



EUROPEAN FROGBIT

Hydrocharis morsus-ranae Origin: Europe

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Mechanical Physical Prevention

DISTRIBUTION (As of 2/2018) Monroe Wayne Cayuga Chenango

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European frogbit is a free-floating annual aquatic plant. The leaves are small, kidney or heart shaped (1.5-6.5 cm long), and leathery, with undersides that may be dark purple. The plant is not anchored to bottom sediments. Three-petaled white flowers with yellow centers bloom in summer. The leaf stem of European frogbit lacks a midline groove, which distinguishes it from American frogbit (*Limnobium spongia*). European frogbit leaves, although smaller in size, may resemble those of white and yellow water lilies.

HABITAT

European frogbit grows well in quiet, open waters including marshes, ditches, swamps, and sheltered coves. This species grows well in calcium rich waters.

THREAT

European frogbit has rapid vegetative spread and forms dense mats, which can crowd out other macrophytes and limit light penetration into the water column. With limited light below the vegetative mats, native plants may not be able to survive, limiting native biodiversity. It can also inhibit recreational use such as swimming, fishing, or boating.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Hand-pulling or harvesting may be an effective management strategy for small infestations or infestations in closed systems such as ponds. High density shade treatments can reduce biomass. European frogbit is also susceptible to some herbicides.











FANWORT
Cabomba caroliniana

Origin: South America

Fanwort is a submerged invasive aquatic plant with green, delicate, fan-like underwater leaves that are usually about 5 cm across and arranged opposite each other in pairs along the stem. Small oval floating leaves are occasionally present. Small (2 cm or smaller) white flowers form and bloom throughout late spring and summer. It can also reproduce vegetatively via fragmentation.

HABITAT

THREAT

Fanwort grows up to depths of 10 m rooted in the muddy substrate of slow moving waters of lakes, ponds, and occasionally rivers. It can grow under a wide range of of nutrient levels, light levels, temperatures, and pH levels.

Fanwort can be an aggressive weed. Once established, fanwort forms dense mats

that can out-compete and displace native vegetation, which leads to a decline in biodiversity. Dissolved oxygen can be depleted when the mats of fanwort decompose. Infestations also inhibit recreational activities, including boating,

INVASIVE RANKING, NYS

High

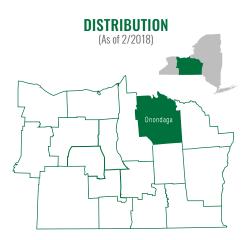
MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention

MANAGEMENT

fishing, and swimming.

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Harvesting can greatly reduce fanwort biomass in a water body. However, mechanical and manual removal are likely to create and spread fragments, which are capable of producing new plants. Several herbicides are effective in controlling fanwort populations. Benthic barriers can also be effective in small areas, although they are not species specific.



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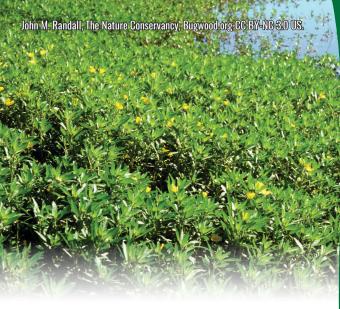
REFERENCE - Robinson, M. 2002. Fanwort: An Invasive Aquatic Plant. D.C.R. Office of Water Resources, Lakes and Ponds Program. http://www.mass.gov/eea/docs/dcr/watersupply/lakepond/fact-sheet/fanwort.pdf. June 12, 2017.











FLOATING PRIMROSE-WILLOW, CREEPING WATER PRIMROSE

Ludwigia peploides Origin: Southeastern United States

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Physical Biocontrol Prevention

DISTRIBUTION



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Floating primrose-willow is a perennial aquatic plant with stems and leaves that float on the water's surface. The leaves have smooth margins and are alternately arranged in clusters. Flowers of the floating primrose-willow have five bright yellow petals with ten stamens. The fruit of the plant is an elongate capsule 1-4 cm long.

HABITAT

Floating primrose-willow can be found rooted in the silty substrate of slow moving bodies of water. It often forms a dense, thick mat of vegetation in shallow waters and grows best in areas with high nutrients, warm water temperatures, and abundant sunlight.

