

# Giant and Japanese Knotweed Control in Polk and Burnett Counties

Aquatic Invasive Species Early Detection and Response  
Project Grant Final Report

AIRR-102-11

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In April 2011, the Polk County Land and Water Resources Department received a three year Aquatic Invasive Species Control Early Detection and Rapid Response Grant from the Wisconsin Department of Natural Resources to control Giant and Japanese Knotweed in Polk and Burnett Counties. This is the second rapid response grant received for control of these species in Polk and Burnett Counties.



## Species Information

Both Japanese and Giant Knotweed are native to Asia and were imported to the United States in the mid 1900's as ornamental plants. These species have begun to escape landscaping conditions, becoming more prevalent in the wild.

Japanese and Giant Knotweed are large robust perennial plants with very aggressive growth habits. Both species grow extremely fast and form a dense canopy of foliage which blocks sunlight from reaching the ground. As a result, native vegetation is unable to grow beneath a knotweed stand. When knotweed establishes on stream banks, the lack of understory can promote intense erosion causing soil and knotweed roots to move downstream.

Knotweed is a perennial, meaning that each spring it re-grows from its extensive root system. In the peak growing season knotweed can grow two to four inches per day. The maximum height of Japanese Knotweed is 8 to 10 feet tall; whereas, Giant Knotweed can reach heights of 12 to 15 feet.



While height is one way to distinguish Japanese and Giant Knotweed, it is not the most reliable. Leaf size and shape are the most reliable way to distinguish the two species of knotweed. Typically, Japanese Knotweed leaves are up to 6 inches in length with flat or truncated leaf bases. Giant Knotweed leaves are much larger, growing up to 12 inches in length. The leaves of Giant Knotweed also differ slightly in shape, taking on a pronounced heart shape.

Both species of knotweed are easily distinguished by their hollow bamboo-like stalks. Additionally, in the late summer both species develop sprays of white flowers which are favored by bees and flies. Both species of knotweed are dioecious, meaning that a male and female plant are required to produce viable seed.

Since knotweed was sold as an ornamental it was thought that cultivars would not produce viable seed. However as time passed, imports from many sources have likely introduced knotweed colonies of the opposite sex, making germination by seed a likely source for reproduction.

In addition to seed production, both species of knotweed can establish new clones from cut stems and root segments. Cut stems can develop roots at each node along the stem and a root segment as small as 1/4 inch can develop into a new stand of knotweed.

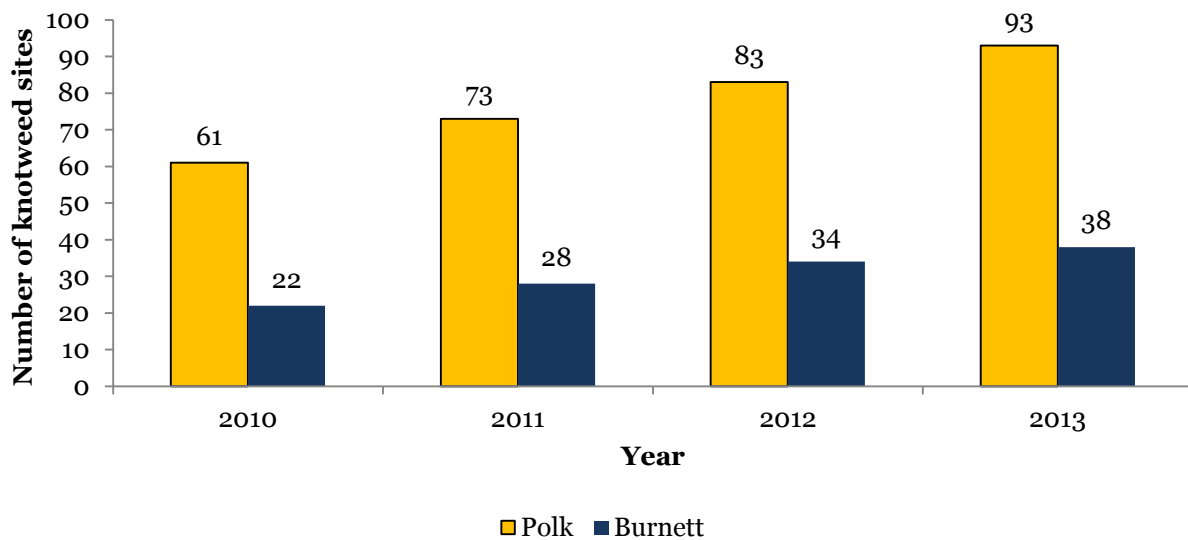
Knotweed is rhizomatous, producing horizontal growing roots that can extend 60 ft from the parent colony. Rhizomes are responsible for colony expansion, making this species especially difficult to control.

