



JEFFERSON COUNTY NOXIOUS WEED CONTROL BOARD

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BEST MANAGEMENT PRACTICES

Invasive Knotweeds

Bohemian Knotweed, Japanese Knotweed, Giant Knotweed, Himalayan Knotweed (*Polygonum bohemicum*, *P. cuspidatum*, *P. sachalinense*, *P. polystachyum*)

(Family—*Polygonaceae*—Buckwheat Family)

Legal Status in Jefferson County: Class B noxious weed (non-native species selected for control in Jefferson County under State Law RCW 17.10). The Jefferson County Noxious Weed Control Board requires control of knotweeds in and within 50 of gravel pits and quarries. **State Weed Law defines control as** *to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants. (See WAC 16-750-003).* State quarantine laws prohibit transporting, buying, selling or offering invasive knotweed for sale or distributing plants, plant parts or seeds.



BACKGROUND INFORMATION

Impacts and History



- Displaces native vegetation due to its aggressive growth, but does not offer food or habitat for wildlife, which native vegetation does.
- Creates bank erosion problems and is considered a potential flood hazard. Despite knotweed's large rhizome mass, it provides poor erosion control.
- Thickets can completely clog small waterways.
- Difficult to control because of extremely vigorous rhizomes that form a dense, deep mat.
- Plants can resprout from stem or root fragments; plant parts that fall into the water can create new infestations downstream.
- Japanese and giant knotweeds are native to northeastern Asia. They hybridize to produce Bohemian knotweed.
- Himalayan knotweed is native to south and central Asia, including the Himalayas.
- Introduced in the U.S. in the late 1800s as ornamental plants and for erosion control.

Description

- Large, clump-forming, herbaceous perennial with 4 to 12 feet tall, round canes with thin, papery sheaths and creeping roots. The hollow stems are jointed and swollen at the nodes, giving a bamboo-like appearance.
- Rhizomes can spread at least 23 feet (7 meters) from the parent plant and can penetrate more than 7 feet (2 meters) into the soil.
- Forms large, dense clones of either male or female plants.
- Stems are thick and hollow, resembling bamboo, green to reddish in color, often red-speckled. Young shoots look similar to red asparagus.
- Leaves are alternate, bright green with smooth edges.
- Giant knotweed leaves are heart-shaped, with lobes at the base (see picture), and often exceed 12 inches in length.
- Japanese knotweed leaves have a flat base and are 4 to 6 inches long.
- Bohemian knotweed, being a hybrid, can vary in size and characteristics between the parent species, but leaves are usually heart-shaped and 7 to 9 inches long.
- Leaves of Himalayan knotweed are much longer and narrower.
- Flowers are small, white/green on Japanese, Bohemian and giant knotweed and light pinkish-white on Himalayan knotweed and grow in showy plume-like branched clusters. Flowers form in July and August and grow in dense clusters from the leaf joints. Flowers are either all female (form seeds) or all male (don't form seeds) on each plant.
- Knotweed typically starts to form seeds by mid-August.



Giant knotweed (left), Japanese knotweed (center) and Himalayan knotweed (right). Bohemian knotweed leaves vary in size and characteristics between giant and Japanese.

Habitat

- Can grow in partial shade or full sun.
- Knotweed thrives in any moist soil or river cobble, but can also grow in dry areas.
- Most commonly found in the flood zone along rivers and creeks, it also grows in roadside ditches, railroad rights-of-way, unmanaged lands, wetlands, neglected gardens, and other moist areas.

