



## King County

Department of Natural Resources and Parks  
Water and Land Resources Division  
**Noxious Weed Control Program**  
206-296-0290 TTY Relay: 711

## BEST MANAGEMENT PRACTICES

### Purple loosestrife (*Lythrum salicaria*) Lythraceae

#### Class B Noxious Weed

**Legal Status in King County:** Class B Noxious Weed (non-native species designated for control by State Law RCW 17.10 and by the King County Noxious Weed Control Board). The King County Noxious Weed Control Board requires property owners to control and prevent the spread of purple loosestrife on private and public lands throughout the county. Control is defined by state law as the prevention of all seed production. State quarantine laws prohibit transporting, buying, selling or offer purple loosestrife for sale or distribute plants, plant parts or seeds.



## BACKGROUND INFORMATION

### Impacts and History

- An invasive and competitive noxious weed that alters wetland ecosystems by replacing native and beneficial plants. Waterfowl, fur-bearing animals and birds leave wetlands when their food source, nesting material and ground cover are replaced by purple loosestrife.
- Agriculture is impacted by a loss of wild meadows, hay meadows and wetland pastures.
- Purple loosestrife was first collected in Washington, in 1929 from Lake Washington. The first eastern Washington collection was in the 1940's from the Spokane area, although there are reports that it escaped from a garden to the Spokane River ten years earlier.
- In the mid to late 1800's this plant was introduced to the United States at northeastern port cities, as ship ballast from European tidal flats. For the next 100 years it was a pioneer species while it acclimated to the northeastern seaboard at the St. Lawrence Seaway.
- This plant worked its way throughout the US following an east-to-west migration route following interstate highways (I-90), riding wind currents created by traffic and using the disturbance created from highway construction to carry it through nearby waterways or drainage systems.

## Description

- Perennial emergent aquatic plant, reaching over 9 feet tall and 5 feet wide. As many as 30-50 herbaceous stems annually rise from a persistent perennial tap root and spreading rootstock.
- **Square stems** (usually 4-sided, sometimes 6-sided). Leaves are usually opposite. The linear leaves are 1 ½ to 4 inches long, with smooth edges and are sometimes covered with fine hairs.
- The showy **magenta flowers appear from July to October** on flowering spikes. The flowers usually have 6 sepals, 6 petals and 12 stamens. Flowers will continue until frost.
- In winter months, dead brown flower stalks remain with old seed capsules visible on the tips.

## Habitat

- Occurs in freshwater and brackish wetlands.
- Grows on moist or saturated soils.
- Sometimes cultivated as a garden ornamental.

## Reproduction and Spread

- Spreads by seed and root fragmentation. A mature plant can produce 2.7 million seeds the size of ground pepper. There is little information about seed viability under field conditions. Seeds stored in laboratory conditions are viable for about 3 years.
- Seeds are mainly dispersed down slope, and not downwind. Seedling densities sharply fall within 34 feet of the parent plant. Seeds are also moved through wetland mud by animals, humans, boats or vehicles.
- Seed banks build for years, unnoticed until the right conditions of disturbance appear, resulting in a population explosion. Mature stands of purple loosestrife can live for 20 years.
- The taproot develops early in the seedling stage. When mature, the taproot and major root branches become thick and woody.
- Vegetative spread is also possible. Buried stems harbor adventitious buds with the ability to produce shoots or roots. Stomping and breaking underground stems, or breaking off stems or roots during incomplete plant removal initiates bud growth.

## Local Distribution

- Found on lakes and waterways throughout King County, with 833 total sites reported in 2004.

## CONTROL INFORMATION

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### 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**).
- Small infestations can be effectively hand-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 site. Generally work first in least infested areas, moving towards more heavily infested areas. On rivers, begin at the infestation furthest upriver working your way downstream.
- Minimize disturbance to avoid creating more opportunities for seed germination.

## Early Detection and Prevention

- Look for new plants. Get a positive plant identification.
- Look for plants along river and lake shorelines, wetlands, ditches and wet pastures.
- The best time to survey is in July and August when the plants are in flower.
- Look for seedlings in June.
- Dig up small isolated patches.
- Prevent plants spreading away from existing infestations by cleaning off equipment, boots, clothing and animals that have been in infested areas.
- Don't buy or plant purple loosestrife. According to state quarantine laws it is illegal to buy, sell or offer purple loosestrife or any of its cultivars for sale.

## Manual

- If the plants are in flower, **cut off and bag all flower heads**. It is very difficult to pull the plants without dispersing the small, lightweight seeds. Brush off boots and clothes before leaving the infested area. The plants may continue to produce flowers. Sites will have to be consistently and regularly monitored until frost to cut and remove any subsequent flowers.
- Hand pulling is recommended for very young plants not yet established, when vegetative spread through root fragments is less likely to occur.
- Larger plants from isolated small populations can be dug out from moist upland areas. This is impractical to impossible when trying to remove hardy, woody roots in saturated wetland soils.
- Flower heads and all plant fragments should be bagged on site and disposed of as trash. Do not compost this noxious weed.
- All manual control sites should be monitored for several years for signs of plants growing from root fragments and from the seed bank.

- Hand pulling and the use of hand mechanical tools is allowable in all critical areas.
- Purple loosestrife plant parts and roots must be removed from the site, however, permission is required to transport purple loosestrife. This is obtained by calling:  
**Department of Agriculture**  
 Greg Haubrich  
 Weed Specialist  
 2015 South 1st St.  
 Yakima, WA 98903  
 (509) 576-3039, fax (509) 575-7858
- For final disposal of purple loosestrife:
  1. bag plant and roots,
  2. deposit bagged material in landfill or other approved site.

