



## JEFFERSON COUNTY NOXIOUS WEED CONTROL BOARD

380 Jefferson Street, Port Townsend 98368

360 379-5610 Ext. 205

[noxiousweeds@co.jefferson.wa.us](mailto:noxiousweeds@co.jefferson.wa.us)



### BEST MANAGEMENT PRACTICES

#### Meadow Knapweed (*Centaurea jacea* x *nigra*)

(synonyms: *Centaurea* x *moncktonii*, *Centaurea debeauxii* subsp. *thuillieri*)

(Family—*Asteraceae*—Sunflower Family)

**Legal Status in Jefferson County:** Meadow Knapweed is a Class B Noxious Weed (non-native species designated for control by State Law RCW 17.10). Washington State and the Jefferson County Noxious Weed Control Board require property owners to control and prevent the spread of meadow knapweed on private and public lands throughout the county. 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 meadow knapweed, brown knapweed or black knapweed for sale or distributing plants, plant parts or seeds.



Photo by Cindy Roche

### BACKGROUND INFORMATION

#### Impacts and History

- Meadow knapweed is a fertile hybrid between black (*C. nigra*) and brown (*C. jacea*) knapweeds, European natives that have been grown as crop or garden plants.
- Brown knapweed was introduced into North America as a hay or forage crop (known as bull clover) and as a pollen source for honeybees.
- Black knapweed, probably introduced in ship ballast or as an ornamental, spread as a weed, and was found in Pullman, Washington, in 1895, and near Portland in 1902.
- Meadow knapweed was first reported in the Pacific Northwest in Multnomah and Lane counties, Oregon, between 1910 and 1920, and was grown as a forage crop in Oregon as late as 1959.
- Meadow knapweed is leafier and more palatable than other knapweeds, but is low value forage and aggressively displaces other forage crops.
- Meadow knapweed invades native plant communities and it can disrupt wildlife habitat and wetlands by displacing native plant species.
- Large infestations are now found in several western Washington counties, including Jefferson County.

## Description



- **Plant:** Meadow knapweed is a perennial that grows from a woody crown. Seedlings are tap rooted; mature plants develop a cluster of roots below the woody crown. The upright stems, mostly 20 to 40 inches (50-100cm) tall, are many-branched and tipped by a solitary flower head up to 1 inch wide.
- **Leaves:** Basal leaves are lance-shaped, up to 6 inches long, 1 1/2 inches wide, slightly pubescent, and may be pinnately cut or have wavy margins, occasionally lobed. Stem leaves usually don't have a petiole and are smaller.
- **Flowers:** Rose-purple (occasionally white) flowers are borne in heads about the size of a nickel that are more rounded than other knapweeds. The light to dark brown bracts which surround the flower head bear a papery fringed margin. At flowering, the bracts reflect a metallic golden sheen. Flowering in western Washington is typically from mid-June to August but can continue into November and December.
- **Seeds:** Seeds are about 1/8 inch long, ivory-white to light brown, sometimes bearing a row of short hairs opposite the point of attachment.

## Habitat

- Meadow knapweed invades moist sites, including pastures and moist meadows, river banks, streams, irrigation ditches, and openings in forested areas.
- Meadow knapweed can spread along heavily disturbed areas such as road ditches, agricultural field margins, railroad beds, pipelines, and recently installed utility lines. The plant will spread from these sites into pastures, meadows and other open habitats. Knapweed normally flourishes in full sun, but can tolerate some shade.

## Reproduction and Spread

- Meadow knapweed reproduces mostly by seed. Root and root crowns can reestablish when fragmented and dispersed by cultivation or construction equipment.
- Meadow knapweed seeds are carried in rivers, streams, or irrigation water, in farm equipment and hay or by vehicles along roadsides. Wildlife and birds will also spread knapweed.

## Local Distribution

Meadow knapweed is common in pastures and on roadsides in east Jefferson County, with major infestations on West Valley road and Center Road.

# CONTROL INFORMATION

## Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of manual, mechanical, chemical, cultural and biological control methods to match the management requirements of a specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- IPM means using an adaptive approach. Control methods should 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 allow for flexibility of methods used as appropriate to the current situation.

## Planning Considerations

- Survey area for weeds, set priorities and select best control method(s) for the site conditions.
- Small infestations can be effectively 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. Specific suggestions are given later in this section.
- Generally work first in least infested areas, moving towards more heavily infested areas.
- Control practices in critical areas should be selected to minimize soil disturbance and reduce the potential for erosion. Minimizing disturbance also avoids creating more opportunities for germination of weed seeds.
- 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 meadow knapweed 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

- Knapweed is easiest to find once it flowers in July. Monitor roadsides, waste and disturbed areas, pastures, rangeland, and trails for new infestations.
- Small plants can be effectively hand-pulled or dug. Uprooting one plant can prevent thousands of new seedlings.
- In pastures, good grazing practices and management of grass and forage species will greatly improve control of knapweed. Seeding desirable species in any area will help prevent weed infestations.
- Prevent plants from spreading away from existing populations by washing tools and boots and cleaning vehicles and animals that have been in infested areas.
- Clean mowing equipment carefully before moving to un-infested areas.
- Off-road vehicles create disturbances and carry weeds. Clean off-road equipment and avoid driving in infested areas.

