# Yellow Flag Iris

***Iris pseudacorus***
**Iridaceae**

**Class C Noxious Weed**
**Control Recommended**

**Legal Status in King County:** Yellow flag iris is a Class C noxious weed according to Washington State Noxious Weed Law RCW 17.10 (non-native species harmful to environmental and economic resources that landowners may be required to control based on local priorities). The King County Noxious Weed Control Board does not require property owners to control this species, but does recommend control where feasible.

## BACKGROUND INFORMATION

### Impacts and History

- Alternate common names include yellow flag, paleyellow iris and yellow iris.
- Native to Europe and the Mediterranean region, including North Africa and Asia Minor. Found as far north as 68 degrees North in Scandinavia.
- The earliest North American record comes from Newfoundland in 1911, and it was established in British Columbia by 1931 (Cody 1961). It was established in California by 1957 and in Montana by 1958 (Tyron 2006).
- Currently reported as invasive in 40 states throughout the US, as well as in Canada and New Zealand (GISD 2020)

- Yellow-flag iris displaces native vegetation along streambanks, wetlands, ponds and shorelines and reduces habitat needed by waterfowl and fish, including several important salmon species.
- It clogs small streams and irrigation systems, and it dominates shallow wetlands, wet pastures and ditches. Its seeds clog up water control structures and pipes.
- Rhizome mats can prevent the germination and seedling growth of other plant species. These mats can also alter the habitat to favor yellow-flag iris by compacting the soil as well as increasing elevation by trapping sediments.
- Studies in Montana show that yellow-flag iris can reduce stream width by up to 10 inches per year by trapping sediment, creating a new bank and then

dominating the new substrate with its seedlings, creating still more sediment retention (Tyron 2006).

- Even when dry, yellow-flag iris causes gastroenteritis in cattle (Sutherland 1990), although livestock tend to avoid it. All plant parts also cause gastric distress in humans when ingested, and the sap can cause skin irritation in susceptible individuals.

## Identification

- A perennial, emergent iris that creates dense stands along freshwater margins. It is the only naturalized, emergent yellow iris in King County.
- Grows to 5 feet (1.5 m) tall.
- Has numerous thick, fleshy rhizomes.
- Flowers are yellow, showy, and sometimes have brown to purple veins at the base of the petals. Several flowers can occur on each stem.
- Can bloom from April to August; in western Washington usually blooms May into July. It will remain green all winter in mild years.
- Broad, flat, pointed leaves are folded and overlap one another at the base. They are generally longer in the center of the plant and fan out in a single plane toward the edges of the plant. The leaves have a midrib and are dark green to blue-green.

Nancy Loewenstein, Auburn University, Bugwood.org

- Fruits are large capsules to 3 inches (8 cm) long. They are 3-angled, glossy green and contain rows of many flattened brown seeds.
- Seeds are corky, large - about ¼ inch (7 mm) across, and float. Seed pods grow in clusters that resemble little bunches of bananas. Seeds spread by water.
- When not in flower or seed, can be confused with cattails (*Typha* sp.), which have stems that are round at the base, have no midrib and are taller than yellow-flag iris. Yellow flag iris stems are flattened along one plane, have a distinctive midrib and are shorter. Can also be mistaken for native bur-reeds (*Sparganium* sp.), which have thick, spongy leaves that are somewhat narrower than iris leaves.


**Iris leaf (left) vs cattail leaf (right)**

## Habitat

- Occurs in freshwater wetlands, fens, ponds, lake shores, river and stream banks, wet pastures and ditches.
- Grows in standing water or next to water on saturated soils. Grows well in silty, sandy or rocky soil.
- Generally grows in shallow water but can create extensive mats over deeper water.
- Sometimes cultivated as a garden ornamental or used for landscaping purposes.

## Reproduction and Spread

- Spreads primarily by seed, as well as vegetatively by rhizome.
- Produces extensive thick, fleshy rhizomes, forming dense mats that exclude native wetland species. Up to several hundred flowering plants may be connected rhizomatously. Rhizome fragments can form new plants if they break off and drift to suitable habitat. Rhizomes that dry out remain viable and will re-infest an area if they are re-moistened.

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- Spongy seeds float and disperse through water, germinating after the water recedes along shorelines. They do not usually germinate under water. Up to 99 percent of seeds have been found to be viable (Gaskin et al. 2016)
- Plants take three years to mature before flowering (Tyron 2006).
- The flowers are pollinated by bumblebees and long-tongued flies.

## Local Distribution

- Widespread throughout King County.
- Present along most lake shores and many stream banks in the developed areas of the county.
- In undeveloped areas of the county it is less common but it does occur in some relatively intact natural areas where it likely spread through yard waste dumping or waterfowl dispersing the seeds.
- A few shallow wetlands are significantly impacted.