Reproduction and Spread

- Knotweed typically starts growth in April, but can begin as late as June in higher elevations.
- Reproduces by seed and vegetatively from rhizomes (creeping underground stems), roots and stems.
- Plant fragments are dispersed by natural causes (flood, erosion) or man-made dispersal (roadside clearing, fill dirt). Knotweed can spread rapidly due to its ability to reproduce vegetatively.
- Root fragments, as small as ½ in (1 cm) can form new plant colonies and can also be spread in contaminated fill material.
- Cut or broken stems will sprout if left on moist soil or put directly into water, or if moved by beavers or earth-moving equipment. Each node on the plant stock is able to produce roots and new plants.
- Seeds can be viable for as long as 15 years. Seeds in the upper 1 inch (2 cm) of soil generally are viable for 4 to 5 years. Below 1 inch (2 cm), the seeds remain dormant longer. Knotweed seedlings are not often found in the wild and most dispersal is by root and stem fragments.
- Knotweed canes die back with the first hard frost and go dormant during the winter. The dead, brown stems may remain standing through the winter with new canes developing in the spring from the same rootstock.

Local Distribution

Found throughout Jefferson County. The heaviest concentrations of invasive knotweeds are along riparian corridors but infestations are also found in residential gardens, wetlands, and on roadsides.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods that reflect the available time, funding, and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions.
- Because of knotweed's incredibly extensive root system and sprouting ability, landscape level control requires long-term planning and follow-up.
- Because the plant spreads easily downstream by water, it is necessary to begin control from the furthest upstream infestation, including all tributaries and other upstream sources of possible re-infestation.
- Although there are potentially successful mechanical or manual control options for small patches, landscape level projects and large sites will likely require integrating herbicide into the control strategy.
- Control practices in critical areas should be selected to minimize soil disturbance or efforts should be taken to mitigate or reduce impacts of disturbance. Any disturbed areas need to be stabilized to control erosion and sediment deposition. Minimizing disturbance also avoids creating more opportunities for germination of giant hogweed and other weeds.
- If the control site requires extensive clearing or grading, or is located near a shoreline, steep slope, stream, or wetland, contact the Jefferson County Department of Community Development to find out whether or not a permit may be necessary.
- Because knotweed is a state-listed noxious weed, control (both manual and chemical) in critical areas is allowed as long as the landowner consults with the Jefferson County Noxious Weed Control Board and follows their guidelines.

Early Detection and Prevention

- Monitor for new populations in May and June.
- Dig up isolated or small populations (50 stems or less). If there are more stems than you can remove manually, it may be necessary to treat the area with an appropriate herbicide in the late summer/early fall.
- Prevent plants from spreading away from existing populations by washing vehicles, machinery, and equipment that have been in infested areas.
- Do not discard stems or root fragments in waterways or on moist soil.

Manual

- Small patches (50 stems or less) can be controlled manually. Stems should be cut or mowed close to the ground twice a month or more between April and August, then once a month until the first frost.
- Rake and pile up the cut stems where they will dry out because stems or stem fragments can sprout, and the area (or adjacent areas) may become re-infested.
- Do not allow cut, mowed or pulled vegetation to enter waterways.
- Dig out as much root as possible in August.
- Each time you see new sprouts (start looking a week after you pull), uproot them as well, trying to pull out as much of the root as you can each time.
- Be sure to carefully dry or dispose of the roots. Do not put them in a compost pile.
- Be sure to search at least 20 feet (7 meters) away from the original patch center.

Mechanical

- Cover with heavy duty geo-textile fabric or black plastic, after cutting stems down to ground level.
- Extend the plastic at least 7 feet beyond the outside edges of the knotweed patch.
- Leave covering material loose, weighted down at the edges with heavy rocks or cement blocks.
- Do not place bark, wood chips or any other kind of mulch on top, because weeds will grow in it, and it will be more difficult to remove the fabric when the knotweed is gone. Watch for holes in the fabric and watch the perimeters for new growth. Every two to four weeks during the growing season, stomp down re-growth under covering material and clean debris off the cloth.
- Plan to leave the covering material in place throughout three to five growing seasons.
- Try this method at the beginning of the year or after cutting the plant down several times during the growing season which will reduce some of the rapid plant growth.

