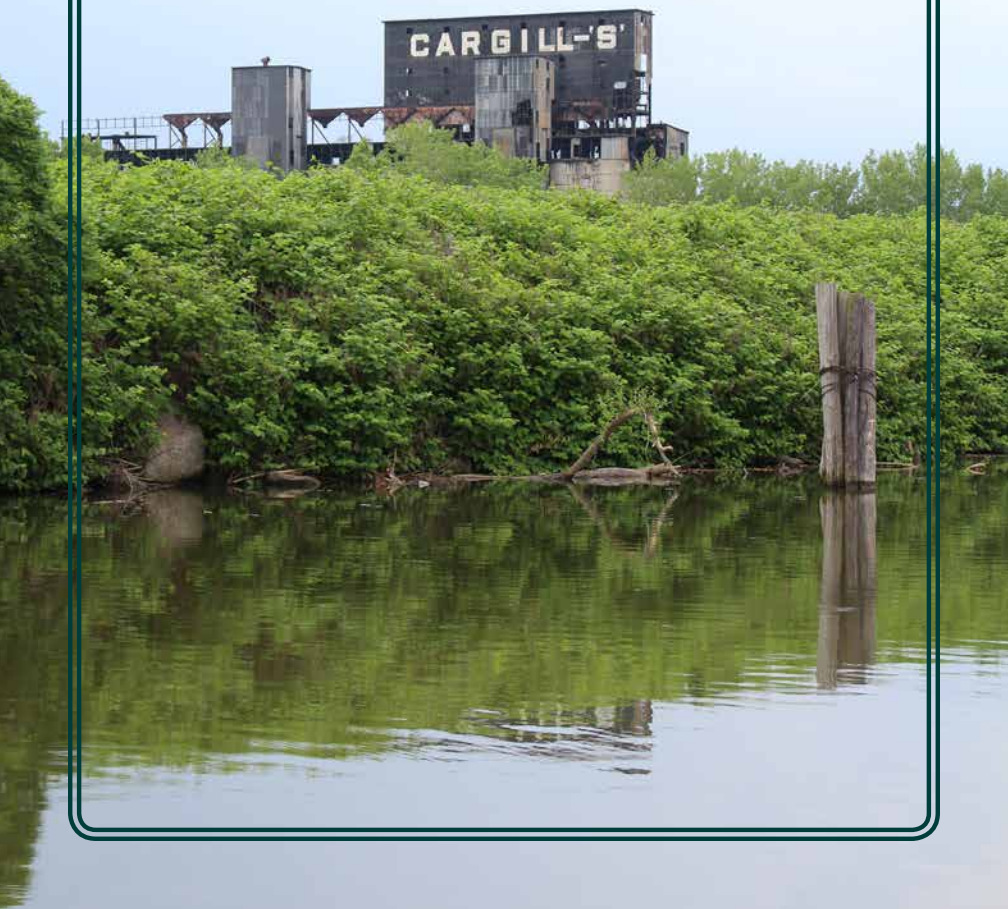


**A Guide to**  
**INVASIVE PLANT SPECIES**  
**Impacting Buffalo River Ecosystems**



# What is an Invasive Species?

Invasive plant species are non-native species that can cause harm to the environment, the economy or to human health. Invasives come from all around the world. As international trade increases, so does the rate of invasive species introductions. (New York State Department of Environmental Conservation)

## Why are Invasive Species a Threat?

Invasive plants eliminate and displace native plants, and replace wildlife food sources with exotic plants. Many invasive plants are very aggressive and can take over a landscape rapidly. They are often inedible, harmful or toxic to both wild and domestic life including humans. They can also draw important pollinators away from beneficial native plants and cause an overall reduction in biodiversity, which damages vulnerable ecosystems.

## Tips on How to Control Invasive Species

- Learn to properly identify and manage invasive plants - this guide is a tool to help!
- If an infestation is discovered, remove plants as soon as possible to prevent spreading.
- Always follow-up after an invasive removal or native restoration project to maintain.
- Before leaving an area, remove mud and seeds from shoes or other clothing.
- Always clean, drain, and dry your boat to remove aquatic invasive species. Do this with any water equipment including waders and fishing equipment.
- Burn local or certified firewood from the area where you're camping to prevent the spread of invasive insects and seeds.

