeness dike and adjacent floodplains were treated for invasives of control [WCC]. A total of 29 acres were surveyed for treatment in 2016.
- 2017: Butterfly bush and knotweed treatments continued along 1.3 river miles of the Dungeness River (24.7 acres) [WCC for NOSC]. River lupine was noted successfully filling areas once dominated by butterfly bush and knotweed. The CCNWCB surveyed and treated 4.4 acres of the Dungeness Dike (directly adjacent to the Dungeness River) for heavy poison hemlock infestations as well as Canada thistle, bull thistle, and herb Robert.
- 2018: The CCNWCB treated roadside noxious weed infestations in the vicinity of the Dungeness River and tributaries; treatments included 4.9 gallons of herbicide and covered 74 road miles.

In 2019: CCNWCB, NOSC, and WCC coordinated to treat 1.2 miles (32.39 acres) for knotweed, butterfly bush, common teasel, poison hemlock, and Canada thistle using 13 gallons of glyphosate (4%) in foliar, cut-stump, or EZ-ject applications.

In 2020: With an increase in funding, the NOSC plans to devote further resources to filling in missing permissions, retreatment of known sites and performing more native plantings. Follow up treatments of the Dungeness Dike will also be crucial.

Bell Creek

Bell Creek is approximately 3.8 miles long and drains 8.9 miles of low elevation watershed. It flows from Happy Valley through the eastern portion of Sequim, into Washington Harbor at the entrance to Sequim Bay. It has been heavily influenced by irrigation runoff since the initiation of irrigation in the Sequim-Dungeness Valley.

Brief Treatment history of Bell Creek

See previous year's reports for more detailed information

- 2013: An industrial site on Bell Creek with a long history of knotweed was treated [PSC].
- 2014: No treatments were reported.
- 2015: Species of concern were treated along Bell Creek [PSC]. Specific information is not available.
- 2016: 8 acres of adjacent land owned by the Washington Department of Fish and Wildlife (WDFW) was treated for teasel, poison hemlock and other noxious weeds [WCC].
- 2017: 6.6 acres of WDFW property adjacent to Bell Creek, using 0.3 gallons of Triclopyr (triclopyr) to treat poison hemlock and teasel. The teasel infestation was still extremely dense in this area but poison hemlock was much reduced. [CNCWCB]
- 2018: crews treated 7.5 acres for teasel and poison hemlock using 0.02 gallons of 0.5% Transline on Washington Department of Fish and Wildlife property adjacent to Bell Creek [WCC].

In 2018: CCNWCB and WCC treated along 0.25 miles of Bell Creek that flows through 9.7 acres of Washington Department of Fish and Wildlife property. Treatments were for teasel and poison hemlock using 0.9 gallons of triclopyr (1%), 0.17 gallons of triclopyr (1.5%), and 0.13 gallons of aminopyralid (0.125%).

In 2020: More resources should be devoted to treating the teasel and himalayan blackberry infestations at this site as they are heavily encroaching into Bell Creek, WDFW property and nearby residental properties and parks. Monitor small patch of knotweed along Bell Creek that was previously treated (near Les Schwab in Sequim).

Herbicide Use, Dungeness River and Surrounding Area (gal)							
	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	0.5	8.0	27.3	40.3	35.7	13	**9.7**
Total Herbicide	0.1	0.4	N/A	2.1*	0.7*	0.7	**1.2**

**Herbicide totals for 2016 and 2017 include Dungeness dike and Bell Creek portions only. Herbicide totals were not furnished by NOSC.*

For more information about control efforts on the Dungeness River, please contact:
Hilton Turnbull, Jamestown S'Klallam Tribe, (360) 681-4603, hturnbull@jamestowntribe.org
Or

Sarah Doyle, North Olympic Salmon Coalition, (360) 379-8051, sdoyle@nosc.org
Or
Cathy Lucero, Clallam County Noxious Weed Control Coordinator, 360-417-2442, clucero@co.clallam.wa.us or Shea McDonald, Noxious Weed Control Inspector, smcdonald@co.clallam.wa.us

Clallam County Road Department:

The Clallam County Road IWM Plan is created and administered by the CCNWCB and the plan strives to work collaboratively to support adjacent invasive plant control programs. Roadsides are high priorities for control of weed species because they cross and link many adjacent properties and land uses, and can act as conduits for the spread of weeds. Additionally, County rock sources/soil disposal sites (pits) act as weed sources and are especially vulnerable to contamination by knotweed. Knotweed is classified as a highest priority target species in the Integrated Weed Management Plan.

Brief Treatment history of knotweed and Integrated Weed Management Plan
See previous Clallam Road Department Annual Reports for details:

- 2017: The first treatment season of the Road Department's Integrated Weed Management. Knotweed was treated at **eight** County quarries or spoil disposal sites; knotweed was treated on **seven** county road right-of-ways.
- 2018: Clallam County Road Department IWM crew treated knotweed infestations on **13 road right-of-ways**: Blue Mountain Rd, Cays Rd, Dan Kelly Rd, Fisher Cove Rd, Henry Boyd Rd, Hermison Rd, Hoko-Ozette Rd, Olympic Hot Springs Rd, Power Plant Rd, Rife Rd, S Bagley Creek Rd, Swan Bay Rd, and Township Line Rd. Crews treated knotweed infestations at the **six pits**: Blyn Pit, Place Pit, Quillayute Pit, Ranger Pit, Umbrella Creek Pit and Whitcomb-Diimmel Pit.

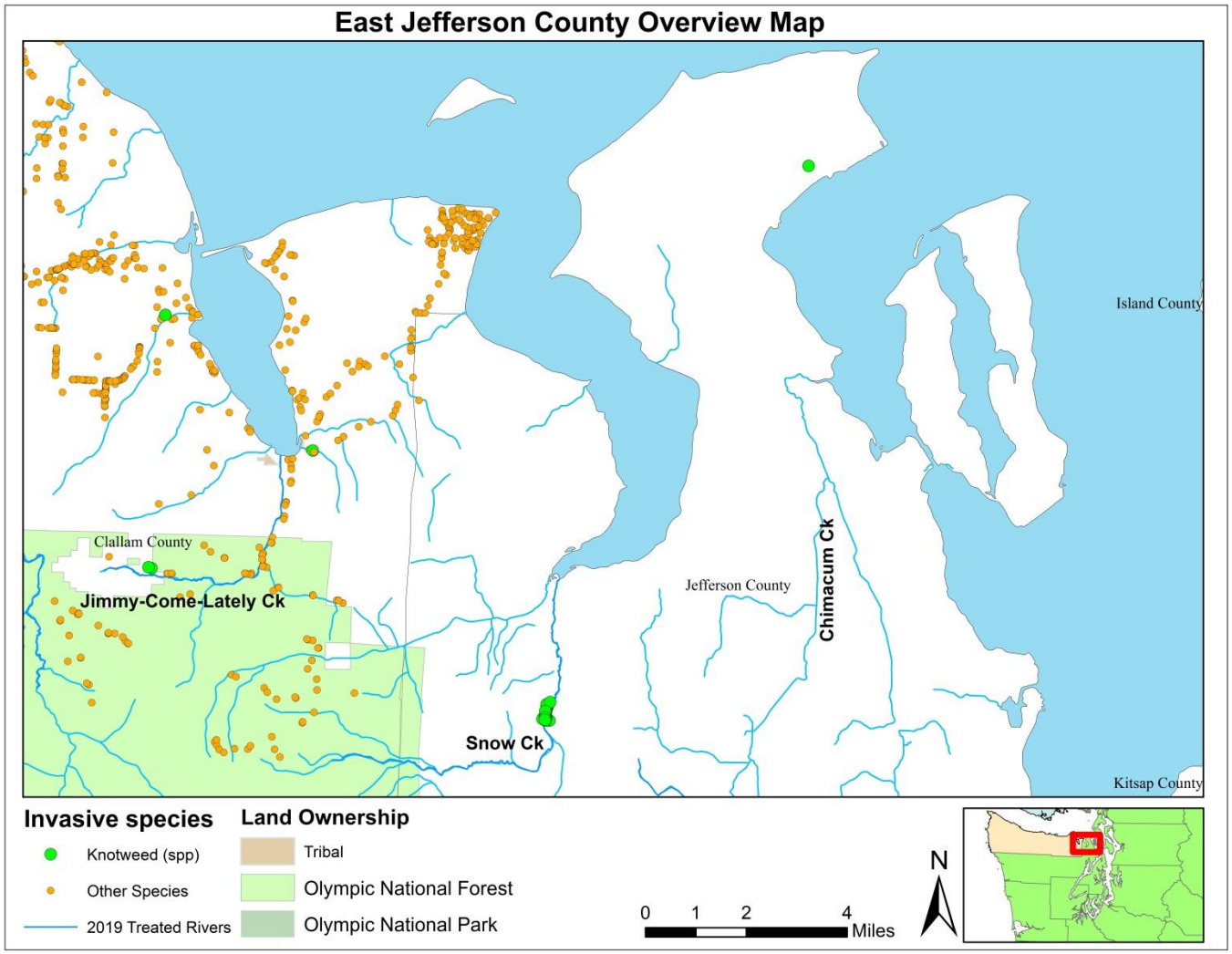
In 2019: In the third season of the Road Department IWM Plan, crews identified and treated previously unknown infestations of knotweed. Infestations treated in 2018 showed positive results with significant reduction in infestation area. Crews treated knotweed with an imazapyr (1%), with a triclopyr (1%) occasionally being used where broadleaf selectivity was necessary.

Clallam County Road Department IWM crew treated knotweed infestations on **10 road right-of-ways**: Charley Creek Rd, Blue Mountain Rd, Cooper Ranch Rd, Hermison Rd, Hoko-Ozette Rd, Jimmy-Come-Lately Rd, Joyce-Piedmont Rd, the Olympic Discovery Trail, Sekiu River Rd, and West Lake Pleasant Rd. Crews treated knotweed infestations at the **five pits**: Blyn Pit, Clallam Bay Storage Yard, Lake Creek Pit, Ranger Pit, and Umbrella Creek Pit.

In 2020: The Clallam Road Department IWM 2020 Plan is available online at the Clallam Noxious Weed Control Board website. Input from additional stakeholders or members of the public should be addressed to the Noxious Weed Control Board.

For more information about control efforts on the Dungeness River, please contact:
Cathy Lucero, Clallam County Noxious Weed Control Coordinator, 360-417-2442
clucero@co.clallam.wa.us
Or
Joe Reynolds, Weed Control Specialist, 360-417-2000 ext. 2703, jreynolds@co.clallam.wa.us

EAST JEFFERSON COUNTY



Port Townsend Area:

Brief Treatment history in the Port Townsend Area

See previous year's reports for more detailed information

Kah Tai Lagoon Park in Port Townsend:

- 2008-2011: A knotweed infestation of approximately 0.75 acres near the entrance of the park was treated [JCNWCB].
- 2012: The Park was designated for a rest year due to low infestation levels.
- 2013: Only about 20 canes of this infestation remained and were retreated.

Old Eaglemount Road

- 2010-2011: A small stand of knotweed was treated [JCNWCB].
- 2012: No treatments were reported.
- 2013: Of the previous infestations, only 4-5 stems remained and were treated.

Oak Bay near Port Hadlock

- 2011: A private parcel was treated for knotweed [JCNWCB].
- 2012: No treatments were reported.
- 2013: Approximately 40 remaining canes were treated. Crew noted that teasel has spread aggressively in areas previous inhabited by knotweed [JCNWCB].
- 2017: No treatment information was reported for inclusion.
- 2018: No treatment information was reported to us for inclusion.

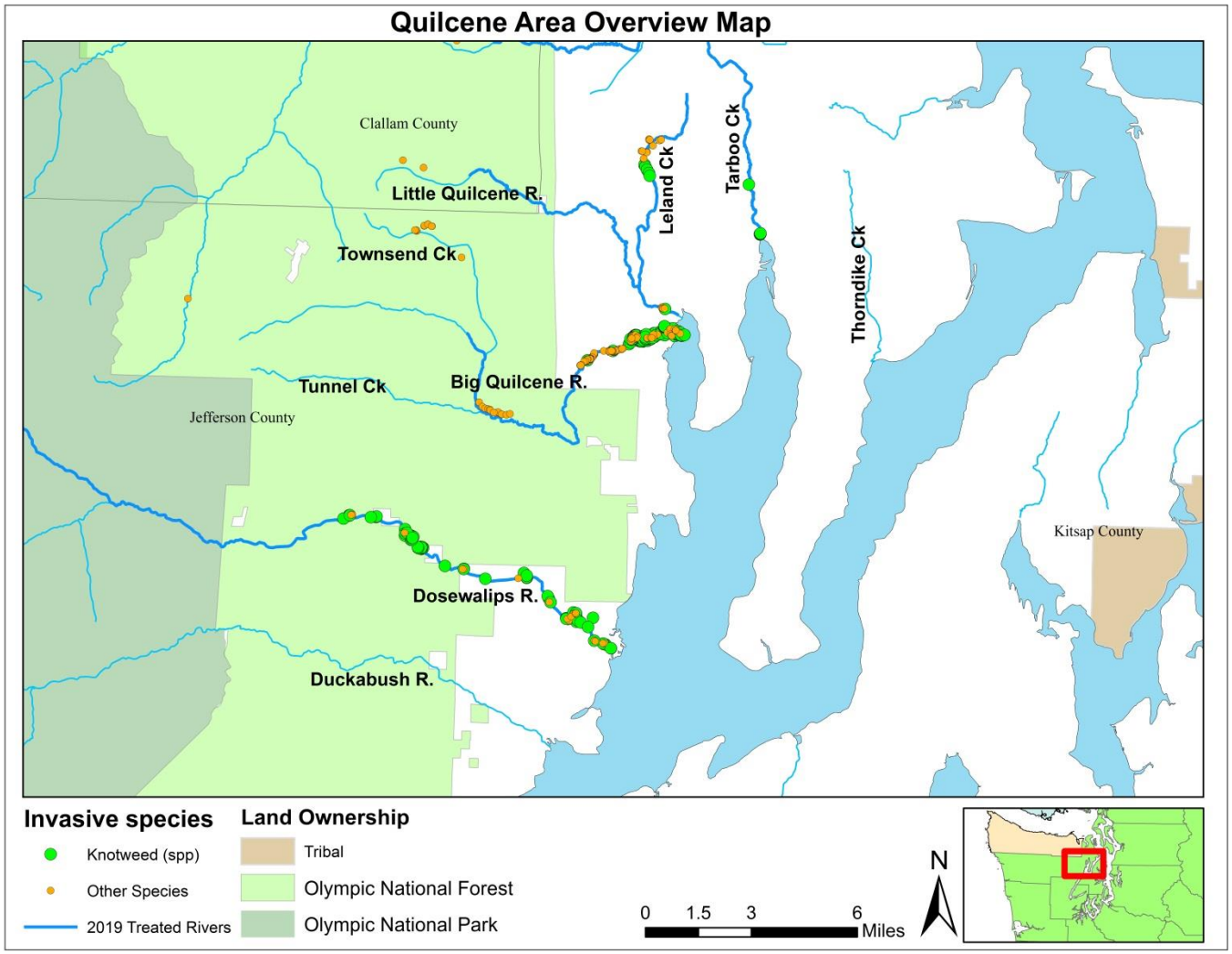
In 2019: No treatment information was reported to us for inclusion.

In 2020: Sites in Oak Bay and Port Townsend should be treated as resources are available.