## Mechanical

- Removal of purple loosestrife with hand held mechanical tools are allowable in critical areas and their buffers.
- Riding mowers and light mechanical cultivating equipment may be used in critical areas if conducted in accordance with an approved forest management plan, farm management plan, or rural management plan, or if prescribed by the King County Noxious Weed Control Program.
- Cutting alone is not a control option for purple loosestrife. Shoots and adventitious roots will develop. Cutting late in the season but before seed set reduces shoot production more than mid summer cutting.
- Black plastic covering is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed production.

## 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.**
- Herbicides may be used in accordance with Federal and State Law in critical areas and their buffers with certain restrictions. Refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues.
- For control of large infestations, herbicide use may be necessary. Infested areas should not be mowed until after the herbicide has had a chance to work.
- For several years following treatment, monitor areas for new plants germinating from the seed bank.

## Specific Herbicide Information

**Glyphosate** (e.g. Rodeo™ or Aquamaster™) Apply to actively growing plants at full to late flowering stage. Seedlings may be effectively treated early in the season after a fall application to mature plants. Apply to foliage but avoid runoff. Caution: Glyphosate is non-selective: it will injure or kill other vegetation contacted by the spray.

**Imazapyr** (Habitat®) Apply to actively growing foliage. Caution: Imazapyr is non-selective: it will injure or kill other vegetation contacted by the spray.

**Selective Broadleaf Herbicides (triclopyr):** Triclopyr (Garlon 3A and Renovate<sup>†3</sup>). Apply with handgun when plants are in the mid to full-bloom stage, or early in the season on seedlings.

All the above listed herbicides require the addition of an approved surfactant. Follow label directions for selecting the correct type of surfactant. Be sure that the selected surfactant is approved for aquatic use.

*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 private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-296-0290.**

## Biological

- Biological control can take up to six years to have a significant impact on the infestation. Population density and the number of flowering plants can be reduced but there will always be some plants remaining when using biological control agents.
- Any biological control plan needs to incorporate another non-chemical control method to be able to prevent all seed production as required by state law.
- Biological control is not recommended or prescribed for small infestations.
- Two species of *Galerucella* beetles were released in Washington in 1992. These leaf-feeders defoliate and attack the terminal bud area, drastically reducing seed production. The larvae feed constantly on the leaf underside, leaving only the thin cuticle layer on the top of the leaf. The mortality rate to purple loosestrife seedlings is high.
- *Hylobius transversovittatus* is a root-mining weevil that also eats leaves. The adult beetle eats from the leaf margins, working inward. Eggs are laid in the lower 2-3 inches of the stem, or sometimes in the soil near the root. The larvae then work their way to the root, where they eat the carbohydrate reserves. Evidence of larvae in the root is a zig-zag pattern.

## SUMMARY OF BEST MANAGEMENT PRACTICES

### Small Infestations in Native and/or Desirable Vegetation

- Hand pulling is recommended for very young plants not yet established, when vegetative spread through root fragments is less likely to occur.
- Larger plants from isolated small populations can be dug out from moist upland areas. This is impractical to impossible when trying to remove hardy, woody roots in saturated wetland soils.
- If the plants are in flower, **cut off and bag all flower heads**. It is very difficult to pull the plants without dispersing the small, lightweight seeds. The plants may continue to produce flowers.

- Sites will have to be consistently and regularly monitored until frost to cut and remove any subsequent flowers.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- Apply appropriate herbicide with wick wiper or by spot spray to minimize off target injury.
- If using an herbicide in an area that has desirable monocots, use a selective herbicide to avoid injury.

### **Large Infestations in Areas with Monocots**

- Cutting alone is not a control option for purple loosestrife. Shoots and adventitious roots will develop. Cutting late in the season but before seed set reduces shoot production more than mid summer cutting.
- Black plastic covering is an interim option for dense seedling infestations. It does not kill the roots of mature plants, but it does slow down growth and seed production. This method is also non-selective.
- If area has desirable monocots present, use a selective herbicide and encourage growth of the monocots.
- If the infestation is in a pasture, encourage healthy grassy areas by seeding and fertilizing. Use a mix of grass and clover species to improve resistance to purple loosestrife. Fertilize according to the soil needs.
- If utilizing biological control, areas need to be checked to control all flowering purple loosestrife not controlled by the biological control agents.

### **Control in Riparian Areas**

- Survey area and document extent of infestation.
- Focus on manual removal for small infestations if possible.
- When removing vegetation near streams and wetlands use barriers to prevent sediment and vegetative debris from entering the water system.
- Cutting will not control purple loosestrife but it can serve in the interim until more effective control measures can be utilized.
- For larger areas where herbicide use is warranted, apply with a wick wiper or spot spray using low pressure and large droplet size.
- 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 areas with monocots present, the area should be re-planted with native or desirable vegetation to prevent reinvasion by weeds.
- Infested areas will need to incorporate a management plan lasting for several years to control plants germinating from the extensive 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 vegetation.

- 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 about to flower, they can be cut until a more effective control strategy can be used.

## References

- Bender, J; update by Rendall, J 1987. Element stewardship abstract for *Lythrum salicaria*  
Nature Conservancy, Arlington, VA.
- Benfield, C, California Invasive Plant Council. *Lythrum salicaria*. Retrieved March 4, 2005  
from UC Davis web page:  
<http://ucce.ucdavis.edu/datastore/detailreport.cfm?usernumber=61&surveynumber=182>
- William, R.D. and D. Ball, T. Miller, R. Parker, J. Yenish, T. Miller, D. Morishita and P. Hutchinson.  
2002. Pacific Northwest Weed Management Book. Oregon State University, revised annually.  
Written Findings. 1997. Washington State Noxious Weed Control Board.