# 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 several 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. See the King County Noxious Weed Regulatory Guidelines for more information.
- 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 for erosion and sediment control.
- Erosion and sediment control (ESC) means any temporary or permanent measures taken to reduce erosion, control siltation and sedimentation, and ensure that sediment-laden water does not leave the site or enter wetlands or aquatic areas. Refer to the King County Surface Water Design Manual, Appendix D for ESC Standards.
- Minimizing soil disturbance also reduces germination of weed seeds.
- Generally, work first in least infested areas, moving towards more heavily infested areas. This allows for natural re-vegetation to occur, which helps sustain the control work over time. Also, controlling small, satellite populations has a bigger impact on reducing the spread to new areas.
- Properly dispose of all parts of the plant (see Disposal Methods section below).
- Whenever possible, control should be done before plants are flowering to prevent seed production. If flowering has already begun, remove flowers before controlling if feasible.

## Early Detection and Prevention

- Look for new plants. Get a positive plant identification by contacting your local noxious weed control program or extension service.
- Look for plants along river and lake shorelines, wetlands, ditches and wet pastures.

- The best time to survey is in April to June when the plants are in flower.
- Look for seedlings starting in late winter.
- Dig up small isolated patches, being sure to remove the entire rhizome.
- Don't buy, move or plant yellow-flag iris.
- Clean any tools and machinery that were used in an infested area before moving to another site to prevent transporting seeds.
- Don't move infested soil to uninfested areas.

## Manual Control

- **Digging**
  - Hand removal with the use of hand tools is allowable in all critical areas in unincorporated King County. Check with the local jurisdiction for regulations in other areas.
  - When removing manually, care should be taken to protect the skin, as resins in the leaves and rhizomes can cause irritation.
  - Manual control is feasible for individual plants or small stands. You can easily pull seedlings in damp or wet soil.
  - Dig out mature plants, taking care to remove the entire rhizome. The rhizome is tough and may require heavier tools, such as pickaxes, pulaskis or saws. If you do not get all of the rhizome, what is left will continue to produce new growth.
  - Keep monitoring the location after you have removed the plants, and new leaves will show you where you missed any sections of rhizome. Continue to remove the rhizome, and in this way, you can eradicate a small patch.
- **Cutting**
  - For plants consistently emerging from standing water, Simon (2008) found that cutting all leaves and stems off at the base, below the waterline, can result in good control. This method is most effective if the plants are cut before flowering.

## Cultural Control

- **Covering**
  - Tarasoff et al (2016) achieved excellent control by cutting and covering an infested area with a PVC pond liner that inhibited gas exchange for 70 days. All rhizomes were killed, with no regrowth in the following season. This should be used for patches that can be completely covered with about 8 additional inches past the infested area. There must be no holes or air pockets, the edges of the liner should be buried, and several rocks or heavy branches spread across to keep the liner flattened to the ground. The liner can be removed after 4-6 months depending on soil saturation – wetter areas

require less time, and the dead rhizomes will have a mushy, dark brown appearance (Agrowest 2019).
    - A heavy tarp that inhibits photosynthesis can be used for small patches, weighted at the edges for several years (Simon 2008). Be sure to extend the tarp well beyond the edges of the infestation and check periodically to ensure that plants are not growing up around the tarp. Other materials (heavy plastic, landscape cloth) are not as effective.
- **Burning** is not recommended. Seeds germinate and grow well after late summer burning (Sutherland 1990), and plants have a strong tendency to resprout from rhizomes after burning (Clark et al. 1998).
- **Grazing** is not effective as livestock avoid eating iris and it is toxic if consumed.

## Mechanical Control

- Removal of yellow-flag iris with handheld mechanical tools is allowable in critical areas and their buffers in unincorporated King County. Check with the local jurisdiction for regulations in other areas.
- In unincorporated King County, 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.
- Repeated mowing or cutting may keep yellow-flag iris contained and can potentially kill it by depleting the energy in the rhizomes after several years of intensive mowing (Tu 2003).

## Chemical Control

- **Precautions**
    - Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions**.
    - Use extra caution where people, animals, bees, native plants or open water are present. Be careful to avoid drift and off-target exposure.
    - 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 your personal safety, at a minimum wear waterproof chemical resistant gloves, long sleeves, long pants, closed toe shoes, socks, hat and appropriate

eye protection. Follow label directions for any additional personal protection equipment needed.