Herbicide Use, Port Townsend Area (gallons)									
	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Port Townsend (several sites)	0.15	-	0.01	-	-	-	n/a	n/a	**n/a**
Old Eaglemount Road	0.004	-	0.0008	-	-	-	n/a	n/a	**n/a**
Oak Bay	1.1	-	0.01	-	-	-	n/a	n/a	**n/a**
Additional Jefferson County sites	-	-	-	-	-	0.4	n/a	n/a	**n/a**
Total Herbicide	1.3	-	0.03	-	-	0.4	n/a	n/a	**n/a**

For more information regarding control in the Port Townsend area, please contact:
Joost Besijn, Jefferson Noxious Weed Control Board Coordinator, noxiousweeds@co.jefferson.wa.us

Quilcene Area



Big Quilcene River

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 in the Olympic National Forest. 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 as most of the water used in Port Townsend comes from the Big Quilcene. The middle reaches between river mile 5 and river mile 2.5 are moderate gradient channels with widened floodplains. There is Federal Fish Hatchery 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 for 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!

Brief Treatment history of the Big Quilcene River

See previous year's reports for more detailed information

- 2008: The entirety of the river was surveyed for knotweed [JCNWCB, HCSEG].
- 2009: Treatments for knotweed took place on this river [Clallam County Noxious Weed Control Board (CCNWCB)].
- 2010: 19 days were devoted to treated knotweed on the majority of the river [North Olympic Salmon Coalition (NOSC), HCSEG].

- 2011: All previously treated knotweed sites were retreated [NOSC, JCNWCB]. Private landowners were given the opportunity for native plantings to take place on treated sites.
- 2012: All known knotweed infestations were treated [NOSC, HCSEG].
- 2013: All known knotweed infestations were retreated and a few new sites were discovered and treated [HCSEG].
- 2014: Surveys of the upper and middle reaches of Big Quilcene did not find any knotweed. Treatments and native plantings focused on the lower reaches of the river [HCSEG].
- 2015: Retreatment of known knotweed sites and revegetation continued. A total of nine sites were planted with native species [HCSEG].
- 2016: 34 acres were treated with 1.49 gallons of glyphosate [HCSEG].
- 2017: 3.2 miles of the lower Big Quilcene River treated using 0.26 gallons of imazapyr to treat 375 acres. Knotweed continues to decline significantly with only 0.075 solid acres of knotweed being treated this year. Crew switched to imazapyr to increase efficacy [HCSEG/WCC].
- 2018: All previously treated knotweed sites were retreated along 3.2 river miles, assisting 12 landowners, using 0.166 gallons of glyphosate and an additional 0.038 gallons of imazapyr (1%) [HSEG, WCC].

In 2019: The Big Quilcene River has a variety of knotweed species, including giant and Japanese Knotweed. In 2019, herbicide use more than doubled the 2018 total; although still only a third of what HCSEG applied in 2016. The increase on Big Quilcene was due to lack of Jefferson County consent in 2018 which restricted HCSEG treating knotweed near the mouth. Thanks to the work of JCNWCB, HCSEG, and WCC was able to thoroughly treat around the mouth of the Big Quilcene, however this success created an increase in herbicide use. HCSEG, with the assistance of a WCC crew, treated 5.3 river miles assisting 27 landowners. Treatments used 0.5 gallons of glyphosate (100% injected) and an additional 0.09 gallons of imazapyr (1%). Comfrey continues to spread in the Big Quilcene. Everlasting peavine, yellow archangel, and Scotch broom were also surveyed and treated in certain locations. Himalayan blackberry was treated on a four acre parcel to prep the site for this winter's upcoming planting. Untreated but surveyed weeds include English ivy and spotted jewelweed. English Ivy is especially bad 0.5 miles above Linger Longer Rd, and below on Jefferson County, HCSEG and WDFW parcels, in the riparian forests adjacent to the estuary. Himalayan blackberry is also dominating the understory of riparian forests in the lower section of this river.

In 2020: Continue to survey and treat as needed. New landowner consent with the USFWS hatchery on the Big Quilcene allowed for treatment of the highest known knotweed point, once this is fully controlled the next highest point of knotweed will be 1.5 miles downstream. Two other landowner agreements were made with previously non-consent parcels; these parcels are located at the same location on the river where there is a dramatic increase in knotweed point density. Only two more holdouts remain in this reach, which will be pivotal in moving the highest point of knotweed further downstream.

Herbicide Use, Big Quilcene River (gallons)												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated*	13	55.75	42.75	4.06	NA	5**	6**	240	34	375	290	**0.3**
Glyphosate injected	2.1	0	0	0	0	0	0	0	0	0	0.2	**0.5**
Glyphosate foliar	3.6	18.3	31.4	9.8	7.3	9.9	4.3	3.6	1.5	0	-	**-**
Imazapyr foliar	0	0	0.9	0	0	0	0	0	0	0.26	0.04	**0.09**
Total Herbicide	5.7	18.2	24.1	9.8	7.3	9.9	4.3	3.6	1.5	0.3	0.2	**0.6**

The discrepancy between acres treated in different years may be due to different counting methods being used. *"Acres Treated" in 2008-2014 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. In 2015, 'Acres Treated' is included as reported by HCSEG. In 2011 the crew recorded strictly the acreage covered by knotweed, not the total infested area, as they had done in previous years. This accounts for the greatly reduced acreage. Data on acres actually treated was not supplied in 2013 and 2014. In 2017, the HCSEG and its WCC crew calculated acres treated using a 100 foot as the average width and multiplied this by river miles.*
***Estimate values*

Town of Quilcene

Brief Treatment history in Quilcene

See previous year's reports for more detailed information

- 2013: Several small sites were treated in mostly terrestrial areas [Jefferson Puget Sound Corp (JPSC)].
- 2014: Several additional small sites were treated around Quilcene [CCNWCB].
- 2015-**2019:** No treatments were recorded due to funding and staffing shortages.

In 2020: The Herb Beck Marina is a potential candidate for surveys and retreatment.

Lake Leland

The Lake Leland County Park is a popular fishing destination. Four distinct knotweed patches have been observed around the south end of the lake divided between County road right-of-way and private property.

Brief Treatment history in Lake Leland

See previous year's reports for more detailed information

- 2011: Sites where permissions were granted were treated for knotweed [JPSC].
- 2012: No treatments took place.
- 2013: Reed canarygrass was treated on Lake Leland and Leland Creek [JPSC].
- 2014- **2019:** No treatments were recorded.

In 2020: Leland's popularity as a fishing destination makes it an important riparian area for consistent knotweed treatments. Surveys and retreatment should take place as needed.

Tarboo Creek

Tarboo Creek, which drains into Dabob Bay, is a small but significant stream. There are 2,700 acres of protected riparian land, managed by many different groups including Jefferson Land Trust, Washington Department of Natural Resources (WDNR) and the Northwest Watershed Institute (NWI). The lower portion of Tarboo Creek is virtually undeveloped and it includes both conifer and deciduous forests and supports protected species such as the bald eagle, northern spotted owl and marbled murrelet.

Brief Treatment history of Tarboo Creek

See previous year's reports for more detailed information

- 2011-2013: Knotweed was treated along Tarboo Creek. [JCNWCB, NWI].
- 2014: No treatments occurred due to staffing shortages at JCNWCB.
- 2015: 1 acre was surveyed for treatment of knotweed [HCSEG].
- 2016-**2018:** No treatments were reported on Tarboo Creek; Infestation points only submitted by HCSEG.

In 2019: HCSEG treated 30ft^2 of knotweed on a private parcel for the Northwest Watershed Institute on Tarboo Creek. They also treated approximately 85 ft^2 of knotweed on WA Department of Fish and Wildlife property near the mouth of Tarboo Creek.

In 2020: Species of concern should be surveyed and treated along Tarboo Creek to protect the relatively pristine habitats.

Little Quilcene River

The Little Quilcene River drains a basin of approximately 40 square miles. Its headwaters originate above 4,400 feet on the north slopes of Mount Townsend and its runoff is derived from both rainfall and snowmelt. The upper watershed is within the Olympic National Forest and is steeply dissected with high gradient, confined stream channels. The lower valley and the flood plain have been developed for domestic, agricultural and timber use. The lower 0.8 miles have been diked and the banks armored to protect properties in the floodplain. The Little Quilcene River discharges to Quilcene Bay approximately one mile north of the mouth of the Big Quilcene. The estuary supports populations of Chinook, pink, chum, steelhead, Coho, sturgeon and cutthroat. However, the dike system, put in place nearly 100 years ago, has disturbed tidal function in the estuary. Sediment washed downstream has caused the formation of a "delta cone": a build-up of sediment in the estuary that can bury salt marshes that provide young salmon food and protection from predators. The HCSEG owns land near the mouth

of the Little Quilcene and has mounted a large restoration effort in the estuary. 35,000 cubic yards of soil have been removed and the shoreline has been moved back 400 feet.

Brief Treatment history of Little Quilcene River
See previous year's reports for more detailed information

- 2009: Knotweed near the mouth of the Little Quilcene River was discovered and treated [JCNWCB].
- 2010, 2013-2014: Remaining knotweed from the mouth of the river were retreated [East Jefferson Washington Conservation Corp (EJWCC), CCNWCB].
- 2015: One privately owned parcel was surveyed for knotweed but none was found [HCSEG].
- 2016: 2 acres of the lower reaches of the river were surveyed, where no knotweed was found [HCSEG].
- 2017: 0.2 miles of the Little Quilcene River was surveyed where only one parcel was found to have knotweed. Less than 0.001 gallon of imazapyr was used to treat 3 square feet of knotweed. [HCSEG]
- 2018: Knotweed was found at several locations during surveys of Leland Creek. An increase in Spotted Jewelweed infestations was observed this season in both Leland Creek and Little Quilcene River systems. Treatments used 0.064 gallons of imazapyr (1%) [HCSEG].

In 2019: HCSEG, working with Jefferson County Weed Control, was able to treat a large patch of knotweed along the county ROW. This patch was also located in an upland section adjacent to, but not in the Leland Creek floodplain. Knotweed treatments on 0.03 acres used 0.34 gallons of glyphosate (100% injection) and 0.01 gallons of imazapyr (1%). Himalayan blackberry treatment was conducted on an HCSEG parcel below Center Rd bridge. This section has an intact alder canopy with 6-8ft blackberry understory.

In 2020: Mass landowner mailings were issued in 2019 to the Little Quilcene and Leland Creek area, in the past HCSEG only had consent on specific parcels to treat knotweed points below Leland Lake. Landowner responses to mailings were optimistic although there were plenty of holdouts; in the 2020 season HCSEG field crew will be able to treat and survey knotweed from Leland Creek down to the mouth of the Little Quilcene. HCSEG will continue to treat and utilize volunteers to manually control the area below Center Rd bridge and replant with native conifers and shrubs.

Herbicide Use, Quilcene Area (gallons)									
Waterway	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Quilcene Town	0.6	-	0.3	0.003	-	-	-	-	**-**
Tarboo Creek	2	2.3	0.03	-	0.02	-	-	-	**-**
Herb Beck Marina/Quilcene	-	-	0.3	0.05	-	-	-	-	**-**
Little Quilcene River	n/a	n/a	0.09	0.02	-	-	0.001	0.06	**0.4**
Total Herbicide	2.5	2.3	0.8	0.07	0.02	-	0.001	0.06	**0.4**

Note that 2011 and 2012 treatments were solely glyphosate. In 2013 the Weed Boards used imazapyr at 1%. There was a 90% reduction in overall use between 2013 and 2014, when imazapyr was again used.

Dosewallips/Duckabush and vicinity

Spencer Creek

Spencer Creek is a comparatively short waterway that flows into Jackson Cove in the northwest section of the Hood Canal.

Brief Treatment history of Spencer Creek
See previous year's reports for more detailed information

- 2008-2010: One severe infestation on the upper reaches of Spencer creek was treated [CCNWCB].
- 2011: Large infestations of knotweed and giant hogweed were treated [CCNWCB].
- 2012: Retreatment of the upper reaches of the creek took place. All downstream sites where permissions were granted were also treated [CCNWCB, JCNWCB].
- 2013: The lower reaches of Spencer creek were retreated [JPSC].
- 2014: 1.7 river miles were surveyed and treated for knotweed, giant hogweed, and yellow archangel. Herbicide usage (see table below) indicates a gradual decrease in infestations [CCNWCB].
- 2015-**2019:** Due to low infestation levels, no treatments were performed on Spencer creek; there was no report of treatments in 2019.

In 2020: If time and resources allow, Spencer Creek should be surveyed and treated for all high priority weeds.

Herbicide Use, Spencer Creek (gallons)									
	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Total Herbicide	1.7	3.3	0.3	0.2	-	-	-	-	**-**

Dosewallips River

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. The remaining area is rural residential, commercial, and private forested lands. The Dosewallips River supports Chinook, steelhead and Hood Canal Summer Chum, the last of which are listed as Threatened under the Endangered Species Act.

Brief Treatment history of the Dosewallips River

See previous year's reports for more detailed information

- 2006: The entire Dosewallips River was surveyed for knotweed [JCNWCB].
- 2007-2009: A combined JCNWCB/CCNWCB crew treated knotweed on the river.
- 2010: Additional surveys of upstream sites revealed more knotweed infestations, which were treated [EJWCC].
- 2011-2012: Sites discovered in 2010 were retreated [EJWCC].
- 2013: Comprehensive treatments of the entire mainstem took place this year. Upstream infestations had decreased greatly, while the lower Dosewallips still had heavy infestations [EJWCC].
- 2014: 13 miles of the river were treated for knotweed and herb Robert [CCNWCB, Jefferson Puget Sound Corps (JPSC), EJWCC].
- 2015: 12.5 miles of the Dosewallips were treated, including three new parcels and a channel newly created by an engineered log jam.
- 2016: The channel created in 2015 was retreated. In addition, 6 acres in the Dosewallips State Park were treated for species of concern [EJWCC].
- 2017:10.5 river miles surveyed; 0.13 acres of solid knotweed treated using 0.07 gallons of imazapyr.
- 2018: Treatments used 0.2 gallons of glyphosate (100%) and an additional 0.4 gallons of imazapyr (1%) [HCSEG].

In 2019: The Dosewallips had a sharp decline in herbicide, from 2018 when HCSEG found a large infestation spreading from the Dosewallips River Rd as well as, locating a matriarch patch on an ephemeral streambed upstream of an infestation on a landowner's property. This year's decline in herbicide highlights the work done in 2018. Treatments on 0.07 acres used 0.04 gallons of imazapyr (1%) and 0.07 gallons of glyphosate (100% injection). The Dosewallips continues to be near control status but small knotweed patches are continually found few and far between. In 2018, we found knotweed above the highest known point, and this year we found another 2-5 stem patch above the highest known point. Besides this set back, most of the knotweed is very small and non-competitive but full elimination of knotweed in this system will take detailed surveys which are difficult for such a large river system. Butterfly bush was also treated and small patches of yellow archangel were found during our knotweed treatment and those were controlled using imazapyr (1%).

In 2020: Upriver surveys on the Dosewallips will be crucial to find the highest knotweed point, the last two years we have found points higher up than we knew about. While treating the Dosewallips this summer a large amount of butterfly bush was found in the lower watershed. Large 6-12 ft patches were found along the bank next to Dosewallips State Park and an impressive amount of small seedlings buffer these patches. HCSEG treated some of the small seedlings but a follow-up cut-stump treatment of the larger patches and a more thorough treatment of small seedlings will be necessary to stop the spread.