## Infestation Inventory

### Total number of knotweed sites

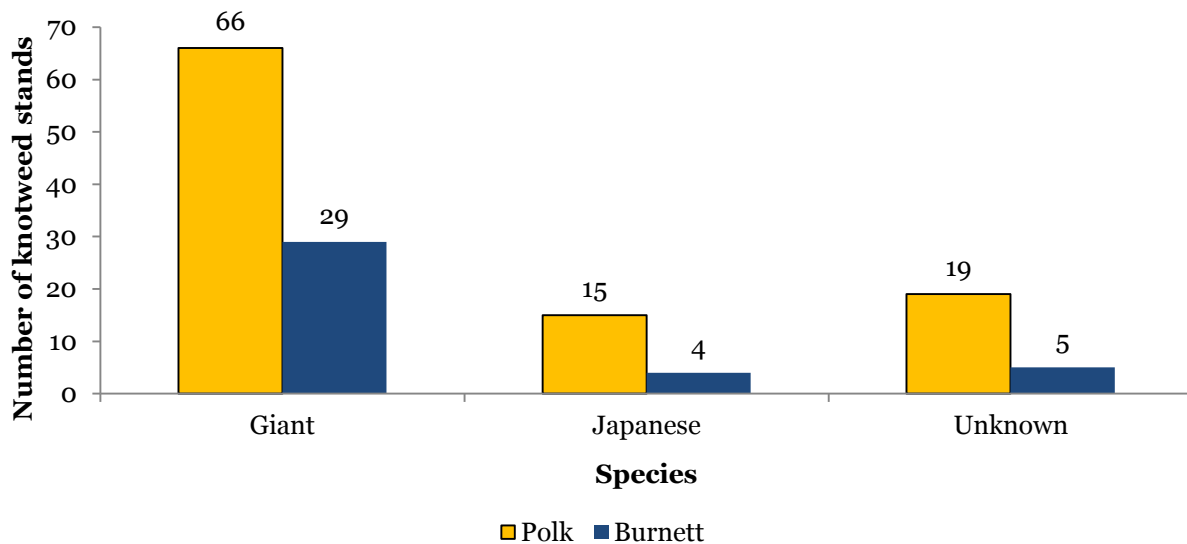
The number of known knotweed sites has continued to grow each year. At the end of 2010—when the first control grant expired—there were sixty-one known knotweed sites in Polk County and twenty-two in Burnett County. During the term of this grant, an additional thirty-two knotweed sites have been documented in Polk County and an additional sixteen have been documented in Burnett County. Currently, there are ninety-three known knotweed sites in Polk County and thirty-eight in Burnett County. A few of the sites have multiple stands of knotweed.

New sites were located by landowners, Polk County Land and Water Resources Department staff, or Burnett County Land and Water Conservation Department staff. Additionally, once landowners were able to identify knotweed and made aware of the issues this plant poses, they often alerted neighbors and friends of the presence of stands of knotweed on their property.



### Species information for knotweed stands

Giant Knotweed is listed as a prohibited species<sup>1</sup> under the Wisconsin invasive species rule; whereas, Japanese Knotweed is listed as a restricted species<sup>2</sup>. Unfortunately, the majority of knotweed stands present in both Polk and Burnett County have been identified as Giant Knotweed (66% and 76% respectively). There are a number of stands in Polk and Burnett County where the species of knotweed has not yet been verified. These stands are typically young stands of knotweed, stands located in poor soils, or stands that have been treated with herbicides in the past. Stunted conditions associated with these factors can make positive species identification difficult.



