

## History of Knotweed Control in Clackamas County



Flowering Knotweed

### Introduction

Since 2002, Metro Regional Parks and Greenspaces, a regional government agency residing over four counties, embarked on a Japanese Knotweed Control Project in the entire Clackamas River Watershed. This project has built lasting partnerships with The Clackamas River Basin Council (CRBC), The Nature Conservancy (TNC), USDA Forest Service, Oregon Department of Fish and Wildlife, Concordia University, and many supportive private landowners. The results of the project have been compelling, new and effective methods of treatment have been refined and tested, while the knowledge regarding noxious weeds has grown. Here is a summary of knotweed control since the beginning of the Clackamas River Project.

### 2002

The Nature Conservancy of Oregon (TNC) and Metro partnered up by splitting a 4-person AmeriCorp team to map the occurrences of knotweed part-time in the Sandy River Gorge and the Clackamas River. In the Clackamas the team mapped over 500 patches, within 19 established reaches over 12 miles of river from River Mill Dam in Estacada downstream to the confluence of Clear Creek in Carver. The control area was established below River Mill Dam because of three reasons: 1.) Land ownership above River Mill Dam is primarily in public ownership (Mt. Hood National Forest) which has federal restrictions for chemical treatment of knotweed along streams, 2.) the Clackamas River above River Mill Dam is modified by a series of dams which may serve as an impediment for knotweed transport within a stream system, and finally the upper portions of the Clackamas are not urbanized which may decrease the opportunity for knotweed and other non-native vegetation to be established in areas of little or no development. An extensive outreach mailing was conducted to increase awareness of knotweed to river and streamside landowners as well as gain permission to treat knotweed on private lands. A photo point monitoring system was implemented to track results on various treatment methods over a field season. The team utilized a cut and spray method of control using various concentrations of Rodeo and Aquamaster through out the field season which had poor results over one season of application. Continuing with a top down approach, the team started an upper watershed survey, above River Mill Dam within the Mt. Hood National Forest, to confirm our speculation of how land use, public forest land ownership, and dams reduce the opportunity for knotweed to be presence along the river in that type of system. Findings were limited to a few patches along the roadside most likely brought there within contaminated soil. No patches found in the riparian area.



### 2003

Metro dedicated a full time crew of three AmeriCorps members and 2 Interns to the Clackamas Watershed. Metro increased its outreach efforts into the tributary streams of Wade, Clear, Eagle, Dubious, Linglebeck, and Goose Creeks to set up land access and get a landowner perspective of the knotweed infestation in those

streams. Metro increased its partnership with the Clackamas River Basin Council and the Oregon Department of Fish and Wildlife to perform an in-stream survey for knotweed in both Clear and Deep Creek. The survey confirmed a low level of knotweed in Clear Creek and major infestation in Deep Creek. Metro supported the efforts of TNC to test the effectiveness of a new treatment method called Stem Injection. Using a combination of stem injection (needle & syringe) and foliar application Metro treated over 19,000 individual stems, over 6 miles of treatment area, with the new method. The team continued to work in a top down fashion treating knotweed sites mapped the previous year. In so doing they continued to refine knotweed occurrence maps, treatment methods, data collection, and implementation of the photo monitoring plots on River, Hooten, and Richardson Islands. A significant volunteer coordination effort was implemented to remove other State listed noxious weeds in the watershed. Over the 2003 field season the team worked with 215 volunteers for a total of 1157.5 hours; specific projects included physical removal of Scotch Broom, Himalayan Blackberry, English Ivy, neighborhood work parties to remove non-natives and paint storm drains, and river-trash clean up events in the Clackamas Watershed. Upper watershed inventories continued to take place and still no knotweed found in the riparian areas. Currently working with the Forest Service to refine known knotweed sites along the roadside.



Before  
Stem Injections



One Month After  
Stem Injections

## 2004

This year was significant for many reasons. First its the last year Metro Regional Parks was going to manage the project (Two-year OWEB grant was awarded under the plan of the CRBC taking management in 2005). Secondly, a stem-injection gun was developed for knotweed control and proved to be much more efficient in the field. Metro deployed a six person team to focus on main stem knotweed maintenance and assessment/treatment into the Eagle Creek Basin, and Wade, Dubios, Linglebeck, Clear, and Goose Creeks. The generous grants from OWEB and Oregon State Weed Board supported Metro's efforts to extend knotweed control on the main stem to the confluence of Clear Creek. The field season started with the evaluation of the previously treated (stem injection/foliar spray) patches. The evaluation of the injection/foliar method resulted in effective treatment of treated patches in 2003 and reduced the main stem knotweed by 70%. The tributary team extended assessment and treatment into the tributaries of Wade, Eagle, Dubious, Linglebeck, and Goose. The assessment covered over 10 miles of in stream survey, over 60 individual survey points, and mapped 15 patches not previously known, gained permission to chemically treat patches, and treated all known patches in specified tributaries.