Herbicide Use, Dosewallips River (gallons)														
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated*	2	5	7.8	5.5	14.1	0.3	0.6	5**	1.3	5718	27.1	1348	1348	**0.07**
Glyphosate injected	0.8	3.2	0.8	0	0	0	0.03	0	-	-	0	0	0.7	**0.07**
Glyphosate treated	0.4	3.2	3.1	0.2	8.5	0.6	1.4	1.6	0.007	0.8	0	0	-	**-**
Imazapyr treated	0	0	0	0	0.02	0	0.02	0.003	0.03	-	0.1	0.07	0.4	**0.04**
Total Herbicide	1.2	6.4	3.9	0.2	8.5	0.6	1.5	1.6	0.04	0.8	0.1	0.07	0.6	**0.1**

***The discrepancy between acres treated in different years may be due to different counting methods being used.** Acres treated in 2015 are as reported, and appears to be the total acres for parcels which received treatment. In 2017, the HCSEG and its WCC crew calculated acres treated using a 100 foot as the average width and multiplied this by river miles.*
***Estimated values*

Duckabush River

The Duckabush is one of the major waterways in Jefferson County. It originates near Mount Duckabush, within Olympic National Park, and flows into the Hood Canal south of the town of Brinnon. It is 24.5 miles long with over 50 tributaries contributing an additional 94 stream miles. The watershed covers an area of approximately 75 square miles. The upper watershed has been minimally logged and is used recreationally for hiking and camping. The lower 3.4 miles are accessible to salmon and support populations of Chinook, coho, chum and pink salmon, as well as steelhead and sea run cutthroat.

Brief Treatment history of the Duckabush River
See previous year's reports for more detailed information

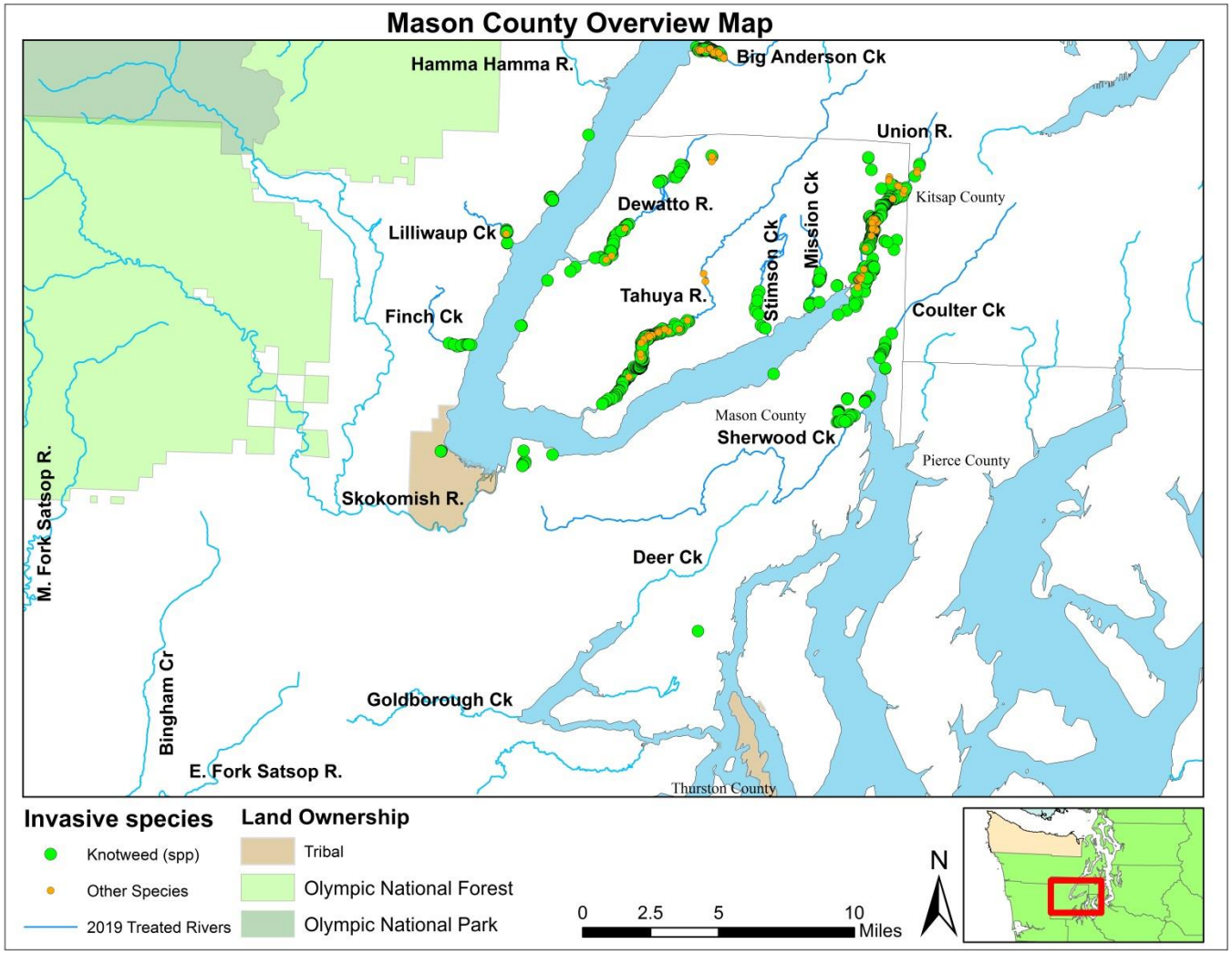
- 2006: Surveys of the Duckabush River did not reveal any knotweed [HCSEG].
- 2007: A landowner reported knotweed on their property, which was treated [CCNWCB].
- 2008-2012: The private property first treated in 2007 was retreated [CCNWCB]. In 2012, an additional complete survey was performed in which no knotweed was found [HCSEG].
- 2013: Approximately 10 plants were treated near the mouth of the Duckabush [CCNWCB, JCNWCB].
- 2014-2017**:** No knotweed treatments took place on the Duckabush. Treatment of other invasive species was performed in National Forest Service lands (not reported here).
- 2018-**2019**: No treatments reported.

In 2020: Due to the low knotweed occurrence on the Duckabush, treatments of other invasive species of concern should be performed in its lower reaches.

Herbicide Use, Duckabush off-channel site (gallons)									
	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Total Herbicide	0	0.01	0.0008	-	-	-	-	-	**-**

For more information about control efforts in the Quilcene area, please contact:
Alex Papiez, Hood Canal Salmon Enhancement Group, 360-275-3575 extension 24,
alex@pnwsalmoncenter.org.

MASON COUNTY



Tahuya River

The Tahuya River is the largest stream on the Kitsap Peninsula, draining 45 square miles of land. The mainstem is 21 miles long, plus an additional 65 miles of tributaries. The numerous tributaries are an important factor in the Tahuya's ability to produce large numbers of coho salmon. Large undeveloped parcels along the remote river banks have made access to the Tahuya for complete river treatments difficult.

Brief Treatment history of the Tahuya River

See previous year's reports for more detailed information

- 2010-2014: The first knotweed survey on the Tahuya River in 2010 revealed 98 parcels with small, intermittent patches of knotweed. These parcels were treated from 2010-2014. By 2014, infestations had decreased substantially on lower reaches of the river and were not treated [HCSEG].
- 2014-2015: Sitka Spruce and Western Red Cedar were planted on four large parcels. In 2015, retreatment of known knotweed sites was prioritized to the mid and upper Tahuya [HCSEG].
- 2016: 5.7 river miles were surveyed for treatment. 47 parcels were treated for knotweed [HCSEG].
- 2017: 6.5 river miles were surveyed (221 treated acres). 8 gallons of imazapyr (1%) was used to treat 0.06 acres of solid knotweed. [HCSEG and WCC]
- 2018: 6.5 river miles (387 acres) were treated for knotweed using 0.01 gallons of imazapyr (1%) [HCSEG].

In 2019: This was the ninth consecutive year, (since 2010) of knotweed surveys and treatments along the Tahuya River main stem. The Tahuya River herbicide totals also increased this year, two main reasons for this are large

infestations of knotweed on non-consent parcels and having our WCC crew do a full treatment on this river, where last year HCSEG staff treated this river because of time constraints. HCSEG, assisted by a WCC crew treated along 10.87 river miles (0.83 acres), assisting 69 landowners on 49 parcels. Treatments used 0.1 gallons of imazapyr (1%) and 0.34 gallons of glyphosate (100% injection).

In 2020: The Tahuya River will need a focus on outreach and targeting holdouts, there are several large parcels owned by one landowner that cannot be reached and probably does not want to be reached. These parcels are infested with knotweed and are a hotspot source for downstream knotweed points. In the upper portion of our treatment area on the Tahuya, piano key shaped parcels make it difficult to gain full consent from all the landowners adjacent to the river.

Union River

The Union River mainstem is 10 miles in length and has an additional 30 miles of tributaries. The river enters Lynch Cove at the terminus of the east arm of Hood Canal, draining 24 square miles of land. The Union Reservoir supplies up to 5 million gallons of water per day to the City of Bremerton and the Puget Sound Naval Shipyard. The Union River is the only watershed in west WRIA 15 and north WRIA 14 to support a healthy run of summer chum salmon.

Brief Treatment history of Union River

See previous year's reports for more detailed information

- 2009-2013: Knotweed treatments were performed on 99 parcels each year [HCSEG].
- 2014: Crews note that while knotweed re-growth is very sparse, noxious weeds including giant hogweed, spotted jewelweed and policeman's helmet have spread into bare ground previously infested with knotweed. Native plant revegetation with primarily coniferous trees was started on 11 parcels throughout Union river.
- 2015: 4.32 river miles were surveyed for treatment [HCSEG, East Jefferson Washington Conservation Corps (EJWCC)].
- 2016: 3.45 miles of Union river was surveyed for treatment and an additional property was selected for native plantings [HCSEG, EJWCC].
- 2017: The HCSEG treated 386 acres along 4.9 river miles. Crew noted control progress has slowed in recent years and have switched exclusively to imazapyr treatments which have showed better results.
- 2018: Treated 4.9 river miles of the Union River (353 acres) using 0.27 gallons of Glyphosate and an additional 0.35 gallons of Imazapyr (1%).

In 2019: This was the eleventh consecutive year (since 2009), that HCSEG has surveyed and treated knotweed along the river mainstem and tributaries. The Union River increased slightly in total herbicide use, but remains relatively static which will hopefully change as we continue to survey the upper tributaries. Also the Highway 300 application was not included in this report which would have significantly increased the amount used on the Union. With the assistance of a WCC crew, HCSEG treated along 9.3 river miles of the Union River (1.68 acres) assisting 68 landowners. Treatments used 0.49 gallons of glyphosate (100% injection), 0.12 gallons of glyphosate (1%) and an additional 0.15 gallons of imazapyr (1%).

The MCNWCB assisted 2 landowners in the Union River watershed by treating knotweed and additional associated invasive species. Treatments on 2.55 acres used 0.00008 gallons of imazapyr (1.25%) and 0.003 gallons of triclopyr (1.5%). The Union River, HCSEG worked with MCNWCB to treat giant hogweed. bittersweet nightshade, old man's beard, spotted jewelweed, reed canarygrass, and Himalayan blackberry which are the most widespread and dominating invasives. Bittersweet nightshade, in many locations appears to be altering healthy riparian functions by spreading into the stream and smothering vegetation. Bur chervil and dame's rocket were observed by Pat Grover, in the riparian zone and along roadsides on Old Belfair Highway; this is a relatively recent observance and extent is increasing. Policeman's helmet is also scattered in small patches.

In 2020: Upper river surveys on the Union River need to be done. In the upper watershed there are several forks and tributaries while the upper mainstem enters a protected watershed owned by the City of Bremerton for the city's drinking water. Surveying this section is prohibited, but this area seems unlikely to harbor noxious weeds due to the protective measure to maintain healthy water quality in the reservoir. HCSEG will survey as far upstream as possible on the mainstem but focus more on surveying the lateral tributaries which are more likely sources of infestation. Tributaries include Hazel Creek, East Fork Union, NE Fork Union, Courtney Creek, Viola Creek and Irene Creek.

Dewatto River

The Dewatto River mainstem is 8.7 miles in length with about 30 miles of tributaries. The river enters Hood Canal about 5.5 miles north of the Great Bend of Hood Canal, draining about 23 square miles. Several wetlands are present near the mouth, providing quality rearing habitat for juvenile salmonids. Historically, the dominant land use of the Dewatto River was timber production but the estuary remains relatively undisturbed. Access to the shore is easy in the lower reaches where the main road runs along the river. The upper reaches are often surrounded by wetlands or thick woods, making access more challenging. Nonetheless, knotweed control has been conducted on the Dewatto River since 2009.

Brief Treatment history of Dewatto River

See previous year's reports for more detailed information

- 2009-2013: After an initial survey in 2009, all known knotweed sites have been treated along the entirety of the Dewatto River each year [HCSEG, EJWCC].
- 2014: By 2013, very few knotweed infestations remained on the river and 2014 was designated as a rest year.
- 2015: 1.12 miles of the upper reaches of the Dewatto River were treated, where the knotweed infestations were the heaviest [HCSEG, EJWCC].
- 2016: Knotweed on the river has decreased significantly since its first treatments in 2009, and only 0.75 river miles were surveyed for treatment [HCSEG, EJWCC].
- 2017: The HCSEG-WCC surveyed 22 parcels along the Dewatto River. Knotweed infestations continue to be minimal, with only 0.133 gallons of imazapyr being used on 4.9 river miles. Most infestations were found within 2.6 miles of where the Dewatto meets the Hood Canal water body. Broad scope of permission has greatly improved the efficacy of treatments. [HCSEG, WCC]
- 2018: 7.5 river miles treated using 0.048 gallons of glyphosate and 0.051 gallons of imazapyr (1%) [HCSEG].

In 2019: This is the tenth consecutive year (since 2009) HCSEG has treated knotweed along the Dewatto River and its tributaries. Knotweed infestation throughout this region is mainly found in smaller "patches" spread intermittently throughout the river and treatments have been successful in reducing patch size. HCSEG, with the assistance of a WCC crew, treated 7.12 river miles of the Dewatto River assisting 6 property owners on 18 parcels. Treatments used 0.71 gallons of glyphosate (100% injection) and 0.16 gallons of imazapyr (1%). The increase in herbicide was due to HCSEG locating a new very large patch in an upland section adjacent to the floodplain. This increase should not be interpreted as an increase in knotweed infestation along the Dewatto River riparian zone, but a new approach to controlling potential upstream and upland patches of knotweed that were previously lacking in control. Bittersweet nightshade and old man's beard continue to be the most problematic invasive weeds. English holly and Canada thistle were also regularly scattered throughout the system.

In 2020: After treating a large patch of knotweed adjacent to the Dewatto River corridor, HCSEG will need to conduct a full survey not only in the upper river reaches but in the middle section of the mainstem where there has not been a survey conducted in the last three years. This area was surveyed in the past and no knotweed was found. This area has two large marsh/wetland sections through it which make surveys very difficult. However, after finding such a large patch of knotweed near this section a survey seems necessary.

For more information about the Tahuya, Union or Dewatto Rivers, please contact:
Alex Papiez, Hood Canal Salmon Enhancement Group, 360-275-3575 extension 24,
alex@pnwsalmoncenter.org.