# Resources

**For Additional Information, consider visiting the following sites:**

Western New York PRISM - <http://nyis.info/>

NYS Invasive Species Info - <http://nyis.info/regulated-species/>

USDA Plants Database - <https://plants.sc.egov.usda.gov/java/>

## Herbicide Terminology

Herbicides are substances that are toxic to plants and can be used to control unwanted species

**Contact Herbicides:** A spray, kills only the part of the plant that the chemical contacts

**Systemic Herbicides:** Absorbed by the plant and enters the root system to kill the entire plant

**Foliar:** An application to the leaves of a plant

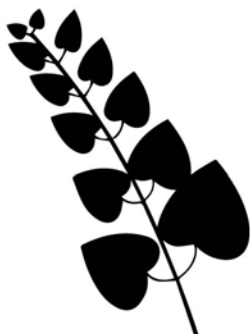
**Cut-Stump:** An application to the stump top immediately after cutting down the plant

**Basal Bark Treatment:** An application of an oil soluble chemical mixed with an oil carrier to the bark of woody plants, usually smaller than 6 inches in diameter

## Chemical Herbicide Disclaimer

USE PESTICIDES WISELY: ALWAYS READ THE ENTIRE PESTICIDE LABEL CAREFULLY, FOLLOW ALL MIXING AND APPLICATION INSTRUCTIONS AND WEAR ALL RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE) AND CLOTHING. CONTACT STATE AUTHORITIES FOR ANY ADDITIONAL PESTICIDE USE REQUIREMENTS, RESTRICTIONS OR RECOMMENDATIONS. MENTION OF PESTICIDE PRODUCTS IN THIS DOCUMENT DOES NOT CONSTITUTE ENDORSEMENT OF ANY MATERIAL.

# Leaf Arrangement



Opposite

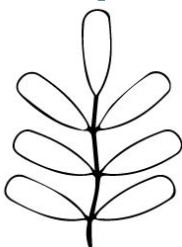


Alternate

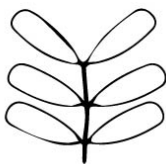


Whorled

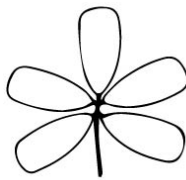
## Compound Leaf Arrangement



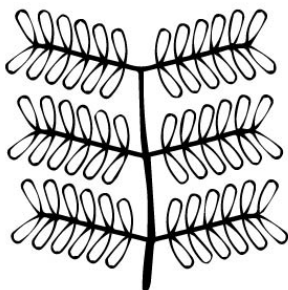
Oddly-Pinnate



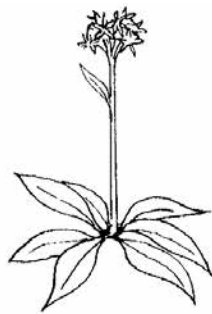
Abrupt-Pinnate



Palmate

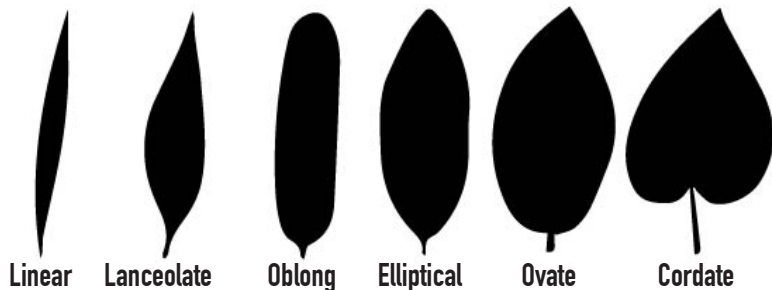


Bipinnate

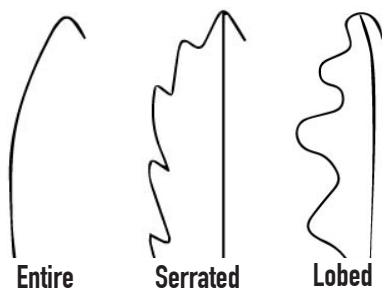


Rosette

## Leaf Shape



## Leaf Margin



**Note for plant buyers:** When purchasing for your landscapes, beware of invasive species, or those with similar characteristics. These plants can easily spread to nature's detriment. For a listing of regulated and prohibited species visit: <http://www.dec.ny.gov/animals/99141.html>

## Invasive Species:

# BUSH HONEYSUCKLE

*The scientific genus of Lonicera contains several invasive Honeysuckle species including Tartarian (Lonicera tatarica), Maacki's (Lonicera maackii), and Morrow's (Lonicera morrowi).*