A site soon to be treated.



Injection gun designed specifically for Knotweed.

The team also coordinated with Forest Service Biologists to share information on knotweed infestation within the Mt. Hood National Forest, which resulted in a shape file to be added to our Upper watershed survey map. During treatment on the main stem Clackamas a significant knotweed infestation was discovered (called "Hot Spots") within the 2003 control area. "Hot Spots" are defined as areas that have not been previously mapped or treated and were unknown to project before 2004 but are within the 1996 flood inundation area/100yr flood plane and will require multiple years of treatment to extirpate. These Hot Spot areas contained over 50,000 individual stems and required the entire month of August and September to perform treatment. Due to these hot spot areas the projects control area focus changed from the confluence of Clear to the confluence of Deep Creek. The team then surveyed all areas that lie between the active flood plane and the high water mark from the 1996 flood to re-ensure that there were no other "hot spots". The team continued to help TNC with the dose response study to support/evaluate the stem injection method (2004 Injection Report). Utilizing a new injection applicator (stem injection gun) manufactured by jk-international allowed the team to inject knotweed at a faster rate than the 2003 field season (2003 = 60stems/hr 2004 = 200stems/hr). The injection total in 2004 exceeded 50,000 stems, which is nearly three times the number in 2003. All areas of known knotweed from River Mill Dam to the confluence of Deep Creek have been treated. In September, all mapped knotweed sites were revisited and sprayed with 5% Aquamaster solution to treat the re-sprout from post injection and/or treat the smaller stems of every plant within the 2004 control area.



New Sprouts

## 2005

During 2005, the CRBC treated all remaining knotweed sites on the main stem Clackamas as well as tributary sites comprising an estimated 23,070 stems.

The CRBC used three forms of treatment to kill knotweed: 1.) stem-injected herbicide and 2.) foliar spray of herbicide and 3.) a combination of both. The CRBC used only the glyphosate-based herbicides Aquamaster® and Rodeo® during 2005. Stem-injected herbicide was applied at an undiluted strength in doses ranging from 2ml to 5ml per stem of knotweed (dose dependent upon stem diameter and, in some cases, acreage limit as to how much herbicide one can apply per acre per year specified on herbicide labels). Foliar applications of herbicide were used to treat stems that were too narrow for stem-injection (stems smaller than ~1cm were too fragile for stem injection). Foliar-applications consisted of a 5% solution of herbicide augmented with 1% surfactant (R-11) and a tracer dye. All treatments were conducted by certified personnel (Crew leader and

AmeriCorps volunteers must receive an ODA Commercial Pesticide Applicators License prior to applying herbicide.)

A large proportion of the reduction realized from the 2003 and 2004 treatments can be attributed to a relatively new treatment technique pioneered by the Clark County Weed Management Department (Director Phil Burgess) and further evaluated during the 2003 field season by Metro and the Nature Conservancy in 2003. This technique, called stem-injection, coupled with supplemental foliar spray of non-injectable stems, resulted in the most efficient level of knotweed control.

In 2005, the CRBC and The Nature Conservancy (TNC) continued to partner up to evaluate the dose response study for stem-injection initiated in 2003. Based on 60 knotweed patches with 5 different treatment categories (control, 1.5ml, 3ml, 5ml, and 5ml + foliar spray) thus far there is no hard evidence that distinguishes any dose to be more effective, except for the control sites.

## Season Accomplishments

- Continue to refine the occurrence map for Japanese Knotweed locations within the entire Clackamas River Watershed.
- Conducted follow up treatment to all known knotweed sites along 9.5 miles of the mainstem Clackamas River and along Eagle, Bear, Delph, Clear, Wade, and Dubios Creeks.
- Conducted a location assessment for knotweed in the entire Deep Creek Basin – of which included surveying all creek/road crossings, 12.5 miles of in-stream surveys, and informational mailings to 187 stream side landowners.
- Partnered up with the Nature Conservancy to do follow up monitoring for the stem-inject dose response experiment initiated in 2003.
- Initiated treatment along the North Fork Deep Creek and Tickle Creek (terrestrial patches).
- Coordinated with project partners; the Nature Conservancy, USFS, Concordia University, and Metro to ensure quality control with respects to knotweed mapping and treatment.
- Informed the public regarding noxious weeds and their impact to watersheds via community events and workshops.