Skokomish River

The Skokomish River drains a basin of about 247 square miles and empties into Anna's Bay in southern Hood Canal near Potlatch. The upper reaches of the Skokomish River lie within the Olympic National Park. The North Fork basin includes Lake Cushman, a reservoir maintained for hydroelectric power generation. The entire basin is sparsely populated, providing important habitat to terrestrial wildlife such as elk, deer, beaver, and waterfowl. Wildlife, shellfish, and finfish are important cultural and economic resources for the Tribe. The Skokomish River system also provides valuable habitat for important species of fish such as Chinook, Coho, and chum salmon;

steelhead; and various trout. Wildlife, shellfish, and finfish are important cultural and economic resources for the Skokomish Indian Tribe, making restoration of the river a priority.

Brief Treatment history of Skokomish River
See previous year's reports for more detailed information

- 2010-2011: Knotweed on the Skokomish River was treated. No other information is available. [Mason Conservation District (MCD)].
- 2012: A new systematic top-down treatment approach was utilized and 43 acres were surveyed for treatment [MCD].
- 2013: 29 parcels of the heavily infested Skokomish Valley were treated. A partnership with the Squaxin Island Tribe also allowed for knotweed treatment in the Skookum Creek watershed [MCD].
- 2014: 24 parcels in the Skokomish Valley were retreated [MCD].
- 2015: Due to the substantial re-growth seen through glyphosate applications, the MCD switched to imazapyr foliar applications. 8.7 river miles of the Skokomish were treated.
- 2016: 12.4 miles of the upper Skokomish were treated. Switching to imazapyr seemed to provide a higher level of control compared to glyphosate applications done before 2015 [MCD].
- 2017:15.5 river miles (442 acres) of the Skokomish River searched for knotweed and giant hogweed. Crew reported that sites upstream of Highway 101, where they have been treating for several years is seeing 80-90% control. This was first year of systematic treatment downstream of Highway 101. [MCD] With such high control, MCD has embarked on seeding and bareroot plantings as appropriate.
- 2018: 8 river miles (321 acres) were treated for knotweed, using 26.7 gallons of glyphosate (5%) and 1.4 gallons of imazapyr (1%) [MCD].

In 2019: No treatments reported.

In 2020: Consider updating GPS inventory of knotweed. Continue systematic treatments of Skokomish River, begin more native plantings as site condition allows.

For more information about the Skokomish River, please contact:
Brayden Raber, Mason Conservation District 360-427-9436 ext. 120, braber@masoncd.org

Mason County Sites: Mission, Little Mission, Sherwood, Finch, Stimson, Coulter, Mill, and Goldsborough Creeks, assorted Hood Canal waterfront sites, and the towns of Allyn, Belfair, North Bay and Shelton

Big Mission Creek/Little Mission Creek

Big Mission Creek and Little Mission Creeks (WRIA 15) border both sides of Belfair State Park as they enter the marine waters of Hood Canal. Mission Creek drains about 13.7 square miles of land and includes approximately 10 miles of main stem and 10 miles of tributaries.
These creeks have an impact on commercial and recreational shellfish harvest in the area and the quality of recreational experiences at Belfair State Park.
Treatment History
MCNWCB, at the request of, and assistance from a property owner, began treatment along Mission Creek in 2008 and 2009. Knotweed control efforts were also undertaken in 2010 at the Belfair State Park. Property owners continue to provide additional permissions. Treatments have been ongoing since 2016 with funding from the WSDA knotweed program. *See summary below

Sherwood/Anderson Creek

Anderson Lake is a man-made lake that discharges into Anderson Creek, a tributary of Sherwood Creek that ultimately discharges into the North Bay of Case Inlet. Several state and federally listed priority fish species have been identified as occurring in the lake
Treatment History
In 2008, funding from an ALEA grant, and with volunteers from the South Puget Sound Salmon Enhancement Group, the MCNWCB initiated treatment along nearly 1,000 feet of private land on Sherwood Creek. ALEA funding again supported this treatment in 2009. In 2010, the MCNWCB responded to an initial request for knotweed control along the shores of Anderson Lake. System wide treatments were initiated in 2014 with funding

from the WSDA knotweed program and assistance from a Department of Natural Resources Puget Sound Corps crew. Treatments have continued since with all but one infested parcel currently permitted within this reach.

2019: 2.16 miles of Sherwood/Anderson Creek were surveyed, with treatment completed on 5.07 acres. This is an increase of 0.46 survey miles and 1.36 acres treated when compared to 2018. Survey on Sherwood/Anderson increased 5.64 acres from 2018. Reduction in knotweed infestations along the creek edge has allowed MCNWCB to expand survey and treatment areas. A 40% reduction in knotweed cover was observed on this system, from 5% in 2018 to 3% this year. Areas being retreated were found to have very small scattered knotweed plants.
*See summary table

Finch Creek

Finch Creek flows through the community of Hoodsport located along the shores of lower Hood Canal. The Department of Fish & Wildlife's Hood Canal Salmon Hatchery is located at the mouth of Finch Creek. Four of the five species of Pacific salmon native to Washington are produced at this hatchery.

Treatment History

Initial treatments with WSDA knotweed funding began in 2013 with assistance from the Department of Natural Resources' Puget Sound Corps crew. Prior work along the system involved treatment of giant hogweed by MCNWCB with funding from Mason County and the Washington State Noxious Weed Control Board.

2019: MCNWCB treated 1.1 miles along Finch Creek, a 0.27 mile increase from 2018. In addition, 8.9 acres were treated, a 7.4 acre increase from 2018. Prior year's treatments have been successful in reducing the cover and vigor of knotweed. This reduction has allowed MCNWCB to survey/treat more area of the creek.
*See summary table

Stimson Creek

Treatment History

Knotweed control efforts were initiated along Stimson Creek in 2009 with funding from an ALEA grant. Members of the Pleasant Cove Water Association volunteered their labor to meet the terms and conditions of their Habitat Management Plan in order to meet State requirements for repair of their damaged water system.
Treatments have continued with Mason County funding, support from Puget Sound Corps crews and, recently, WSDA knotweed funding.

2019: MCNWCB completed treatment on the lower portion of Stimson Creek, surveying 12.7 acres along Stimson creek and completing treatment of 4.25 acres for knotweed. Cover class of knotweed treated this year was 0.2%, a 90% reduction in knotweed cover in treatment areas since 2018.
*See summary table

North Bay/Allyn/Coulter Creek

North Bay and the Coulter Creek system have been identified by Pierce County and WDFW as an area of biodiversity for wildlife species and habitats within both Pierce and Mason Counties.
The Coulter Creek drainage basin is one of the largest streams in the WRIA 14A: Kennedy-Goldsborough watershed. The main stem of Coulter Creek is approximately eight miles long; several tributaries contribute an additional 10 to 12 miles of channel length. The headwaters of Coulter Creek and upper seven miles of the main stem are located in Kitsap County. The lower 1.9 miles are located in Mason County. A fish hatchery operated by Washington State Department of Fish and Wildlife (WDFW) is located at RM 0.25 on Coulter Creek.

Treatment History

In 2015, a parcel at the mouth of Coulter Creek, and owned by Mason County, received an initial knotweed treatment. WSDA knotweed funding supported additional treatments by the MCNWCB in cooperation with the Puget Sound Corps in 2016. WSDA funding continues to support follow-up treatments in this watershed. This year MCNWCB worked to secure permission from E. E. Overton, a forest products company that holds 2,229 acres in the upper reach of Coulter creek. This agreement permitted initial treatments in this area and survey of an additional 1.49 miles of Coulter Creek on foot and 4.7 miles by vehicle. Through this we were successful in identifying and treating the extent of knotweed on Coulter Creek within Mason County.
Since 2018 there has been an increase of 39.75 acres surveyed and 4 acres knotweed treated. Cover class of knotweed treated has been greatly reduced from 2018 (1%) to 2019 (0.4%).
*See summary table

Brief Treatment history of Miscellaneous Mason County Sites

See previous year's reports for more detailed information

- 2013: Through a grant funded by the Department of Natural Resources, large infestations on Sherwood, Finch and Stimson Creeks were treated for the first time. Crews utilized a top-down strategy to treat the entirety of both creeks [MCNWCB, Puget Sound Corps (PSC)]. The MCNWCB also treated sites on Goldsborough Creek as well as North and Oakland Bays.
- 2014: 1.74 river miles on Sherwood and Finch Creeks, Union River, Lake Isabella and North Bay were treated for knotweed and other species of concern [MCNWCB, PSC].
- 2015: 3.7 river miles of Coulter, Finch, Stimson and Sherwood Creeks were treated for invasive species. Additional terrestrial and aquatic treatments in the towns of Allyn, Belfair, Shelton and North Bay were also conducted. Goldsborough and Mill Creeks were surveyed to prepare for future treatments [MCNWCB].
- 2016: The first large scale treatments for knotweed and giant hogweed on Goldsborough and Mill Creeks took place. 3.58 river miles on Coulter, Finch, Sherwood and Stimson Creeks were treated for invasives of concern. Terrestrial sites in Allyn, Belfair, Shelton, and North Bay were also retreated [MCNWCB].
- 2017: Treated 4.4 river miles (7 solid acres of knotweed) on 86 parcels on Coulter, Anderson, Sherwood, Finch, Mission, Little Mission, and Stimson Creeks as well as in North Bay/Allyn using a combined 7.1 gallons of glyphosate and imazypyr. Additional invasive plants, including herb Robert, policemen's helmet, and giant hogweed were treated with aminopyralid and triclopyr [MCNWCB]. 2.4 river miles were surveyed, and 3.5 acres were treated for knotweed and giant hogweed on Goldsborough and Mill Creek [MCD].
- 2018: 2.4 river miles (8.5 acres) of Goldsborough /Mill Creek were treated for knotweed using 0.002 gallons of glyphosate (5%) and 0.13 gallons of imazapyr (1%). 1.7 miles of Sherwood/Anderson Creeks, 0.6 river miles of Coulter Creek, 0.72 miles of Mission/Little Mission Creek, 2.19 river miles of Stimson Creek, 0.8 miles of Finch Creek, as well as miscellaneous sites within WRIAs 14, 15, and 16 were all treated using 6.2 gallons of glyphosate (injected at 100%) and 1 gallon of imazapyr (1%) over 23 acres. 25 acres of Hood Canal waterfront properties were treated using 0.09 gallons of glyphosate (injected at 100%) and 0.14 gallons of imazapyr (1%).

In 2019 summary: The Mason County Noxious Weed Control Board (MCNWCB) assisted 105 landowners on 331 parcels including: 2.16 miles of Sherwood/Anderson Creek, 2.05 miles of Coulter Creek, 1.7 miles of Mission/Little Mission Creek, 2.1 miles of Stimson Creek, 1.1 miles of Finch Creek, as well as miscellaneous sites within WRIAs 14, 15, and 16. All told, these treatments used 4.4 gallons of glyphosate (100% injection), 1.2 gallons of imazapyr (1%), 1.3 gallons of glyphosate (100% injection), 0.04 gallons of aminopyralid (0.13%), 0.3 gallon triclopyr (1.5%), and 0.3 gallons of triclopyr (1%) over 58.5 acres. 2019 funding from a WSDA grant provided for treatment of giant hogweed at several properties along Finch Creek where knotweed has been treated. Perennial pepperweed, bindweed, policeman's helmet and butterfly bush have also been treated in knotweed treatment areas.

In 2020: MCNWCB: A majority of permissions in Anderson, Coulter, Finch, and Sherwood Creeks, and along the shore of North Bay, will expire December 31, 2019. Renewal of these permissions is of high priority in order to sustain the progress made to date.

Obtain permissions from a single property owner along Finch Creek, and a single property owner along Sherwood Creek, both with known infestations of knotweed. To date, despite repeated attempts, neither has provided permission.

The highest priority for treatment in 2020 will be the Mission Creek watershed as it contains the most heavily infested reaches. The program continues to build on landowner agreements received as neighbors are encouraged to participate.

HCSEG surveyed Lilliwaup Creek below the falls in 2019 and found a large infestation of knotweed. HCSEG will begin outreach this winter and spring and conduct treatment on the lower reach in 2020.

Summary Table	Herbicide Use, Mason County, 2013 (gal)		Herbicide Use, Mason County, 2015 (gal)		Herbicide Use, Mason County, 2016 (gal)		Herbicide Use, Mason County, 2017** (gal)		Herbicide Use, Mason County, 2018*** (gal)		Herbicide Use, Mason County, 2016 (gal)	
	Glyphosate injected	Herbicide foliar	Glyphosate injected	Herbicide foliar	Glyphosate injected	Herbicide foliar	Glyphosate injected	Herbicide Foliar	Glyphosate injected	Herbicide Foliar	Glyphosate injected	Herbicide Foliar
Skokomish River	0	16.84	N/A	N/A	n/a	n/a	n/a	n/a	0	28.1	**-**	**-**
Tahuya River	0	8.3	0	0.7	0	0.08	0	0.08	0	0.013	**0.3**	**0.1**
Union River	5.7	8.6	0	3.5	0	1.4	0	0.7	1.9	0.43	**0.5**	**0.3**
Dewatto River	0	0.1	0	0.3	0	0.02	0	0.13	0.05	0.051	**0.7**	**0.2**
Finch Creek	2.06	0.03	0	1.5	0.4	0.2	n/a	n/a	0.07	0.057	**0.2**	**0.1**
Stimson Creek	3.0	1.2	0	0.1	0.8	0.07	n/a	n/a	0.3	0.033	**0.05**	**0.01**
Sherwood & Anderson Creek	3.2	0	0	2.6	0.8	0.5	n/a	n/a	0.6	0.15	**0.5**	**0.1**
Misc. riparian sites	1.3	0.8	0	0.6	1.5	1.1*	n/a	n/a	0.7	0.20	**-**	**-**
Coulter Creek	-	-	-	-	-	-	-	-	0.2	0.09	**0.3**	**0.1**
Mission Creek	-	-	-	-	-	-	-	-	2.7	0.031	**1.5**	**0.4**
Little Mission Creek	-	-	-	-	-	-	-	-	0.5	0.1	**-**	**-**
Mill & Goldborough Creek	-	-	-	-	-	-	-	-	n/a	0.13	**-**	**-**
Terrestrial sites	1.5	1.3	0	4.7	2.2	0.6	n/a	n/a	0.7	0.2	**3.1**	**1**
Total Herbicide	16.8	37.2	0	13.9	5.7	4	0	0.9	7.6	29.6	**7.2**	**2.3**

**Herbicide totals for 2016 do not include Mill and Goldsborough Creeks, which were not provided.*

*** In 2017, only total herbicide usage from MCNWCB was reported, which can be found in "total" column Totals do not include Mill and Goldsborough Creeks, which were not provided.*

****Totals for 2018 have generally been rounded to two decimals.*

For more information about Mason County work, please contact:
Pat Grover, Mason Noxious Weed Control Board, 360-427-9670 ext. 592 or 360-426-5757, patriciag@co.mason.wa.us