### Identification:

- Deciduous shrubs that can grow up to 15 feet tall
- Leaves grow opposite of each other on the stem and have smooth margins
- Produces small white, yellow, pink or red flowers in the late spring (native honeysuckle produces yellowish flowers)
- Invasive Honeysuckle has hollow stems, while native species do not
- Often found growing along forest edges, in canopy openings, meadows and abandoned fields

### Impact:

- Form very dense populations that can outcompete and suppress the growth of native plant species
- Can outcompete native plants for sunlight in the early spring leaf-out
- Fruit is highly consumed by birds, aiding in dispersal of seeds
- Fruit has lower nutritional value than native species, which can negatively impact migrating birds

### Control/Removal:

- Manually remove smaller shrubs
- For larger plants, cut-stump application of oil-based herbicide, like Trilopyr, is effective

Invasive Species:

# BUSH HONEYSUCKLE

*Egg-shaped leaves range from 1 to 3 inches in length.  
Leaves are arranged oppositely along stems.*

**Honeysuckle with Flowers**



**Dense Growth Along Water**



**Honeysuckle Berries**



Invasive Species:

# CANADA THISTLE

*This perennial thistle (Cirsium arvense) outcompetes native vegetation by utilizing its extensive root system.*

## Identification:

- Basal rosettes appear in the spring, or when soil conditions are moist
- Leaves are irregularly lobed with spiny, toothed margins
- Leaves are arranged alternate on stem
- Flowers are a light purple-pink color and at times white
- Seeds have feathery blooms which aid in wind dispersal

## Impact:

- Crowds out and replaces native plants
- Quick to invade abandoned sites, tilled fields, ditches, or any recently disturbed soil
- Produces approximately 1,000 seeds per flowering shoot, aiding in spread

## Control/Removal:

- Manual removal is challenging, as the plant can form new shoots anywhere along its extensive root system
- Combine mowing and chemical treatment (glyphosate) for most effective control



Invasive Species:

# CANADA THISTLE

*Leaf margins are dense with spines.*

*Flowers are often light purple-pink, but can also be white.*

**Spiny Leaf Margins**



Photo: Andrea Locke

**Basal Rosette**



**Flower**



## Invasive Species:

# COMMON BUCKTHORN

*This species of small tree (Rhamnus cathartica) was introduced from Europe as an ornamental hedge plant and has a thorn located at the tip of most branches.*

### Identification:

- Perennial woody shrub that can grow up to 20 feet tall
- Dark bark has lenticels, or small horizontal markings allowing for gas exchange
- Flowers, which are small and appear in clusters, bloom in late spring or early summer
- Small pea sized fruit turn from green to red and then to black when ripe
- Fruit often remains on plant throughout winter months
- Leaves are elliptic in shape with toothed margins and have curved leaf veins (glossy buckthorn leaves have parallel leaf veins)

### Impact:

- Seeds easily propagate, especially in disturbed sites
- Grows rapidly, forming dense thickets and monocultures
- Outcompetes native species and can invade moist wetland areas
- Decomposing leaves can alter soil pH

### Control/Removal:

- Manual remove small plants
- Frequently check disturbed soil areas for new growth
- Seeds germinate less successfully under thick layers of leaf litter or woody debris
- Cut-stump treat with herbicide, specifically an oil-based Triclopyr

Invasive Species:

# COMMON BUCKTHORN

*Leaves are elliptical in shape with toothed margins and rounded to pointed tips.  
Flowers are small, green and fairly inconspicuous.*

**Tree with Berries**



**Bark Markings**



## Invasive Species:

# COMMON REED

*Also known by its genus name 'Phragmites', Common Reed is a tall grass that forms thick masses, which crowds or shades out native vegetation.*

### Identification:

- Tall, herbaceous perennial that can grow up to 15 feet tall
- Feathery plumes change from purple-brown in summer to tan-grey later in the season
- Alternate, long, spear-shaped leaves
- Stem nodes are a dull tan-green color
- Often found in wetlands, disturbed soils, along roadways and in ditches

### Impact:

- Grows in dense stands that can displace important native plant species with similar habitat requirements
- Spreads by seed, rhizomes and stolons
- Colonies can take up shallow open water areas that would otherwise provide fish and amphibian habitat
- Provides poor nesting habitat for waterfowl and other native birds
- Inhibits recreational activities such as swimming, boating and fishing

### Control/Removal:

- Apply the herbicide glyphosate to leaves
- Cutting and treating stems with an herbicide tends to be the most effective method of control for large stands
- Cover cut plants with thick black plastic (as well as an area at least 6' beyond area of infestation) during the growing season to limit growth

