

# Pest Management – Invasive Plant Control

## Japanese Knotweed

### **Conservation Practice Job Sheet**

**MN-797**



**Japanese Knotweed (*Polygonum cuspidatum*)**

Photographers: Tom Remaley, Jil M. Swearingen, National Park Service



**Japanese Knotweed, leaves**

### **Japanese Knotweed**

Japanese knotweed, also known commonly as ‘bamboo’, is a native of Japan that was brought to the US from Britain in the late 1800’s as an ornamental.

### **Ecological Threat**

Japanese knotweed is a shrub-like, herbaceous perennial (but dies back to ground each fall) that can grow to ten feet in height and form dense thickets of erect stems that exclude native vegetation and greatly alter natural ecosystems. It poses a significant threat to riparian areas, where it can survive severe floods and is able to rapidly colonize scoured shores and islands. Once established, populations are extremely persistent and difficult to control.

Japanese knotweed can tolerate a variety of adverse conditions including full shade, high temperatures, high salinity and drought. It is often seen along stream banks (erosion and deposition areas) where it often forms an impenetrable mass of stems; it also occurs in wetlands, roadways and waste places.

Knotweed reproduces sexually as well as vegetatively through an extensive network of rhizomes (roots that

can sprout new stems) that may spread up to 65 feet from the parent plant.

Knotweed spreads primarily by its long, stout rhizomes. It may also colonize new areas through wind dispersed seed as well as through transported root and stem fragments as small as ½ inch. The seeds have no dormancy requirements and germinate readily. Knotweed is often transported to new sites in floodwaters and as a contaminant in fill (along roads).

### **Description**

Japanese knotweed’s stout, hollow, bamboo-like stems and the large (3 to 6 inches long), broadly ovate, alternate leaves are distinctive. Tiny white or greenish-white flowers develop in late summer and grow in numerous linear clusters that form a mass of white over the plant when in full flower (see picture above). The plant is insect pollinated. Frost-killed stems turn bronze colored and may remain upright through winter.

### **Control**

Japanese knotweed control should take a watershed perspective, from the headwaters downstream, as the primary dispersal mechanism is by water (both seeds

and plant fragments). Control of knotweed must be well thought out due to the extensive root system and sprouting ability as well as the site limitations. Knotweed frequently infests riparian areas near streams which add complexity to any control plan.

Manual, mechanical and chemical methods are all useful to varying degrees in controlling knotweed. Removing or killing plants will provide increased light at the site which may lead to a surge of sprouts in the following year. Prepare to monitor and control these outbreaks for multiple years.

As with all invasive species, Japanese knotweed is most effectively controlled by recognizing their appearance early and removing isolated plants before they begin spread.

### **Biological Control**

Biological controls of knotweed are being studied. There are none at this time.

### **Mechanical or Manual Control**

Mechanical controls are effective for small initial populations or in environmentally sensitive areas where herbicides cannot be used and include grubbing or pulling seedlings, rhizomes, mature plants, and repeated clipping. Manual control takes special precautions because any live plant part (1/2 inch or larger) may sprout. Plant parts must be disposed of properly and must not be allowed to enter waterways. Stems and roots must be contained or dried with little or no soil contact or they may sprout. Do not compost plant parts.

Digging or pulling (uprooting) will eliminate a portion of the root system but not all. Pull the root crown and as much root as possible. Each time new sprouts are seen (look after a week and at least 20 feet from the plant) uproot them and get as much root as possible. This method is only feasible on very small patches.

Because disturbed, open soil can support rapid invasion by other invasives, managers must monitor their efforts at least once per year and repeat control measures as needed. Limit soil disturbance whenever possible.

Hand cutting, mowing or other methods must be applied every 2-3 weeks from April through August. Cutting should continue after August but less frequently. Prevent plants from exceeding 6 inches in

height. Again, dispose of plant parts properly or they will sprout.

Covering with heavy plastics and geotextile fabrics has had some success but is costly and requires pulling, cutting or herbicide treatment near the edges. Cut stems to the ground surface and then cover the stand being sure to extend coverage at least 10 feet beyond the farthest stems. Weigh down the edges and monitor for sprouts. Leave cover in place for at least two growing seasons.

Any type of manual control will require a strong commitment from the manager because of the aggressive growth characteristics of knotweed. The treatments will need to continue, as described above, for at least three years but probably much longer depending on the size of the patch. Manual control of knotweed is best suited to ecologically sensitive areas and isolated small patches where there is a commitment to avoid herbicide use.

### **Prescribed Burning**

There is little information about the efficacy of burns.

### **Chemical Control**

Herbicide applications to knotweed must be carefully planned and implemented as the stands are typically near surface waters. Methods include spraying, wicking, injecting, and pouring. Integrating control techniques, such as cutting in the spring and applying herbicide in late summer, may be a good alternative for the site.