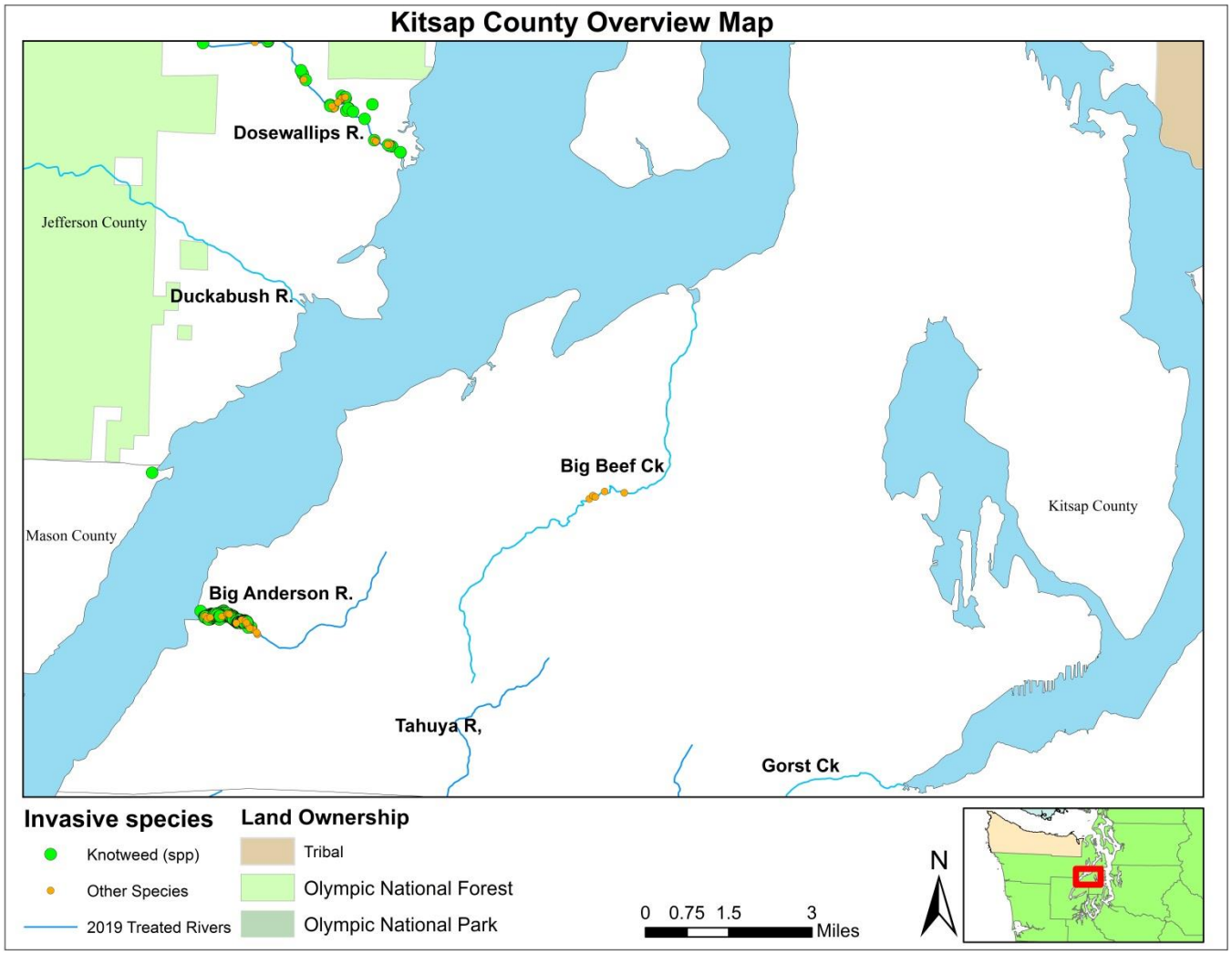
Or

Brayden Raber, (Mason Conservation District) 360-427-9436 ext. 120, braber@masoncd.org

Or

Alex Papiez, Hood Canal Salmon Enhancement Group, at 360-275-3575 extension 24, alex@pnwsalmoncenter.org

KITSAP COUNTY



Big Anderson Creek

Brief Treatment history of Big Anderson Creek

See previous year's reports for more detailed information

- 2012-2015: Knotweed treatments were conducted on Big Anderson Creek, but details were not made available [HCSEG].
- 2015: 1.2 river miles were surveyed for knotweed and 13 parcels were treated [HCSEG].
- 2016: 0.77 miles of Big Anderson Creek were treated. Herbicide usage has dramatically decreased in recent years. 4.36 gallons of glyphosate was applied to 10 parcels in 2016 while in 2014 the crew used over 22 gallons on 13 parcels [HCSEG].
- 2017: 1.75 river miles of Big Anderson Creek were treated for knotweed. The HCSEG used 0.623 gallons of imazapyr to treat 0.44 solid acres. Compared to 2016, the herbicide applied per river mile has decreased by 5.3 gallons, due to decreased infestations of knotweed and the crew switching over to using imazapyr exclusively.
- 2018: 2 river miles of Big Anderson Creek were treated for knotweed using 0.3 gallons of glyphosate (injected at 100%) and 0.4 gallons of imazapyr (1%)

In 2019: This is the eighth consecutive year that HSEG has treated knotweed on Big Anderson Creek. Big Anderson Creek had a slight decrease in herbicide as the combination of replanting and annual treatments continue to pay off. The amount of knotweed volume has decreased dramatically however dense smaller sized and often epinastic plants continue to linger even after treatment with imazapyr. This year, HSEG, with a WCC

crew treated 1.35 river miles of Big Anderson Creek for knotweed using 0.4 gallons of glyphosate (injected at 100%) and 0.3 gallons of imazapyr (1%).

In 2020: Big Anderson treatment needs to start from the top and move downstream. A very thorough grid is necessary along the defined channel upriver of the expansive braided floodplain. In the past, starting at the mouth and working upstream has the crew being most thorough at the bottom and least thorough at the top. This creates an atmosphere less likely to find small single-stem points in the highest section of the river.

Big Beef Creek

Brief Treatment history of Big Beef Creek

See previous year's reports for more detailed information

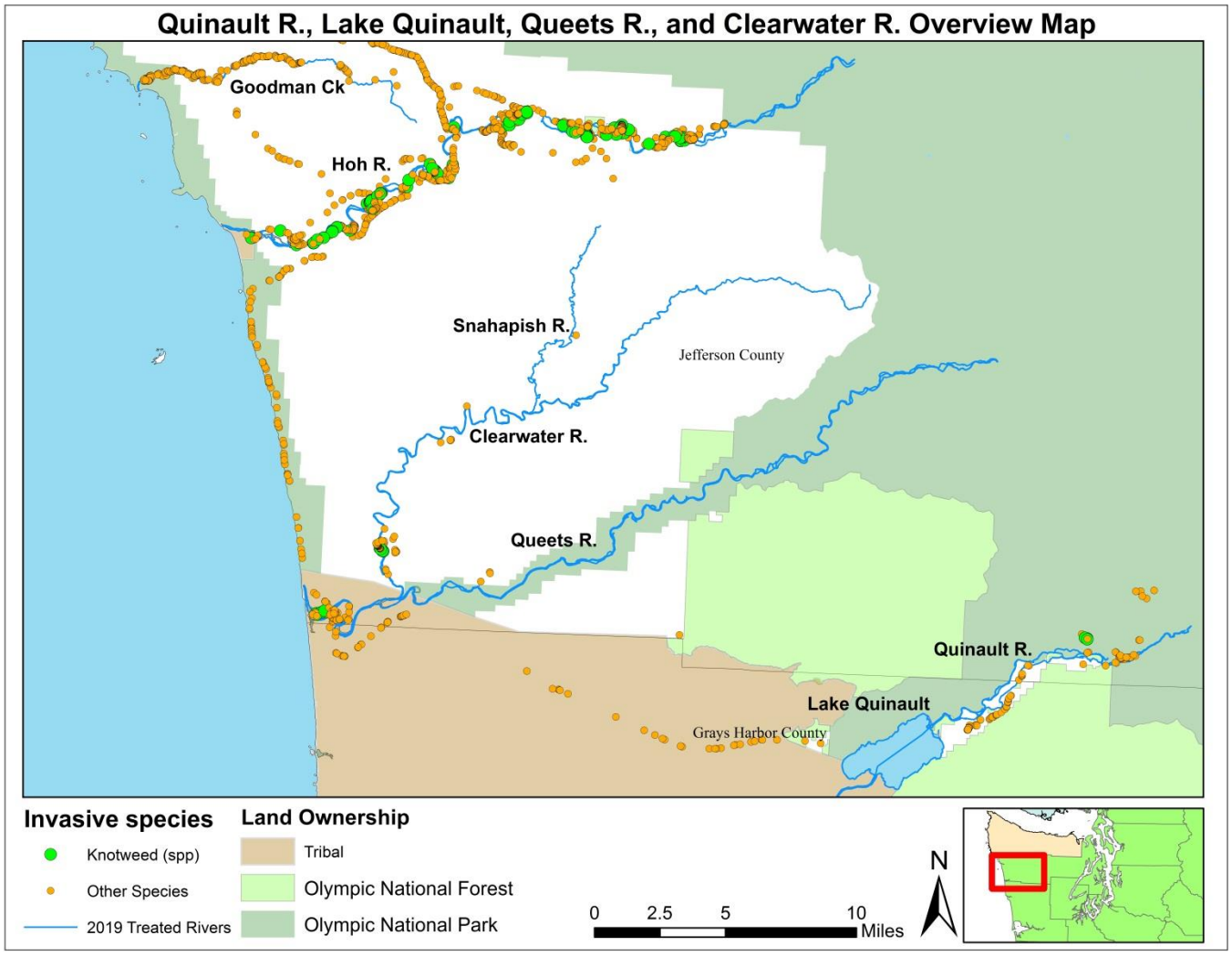
- 2015: All of Big Beef Creek was surveyed after knotweed was discovered near a restoration area [HCSEG].
- 2016: A database of landowners along Big Beef Creek was generated and permissions were solicited. 26 permissions were gained and an additional 7.8 acres were surveyed [HCSEG].
- 2017: Permissions to treat on Big Beef Creek were secured for the first time. 4.75 river miles were surveyed, 0.04 solid aces of knotweed treated. [HCSEG]
- 2018: Treatments used 0.008 gallons of imazapyr (1%) [HCSEG].

In 2019: HCSEG did not treat Big Beef in 2019, however knotweed control has been successful from Lake Symington to the mouth and the remaining knotweed is located near the mouth on UW Parcels which are in the process of being acquired by HCSEG.

In 2020: HCSEG will resume treatments on Big Beef, and will have full consent to treat the knotweed patches in the lower reach.

For more information about Big Anderson and Big Beef Creeks, please contact:
Alex Papiez, Hood Canal Salmon Enhancement Group, 360-275-3575 extension 24,
alex@pnwsalmoncenter.org

Quinault River, Lake Quinault, Queets and Clearwater Rivers



The Quinault River, Lake Quinault and the Queets-Clearwater watershed are all included in WRIA 21. This WRIA contains some of the last remaining free-flowing large rivers in the lower 48 states. It contains areas of habitat that are relatively pristine (especially those within the Olympic National Park (ONP)), as well as areas that have been greatly affected by logging and other activities over the last century. The entire WRIA is included in the Quinault Indian Nation's (QIN) Usual and Accustomed Fishing and Hunting Area. It is a rural, sparsely-populated area where land ownership is dominated by ONP, United States Fish and Wildlife (USFS), Washington Department of Natural Resources and large timber companies. Unlike the protected marine and estuarine environments of Puget Sound and the Hood Canal, these streams drain directly into the Pacific Ocean. Fish leaving these coastal streams do not typically fare well in the Pacific Ocean, making in-stream survival of juvenile fish more significant.

Quinault River

Tributaries and floodplain, Lake Quinault and Prairie Creek

The Quinault River is 69 miles long and originates in the Olympic National Park. It flows into and out of Lake Quinault and empties into the Pacific Ocean at Taholah. The lower watershed has 68,000 acres of tributaries, 600 miles of roads and 300 miles of streams. The Quinault River has healthy stocks of sockeye and also supports

Chinook, chum and Coho. The upper reaches offer spawning and rearing habitat for federally-listed bull trout. Prairie Creek is located near the outfall from Lake Quinault and is a source of knotweed infestation in the lower Quinault River.

Brief Treatment history in the Quinault River, Lake Quinault, and Prairie Creek
See previous year's reports for more detailed information

- 2007-2011: A grant made available to the Quinault Indian Tribe (QIN) allowed for knotweed control to be performed on Prairie Creek. In 2011, treatments were deemed to be very successful as infestations were greatly reduced and natural vegetation was re-establishing in treated areas.
- 2010: Funding was provided to the QIN for knotweed treatments in the Quinault River. Most of its sub-watersheds were surveyed and treated [QIN].
- 2011: The Upper Quinault River was surveyed and treated for the first time [North Cascades Exotic Plant Management Team (NCEPMT), Grays Harbor Noxious Weed Control Board (GHNWCB)].
- 2012: The Lower Quinault tributaries were treated for the first time [QIN].
- 2013: 1,000 acres of the Lower Quinault floodplains were surveyed for first time treatments. Dense stands of knotweed encompassing 43 acres treated. The Lower Quinault tributaries were also treated for a second year and a revegetation project was started [QIN]. Sections of the river within Olympic National Park boundaries were treated [NCEPMT].
- 2014: Riparian sites in the Quinault Indian Reservation were treated for knotweed and reed canarygrass by the Brittland Company. Infestations at Lake Quinault were treated by the 10,000 Year's Institute (10KYI).
- 2015: 4 miles of the Lower Quinault River and 1,100 acres of Lake Quinault and Quinault river tributaries were retreated [10KYI, Brittland Company].
- 2016: 30.4 river miles of the Quinault River watershed were treated. Crews have noted that project areas are improving, but there are 20 heavily infested miles on the Lower Quinault River that have not been treated [QIN, Brittland Company, NCEPMT].
- 2017: Under the Pulling Together in Restoration project, the 10KYI surveyed 19 road miles on SR 101 and Moclips Highway and treated various invasives weeds using 2 gallons of glyphosate (2%) over 180 acres. The Moclips highway was a high priority for the 10KYI as wind dispersed seeds from this area can be carried to the Upper Quinault and Queets tributaries.
- 2018: 12 river miles were treated using 2 gallons of glyphosate (1.5%) and 0.15 gallons of imazapyr (1%) [10KYI].

In 2019: The 10,000 Years Institute reported multiple treatments equivalent to 35 road miles and 9.9 river miles of the Quinault River for non-knotweed invasives. Crews were deployed from July to October to prevent and control reed canarygrass, Scotch broom, tansy ragwort, knotweed, herb Robert, blackberry, and yellow-flag iris at sites located along the South Shore Road, SR 101, and mainstem, north fork and east fork Quinault River, Bunchfield and Joe Creek Sloughs, Zeigler Creek, and Irely Creek. Crew Treatments used 1.1 gallons of glyphosate (1.5%), 0.1 gallons of glyphosate (50% cut-stump), and 0.3 gallons of imazapyr (1%).

In 2020: Collaboration with local roads departments may be beneficial to coordinate mowing with treatments of this area.

Queets-Clearwater River

The Queets River is 53 miles long and is mainly within the boundary of the Olympic National Park. The last four miles outside the park are within the Quinault Indian Reservation. The Queets supports stocks of Chinook, Coho, chum and steelhead; additionally, the upper reaches offer spawning and rearing habitat for federally-listed bull trout. The Clearwater River, which is 39 miles long, is one of the main tributaries. It joins the Queets at approximately river mile 4, as the Queets leaves the National Park. It also supports stocks of most salmon species. Conservation efforts are underway on the Clearwater on 3,088 acres purchased by The Nature Conservancy.

Brief Treatment history in Queets- Clearwater Watershed
See previous year's reports for more detailed information

- 2011: The Environmental Protection Agency (EPA) awarded a 3 year grant to the Quinault Indian Tribe (QIN) for treatments on 153,000 acres of the Queets and Clearwater Rivers. The Jefferson County Noxious Weed Control Board (JCNWCB) was contracted to obtain landowner agreements. Approximately

2/3 of each river system was surveyed. One site was found on the Queets and the source of knotweed for both river systems was found on the Clearwater River.