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<sup>1</sup> “Prohibited invasive species” or “prohibited species” means an invasive species individuals, small populations or small pioneer stands of terrestrial species, or in the case s that the department, at the time of listing under s. NR 40.04 (2), has determined is likely to survive and spread if introduced into the state, potentially causing economic or environmental harm or harm to human health, but which is not found in the state or in that region of the state where the species is listed as prohibited in s. NR 40.04 (2), with the exception of isolated of aquatic species, that are isolated to a specific watershed in the state or the Great Lakes, and for which statewide or regional eradication or containment may be feasible. (Wis. Adm. Code ch. NR 40)

<sup>2</sup> “Restricted invasive species” or “restricted species” means an invasive species that the department, at the time of listing under s. NR 40.05 (2), has determined is already established in the state or in that region of the state where the species is listed as restricted in s. NR 40.05 (2) and that causes or has the potential to cause economic or environmental harm or harm to human health, and for which statewide or regional eradication or containment may not be feasible. (Wis. Adm. Code ch. NR 40)


# Giant and Japanese Knotweed Locations Polk and Burnett County, WI December, 2013





## Legend

### Knotweed Locations (138 total)

#### Species

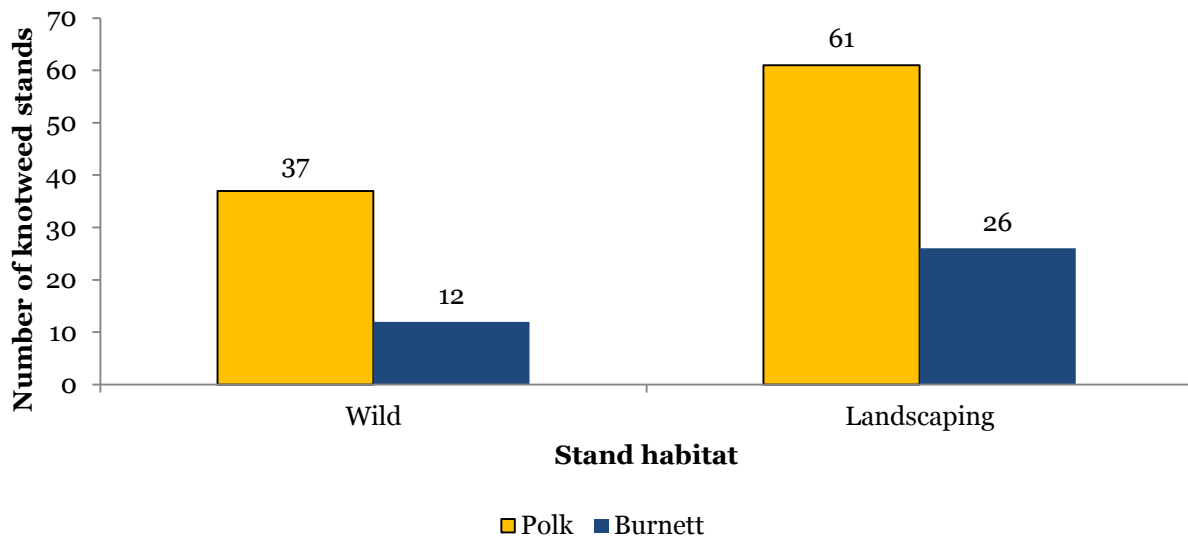
-  GIANT - 95
-  JAPANESE - 19
-  UNKNOWN - 24

-  Polk County
-  Burnett County

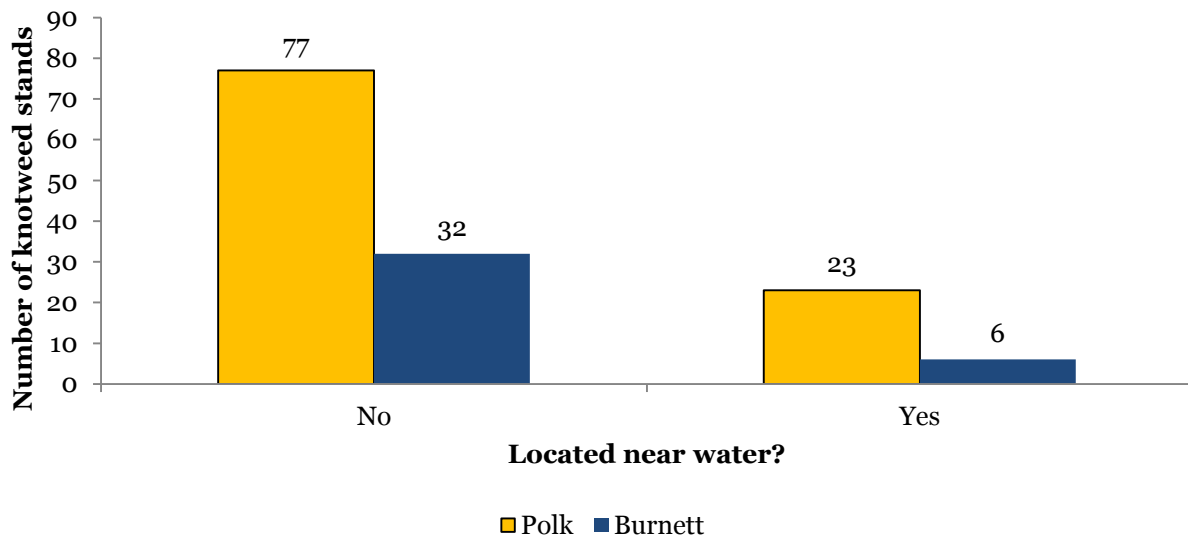
### Environment knotweed stands are located in