Invasive Species:

# COMMON REED

*Green or tan stems covered by tightly clinging leaf sheaths.*

**Dense Stand of Common Reed**



**Close Up of Plumes**



## Invasive Species:

# EUROPEAN BLACK ALDER

*Frequently found colonizing along the edge of waterways, European Black Alder (*Alnus glutinosa*) creates an abundance of pollen, often triggering allergy symptoms.*

### Identification:

- Large tree reaching heights of 40 to 60 feet
- Large, glossy green, oval to round leaves with a toothed margin and indent in leaf tip (native alder has continuous leaf margin)
- Before the tree leafs out in early spring, slim, cylindrical male flowers appear that are red-yellow in color
- Female flowers are small, pink and egg-shaped
- In the fall, cone-like fruits appear
- Young leaves and shoots are often sticky from a resin

### Impact:

- Dense population growth displaces native plants
- Shades out understory shrubs and other plants
- Seeds are dispersed by wind and if they fall on water have the potential to spread long distances
- Can colonize very poor soils by fixating nitrogen from the air

### Control/Removal:

- Small populations can be removed manually
- Remove trees, or at a minimum the branches, before they produce seeds
- Cut-stump treat with herbicide
- Girdling tree may also be effective, by cutting and removing 10 cm of outer and inner bark to cut off nutrient supply (this is most effective when combined with herbicide)
- Trees are shade intolerant, establishment of native trees are encouraged



Invasive Species:

# EUROPEAN BLACK ALDER

*Leaves oval to rounded, glossy green, with a toothed margin.*

*Male flowers in dangling catkins, yellow-red, in early spring before leaves appear.*

*Female flowers small, pink, egg-shaped. Fruit are cone-like structures.*

**Male Catkins (Flower Cluster)**



**Rounded Leaf Tips and Cones**



## Invasive Species:

# GIANT HOGWEED

*A Federally regulated noxious weed\*, Giant Hogweed (*Herculeum mantegazzium*) causes severe skin irritation in the form of burns and blisters.*

*\*Noxious Weed: a weed that has been designated by an agricultural authority as one that is injurious to agricultural or horticultural crops, natural habitats or ecosystems, or humans or livestock.*

### Identification:

- Large, compound, deeply lobed leaves are 3-5 feet wide
- The underside of the leaves have stiff hairs which are dense and stubby, generally 0.25 mm in length
- Stem is spotted with purple and has coarse hairs
- Flat topped flower head, which blooms in June, can reach up to 2 feet across
- Often misidentified as Cow Parsnip (does not have purple stem), or Angelica (has a smooth, purple stem)

### Impact:

- Sap can create severe skin irritation, known as photophyodermatitis
- Displaces native plants, often forming dense colonies
- Plant 'dies-back' over winter months exposing soil, increasing potential of soil erosion
- Provides an alternative host for fungi (*Sclerotinia* sp.) which causes diseases in a wide range of crops

### Control/Removal:

- Closely track current populations and report to the NYSDEC if found
- Consider getting professional help for removal of this plant
- Do not move soil contaminated with seed
- Giant hogweed is susceptible to systemic herbicides, such as Roundup
- Re-establish native species to the site after removal



Invasive Species:

# GIANT HOGWEED

*Have you found a Giant Hogweed plant? Call the NYSDEC Giant Hogweed Hotline:  
1-845-256-3111*

**Deeply Lobed Leaves**



**Blotchy Stems with Coarse White Hairs**



## Invasive Species:

# KNOTWEED

*The genus Reynoutria contains Japanese knotweed (Reynoutria japonica), Giant knotweed (Reynoutria sachalinense), and a hybrid of the two; Bohemian knotweed (Reynoutria x bohemica). They are often misidentified.*

### Identification:

- Fast-growing plant with jointed, hollow stems
- Leathery, leaves grow in an alternate arrangement
  - Giant knotweed leaves are heart shaped
  - Japanese knotweed leaves are oval
  - Bohemian knotweed leaves are variable, sometimes flat along the base
- Greenish - white flowers bloom in August
- When dormant in winter, reddish stems may be visible
- Can grow to be 3 to 10 feet tall

### Impact:

- New plants can grow from a small fragment or by underground rhizomes which produce additional shoots and root systems
- Tolerant of most conditions and are known to grow through pavement and in construction debris
- Grows at an alarmingly fast rate, quickly forming monocultures
- Can create unstable riparian shorelines, due to their fibrous roots