- 2012: Crews treated previously surveyed knotweed infestations (2.25 acres total) and completed surveys along remaining lengths of the rivers [QIN, JCNWCB].
- 2013: All known sites on both rivers were retreated. Additional invasive species were surveyed. The large source infestation of knotweed on the Clearwater River had decreased in size substantially [QIN, JCNWCB].
- 2014: Invasive species and remaining knotweed mapped in 2013 were treated by Brittland Company and 10KYI. Reed canarygrass was also treated at the mouth of the Queets.
- 2015: 33 river miles of the Queets and Clearwater Rivers were treated [10KYI].
- 2016: No treatments were recorded this year.
- 2017: 35.75 miles surveyed along Lower Queets, Clearwater and Snahapish rivers. Knotweed had continued to decline and crews treated additional invasive weeds, including reed canary grass, Canada thistle, Scotch broom, herb Robert and tansy ragwort. A total of 45 knotweed sites were treated on the first 1.58 miles of the Queets from its mouth, but only two sites were observed and treated on the entirety of the Clearwater River. Treatments of reed canary grass and Canada thistle were expanded from the Clearwater upstream to the Snahapish River and included 13 miles [10KYI].
- 2018: 0.3 river miles of the Lower Queets River treated for tansy ragwort, reed canarygrass, and Canada thistle. Treatment of 1.34 acres used 0.26 gallons of glyphosate (1.5%) and 0.24 gallons of imazapyr (1%). Treatments on the Snahapish River (tributary to the Clearwater at RM 19) only occurred at a research site in partnership with WSDA to ascertain glyphosate detection in water post treatment (0.6 acres treated with 0.015 gallons of glyphosate (1.5%).

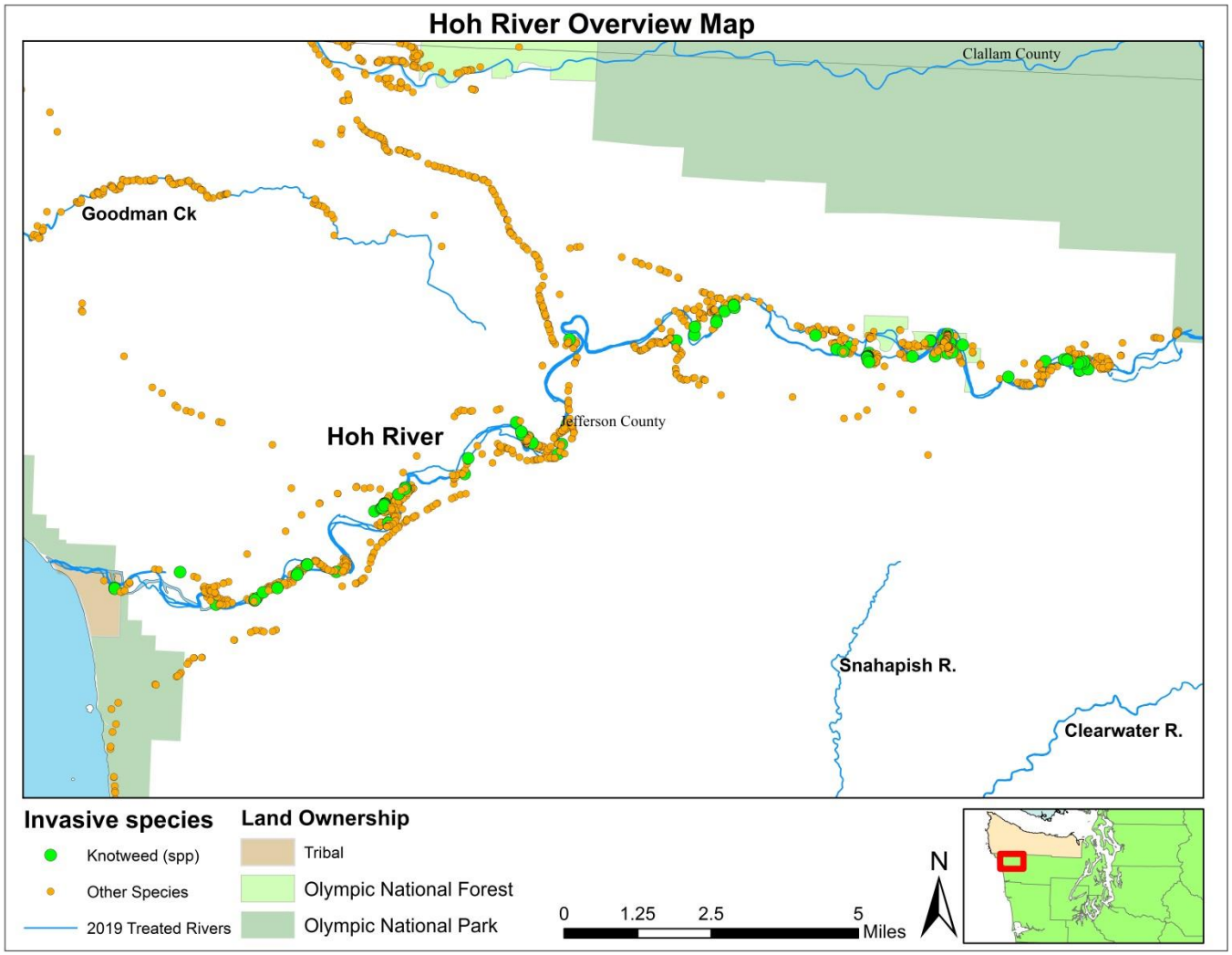
In 2019: The 10,000 Years Institute (10KYI) reported multiple treatments equivalent to 45.2 road miles and 2.2 river miles of the Lower Queets River for tansy ragwort, reed canarygrass, and Canada thistle. Treatment of 5.1 acres used 0.07 gallons of glyphosate (1.5%). The 10KYI also reported treatment on 12.4 road miles of the Clearwater River watershed for bull thistle, curly dock, evergreen blackberry, foxglove, Himalayan blackberry, reed canarygrass, and Scotch broom. Treatment of 88.21 acres used 0.2 gallons of glyphosate (50% cut-stump), 0.25 gallons of glyphosate (1.5-2%). 0.03 gallons of imazapyr (1%), and 0.04 gallons of triclopyr (1%). Surveys and treatment were conducted along the state/county Clearwater Mainline, in the town of Clearwater, on private pastures and forestland, and river frontage along one private parcel. Reed canarygrass, tansy ragwort, curly dock, foxglove, non-native blackberry and knotweed were controlled with manual and herbicide treatments. Crews were funded through the Pulling Together in Restoration project which focuses on prevention of spread by addressing sources, vectors, and pathways and removing seeds and propagules, while treating mature plants with the most effective known methods.

The North Cascades Exotic Plant Management Team treated in the upper Queets for Canada thistle, tansy ragwort, and Himalayan blackberry; the data points are included in the map but no additional information was provided.

In 2020: The 10KYI plans to continue to monitor for knotweed, while controlling other high priority or infrequent non-native species.

For more information about knotweed treatment on Quinault, Queets and Clearwater Rivers, please contact:
Greg Eide of the Quinault Tribe, 360-276-8211, extension 7341, greg.eide@quinault.org,
Or
Jill Silver, 10,000 Year's Institute, 360-385-0715, jsilver@10000yearsinstitute.org.

Hoh River



The 300 square mile watershed is famous for wild stocks of winter steelhead, fall Coho, and spring/summer and fall Chinook salmon. Restoration and maintenance of a functional mature riparian forest is considered a primary component of a salmon recovery strategy by the WRIA 20 salmon recovery and watershed planning groups. Knotweed eradication is critical to restoration of riparian habitats and so the Hoh River Knotweed Control Project has been underway in the Hoh watershed since 2001. The Hoh knotweed infestation initiated from a single clump identified by Hoh Tribe field staff in 1999, located at an old homestead near the Olympic National Park (ONP, river mile 29.75). The clump was eroded and spread down the river during a winter flood.

Brief Treatment history of the Hoh River

See previous year's reports for more detailed information

- 2001-2002: Treatments of knotweed were conducted through the Hoh River Knotweed Control Project [10KYI, Hoh Tribe, Hoh River Trust, ONP].
- 2003: A survey of the Hoh River documented 18,585 canes in 1,247 sites dispersed over 20 river miles that were treated [10KYI, Hoh Tribe, Hoh River Trust, ONP].
- 2003-2013: Annual surveys and retreatment of the 30 mile river corridor downstream of ONP land were performed each year during this time. Crews noted a substantial decrease in knotweed plant density and distribution. However, other species including reed canarygrass, herb Robert, Canada thistle and Scotch broom had spread in previously treated areas and highly disturbed shorelines. In 2011, inventorying of reed canarygrass was started Elk Creek, a Coho and steelhead spawning tributary of the Hoh River [10KYI, Hoh Tribe, Hoh River Trust, ONP].

- 2014: 125 knotweed and 319 reed canarygrass sites were treated along the Hoh River mainstem [10KYI, Hoh Tribe, Hoh River Trust, ONP].
- 2015: 40 knotweed and 193 reed canarygrass infestations along the mainstem Hoh River and its side channels, gravel bars and floodplains were retreated. Crews found increased infestations of Canada thistle, herb Robert and Scotch broom due to seed movement in river channel migrations. Scotch broom and herb Robert were controlled along Highway 101 [10KYI, Hoh Tribe, Hoh River Trust, ONP].
- 2016: Invasive species were retreated along the Hoh River's 30 mile mainstem. 28 small knotweed sites were treated while over 40 acres of Scotch broom were treated using cut stump applications. Notably, reed canarygrass infestations on the Hoh are down by 90% and crew were able to treat a single hydrangea before it spread [10KYI].
- 2017: The 10KYI performed work on the Hoh River, totaling 3,562 acres searched, under the Pulling Together in Restoration Project, the Hoh Riparian Restoration Project, and the Washington State Department of Agriculture (WSDA) Knotweed program. Knotweed was treated at 37 sites (28 Bohemian, 8 Japanese, and 1 Giant), totaling 0.08 acres. Treatment focus shifted towards reed canary grass, Scotch broom, Canada thistle, and herb Robert. The 10KYI noted an explosion of herb Robert infestations along the Hoh and neighboring roadsides, but successfully coordinated with the Jefferson County Road Department to mow roadsides after herb Robert had been pulled and bagged.
- 2018: 10KYI crew covered much of the 36.6 miles of river channel and floodplain in the project area west of the Olympic National Park boundary at river mile (RM 29.75). Knotweed points comprise the lowest number of the focal species – 46 Bohemian, 2 Giant, and 10 Japanese sites were found and 56 of the 58 were treated. Crews treated Canada thistle, herb Robert, St. John's wort, tansy ragwort, reed canarygrass, and foxglove either manually or with Glyphosate (1.5%) or Imazapyr (0.5%), they treated 167 acres of Scotch broom with Glyphosate (50-100% cut-stump)

In 2019: Work conducted in the Hoh River watershed occurred under two funding sources and projects, the 2019-2021 Hoh Riparian Restoration Project for the river corridor, and the 2019-2021 Pulling Together in Restoration project for roads and upland source sites. 10KYI has conducted Hoh River knotweed control annually since 2003 over as much of the river corridor as funding and crew size allows. Surveys and treatment for other species expands knotweed surveys– we found sites this year during herb Robert, tansy ragwort, reed canarygrass, and Scotch broom work days. Partners included ONP, ONF, WSDNR, WSDOT, Jefferson County road staff, the Hoh Tribe, the Nature Conservancy, and small private landowners.

Knotweed - Knotweed points comprise the lowest number of our focal species – 109 sites and 0.8 acres were found and treated with imazapyr (1%) between river miles 27 and 0.25. As observed in the past, plants continue to sprout as late as mid-October on river gravel bars where rhizomes are deeply buried. The field season ended with freezing temperatures in mid-October. Treatment of a single tall stem along the Upper Hoh Road in early December of 2018 was unsuccessful. Found in effectiveness monitoring surveys, it was retreated in August.

Reed canarygrass – We conducted the fifth year of control for reed canarygrass at 187 sites over 10.07 acres, clipping and removing seeds and foliar spray with glyphosate (1-2%). Several new locations with dense reed canaraygrass were found, but the largest site along Elk Creek shows significant reduction of plants and seeds. The previously treated Pole Creek wetland had only small patches of regrowth, and no seed production. Also mapped, de-seeded, and treated reed canarygrass on 43 miles of roads, including the State Hoh Mainline and County Upper Hoh Road, Lower Hoh Road, and Oil City Road. Hay and straw materials use in roadside erosion control on private timberlands may have been sources of new infestations.

Scotch broom – Pulled young plants, and applied cut-stump treatment to mature plants glyphosate (25-50%) on the river floodplain and riparian zone, treating 116 acres at 138 sites. Cut-stump treatments are proving effective at 25% concentration. Seed banks are continuing to show continuous germination. Scotch broom comprises the highest density of all invasive species in the river floodplain, adjacent harvest units, and gravel mines. Scotch broom is expanding along roads in the watershed, especially where seed-infested gravel is used for construction. We assisted WSU's biocontrol staff with collecting seeds to ascertain seed-weevil activity in two sites in the watershed.

Herb Robert – We've started to see success to new treatment strategies – but herb Robert continues to spread, and crews worked hundreds of hours in response. Patches were treated at 297 riverine sites covering 86 acres, and along five miles of the Upper Hoh and Oil City roads. Mature plants and individual young plants are pulled, bagged, and disposed. Crews return periodically to foliar dense patches of seedlings. Winter treatment with 1% glyphosate was successful, with native plants recovering at those sites. As in prior years, we collaborated with Jefferson County road crews to pull and foliar prior to roadside mowing, which is-a very effective anti-spread practice.

Tansy ragwort – Mature plants with flowers were pulled throughout the watershed at 150 sites covering 86 acres. The two largest sites are agricultural, river adjacent properties. Bagged flowerheads were disposed at the local solid waste utility. Rosettes were removed manually or sprayed with glyphosate (1-2%) or imazapyr (0.5%).
Canada thistle – Canada thistle is now the fourth-most dense invasive species in the Hoh River floodplain, treated at 140 sites and 3.37 acres with glyphosate (1%) or imazapyr (0.5%). Biocontrols have been distributed in the past, but are not observed to be present – perhaps perished due to high flows and heavy rain.
Foxglove – Treated rosettes with 1-2% glyphosate or 0.5% imazapyr (0.5%).
St. John's-wort - This species is spreading along SR 101 with mowing, and moving into other roadsides. We are controlling on the Upper Hoh Road.
Everlasting peavine – Due to continuous surveys and treatment, everlasting peavine is rare in the Hoh watershed, with only two known and previously treated sites on roadsides, presumably introduced.
Orange hawkweed – Planted (!) at a residential yard surrounded by forest in the lower watershed where the owner refuses to allow control. We are hoping for a change in that position, and are keeping an eye out for spread.
Spotted jewelweed – At a small site first reported by Hoh River Trust in 2017 in the upper watershed had expanded to 0.09 acre patch, pulled in October before seeds popped. Crews are now alerted to the leaf shape and will continue to monitor and pull it.
Wild chervil – A single plant observed on the Upper Hoh Road (introduced via east-county mowing equipment) was mapped and sprayed with triclopyr. The road department was advised, and equipment washing implemented. Queen Anne's lace was also found in rip rap on the river edge on the same road, also likely from construction equipment.

In 2020: With knotweed infestations dramatically reduced since initial treatments in 2001 (data not shown here), future work will also focus on other invasives, especially reed canarygrass. Revegetation projects should be implemented to prevent spread of aggressive weeds in previously treated areas.