## Manual

- Established meadow knapweed plants have a large fibrous root that is hard to pull. Dig out plants and as much root as possible before they flower. Completely removing plants is easiest when the soil is loose or wet.
- Plants in flower or in bud will form viable seeds even after they are pulled, so clip seed or flower heads and carefully bag and dispose of them.
- Cutting and bagging flower heads without removing the plants complies with the law and can buy time for more effective control.
- Return to the same location in the following spring and summer to remove plants coming up from seeds already in the soil or growing from root fragments and continue to monitor the area for several years.

## Mechanical

- Mowing, will **not** control meadow knapweed effectively. Plants have spreading, fibrous root systems that store considerable food reserves and mowed plants will send up new shoots after mowing.
- Mowed plants respond by becoming lower growing, more branched, and with more bulky, spreading roots. Plants can still re-sprout, flower and set seed in the same season they are mowed. If you do mow, be sure to clean mowers to prevent spreading seeds to uninfested areas.
- A single plowing may increase meadow knapweed cover, however, on productive agricultural sites, an intensive management program that combines cultivation and annual crops may effectively control meadow knapweed.

## Biological

- Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species, reducing the population and reproductive ability of the weed. Biological control is generally most effective when used on large infestations or in areas where it is difficult to use other control techniques. Any biological control plan needs to incorporate another non-chemical control method since the goal is to prevent all seed production.
- Biological control can take many years to have a significant impact on an infestation. Population density and the number of flowering plants can be greatly reduced but eradication is not possible with biocontrol.
- Currently the only biocontrol agent that attacks meadow knapweed is the seed-feeding weevil, *Larinus obtusus*. Beetle populations build up quickly and appear to disperse well throughout the infestation; however, its effectiveness in reducing weed populations is still uncertain. With up to six larvae per seed-head, it appears that seed production may be dramatically reduced.

## 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).
- Herbicides are most effective on actively growing plants in warm, dry weather.
- 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 meadow knapweed.
- Herbicides are most effective on actively growing plants in warm, dry weather.
- 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.**
- 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.
- **If using herbicide on plants that are about to flower, the flower heads need to be removed and bagged before applying herbicide.**

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](mailto:noxiousweeds@co.jefferson.wa.us).

## SUMMARY OF BEST MANAGEMENT PRACTICES

### Small Infestations in Desirable Vegetation

- Pull plants by hand if soil is wet; the plants may need to be dug out if they are large or in dry compacted soil.
- If the plants are in flower, cut off and bag all flower heads because they can form viable seeds after they are cut or dug up. If there are already seeds, bag and cut off the seed heads before digging up the rest of the plant.
- OR apply appropriate herbicide to actively growing plants if hand removal is not practical.

### Large Infestations\Monocultures

- Mowing will not control knapweed. Mowing can be used if the infestation is found later in the year to keep the plants from flowering until an approved control method can be used. Do not mow plants that have gone to seed, and clean mower after cutting knapweed to avoid moving it off-site.
- Large infestations can be controlled with selective herbicides. Suppression of large infestations of knapweed with a selective herbicide will greatly increase grass production, which in turn increases the suppression of the knapweed.
- Manage pastures to promote grass and clover vigor. Fertilize according to the soil needs. For more information on pasture management, contact the Jefferson Conservation District (<http://www.jeffersoncd.org/links.html>) .

## Riparian and Aquatic Area Control

- Focus on manual removal for small infestations if possible, and prevent seed production.
- If manual removal is not possible use an appropriate herbicide.
- 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

- Pull small infestations if possible, and prevent seed production.
- If manual removal is not possible use an appropriate herbicide.
- Revegetate with desired species if necessary.
- If plants are about to flower, they can be mowed until a more effective control strategy can be used, BUT seed heads or flower heads should be bagged and disposed of.

## REFERENCES

- King County Noxious Weed Control Program—Best Management Practices—Meadow Knapweed
- Ochsmann, Jörg. 2005. The Knapweed pages. <http://www.centaurea.net>
- Pacific Northwest Weed Management Handbook. 2006. Oregon State University.
- PNW0566. 2003. Washington State University.
- Wilson, L. M. and C. B. Randall. 2003. Biology and Biological Control of Knapweed. USDA-Forest Service FHTET-2001-07. 2nd Edition.

### Internet References (unknown authors)

- <http://www.invasive.org/eastern/biocontrol/13Knapweed.html>
- [http://www.co.whatcom.wa.us/publicworks/pdf/weeds/meadow\\_knapweed2.pdf](http://www.co.whatcom.wa.us/publicworks/pdf/weeds/meadow_knapweed2.pdf)

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