The majority of knotweed stands are located in lawn and landscaping environments which is unsurprising given that knotweed was introduced as an ornamental landscaping plant. In both Polk and Burnett County, approximately two thirds of the knotweed stands are located in lawn and landscaping environments (62% and 68% respectively).

The remaining knotweed stands are located in wild environments, or areas that are minimally maintained such as road right of ways, fields in the conservation reserve program (CRP), woodlots, fence rows, and shorelines. Likely, these wild colonies were established due to the existence of a nearby colony in a yard or landscaped setting.



The majority of knotweed stands are located in terrestrial environments as compared to near water. In both Polk and Burnett Counties, less than a quarter of knotweed stands are located near water (23% and 16% respectively).



# Giant and Japanese Knotweed Locations Polk and Burnett County, WI December, 2013



## Legend

**Knotweed Locations (138 total)**

### By Water

■ NO - 109

● YES - 29

□ Polk County

□ Burnett County



# Giant Knotweed Locations By Water

## Polk and Burnett County, WI



### December, 2013




#### Legend

#### Knotweed Locations (20 total)

#### Species, By Water

-  GIANT, YES - 15
-  UNKNOWN, YES - 5

 Polk County

 Burnett County

## **Treatment Methods and Results**

### 2010 Treatment Methods<sup>3</sup>

In 2010, three different herbicides were used for knotweed control: Habitat (Imazapyr), Milestone (Aminopyralid), and Cornerstone Plus (Glyphosate). These herbicides were chosen for their good reputation for knotweed control and because they are labeled for use in different environments. Herbicides were either foliar applied or injected directly into the stem of the plant.

Habitat is labeled for use near water and was used on sites in close proximity to surface water. Milestone, a selective herbicide only effective on broadleaves, was used in grassed areas to avoid damage to grasses. Habitat <sup>4</sup> and Milestone <sup>5</sup> were used on large stands where foliar application was necessary due to the size of the stand or the density of stems. Foliar application was typically completed in late July through August to take advantage of the fact that knotweed is most susceptible to herbicides before flowering.

Cornerstone Plus can be used near water and is a non-selective herbicide, meaning it kills everything. For this reason, Cornerstone Plus was only used with injection systems. Cornerstone Plus is very effective used in its concentrate form and when applied in the stem as close to the roots as possible. However, since stem injection is time intensive, it is not practical for large stands or stands with very dense stems.

Mowing was also incorporated into the management of some stands. If a stand was not able to be treated early and was large enough to make entire stand access difficult, mowing operations were performed. Mowing allowed the stand to be accessible and forced the plant to re-grow. Re-growth expends a great deal of energy and was found to make the plant more susceptible to herbicide treatment. Once the stand regenerated to a height of 2 to 3 feet tall, a foliar treatment of herbicide was applied in the middle of the summer.

Mowing was not performed as the only control effort on any stands. Mowing was always followed by a foliar treatment of either Habitat or Milestone.

### 2010 Treatment Results

Most sites treated with Milestone or Habitat by foliar applications in 2010 resulted in stand reductions between 75-98%. Most sites will require a foliar follow-up application in 2011 to treat small amounts of re-growth. The percentage of re-growth seen was dependant on the original size of the stand. In larger stands more re-growth was observed in 2011. In smaller stands less re-growth was seen. This shows the importance of treating a stand early and as soon after establishment as possible.