Herbicide Use, Hoh River (gallons)												
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	**2019**
Acres Treated	1093	1000	NA	0.16	0.1	0.1	3.8	0.06	0.7*	164	49.2	**919**
Glyphosate injected or cutstump (100%, 50%, or 25%)	0.02	0.2	0.25	0.13	0	0	0	0	0	0	7.6	**14.6**
Glyphosate foliar	0.6	0.1	0.8	0.7	0.4	0	0.2	0	0	10.4	4.1	**3.6**
Imazapyr foliar	0.06	0.04	0.2	0.02	0.09	0.1	0.7	0.07	0.2	0.05	0.9	**0.3**
Triclopyr foliar											0.4	**-**
Total Herbicide	0.6	0.3	1.2	0.9	0.5	0.1	0.9	0.07	0.2	*11	13	**18.6**

** 2017 total herbicide usage includes above totals plus 0.525 gallons of concentrated Element 3A (triclopyr) used on non- knotweed invasives.*

Goodman Creek

This fourteen mile river stands alone between the Hoh and Quillayute watersheds and empties into the pacific through a gap in a rocky headland.

Brief Treatment history of the Goodman Creek
See previous year's reports for more detailed information

- **2017:** 10KYI Treated 10 miles and searched 212 acres for non-knotweed invasives including; reed canarygrass, Canada thistle, Scotch broom, tansy ragwort, herb Robert, foxglove, smartweed.
- **2018:** 8.31 river miles treated (219 acres searched) for reed canarygrass, Canada thistle, tansy ragwort and common tansy. Treatments used 0.89 gallons of glyphosate (1.5%) and 0.47 gallons of imazapyr (0.5%) on a total of 4.6 acres.

2019: Work was conducted in the Goodman Creek watershed along roadways and in waterway under two funding sources – PTIR for roads, and 10KYI's 2019-2021 SRFB project, the Goodman Creek Reed canarygrass Control Project, both supporting restoration investments and outcomes from a number of restoration projects planned and in process the Pacific Coast Salmon Coalition.
Reed canarygrass – We conducted the third year of invasive plant control along nine miles of Goodman Creek– treating 4.33 acres and 226 plant sites in the river corridor and off-channel habitats, some as large as 0.25 acre.

reed canarygrass density was reduced by 80% compared to the previous year. Cut and bagged seed-heads in smaller patches and pushed stems into large clumps to reduce their spread. Treated with glyphosate (1%) or imazapyr (0.5%). The last lowest mile did not receive treatment due to the unexpectedly very wet September. Another two years of work is expected to eliminate reed canarygrass from this small river lying between the Bogachiel and Hoh watersheds. Also mapped and de-seeded RCG on contributing roads to Goodman Creek including the Goodman Mainline.
Canada thistle – CT is the second-most dense invasive species on Goodman Creek. CT was treated with glyphosate (1%) or imazapyr (0.5%), at 24 sites covering 0.71 acres.
Scotch broom – Pulled young plants along roadsides and in the stream corridor on 0.01 acre.
Foxglove – Pulled mature plants and/or treated rosettes with glyphosate (1%) or imazapyr (0.5%) on 0.14 acres.

2020: It is likely that 10KYI will target this watershed as resources are available. Additional focus should include the access roads to Goodman Creek which are heavily infested with Scotch broom.

For more information about knotweed treatment on the Hoh River and in the Goodman Creek Watershed, please contact:
Jill Silver, 10,000 Years Institute, at 360-385-0715 jsilver@10000yearsinstitute.org.

Wynoochee River

This 60 mile river starts in the south-central edge of Olympic National Park and flows south into the Chehalis River, with a drainage basin of 218 square miles.

Brief Treatment history of the Wynoochee
2018: In September, the Grays Harbor County Noxious Weed Control Board Coordinator, with the help of the WSDA, surveyed the Wynoochee River for the most upstream patch of knotweed. The first sighted knotweed was approximately at river mile 25.
In November, a ground survey was conducted of the locations and access points of the knotweed on either side of the river. After doing a preliminary survey, landowners in the region were contacted to gauge receptivity of control for knotweed, including Green Diamond Resource Co., Weyerhaeuser and several private landowners. The responses were positive regarding efforts towards mitigating the worsening infestations of knotweed on the Wynoochee River.

2019: In August, the (GHCNWCB) received grant funding from the Washington Department of Agriculture (WSDA) for a project to control invasive Japanese/Bohemian knotweed on the Wynoochee River for the period of July 1, 2019 to June 30 2021.
11 landowners were contacted within the project reach, owning a total of 23 parcels, and were willing to sign the "Permission to Enter Private Land and Waiver of Liability". Treated/surveyed knotweed on seven river miles of the Wynoochee River, between river mile 19 and 26, amounting to approximately 103.75 acres treated and 900 acres surveyed and protected.

2020: Continue to survey and treat as needed for the duration of the grant period.

For more information about knotweed treatment in Grays Harbor County, please contact:
Kiley Smith, Grays Harbor County Noxious Weed Control Board Coordinator, 360-482-2934,
kiley.smith2@wsu.edu

Table 1: Work by County-by Watershed

The following table was compiled by the Clallam County Noxious Weed Control Board (CCNWCB) and includes knotweed and invasive-plant control project data from various partners across the Olympic Peninsula. The table includes both public outreach and treatment data and is organized by watershed and county in the order presented in the narrative section of this report. Watersheds with work completed by multiple entities are shown in the same row, either denoted by a space to indicate the entities worked independently or comma to indicate a joint project.

The data was submitted to the CCNWCB in the standardized reporting template or annual reports. Values were estimated by CCNWCB if sufficient partial data was submitted, values that could not be estimated are listed as n/a[$]. For more detailed information regarding 2019 treatment activities, refer to the narrative section by river system in this report. Watersheds that have historically had knotweed control activities but none reported in 2019 are included in this table with dashed (-) entries. Activities or species not reported to the CCNWCB are not included in this table.

The table includes: the **River Miles** or **Road Miles** - the total linear distance searched or treated; the **Acres Protected**, the total acreage searched for knotweed or invasive species; the **Acres Treated**, the total acreage where treatments occurred (manual or chemical); the **Solid Acres**, the estimated aggregated acres with 100% coverage of knotweed or target species; the **Parcels Treated/Surveyed**; the outreach statistics of **# Landowner Permissions** obtained, the **# Landowners Assisted**, and **# New Agreements** obtained; and the invasive **Targeted Species**. A complete list of terms, agency acronyms and expanded definitions is included at the end of the table.

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
Clallam County Watersheds										
Dickey River	QNR, CCNWCB	7.9	30	4	1.6	4/4	4	4	0	knotweed
*(Mina Smith Rd)**	CCNWCB	3.2	6.4	0.01	0.006	n/a[$]	1	1	0	knotweed, Scotch Broom, tansy ragwort, yellow archangel
Calawah River	10KYI	49.4	183.6	18.5	0.08	69/130	7	7	2	English holly, evergreen blackberry, Himalayan blackberry, Scotch broom, yellow archangel
Bogachiel River	10KYI	58.8	516.2	214	1.8	97/204	12	62	6	knotweed, Canada thistle, English holly, evergreen blackberry, everlasting peavine, giant reed, Himalayan blackberry, reed canarygrass, Scotch broom, yellow archangel, yellow-flag iris
Quillayute River	10KYI	6.6	116.3	5	0.07	17/51	9	48	4	Scotch broom
	QNR, CCNWCB	9.3	1,198	21.5	8.03	7/7	7	7	0	knotweed, bittersweet nightshade, Canada thistle, evergreen blackberry, herb Robert, Himalayan blackberry, Scotch broom,

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
										spotted jewelweed, tansy ragwort,
Sol Duc River	10KYI QNR	39.9 0.25	270.5 6	0.005 0.7	0.005 0.05	83/161 1/1	6 1	15 1	2 0	knotweed, bull thistle, Canada thistle, common tansy, English holly, evergreen blackberry, everlasting peavine, foxglove, Himalayan blackberry, herb Robert, jewelweed, reed canarygrass, tansy ragwort knotweed
City of Forks	QNR	n/a[$]	5	0.5	0.07	1/1	1	1	0	knotweed
Big River	Makah CCNWCB	0.5 6.6	6.21 40	0.8 0.06	0.02 0.006	3/4 13/51	4 5	4 5	0 0	knotweed and additional weeds knotweed, tansy ragwort, Scotch broom
Hoko River	CCNWCB Makah	2.8 n/a[$]	117.9 8.6	.02 0.08	0.26 0.06	19/11 2/2	52 1	4 1	52 0	knotweed knotweed
Clallam River *(Charley Creek Rd)**	Makah CCNWCB	n/a[$] 0.75	7 1.4	0.11 0.4	0.08 0.006	5/5 1/4	5 1	5 1	3 0	knotweed knotweed, yellow archangel
Pysht River	-	-	-	-	-	-	-	-	-	-
Lake Creek, Lake Pleasant and Beaver	CCNWCB	1.2	3.9	0.28	0.05	2/2	2	2	2	knotweed
Lake Crescent	-	-	-	-	-	-	-	-	-	-
Deep Creek	LEKT	n/a[$]	n/a[$]	n/a[$]	n/a[$]	n/a[$]	n/a[$]	n/a[$]	n/a[$]	knotweed
Nordstrom Creek	-	-	-	-	-	-	-	-	-	-
Salt Creek	-	-	-	-	-	-	-	-	-	-
Elwha River *(Olympic Hot Springs Rd)**	LEKT CCNWCB	n/a[$] 1.75	578.14 3.7	578.14 3.7	0.4 0.9	n/a[$] n/a[$]	n/a[$] 1	n/a[$] 1	n/a[$] 0	knotweed and additional weeds knotweed, Bishop's goutweed, bull thistle, Canada thistle, common tansy, herb Robert, meadow knapweed, orange

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
										hawkweed, tansy ragwort, yellow archangel
Dry Creek	-	-	-	-	-	-	-	-	-	-
Valley Creek	CCNWCB	0.9	5.45	0.15	0.1	3/40	40	3	3	knotweed, common teasel, purple loosestrife, yellow archangel
Peabody Creek	CCNWCB	0.9	5.58	0.6	0.1	15/54	13	13	13	knotweed, yellow archangel
Ennis Creek	CCNWCB	2.8	17	2.1	0.4	21/35	64	20	10	knotweed
Lee's Creek and East Lee's Creek	CCNWCB	2.8	17.2	0.006	0.1	5/61	44	39	7	knotweed
Morse Creek	CCNWCB	n/a[$]	1.2	0.03	0.01	1/2	1	1	1	knotweed
Bagley Creek	-	-	-	-	-	-	-	-	-	-
Siebert Creek	-	-	-	-	-	-	-	-	-	-
Bell Creek	WCC	0.3	15.2	9.7	2.4	1/1	1	1	0	Canada thistle, common teasel, Himalayan blackberry, poison hemlock
Dungeness River	NOSC,WCC	1.2	159	32.4	0.07	6/6	6	3	3	knotweed, butterfly bush
	CCNWCB, WCC	0.5	8.8	2	0.5	2/2	2	2	1	knotweed
Meadowbrook Creek	-	-	-	-	-	-	-	-	-	-
Total: 19 waterways	**7 entities**	**198.3**	**3328.1**	**894.5**	**17**	**376/837**	**290**	**251**	**108**	**23 species**
Jefferson County Watersheds										
Snow Creek	NOSC	1.2	56	8.08	0.33	3/15	6	3	3	knotweed, yellow archangel
Port Townsend	-	-	-	-	-	-	-	-	-	-
Lake Leland	-	-	-	-	-	-	-	-	-	-
Big Quilcene River	HCSEG	5.34	400	0.3	0.19	36/100	27	27	7	knotweed, comfrey, everlasting peavine, Himalayan blackberry, yellow archangel, Scotch broom
Little Quilcene River and Leland Creek	HCSEG	1.98	68	0.03	0.025	4/26	36	4	16	knotweed, Himalayan blackberry
Quilcene and	-	-	-	-	-	-	-	-	-	-

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
vicinity										
Chimacum and Irondale	-	-	-	-	-	-	-	-	-	-
Tarboo Creek	HCSEG	n/a[$]	87	0.003	n/a[$]	2/2	2	2	n/a[$]	knotweed
Spencer Creek	-	-	-	-	-	-	-	-	-	-
Dosewallips River	HCSEG, WCC	14.02	586.8	0.07	0.01	24/68	28	24	2	knotweed, butterfly bush, periwinkle, yellow archangel
Duckabush River	-	-	-	-	-	-	-	-	-	-
Queets/ Clearwater River	10KYI NCEPMT	59.8 n/a[$]	498.98 n/a[$]	93.31 n/a[$]	0.65 n/a[$]	34/55 n/a[$]	8 n/a[$]	11 n/a[$]	0 n/a[$]	bull thistle, Canada thistle, curly dock, evergreen blackberry, foxglove, Himalayan blackberry, reed canarygrass, Scotch broom, tansy ragwort n/a[$]
Snahapish River	10KYI	9.5	31	0.05	0.007	1/4	4	4	0	reed canarygrass
Goodman Creek	10KYI	17.6	242.9	196	2.31	12/16	3	3	1	Canada thistle, reed canarygrass
Hoh River & tributaries	10KYI	73	2,271.4	919	8.45	101/140	12	31	0	Canada thistle, English holly, evergreen blackberry, Himalayan blackberry, foxglove, herb Robert, Scotch broom, tansy ragwort
County Road System right-of-way Properties	-	-	-	-	-	-	-	-	-	-
Total: 9 watersheds	**5 entities**	**182.4**	**4,242**	**1,216.8**	**12**	**217/426**	**126**	**109**	**29**	**16 species**
Mason County Watersheds										
Tahuya River	HCSEG, WCC	10.87	353	0.83	0.25	49/197	69	49	8	knotweed, butterfly bush

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
Union River	HCSEG, WCC	9.03	319.5	1.68	0.45	68/149	83	68	5	knotweed, bittersweet nightshade, English holly, giant hogweed, Himalayan blackberry, yellow archangel
	MCNWCB	0.1	16.33	2.55	0.51	3/8	2	2	1	knotweed, giant hogweed, field bindweed, yellow flag iris, herb Robert, bull thistle, common burdock, Himalayan blackberry
Dewatto River	HCSEG, WCC	7.12	136	0.36	0.36	18/33	6	6	0	knotweed, bittersweet nightshade, Canada thistle, English holly, old man's beard
Skokomish River	-	-	-	-	-	-	-	-	-	-
Mission Creek	MCNWCB	1.7	10.3	6.25	0.66	11/24	20	9	3	knotweed
Little Mission Creek	-	-	-	-	-	-	-	-	-	-
Hood Canal waterfront	-	-	-	-	-	-	-	-	-	-
Sherwood/ Anderson Creek	MCNWCB	2.16	19.64	5.07	0.32	23/45	33	18	3	knotweed
Finch Creek	MCNWCB	1.1	10.7	8.9	0.17	18/43	28	15	2	knotweed, giant hogweed, Japanese coltsfoot
Goldsborough/ Mill Creek	-	-	-	-	-	-	-	-	-	-
Stimson Creek	MCNWCB, WCC	2.1	12.73	4.25	0.023	4/17	9	3	0	knotweed
Coulter Creek	MCNWCB	2.05	46.9	8.25	0.23	11/230	16	7	2	knotweed
North Bay/Allyn	MCNWCB	0.08	5.31	0.4	0.23	6/12	25	3	0	knotweed
Other sites WRIA 16	MCNWCB	n/a[$]	2.21	0.87	0.12	5/8	4	4	1	knotweed, giant hogweed
Other sites WRIA 15	MCNWCB	0.04	15.22	10.16	0.32	11/21	9	9	6	knotweed, butterfly bush, perennial pepperweed, tansy ragwort
Other sites WRIA 14	MCNWCB	0.21	96.2	14.3	2.15	35/52	31	37	14	knotweed, black locust, common tansy, giant hogweed, Himalayan blackberry, poison hemlock, spotted knapweed, tansy ragwort
Oakland Bay	-	-	-	-	-	-	-	-	-	-