Glyphosate (brand names Roundup, and for use near waterbodies, Rodeo) is a nonselective herbicide which kills both grasses and broad-leaved plants while triclopyr<sup>2</sup> (brand names Garlon, Pathfinder, and others) is a selective herbicide that kills broad-leaved plants but does little or no harm to grasses.

**Foliar Treatment:** It may be necessary to precede foliar applications with stem treatments to reduce the risk of damaging non-target species. Although it is generally best to apply foliar spray in late summer when the plant is translocating nutrients, this is not usually practical for knotweed which may be 10 feet tall late in the season. From a practical standpoint, the best time to foliar spray is when the plants are 3-6 feet tall<sup>3</sup>. These stands will require follow up treatments later in the growing season. Apply a 2% solution of glyphosate or triclopyr<sup>2</sup> and water to thoroughly wet all foliage. Do not apply so heavily that herbicide will

drip off leaves<sup>1</sup>. A 0.5% non-ionic surfactant is recommended in order to penetrate the leaf cuticle, and ambient air temperature should be above 65 °F.<sup>2</sup> Foliar applications appear to be a reasonably efficient approach (1 to 4 treatments over two seasons) to obtain control over small and medium size knotweed patches. Larger patches will often require treatment over several years and combinations of manual and chemical control methods<sup>3</sup>. Do not cut down treated plants for at least a full growing season.

**Cut stem treatment:** Use this method in areas where plants are established within or around non-target plants or where vines have grown into the canopy. Cut the live stem about 2 inches above ground level (between the lowest nodes). Immediately apply a 25% solution of glyphosate (e.g., Roundup, or use Rodeo if applying in or near wetland areas) or triclopyr<sup>2</sup> (e.g., Garlon) and water to the cross-section of the stem.<sup>1</sup> A subsequent foliar application of glyphosate may be require to control new seedlings and re-sprouts.

<sup>1</sup> – From Alien Plant Invaders of Natural Areas Fact Sheets (NPS)

<sup>2</sup> – Check the label for appropriate use in Minnesota

<sup>3</sup> – From Controlling knotweed in the PNW, J. Soll 2004.

### **Important Note!**

Mention of specific pesticide products in this document does not constitute an endorsement. These products are mentioned specifically in control literature used to create this document.

By law, herbicides may only be applied as per label instructions. Follow all label instructions when applying pesticides including “grazing and re-entry level restrictions” and application site restrictions (is the product labeled for “the application site” you are considering?).

Most of the products listed are not acutely toxic but have high potentials to move off-site via leaching or runoff under certain conditions. Off-site movement potential can be minimized by avoiding over-spraying or application to the point where products are reaching or dripping onto the ground.

### **Disposal**

Stem and root fragments as small as ½ inch can sprout so special care must be taken to contain the plant parts when using manual control. Do not allow plant parts

to enter waterways during control. Limit soil contact when drying the plant parts. Small plants may be hung in trees to prevent re-rooting. Cut stems may be piled on a raised platform, brush pile or tarp for drying. Do not compost plant materials as they may sprout and then spread. Piles may be burned. Do not remove soil or plant material from the site unless being disposed of in a landfill.

### **Information and Recommendations compiled from:**

- The Nature Conservancy - Fact Sheets (and references therein)
- Plant Conservation Alliance Fact Sheet: Japanese Knotweed; Tom Remalley, Great Smoky Mountains National Park, Gatlinburg, TN, Author <http://www.nps.gov/plants/alien/fact/pocu1.htm>
- Invasive Plant Atlas of New England (IPANE)
- CT NRCS Invasive Species ID Sheets [ftp://ftp-fc.sc.egov.usda.gov/CT/invasives/japanese\\_knotweed.pdf](ftp://ftp-fc.sc.egov.usda.gov/CT/invasives/japanese_knotweed.pdf)
- Invasive Plant Atlas of New England (IPANE)
- Literature Review for USFWS (Draft) – SLCVP TNC 2006
- Vermont Invasive Exotic Plant Fact Sheets <http://www.uvm.edu/mastergardener/invasives/invasivesdocuments/Exotic%20fact%20sheets%20003%20no%20page%20numbers.pdf>
- Controlling Knotweed in the Pacific Northwest. TNC of Oregon. J. Soll, 2004.
- Minnesota Department of Natural Resources. 2007. The Minnesota Department of Natural Resources Web Site (online).
- The Nature Conservancy. [Japanese Knotweed: Element Stewardship Abstract](#). In: Wildland Weeds Management & Research Program, Weeds on the Web.
- Ahrens, J.F. 1975. Preliminary results with glyphosate for control of *Polygonum cuspidatum* Proceedings of the Northeast Weed Control Conference 29:326.

<http://tncweeds.ucdavis.edu/moredocs/polsp01.pdf>