



King County
Department of
Natural Resources and Parks
Water and Land Resources Division
Noxious Weed Control Program

BEST MANAGEMENT PRACTICES

Scotch Broom, Scot's Broom *Cytisus scoparius* Fabaceae

Class B Noxious Weed Designated for Control only in Select Areas

Legal Status in King County: Class B Noxious Weed (non-native species designated for control only in select areas by Washington State law RCW 17.10 and the King County Noxious Weed Control Board). The King County Noxious Weed Control Board requires control on the King County portion of State Route 2 and on Interstate 90 between mile marker 34 and the King-Kittitas County Line. Control is not required for the remainder of the county, but it is recommended where feasible. Control is defined by state law as the prevention of all seed production. State quarantine laws prohibit transporting, buying, selling or offering Scotch broom for sale, or distributing plants, plant parts or seeds.



BACKGROUND INFORMATION

Impacts and History

- Scotch broom displaces native and beneficial plants, causing considerable loss of grassland and open forest habitat.
- Seeds and other plant parts are toxic to humans, horses and livestock.
- Renders rangeland and grasslands worthless.
- Interferes with re-establishment of conifer seedlings on harvested forests.
- Damages western Washington and Oregon prairies by changing the chemical composition of the soil and shading out prairie species.
- Dense stands can impede movement of wildlife.
- Potential fire hazard that can increase the intensity of grassland and forest fires.
- Scotch broom is difficult to eradicate due to substantial and long-lived seed bank.
- Native to the British Isles and central Europe.

Scotch broom was introduced as a garden ornamental in the 1860's. It was planted along roadsides and cut banks to prevent soil erosion and is found throughout most of western Washington, British Columbia, Oregon and California. Also commonly known as Scot's broom.



Description

- Large, yellow-flowered shrub in the legume family with evergreen stems and small, deciduous leaves.
- Grows 6 to 12 feet tall.
- Branches are erect, 5-angled with prominent ridges, and star-shaped in cross-section. Young stems are green. Older branches and trunks are yellowish-brown.
- Flowers are bright yellow, pea-like, sometimes with orange-red markings in the center, and are borne on short stalks in the leaf axils. They are ½ to 1 inch long.
- Leaves are small, oval and be single at the stem ends but are generally in three leaflets.
- Leaves are often dropped during dry summer months or periods of stress. Plants may be leafless for most of the year.
- Seedpods are black or brown, flattened, hairy on the margins, and are 1 to 2 ½ inches long.



Habitat

- Tolerant of a wide range of conditions but grows best in dry, well-drained soils in full sun.
- Seedlings can establish under the canopy of mature plants in full shade.
- It is tolerant of low-nutrient soils and a wide range of soil moisture conditions.
- Scotch broom commonly found in disturbed areas, pastures, agricultural lands, harvested timberlands, roadsides, trails, river banks, parks and vacant lots.

Reproduction and Spread

- Reproduces primarily by seed.
- Peak bloom time is April to June but some flowers may appear sporadically throughout the year.
- Seeds are produced in late summer, germinate in fall and spring.
- When mature, seedpods split and eject seeds up to 20 feet away.
- Seeds are further dispersed by natural forces such as erosion, flowing water, and ants collecting seeds for food, as well as by human disturbance such as road work and other activities.
- A single plant can produce over 10,000 seeds per year.
- Plants typically start producing seeds after three years and usually live about 17 years, but can survive as many as 25 years.
- Seeds can remain viable in soil from 5 to 60 years.



Local Distribution

Scotch broom is widely distributed throughout the King County, especially along freeways, on rivers, in parks, and in disturbed vacant lots and un-maintained pastures.

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 which 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 and regulatory compliance issues (**refer to the King County Noxious Weed Regulatory Guidelines**).
- Think about the long-term health of the site. Re-vegetation with native plants adapted to the site conditions will reduce re-infestation by Scotch broom and other weeds. However, re-vegetation can limit control options since care needs to be taken not to damage young plants. Make sure re-vegetation plan is compatible with broom management activities.
- Always consider the long-term goals for the site and the community.
- Sites that have other beneficial plants present should be controlled at times when the least amount of damage will be done to the desirable plants.
- Small infestations can be effectively pulled or dug up. Isolated plants should be carefully removed in order to stop them from infesting a larger area.
- For larger infestations, the strategy will depend on the land use of the site. In pastures, good grazing practices and management of grass and forage species will greatly improve control of Scotch broom. Specific suggestions are given in the Best Management section.
- Generally work first in least infested areas, moving towards more heavily infested areas.
- Minimize soil disturbance to avoid creating more opportunities for seed germination.
- Be adaptive: If the Scotch broom doesn't respond to one method, try a different method, change the timing or modify the technique.
- Be persistent. Any plants that go to seed will prolong the infestation problem. When plants become mature, they need to be removed or controlled before they go to seed. Most infestations require control work several times a year.
- Combine control methods.
- Pay attention to seasonal timing and to unexpected results. Different methods will bring variable results depending on site conditions, soil, water, competing vegetation, and site disturbance.