THREAT

Floating primrose-willow can form thick mats on the water's surface, which crowds native vegetation and blocks sunlight from penetrating into the water column. This can cause submerged aquatic plants to die from lack of sunlight and negatively affect water chemistry and aquatic communities.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Physical removal is a preferred control method for floating primrose-willow. The fruit, rhizomes, and seeds should be targeted for removal in their entirety as fragmentation can result in spread and unsuccessful control. Floating primrose-willow is also susceptible to herbicides. Water primrose beetles and triploid Grass Carp (*Ctenpharyngodon idella*) are potential biocontrol agents.

REFERENCE - Pennsylvania Department of Conservation and Natural Resources. Invasive Plants in Pennsylvania, Floating Primrose Willow. PADCNR. http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_012344.pdf

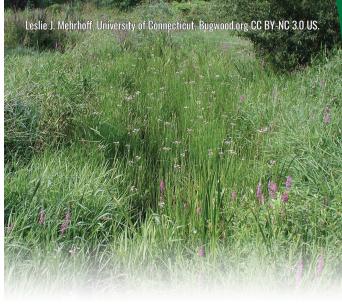


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FLOWERING RUSH

Butomus umbellatus Origin: Eurasia and Africa

INVASIVE RANKING. NYS

Medium

MANAGEMENT STRATEGY

Chemical Physical Prevention

DISTRIBUTION



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shore or in shallow water. Leaves grow up to 1 m long and are triangular in cross section. The plant can grow to 1.5 m, with umbrella-shaped clusters of three-petaled flowers from white to dark pink. Plants bloom from June to August, but do not flower in deep water. Flowering rush reproduces through seeds, branching and fragmentation of rhizomes, and production of bulbils on rhizomes and inflorescences.

HABITAT

Flowering rush lives where cattails are typically found, growing in freshwater lakes, riparian areas, and wetlands. It can grow in water depths to about 2 m.

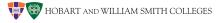
THRFAT

Flowering rush can form dense stands that displace native species, which can reduce biodiversity. Dense stands of flowering rush can also alter water temperatures, water and nutrient flow, and sedimentation rates.

MANAGEMENT

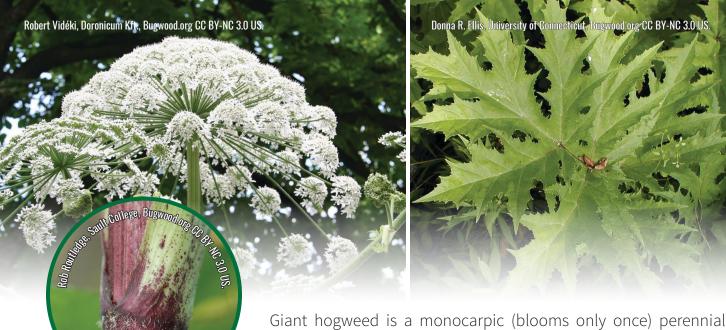
Plants may be removed physically, but care should be taken to account for all parts, as it can spread via floating seeds, rhizomes, and root fragments. Removed material should be dried to prevent any new shoot growth. Cutting the plants below the water surface can reduce abundance, but will not kill them. Chemical control is usually not effective due to the herbicide washing off the plant. Several treatments would be required.

REFERENCE - Cao, L., L. Berent, and A. Fusaro, 2017, Butomus umbellatus L.: U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, FL, and NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI, https://nas.er.usgs. gov/queries/greatlakes/FactSheet.aspx?SpeciesID=1100&Potential=N&Type=O, Revision Date: 12/5/2012, Access Date: 9/15/2017











GIANT HOGWEED

Heracleum mantegazzianum Origin: Eurasia

INVASIVE RANKING. NYS

High

MANAGEMENT STRATEGY

Chemical Physical Prevention

DISTRIBUTION

(As of 2/2018) Chenango

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HABITAT

The species is common along railroads, roadsides, rights-of-ways, vacant lots, streams, rivers, uncultivated or waste lands and agricultural areas.

herb that typically grows to 3-4 m in height. The stems are hollow, covered in bristles, and have dark reddish-purple blotches when flowering. The leaves are deeply lobed and serrated, with one to three leaflets, and may grow to 1.5 m in width. The flower can grow

to about 80 cm in diameter and is composed of a broad, umbrella-

THREAT

Giant hogweed sap contains a substance that, when touched, causes skin to become sensitive to ultraviolet light. This can result in severe burns when the affected areas become exposed to sunlight, producing swelling and severe, painful blistering. Giant hogweed is also an aggressive competitor; because of its size and rapid growth, it out-competes native plant species and reduces the amount of suitable habitat available for wildlife. It dies back during the winter months, leaving bare ground that can lead to increases in soil erosion on riverbanks and steep slopes.