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<sup>3</sup> Prior rapid response grant.

<sup>4</sup> Habitat was mixed with water at a 2.5-3% solution. Approximately 3 to 4 ounces of Habitat was mixed to one gallon of water.

<sup>5</sup> Milestone was mixed using 10 milliliters of herbicide per gallon of water.

## 2011 Treatment Methods

In 2011, two additional herbicides were tested: Turflon Amine and Garlon 3A . The active ingredient in both of these herbicides is Triclopyr, which was used because of the lack of soil residual carryover of this herbicide. Milestone and Habitat have significant soil activity and non-target species mortality was seen around areas treated with these herbicides even when no herbicide was applied to the non-target species. These species were injured through root uptake.

Turflon Amine, a selective herbicide effective only on broadleaves, was used in lawns so grass would not be killed. Garlon 3A is labeled for use near water and was used on sites in close proximity to surface water. Both herbicides were used in foliar applications.

In 2011, twenty-one stands of knotweed were treated in Polk County and twelve were treated in Burnett County.

## 2011 Treatment Results

Observations of stands treated with Triclopyr herbicides Turflon Amine and Garlon 3A indicated poor to fair control. Stands treated with Turflon Amine (15.2% Triclopyr) showed no signs of stem reduction in 2012 following 2011 treatment. Garlon 3A (44.4% Triclopyr) showed fair control, reducing stand size by inhibiting re-growth or delaying re-growth until late summer, if re-growth was seen at all. Due to poor control, Turflon Amine and Garlon 3A were not used after the 2011 season.

Stands that were stem injected with Glyphosate showed signs of root dormancy. The stand would be dormant underground for one whole growing season following treatment and re-growth would be observed the following year and require a foliar treatment.

## 2012 Treatment Methods

No new herbicides were used in 2012 due to the quantity of herbicide already purchased for the project.

However, a new rhizome injection system from Green Shoots, LLC was tested in 2012. This method of injection targets the rhizome, specifically the green node of the plant. This system made late fall treatments possible even after frost had burned down the above ground growth. A Habitat herbicide and water solution was used with this method.

The new method of injection proved to be more difficult than expected. The rhizome was difficult to inject and caused damage to the injection system. It appeared that very little herbicide was injected into the green node, instead being deposited in the hollow reservoir left



**Green Shoots LLC injection system prototype.**

from cutting the stems. A follow up visit 6 weeks later proved the method of treatment successful in killing the root masses with large stems. However, it was not successful in translocating herbicide to the outer roots producing stems too small for injection. A foliar follow up treatment of Milestone herbicide was administered to kill this re-growth.

A YouTube video was created demonstrating the use of this system and can be found at: <http://www.co.polk.wi.us/landwater/videos.asp>

In 2012, twenty-three stands of knotweed were treated in Polk County and nine were treated in Burnett County.

### 2012 Treatment Results

The green node injection system seemed to show good results following the 2012 treatment. This method was successful in eliminating the large stem clusters and their root masses and significantly decreased stand density. However, this treatment did not eradicate the entire root system. The small roots around the outside margin of the stand were not affected and re-growth was significant. To get adequate results the green node injection method needs to be paired with a foliar treatment of the re-growth following the green node injection.

### 2013 Treatment Methods

No new herbicides were used in 2013 due to the quantity of herbicide already purchased for the project. Milestone continued to be the herbicide of choice. A foliar treatment was administered to kill the remaining re-growth on stands which were initially treated with the green node injection system. Some of the stands treated with Turflon Amine and Garlon 3A were re-treated in 2013 with Milestone to achieve better results. Milestone applied in the late summer early fall, before any frost, has showed the best results throughout the course of this project. Milestone will be used almost exclusively for future treatments.

In 2013, nineteen stands of knotweed were treated in Polk County and seven were treated in Burnett County.