Early Detection and Prevention

- Seedlings are likely to appear in fall or spring, mature plants flower mainly from April to June but flowers may appear sporadically throughout the year.

- Small populations can be pulled or dug but the site should be monitored for several years for plants growing from root fragments and from the seed bank.
- After the control is complete, re-vegetate the site with non-invasive vegetation to compete with broom seedlings, but make sure re-vegetation plan is compatible with follow-up weed control activities.
- Prevent plants from spreading from existing populations by washing vehicles, boots and animals that have been in infested areas.
- If animals are being moved from an infested pasture to an un-infested pasture, if possible first hold them for at least five days so that any seeds pass out of the animals' digestive system.
- Do not purchase or introduce these invasive plants into your yard or landscape. According to state quarantine laws it is illegal to buy or sell Scotch broom, or any of its cultivars.

Manual

- When digging or pulling, make sure to remove as much root as possible so the plant will not re-sprout. This method can be highly labor-intensive and to be fully effective all mature plants in the site need to be pulled so that no new seeds are produced. Both methods are significantly easier when soils are moist.
- Pulling of medium to large plants is much easier with a **Weed Wrench™**, a solid steel tool for pulling woody plants. Several wrenches are available to borrow from the King County Noxious Weed Control Program (206-477-9333).
- Pulling disturbs the soil and creates ideal conditions for broom seed germination so sites will need to be carefully monitored for new growth.
- Cutting can be an effective control method for older plants that are no longer green at the base. If cutting, it is best to cut the plants when they are stressed during the summer drought in late July to August. Cut stems as close to the ground as possible. Monitor for re-growth and cut again. The disadvantage of this method is that plants are typically in seed during the late summer. Cutting may spread the seeds around so try to cut the plants before the seed pods mature.
- Cutting has been shown to be most effective on plants with a stem diameter greater than 2". Younger, smaller diameter plants that are cut should be monitored closely for regrowth.
- Expect the level of control work to be intensive for the first several years due to seed banks, soil disturbance that occurs when pulling or digging, and regrowth of cut plants.



Mechanical

- Mechanical control methods can be used to suppress larger infestations with either manually operated brush cutting tools or tractor mounted mowers.

- Plants should be cut between flowering and seed pod maturation to prevent seed spread. However, cutting at this time may not increase plant mortality. A late summer cutting after the broom has gone to seed can exhaust root reserves and decrease re-sprouting.
- Older plants are less likely to resprout from cut stems (usually about 20 percent over 5 years old will resprout).
- Younger plants are more likely to resprout (about 50 percent).
- Mowing, and other mechanical control techniques alone are generally not as effective as other methods and will either need to be repeated throughout the season or combined with other control methods to prevent re-sprouting, especially with younger plants. Mowing in the spring followed by a fall herbicide application, once plants have re-grown, can be an effective control method.
- Mature plants with a stem diameter of greater than 2" are the most susceptible to mechanical control, and may not require other methods.
- Bulldozing is not a recommended control method. It tends to spread seeds on a site and removes all other vegetation that was competing with the broom.

Biological

- Several biological control insects have been released in Washington State including Scotch broom bruchid (*Bruchidius villosus*), a beetle whose larvae feed on developing seeds, and Scotch broom seed weevils (*Exapion fuscirostre* or *Apion fuscirostre*). Results are still tentative for both controls in King County. *E. fuscirostre* is very widespread in King County and *B. villosus* is established at several locations.
- One research study from Oregon found that *E. fuscirostre* attacked 40-60% of pods and that of those pods attacked, 85% of the seeds were destroyed. In California, seed production was reduced by 60%.
- Initial findings from research on *B. villosus* ongoing in Oregon (where the beetle is relatively new) show that 10-25% of seedpods have been attacked. In North Carolina, where the beetle has been established for many years, more than 80% seed reduction is reported.
- A gall-causing mite, believed to be *Aceria genistae*, has recently appeared in King County, however it is not an approved bio-control and should not be spread. Research is ongoing to determine whether this mite should be approved as a biocontrol agent for Scotch broom.
- Takes many years for biological control insect population to be large enough to impact the infestation (usually at least 5-7 years, possibly longer).
- Regular and sustained grazing by goats can reduce broom infestations in some cases. If confined, Angora and Spanish goats will graze the tops of young plants, preventing plant development and depleting root reserves. Goats are likely to be most effective when used to clear one to four year old plants or re-growth, rather than the initial clearing of dense, mature stands.

Chemical

- 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.**

- For your personal safety, at a minimum, wear gloves, long sleeves and pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
- For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.
- For control of large infestations on roadsides and other non-pasture areas, herbicide use may be necessary.
- The best time to use foliar spray on broom is in the spring and again in the fall when plants are actively growing. Basal bark and other non-foliar treatments can be performed any time of the year depending on the herbicide used.
- **Infested areas should not be mowed or cut after an herbicide application until herbicide has had a chance to move throughout the plant.**
- Re-treatment the following year is necessary to control late-germinating plants. Continue to monitor for new plants for at least ten years after the initial treatment and following any disturbance to the soil such as tilling or construction.