### Control/Removal:

- Manually pull individual young plants, ensuring all parts of the root have been removed
- Older plants have a strong, large intertwined root system making manual removal difficult
- Inject herbicide, like Roundup, into the plants stem or spray the plants leaves
- Herbicide treatments will need a multi-year regimen

Invasive Species:

# KNOTWEED

*Leaves are broadly oval to somewhat triangular or heart-shaped, pointed at the tip.  
Leaves grow alternate along the stem.*

## Expansive Growth Along Stream



## Alternate Leaves



## White Flowers



## Invasive Species:

# MUGWORT

*Spreading primarily through windborne seeds, Mugwort (Artemisia vulgaris) is capable of producing as many as 200,000 seeds annually.*

### Identification:

- Leaves and stems have a dull, grayish cast
- Alternate dark green leaves have silver-white hairs on the undersides
- When crushed, this plant releases a mild vanilla-like fragrance due to the presence of chemical compounds called coumarins
- Commonly found in disturbed sites like roadsides, forest edges, areas with steep slopes, and habitat restoration sites

### Impact:

- Tolerant of shade and drought, mugwort is highly successful at colonizing an established site
- Can produce as many as 200,000 seeds annually, which spread to surrounding areas when windborne
- Underground rhizomes produce additional shoots and root systems
- Can produce allelochemicals making it distasteful to herbivores and producing undesirable growing conditions for native plants

### Control/Removal:

- Manual removal is difficult, as this plan can resprout from root fragments
- Covering plants with a thick fabric for a few years can weaken them and make other removal methods more effective
- Tolerant of mowing regimes
- Identify this invasive quickly and respond with persistent manual pulls
- Application of the herbicide Milestone has proven to be highly successful

Invasive Species:

# MUGWORT

*The leaves are alternate, densely covered with wooly, silver-white hairs on the underside and slightly hairy on the upper surface.*

**Mugwort Stem**



**Close-up of leaves**



## Invasive Species:

# SPOTTED KNAPWEED

*The scientific genus of Centaurea contains invasive Knapweed species including Centaurea stoebe and Centaurea maculosa, often referred to as Spotted Knapweed.*

### Identification:

- Often found in open fields, or areas with dry, barren, shallow soil
- First year of growth produces a basal rosette of leaves 6-8 inches long
- Can grow up to 3 feet tall and produce up to 1000 seeds which are dispersed by the wind
- Blooms from July through late September
- Purple-pink, thistle-like flowers grow at the end of stems
- Thin hairs on the stems and leaves give the plant a silvery-gray cast

### Impact:

- Can invade undisturbed habitats because it germinates and grows very early in the spring
- Releases allelochemicals called flavinoids from their roots which inhibit nutrient uptake by the roots of other plants and stunts their growth
- Plants are not often consumed by livestock and wildlife, allowing further growth
- This plant has also been linked to increased soil erosion

### Control/Removal:

- Regulate small infestations with manual removal
- Herbicides may be used, but areas must be continually monitored
- Seeds must be burnt or composted at high temperatures as they are heat-resistant (could also seal in garbage bags headed to landfill)
- Biocontrol species include multiple weevils species



Invasive Species:

# SPOTTED KNAPWEED

*Stem leaves are alternate and may be slightly lobed or linear.*

**Short Hairs on Stems and Leaves**



**Flower**



## Invasive Species:

# TREE OF HEAVEN

*This fast growing tree (Ailanthus altissima), also known as ailanthus, Chinese summac, and stinking sumac, has the ability grow to towering heights of 80 feet.*

### Identification:

- Produces pinnately compound leaves with smooth margins and a notched base on each leaflet
- Crushed leaves release a rancid smell
- Yellowish flowers arrive in early summer and grow in large clusters
- Produces up to 325,000 single winged, papery seeds called samaras

### Impact:

- Sap may cause allergic dermatitis, and have also been reported as causing heart problems necessitating hospitalization from prolonged exposure
- A cut or injured tree may send up dozens of root suckers and shoots, creating large clonal colonies, often on forest edges
- Extensive root system can cause damage to underground infrastructure and building foundations

### Control/Removal:

- Young seedlings can be pulled or dug up
- Cutting the tree down will likely send up large number of root sprouts and suckers, creating additional growth
- Foliar application of herbicide, like Roundup, to smaller trees is generally effective
- Application of an oil-based triclopyr to cut-stump
- Establishment of native trees are encouraged as trees are shade intolerant



Invasive Species:

# TREE OF HEAVEN

*The leaves are pinnately compound. Ailanthus altissima resembles native sumac and hickory species, but it is easily distinguished by the notched base on each leaflet.*

**High Reaching Branches**



**Underside of Leaves**



## Invasive Species:

# YELLOW FLAG IRIS

*This showy flower (Iris pseudacorus) forms a dense mat of roots, compacting soil and inhibiting seeds of other plants to germinate.*

### Identification:

- Commonly found along the water's edge or in wetlands
- Can grow to heights of 3-4 feet
- Lance shaped leaves are smooth, stiff, and broad
- Yellow flowers bloom from April to June
- Glossy green fruit capsule is 6-angled, while the native Blue Flag Iris is 3-angled
- Produces cork-like seeds that can float on the water surface

### Impact:

- Forms large monocultures that displace native species
- Can prevent the germination and growth of native species and eventually displace them entirely
- All parts of the Yellow Flag Iris are non-fatally toxic to livestock and other animals
- Tolerant of high water turbidity, nutrient pollution, and urban pollution, resulting in a broader range than the native Blue Flag Iris

### Control/Removal:

- Manually dig up the root system - wear gloves to avoid skin irritation
- Mark invasive plants while flowering to differentiate with native plants, then remove when time allows
- Cut and injecting systemic herbicide into each flowering stalk
- Repeat mowing or removal of seed pods can control the spread of larger infestations
- Plant material should not be composted on-site because rhizomes can continue to grow without water for a limited time

Invasive Species:

# YELLOW FLAG IRIS

*Flat, erect leaves with a raised midrib.*

*Easily confused with Native Blue Flag Iris until time of bloom.*

**Cluster of Yellow Flag Iris**



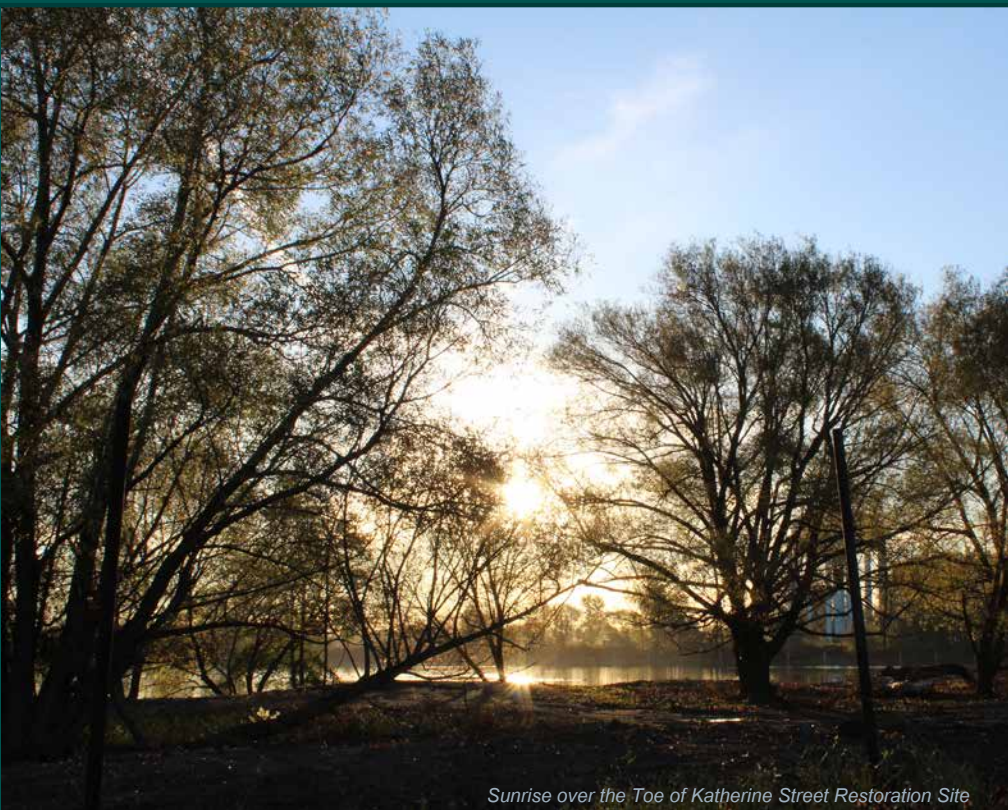
Photo: Bev Seyler

**Yellow Flag Iris**



**Native Blue Flag Iris**





*Sunrise over the Toe of Katherine Street Restoration Site*

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