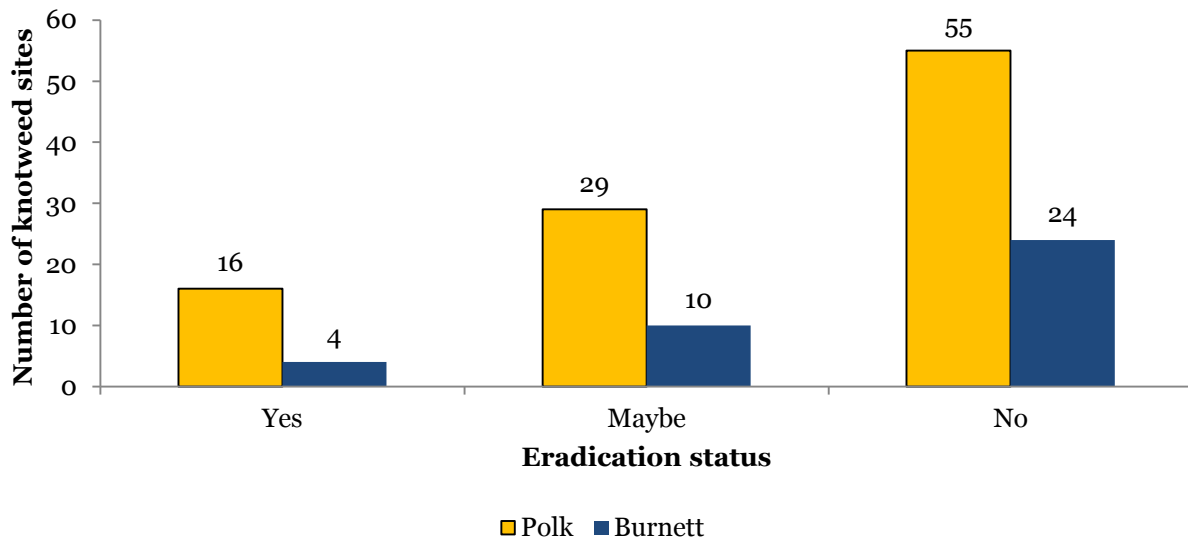


**Stem injection with a JK International, LLC knotweed injection system.**

## Stand Eradication

Eradication success is still questionable for many of the knotweed stands that have been treated. Successful eradication has only been seen on a small number of stands, though many stands have been dramatically reduced. Hopefully, affected landowners will continue to address this species on their own and eradicate stands on their property. The Polk County LWRD will continue to address new knotweed stands with future aquatic invasive species projects.

In both Polk and Burnett Counties less than a quarter of knotweed stands have been eradicated (16% and 11% respectively) and over half have not been eradicated (55% and 63%). For the remaining sites, additional follow up is required to determine if the stand has been eradicated.








# Giant and Japanese Knotweed Locations Polk and Burnett County, WI December, 2013



## Legend

### Knotweed Locations (138 total)

#### Eradicaded

-  MAYBE - 39
-  NO - 79
-  YES - 20
-  Polk County
-  Burnett County

## Seed Viability

In 2011, both male and female knotweed colonies were identified in the Frederic area just over 1 mile apart. The female stand was found to be producing seed. Seeds were collected from the female stand and were analyzed for viability at the UW-Madison Lab. Of the one hundred forty-four seeds analyzed, forty-three germinated, demonstrating 30% viability in 2011. Since this stand was known to produce viable seed, it was treated with herbicide in 2012.

In 2012, a second stand was located that was producing seed. This stand was located along the scenic St. Croix River in Osceola. Seed was collected in the fall of 2012 and sent to the UW-Madison Lab for viability testing. Test reports indicated that none of the seed collected in 2012 was viable. However, since knotweed seed viability is known to vary from year to year, seed was also collected from this site in the fall of 2013.

Additionally, in 2013, seed was collected from a second knotweed stand located on the St. Croix River site in Osceola and from a stand located along County Road C in the Town of Alden. As of December 2013, viability results have not been received for the three stands where seed was collected in the fall of 2013.



## Education Efforts

Throughout the term of the grant, LWRD made every possible effort to provide education to the public regarding Japanese and Giant Knotweed. Additionally, each landowner with knotweed on their property was contacted in person or via mail and provided with the WDNR knotweed brochure.

In 2012, LWRD filmed a YouTube video demonstrating the green node injection system which is available on the County website.

In August 2013, a field demonstration was held by LWRD staff for lake residents on Cedar Lake and members of the Star Prairie Fish and Game Sportsman's Club. During this demonstration those in attendance were shown how to identify the different species of knotweed, educated on effective herbicides and proper timing of applications, and given a demonstration of foliar application of Milestone. Eight members of the public attended and have since committed to continue raising awareness around the lake.