Watershed	Partner(s)	River Or Road Miles	Acres Protected	Acres Treated	Solid Acres	Parcels Treated/ Survey	# of Landowner Permissions	# Landowners Assisted	# New Agreements	Targeted Species
Spencer Lake	-	-	-	-	-	-	-	-	-	-
Shelton(Misc.)	-	-	-	-	-	-	-	-	-	-
Hwy 101 (Misc.)	-	-	-	-	-	-	-	-	-	-
Hwy 106 (Misc.)	-	-	-	-	-	-	-	-	-	-
Belfair (Misc.)	-	-	-	-	-	-	-	-	-	-
Liliwaup Creek	-	-	-	-	-	-	-	-	-	-
Total: 12 watersheds	**3 entities**	**36.56**	**1,044**	**63.87**	**5.8**	**262/839**	**335**	**230**	**45**	**23 species**
Kitsap County Watersheds										
Big Anderson Creek	HCSEG, WCC	1.35	77	0.6	0.72	14/20	8	8	0	knotweed, butterfly bush, English holly, English laurel, Himalayan blackberry, reed canarygrass, periwinkle, yellow archangel
Big Beef Creek	-	-	-	-	-	-	-	-	-	-
Total: 1 watershed	**2 entities**	**1.35**	**77**	**0.6**	**0.72**	**14/20**	**8**	**8**	**0**	**8 species**
Grays Harbor County Watersheds										
Wynoochee River	GHNWCB	7.3	900	103.8	17.8	23/23	11	11	11	knotweed, invasive blackberry, spotted jewelweed
Ocean Shores	10KYI	0.2	10	10	0.04	2/2	1	1	1	Scotch broom
Quinault River	10KYI	44.9	136.2	27.8	3.9	39/147	9	9	3	evergreen blackberry, reed canarygrass
Moclips highway and SR 101	-	-	-	-	-	-	-	-	-	-
Total: 2 watersheds	**2 entities**	**52.4**	**1,046.2**	**141.6**	**21.74**	**64/172**	**21**	**21**	**15**	**5 species**

*CCNWCB completed treatments of knotweed and invasive species on Clallam County right-of-way directly adjacent to waterways in the listed watershed.

AGENCY ACRONYMS USED IN TABLE:
10KYI-10,000 Years Institute
CCNWCB-Clallam County Noxious Weed Control Board
DNR-PSC-Clallam based Puget Sound Corps, Mason based Puget Sound Corps
DNR-WCC-Department of Natural Resources Washington Conservation Corps
EJWCC-East Jefferson Washington Conservation Corps
GHNWCB-Grays Harbor Noxious Weed Control Board
HCSEG-Hood Canal Salmon Enhancement Group
LEK-WCC-Lower Elwha Tribe based Washington Conservation Corps
MCD-Mason Conservation District
MCNWCB-Mason County Noxious Weed Control Board
NCEPMT-North Cascades Exotic Plant Management Team
ONP-WCC-Olympic National Park based Washington Conservation Corps
PCSC-Pacific Coast Salmon Coalition
QIN-Quinault Indian Nation
QNR-Quileute Indian Tribe-Natural Resources
TNC-The Nature Conservancy

TERM DEFINITIONS*:*
Agency: name of organization that performed the work-may not be the same agency that managed the project
Watershed/Waterway: Riparian area where treatments occurred. Some areas were combined if there was not detailed information broken out.
River/Shore miles: One mile of river-includes both banks, (**not** counted as separate miles like road shoulders). Data was estimated from track logs, measuring in GIS, or other information as available. NOTE: Some entities may have included re-treatment miles, (river or road) in their total; this accounts for some treated areas exceeding the river or road's actual length. We have included the data as reported to us.
Area Protected: Ideally, length of river searched, times average width of the area actually searched. It is an indicator of the area that had to be canvassed while looking for knotweed that was interspersed. CCNWCB used a 50 foot width when there was no information to the contrary. When an entity reported only total acres of a parcel, we assumed a 50 foot width unless there was information t to the contrary. Other entities calculated and reported this total differently.
Area Treated: This indicated the area of plants treated without lumping them together. Some entities included anything protected (surveyed), as treated area. Some only reported total parcel area, which may or may not have been surveyed or was only partially treated. Weed boards report treated area as the area encompassed (either estimated by paces, visual or GPS measured) by the farthest extent of the target species. If the infestation is distinctly patchy, the patches are instead summed up within a site and reported.
Solid Acres: Area of treated plants if they are all lumped together. WSDA has directed the Weed Boards to estimate this total based on the average calibrated gallons of mix/acre. For example, if backpack foliarers are calibrated to deliver 43 gallons/acre-this is approximately 1000 sq feet treated/gallon of mix. The formula would then be gallons of mix X 1000 sq feet/43,560 sq feet =solid acres. This was sometimes estimated from the rate and total gallons of herbicide used, and then plugged into the above formula assuming one gallon of mix equaled 1000 square feet treated.
Parcels Treated/Parcels Survey: This information was not uniformly supplied. The intent is to give a sense of how many parcels actually had plants to treat, how many had to be surveyed to find infestations. For weed boards it was calculated from number of distinct parcels where crew recorded GPS waypoints. GPS Track logs can provide a count of the number of parcels surveyed.

Total # of Permissioned Parcels: The total number of parcels encompassed by Land Owner Agreements within a project area. This figure gives a sense of how much area is involved and is connected to how many landowners had to participate.
Landowners Assisted: The number of landowners on whose land you actually worked during the season. Because permissions typically are given for four years, this number may differ from the total number of landowners from whom you have acquired permission. As knotweed projects mature or as time allows, crews may not go to every property for which they have permission.
Species Treated*:* For the most part, the projects in the table are knotweed focused. However, it is important to start showing the increasing complexity of projects that consider multiple species and the frequency with which they are now occurring around the Peninsula. Early infestations of additional invasives were sometimes treated in the course of treating knotweed. The Puget Sound Corps crews working under the auspices of Clallam be tasked with control of multiple species impacting riparian corridors either during the course of knotweed treatments or otherwise. **Please note** that Clallam County NWCB has only reported additional weed species work that was in the same vicinity or contiguous with knotweed projects.

Appendix I: Contact Information

This list encompasses agencies treating knotweed. Please see our website for past and present working group attendees and their contact information—www.clallam.net/weed

Clallam County Noxious Weed Control Board
Cathy Lucero, Noxious Weed Control Coordinator
360-417-2442
clucero@clallam.co.wa.us

Jefferson County Noxious Weed Control Board
Joost Besijn, Noxious Weed Control Coordinator
360-379-5610 ext. 205
noxiousweeds@co.jefferson.wa.us

Mason County Noxious Weed Control Board
Pat Grover, Noxious Weed Control Coordinator
360-427-9670 ext 592
PatriciaG@co.mason.wa.us

Grays Harbor County Noxious Weed Control Board
Kiley Smith, Noxious Weed Control Coordinator
360-482-2265
kileysmith2@wsu.edu

Mason Conservation District
Brayden Raber
360-427-9436 ext 120
braber@masoncd.org

Quileute Tribe
Garrett Rasmussen
360-374-2027
garrett.rasmussen@quileutenation.org

Makah Tribe
Rob McCoy
360-645-3058
rob.mccoy@makah.com

Lower Elwha Klallam Tribe
Kim Williams
360-457-4012 ext 7499
kim.williams@elwha.org

Jamestown S'Klallam Tribe
Hilton Turnbull
360-681-4603
hturnbull@jamestowntribe.org

Quinault Indian Nation
Greg Eide
360-276-8211
Greg.eide@quinault.org

Olympic National Park
Janet Coles
360-565-3073
Janet_coles@nps.gov

Olympic National National Park (North Cascades Exotic Plant Management Team)
Sophie Wilhoit
360-565-3076
sophie_wilhoit@nps.gov

US Forest Service (Olympic Region)
Cheryl Bartlett
360-956-2283
cbartlett@fs.fed.us

10,000 Years Institute
Jill Silver
360-385-0715
jsilver@10000yearsinstitute.org

Hood Canal Coordinating Council
Robin Lawlis
360-394-0046
rlawlis@hccc.wa.gov

Hood Canal Salmon Enhancement Group
Alex Papiez
360-275-3575 ext 24
alex@pnwsalmoncenter.org

Forterra
Kurt Schlimme
206-905-6954
kschlimme@forterra.org

Center for Natural Lands Management
Patrick Dunn
360-956-9713
pdunn@cnlm.org

North Olympic Salmon Coalition
Sarah Doyle
360 379-8051
sdoyle@nosc.org

Pacific Coast Salmon Coalition
Alex Huelsdonk
360-374-8873
pacsac@olypen.com

Appendix II: WSDA Approved Report Form

20__ CLALLAM COUNTY-ROADS
Herbicide/Manual Treatment Data Form

Project ID #:

Project Complete? **Y** or **N** (add notes)

Name of Entity/Person for whom Treatment was applied: Clallam County

Street Address: 223 E 4 th St City: Port Angeles State: WA Zip: 98362

Address or Exact Location of Site:

PIN#:

General Activity Fields

County (circle one)	WRIA (circle one)	Project Name (from project list)	Department (circle one)	Workforce**
Clallam	15 16 17 18 19		Roads Parks DCD Other	

****Workforce:** County Name, WCC Crew Name, County Weed Board

Crew Members Present:

Site/Inventory Fields

Start Date	Stop Date	acres examined for weeds	Treatment Site (circle one)	**Total Manual Infested Area Treated: (DO NOT lump plants together)**
			Road edge/ROW Park Other	**acres**

Weeds Treated (Just the PLANTS code is OK)	**Infested Area Treated** (DO NOT lump plants together)	% of area examined for weeds infested with this species (lump plants together – use cover classes 1 - 9 listed below)	**M**anual/**H**erbicide or **S**urvey
	sq ft		
	sq ft		
	sq ft		
	sq ft		
	sq ft		

[7] **Cover Classes: 1** = Trace, **2** = 1 – 3%, **3** = 3 – 5% **4** = 5 – 10%, **5** = 10 – 25%, **6** = 25 – 50%, **7** = 50 – 75%, **8** = 75 –95%, **9** = 95 – 100%
Note: Cover classes are meant to be *approximations only*.

All Licensed Applicators: Name and License # _____

Firm Name: Clallam County Noxious Weed Control Board Phone # 360-417-2442

Firm Address: 223 E 4th St, Suite 15 City: Port Angeles State: WA Zip: 98362

Application Date	Time Start	Time Stop	Temp (F)	Wind Speed (MPH)	Wind Direction	Cloud Cover	Remarks – Weather forecast

Application Area (acre)	Total Volume of Mix Applied (gal)	Diluent	Special comment
		Water	

Product Name	EPA Registration #	Amount of herbicide used (oz)	Herbicide Applied/Acre or other measure	Concentration Applied

Was this application made as a result of a permit? Yes No
If yes, Permit # _____

WA State NPDES Acres:

Notes: # Interactions:

Page 2

Appendix III: Season Work Summary Reporting Form

TEMPLATE FOR KNOTWEED WORK REPORTING 2019

(Please fill in one form for each waterway if possible—or let us know if you are aggregating all your work-feel free to copy extra tables)

PART 1

Agency/Entity:____

Crew Used, Crew Leader name:____

Waterway or location:____

Miles treated	Acres searched	Acres treated	Cover class OR #stem	Herbicide used	Rate	Amount Of Concentrate (total)	Total Amount of Mix Applied (gal)	Application Method	No. Parcels Treated	No. Parcel Surveyed	No. Landowner Permissions	No. Landowner Helped	No. New Agreement	No. Public vs Private Owner	Weed Species Treated

Agency/Entity:____

Crew Used, Crew Leader name:____

Waterway or location:____

Miles treated	Acres searched	Acres treated	Cover class OR #stem	Herbicide used	Rate	Amount Of Concentrate (total)	Total Amount of Mix Applied (gal)	Application Method	No. Parcels Treated	No. Parcel Surveyed	No. Landowner Permissions	No. Landowner Helped	No. New Agreement	No. Public vs Private Owner	Weed Species Treated

Agency/Entity:____

Crew Used, Crew Leader name:____

Waterway or location:____

Miles treated	Acres searched	Acres treated	Cover class OR #stem	Herbicide used	Rate	Amount Of Concentrate (total)	Total Amount of Mix Applied (gal)	Application Method	No. Parcels Treated	No. Parcel Surveyed	No. Landowner Permissions	No. Landowner Helped	No. New Agreement	No. Public vs Private Owner	Weed Species Treated

EXPLANATION

Agency	Who you are—eg, Hood Canal Salmon Enhancement Group
Crew used and leader's name	Crew—eg East Jefferson WCC, with name of leader
Waterway or location	River or general area—eg Sekiu River or Forks.
River miles treated	One mile of river-includes both banks, (**not** counted as separate miles like road shoulders)
Acres searched (protected)	Ideally, length of river searched, times average width. If you do it differently, please tell us how you derived your estimate. (ie, if you count an entire parcel, even if you haven't searched it, please indicate this.)
Acres treated	As above
Number of stems (or cover class)	Aggregate number of stems treated, if possible (or cover class—percentage of treated area occupied by the plants—eg, 1%, 20% etc)
Herbicide used	Product name
Herbicide Rate	%
Amount of concentrate	In gallons
Total amount of mix applied	Total amount of mixed herbicide applied, in gallons
Application method	Self explanatory
Number of parcels treated	Total number of parcels where control work was done
Number of parcels surveyed	Total number of parcels that were surveyed
Number of landowner permissions	One permission may cover multiple parcels
Number of landowners helped	Number whose property you actually worked on
Numbers of public\private landowners	Eg, if you have 25 permission forms and 6 are from public agencies such as WDFW, write 6\19
Other weed species treated	Did you treat weeds besides knotweed?

PART II: NARRATIVE (SUMMARY)

Example from last year:

Jefferson County—*Weed board staff treated Spencer Creek, Tarboo Creek and a number of small sites. A WCC crew, funded by both North Olympic Salmon Coalition (NOSC) and the Hood Canal Salmon Enhancement Group (HCSEG) re-treated the entire Big Quilcene, Little Quilcene, Dosewallips and Duckabush Rivers. Jefferson County Noxious Weed Control Board (JCNWCB) received funding from the Quinault Indian Nation to acquire landowner permission for knotweed survey and control in the Queets-Clearwater watershed.*

PART III

IMPORTANT!: Other information (fill in the blanks)

1. What was significant about this year's work?

_____

2. Any specific success story?

_____

3. Any breakthrough treatment?

_____

4. Progress made?

_____

5. Recommendations for next year?

_____

6. Tell us about additional weed species that you treated.

_____

7. Is there a reveg or management plan in place?

_____

8. What partners did you work with?

_____

9. Where was your funding from?

_____

10. Did you sponsor any educational events?

_____

11. Anything else we forgot to ask?

_____

12. Please include contact information—contact person, address, phone number, email and website

_____