Application Methods

- Foliar spraying requires a thorough wetting of the actively growing plant parts.
- Basal bark and cut stump application are also effective with triclopyr ester and 2,4-D but these are fairly labor-intensive methods. Wiping concentrated herbicide on a recently cut stump (within moments of cutting) involves more time than foliar spraying but is more target-specific and will damage fewer nearby plants.
- There are tractor-driven booms that wipe on herbicide. This may be particularly effective on young (2 year old) plants that can not be controlled by cutting due to resprouting but are high enough above other plants to allow wiping only the Scotch broom plants.

Specific Herbicide Information

Glyphosate (e.g. Aquamaster, Roundup): can effectively control Scotch broom. Apply to actively growing plants in spring. Addition of a surfactant will improve results. Glyphosate is non-selective and will damage grass and other vegetation it comes into contact with. Treatment with glyphosate needs to be combined with effective re-vegetation of the site to prevent broom seedlings from re-infesting the area. Re-treatment the following year is necessary to control late-germinating plants.

Triclopyr (e.g. Garlon 3A, Garlon 4, Crossbow): apply any time Scotch broom is actively growing. Foliage must be thoroughly wet. With Garlon 3A it is important to use a high volume of water (see PNW Weed Management Handbook for more information). Will not injure most grasses. Retaining the grass will help reduce the germination of Scotch broom seeds in the soil. Garlon 4 and Crossbow can be used for basal bark applications any time of year. **NOTE: Make sure to follow all grazing and harvesting restrictions described on the product label.**

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Dig or pull up plants by hand when soil is moist (fall through spring). This method is very effective on seedlings and smaller plants up to 1" in diameter.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- Apply appropriate herbicide by spot spraying to minimize off target injury.
- Monitor site throughout growing season and remove any new plants.
- If using an herbicide in a grassy area, use a selective herbicide to avoid injury to the grass.
- Do not leave bare soil, use heavy mulch or replant to help compete with broom seedlings. This is especially important if small evergreen trees are being grown.
- Shade makes broom grow more slowly, so competitive plantings will improve long term management of broom populations.

Large Infestations in Grassy Areas

- Mowing multiple times per season for several seasons can keep broom from setting seed, but is unlikely to kill all of the broom, especially young plants.
- Mature plants of 2" plus diameter can generally be controlled by cutting the plant at the base between flowering and seed set (late July – August), but this may not work in all cases.
- Large infestations can be effectively controlled with herbicides. (See the Chemical section of this BMP).
- Smaller amounts of herbicide will be needed if plants are first cut or mowed as there will be less plant matter to treat. However, plants need to be actively growing when sprayed.
- Eradication of Scotch broom with a single herbicide application is unlikely. Typically it takes several applications, over the course of a few years, to reduce a large infestation to a level that is manageable by other means.
- Suppression of large infestations of broom with a selective herbicide can greatly increase grass production, which in turn increases the suppression of the broom.
- Promote healthy grassy areas by seeding and fertilizing. Use a mix of grass and clover species to improve resistance to broom. Fertilize according to the soil needs.
- Heavily infested areas that are not candidates for other types of control may be managed with bio-control to reduce seed production.

Control in Riparian Areas

- Additional permits may be required for control of infestations in riparian areas. See Noxious Weed Regulatory Guidelines for more information (<http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/Noxious-Weed-Control-Regulatory-Guidelines-Rev2014.pdf>).

- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. Refer to the King County Surface Water Design Manual for further information about sediment and erosion control practices (<http://www.kingcounty.gov/environment/water-and-land/stormwater/documents/surface-water-design-manual.aspx> for information).
- Survey area and document extent of infestation.
- Target only the Scotch broom, retain all native and beneficial plants.
- Focus on manual removal for small infestations if possible.
- Mowing can be effective at killing larger established plants but not younger ones. Mowing must be repeated multiple times over a season to prevent seed set and is not likely to kill plants unless combined with other methods.
- For larger areas where herbicide use is warranted, apply with a wick wiper or spot spray using low pressure and large droplet size or use basal or cut stump methods.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion.
- If a non-selective herbicide is used in grassy areas, the area should be re-seeded to prevent reinvasion by weeds.
- Infested areas will need to incorporate a management plan lasting for several years to control plants germinating from the seed bank.

Control along Road Rights-of-Way

- Pull small infestations if possible.
- Spot spray with glyphosate if weeds are in areas with no desirable grasses.
- If plants are in grassy areas, use a selective broadleaf herbicide; if controlled with a non-selective herbicide, re-seed after control is completed.
- If plants are on a steep slope make sure to re-plant with vegetation of varying root depth to stabilize slopes.

Scotch Broom Disposal Methods

- **Do not put plants with seed pods in compost or yard waste.** Seeds are very tough and long-lived and can contaminate mulch made from compost. Ideally, control activities should be done before plants go to seed to avoid disposal problems.
- Scotch broom can be chipped and left on site, burned (after obtaining appropriate burn permits), or can be disposed of at a King County transfer station.
- Plants without seeds can also be disposed of in household yard waste containers or taken to the city or county transfer station yard waste section.
- If it is not practical to dispose of the broom as recommended above, leave plants with mature seed pods on-site in order to limit spread to new areas.

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