- **Specific Herbicide Information**
  - Since yellow-flag iris is a monocot, only non-selective herbicides are effective. However, non- selective herbicides will injure or kill any plant they contact, so special care must be taken when using these chemicals. The herbicides discussed below are non-selective.
  - **Imazamox** (Clearcast)
    - Successful fall (September) foliar treatments have been conducted resulting in an estimated 75% control year to year using 4% imazamox and 1.5% aquatic surfactant. For large, contiguous areas, be careful to not go over the maximum label rate of 1 gallon per acre (1.0 lb ae/A). This product can be more mobile in the soil than glyphosate, potentially causing harm to adjacent plants, but persists for less time than imazapyr. (B. Peterson, Personal Communication, 4/2/2020)
  - **Imazapyr** (e.g. Polaris or Habitat®)
    - Simon (2008) found that 1% imazapyr (with 1% non-ionic surfactant) sprayed in the fall resulted in good control. Imazapyr sprayed in the spring, or a combination of imazapyr (1%) and glyphosate (2.5%) sprayed in fall both result in good control, but slightly less effective than imazapyr alone.
    - The wick-wiping method is useful for reducing non-target impacts but avoid runoff. Apply directly to foliage with a concentration of 1-5%. (S. Moore, Personal Communication, 01/21/2020)
    - Note that imazapyr has been shown to have some residual soil activity, so care should be taken to avoid spraying in the root zone of desirable plants, and do not replant the treated area for several months after application.

Wick-wiping with sponge tongs and squirt bottle

  - **Glyphosate** (e.g. Rodeo™, Roundup Custom or Aquamaster™)
    - This is the most frequently used chemical for controlling yellow-flag iris. It has a shorter residual and is less mobile than imazamox or

imazapyr. Apply to actively growing plants in late spring or early summer.

- According to Simon (2008), glyphosate at lower rates is not as effective as either imazapyr, or imazapyr and glyphosate combined. Follow the label for recommended rates for yellow-flag iris since higher rates may provide better results.
- A study in Montana showed good results with a foliar application of 5% Rodeo plus Competitor (Tyron, 2006).
- The wick-wiping method is useful for reducing non-target impacts but avoid runoff. Apply directly to foliage with a concentration of 1-5%. (S. Moore, Personal Communication, 01/21/2020)

*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.**

### Biological Control

- Although several insects and pathogens are known to attack yellow-flag iris (Tu 2003), no biological control agents are presently known, and no research is currently being conducted.

## SUMMARY OF BEST MANAGEMENT PRACTICES

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

- Hand digging is recommended for very young plants not yet established.
- Larger plants from isolated small populations can be dug out from moist upland areas. This is difficult but possible with persistence.
- Plants emergent in standing water can be cut below the waterline.
- If manual control is not possible due to site conditions or available labor, apply appropriate herbicide by spot spray, stem-injection or wick-wiper to minimize off target injury.

### Large Infestations/Monocultures

- Persistent mowing or cutting over several years may be effective. Cutting flowering plants will stop seed dispersal.
- Cutting and covering with a pond liner to inhibit gas exchange is an option if the entire patch can be covered and the edges of the liner buried.
- Herbicide use may be necessary.

- If the infestation is in a pasture, combine control methods with ongoing good pasture management. Encourage healthy grassy areas by seeding and fertilizing. Use a mix of grass and clover species to improve resistance to weeds. Fertilize according to the soil needs.
- Control of larger areas will need to incorporate a management plan lasting for several years to remove plants germinating from the seed bank and rhizome fragments.
- When large areas of weeds are removed, the cleared area needs to be replanted with native or non-invasive vegetation and stabilized against erosion. See the King County Surface Water Design Manual, Appendix D for Erosion and Sediment Control Standards.

## Control in Riparian Areas

- Additional permits may be required for control of infestations in riparian areas. See the Noxious Weed Regulatory Guidelines for more information or contact your local jurisdiction.
- Survey area and document extent of infestation. Start eradication efforts at the headwaters and progress downstream whenever possible.
- 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.
- For larger areas where herbicide use is warranted, use the method that will cause the least amount of damage to desirable vegetation, such as spot spraying or wick wiping.

## Control Along Road Rights-of-Way

- Dig up small infestations if possible.
- Spot spray infested areas with a systemic herbicide (see Chemical Section above for recommendations), taking care not to spray beneficial vegetation. Wait until the herbicide has had a chance to work (up to several weeks) before mowing.
- If plants are in grassy areas, re-seed after control is completed.

## Disposal Methods

- Never dump plant material in a natural area because weeds can spread from yard waste piles.
- Dispose of all removed pieces of rhizome away from wet sites. Composting is not recommended for these plants in any home compost system, because rhizomes can continue growing even after three months without water (Sutherland 1990). Plant parts may be put in municipal yard waste bins, disposed of with trash or taken to a transfer station.

- Plant parts may also be piled up in a dry area and allowed to break down on site. Monitor piles for any regrowth and make sure piles are contained.

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