Disposal

- Knotweed crowns and rhizomes should be collected and discarded with the trash or taken to a transfer station for disposal. Composting crowns and rhizomes is not recommended.
- Knotweed stems can be composted, but they will root on moist soil so they need to be completely dried out before composting.
- Stems can be left on site to dry out and decompose if they are in a dry area where they will not move into waterways or onto moist soil.
- Dried out stems may be broken up or chipped into pieces less than an inch long and then composted on site, disposed of in a city-provided yard waste container or in the green recycling at a transfer station.
- Stems of knotweed with seeds should be collected and put in the trash or taken to a transfer station. If removal is not feasible, these stems can be left on site. However, there is a risk of spread from the seeds, so the area should be monitored for several years for seedlings.
- Never dispose of knotweed plants or plant parts into waterways, wetlands, or other wet sites where they might take root.

Biological

- Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species. Biological control is generally most effective when used in conjunction with other control techniques.
- Research is underway for possible biological control agents that have been identified in the knotweed's native range. However, there are currently no insect biological control agents available for managing invasive knotweed.
- Goats are reported to eat knotweed and in some circumstances, controlled goat grazing may be an option similar to intensive mowing. Be aware that goats will eat desirable vegetation as well as knotweed.

Chemical

- Effective chemical control of biennial and perennial weeds can be achieved only with *translocated* herbicides (ones that move through the plant and kill the roots).
- If desirable grasses or other monocots (sedges, rushes or cattails) are present, use a selective herbicide (one that affects only broadleaved plants), or carefully spot-spray only the knotweed.
- OR, inject herbicide into individual canes— call the Weed Board for information on this method.
- Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label. **Follow all label directions.**
- The most effective time to chemically treat knotweed is late summer or early fall. However, plants can then be 6 to 10 feet tall and spraying over one's head is neither safe nor practical. A way around this is to cut plants in early to midsummer (disposing of cut stems appropriately), and spray the re-growth later in the year.
- Treated areas should not be mowed or cut until after the herbicide has had a chance to work. This can be as long as 2-3 weeks.
- It is important to establish new vegetation after treating an area. Follow the label for the timing because some herbicides stay active longer than others.

For questions about herbicide use, and specific herbicide recommendations, contact the Jefferson County Noxious Weed Control Program at 360-379-0470 ext 205, or noxiousweeds@co.jefferson.wa.us.

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Desirable Vegetation

- Dig up plants by hand if soil is wet.
- OR apply appropriate herbicide by spot spray to minimize off target injury.
- Monitor site throughout growing season and remove any new plants. Remember to search at least 25 feet from the original infestation.

Large Infestations\Monocultures

- Mowing is not effective for controlling invasive knotweed infestations, unless followed by some other control method such as covering and mulching.
- Covering or mulching can be effective but be sure to monitor for invasive knotweeds on edges of covered sites, at overlapped areas, or where the covering has been staked.
- Large infestations can be controlled with herbicides.
- Eradication of knotweed with a single herbicide application is difficult. Typically it takes several treatments, over 4 to 5 years to get an infestation under control.

Riparian and Aquatic Area Control

- Survey area and document extent of infestation from the headwaters of waterways down.
- Focus on manual removal for small (less than 50 stems) infestations if possible.
- If manual control is not feasible, inject or spot-spray an appropriate herbicide.
- Monitor for several years to control plants re-sprouting from the rhizome mass, skipped plants and any regrowth.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion.
- **Any herbicide application over or near water can be done only by a specially-licensed applicator using an approved aquatic formulation, and may require a permit from the Washington State Department of Ecology.**

Road Right-of-Way Control

- Dig up small infestations if possible.
- If manual control is not feasible, spot spray with an appropriate herbicide.
- If bare spots are left, replant with low-growing native plants.
- Mowing is not an effective means of control and can spread knotweed infestations along road rights-of-way, but it can serve as the first step in a combination approach to control.

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