MANAGEMENT

If seen, report this plant to the giant hogweed information line at 845-256-3111 or ghogweed@dec.ny.gov. Be sure to provide photos, location, and an estimated number of plants. Follow proper safety precautions when working around giant hogweed. Care should be taken to not allow skin to come into contact with any part of the plant. Wash skin and equipment after control. Cut the taproot 15 cm below ground level using a spade with a sharp blade, remove the cut part of the plant from the soil, and leave it to decompose. Apply systemic herbicides, such as glyphosate and triclopyr, through mid-October as long as giant hogweed plants are still green and not dying back. To prevent spread, flower/seed heads should be removed and placed in clear plastic bags and left to sit in the sun for at least one week prior to disposal. Start control early, it is easier to work safely around giant hogweed plants when they are small. HOBART AND WILLIAM SMITH COLLEGES

REFERENCE - USDA Forest Service. 2005. Giant Hogweed. Weed Of The Week. https://www.na.fs.fed.us/fhp/invasive_plants/weeds/ giant-hogweed.pdf. June 12, 2017

shaped cluster of small white florets.

Giant Hogweed Identification. New York State Department of Conservation. https://www.dec.ny.gov/animals/72766.html.









HYDRILLA Hydrilla verticillata Origin: Asia

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Biocontrol Prevention

DISTRIBUTION



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Hydrilla is a submerged herbaceous perennial plant with visibly serrated leaves that grow in whorls of three to eight, often five. The undersides of Hydrilla leaves can be spiny and the midrib of each leaf is often reddish. Hydrilla can spread by seeds, tubers (which resemble tiny bulbs in the sediment), plant fragments, and turions (overwintering buds located on the stems). This invasive plant looks similar to American or Canadian waterweed (*Elodea canadensis*), a common native and aquarium aquatic plant, which has smooth leaves usually arranged in whorls of three and no tubers or turions.

HABITAT

Hydrilla inhabits freshwater lakes, ponds, rivers, impoundments, and canals. Hydrilla is shade-tolerant and can thrive in a wide range of nutrient conditions and depths.

THREAT

Hydrilla spreads quickly, and once established, forms dense stands that crowd out native species and disrupt aquatic habitats. Hydrilla can also clog waterways and restrict water flow, which may damage water control structures and inhibit recreational activities such as swimming, boating, and fishing.

MANAGEMENT

Several techniques have been used to manage Hydrilla. Mechanical removal can be effective only if all parts of the plant are removed including the long-lasting tubers. Herbicides and physical barriers, such as benthic mats, are also effective. Biological agents can also be a successful management strategy, although they are not widely used in NY. The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.











JAPANESE KNOTWEED

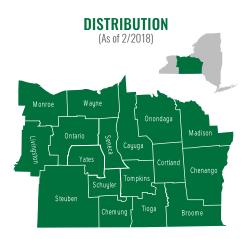
Fallopia japonica Origin: Eastern Asia (Japan, China, Korea)

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Physical Prevention



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Japanese knotweed is a tall, shrubby, herbaceous perennial that forms dense patches up to 3 m tall. Stems are hollow and 'bamboo-like', with purple speckles. Leaves are broadly triangular in shape, about 15 cm long and 7-12 cm wide, coming to a sharply pointed tip. They emerge alternately from the swollen internodes, producing a 'zig-zag' appearance. In late summer, Japanese knotweed produces small, creamy white flowers in spikes up to 10 cm in length.

HABITAT

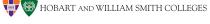
This species can tolerate a wide range of light conditions, temperatures, nutrients, and other environmental conditions. It is commonly found along streams and rivers, in low-lying areas, and in disturbed areas.

THREAT

This species spreads rapidly, forming dense populations that crowd and shade out native vegetation resulting in reduced species diversity, altered ecosystems, and negatively impacted wildlife habitat. Japanese knotweed grows aggressively in riparian and previously disturbed areas and can have detrimental effects on infrastructure.

MANAGEMENT

Rhizomes must be controlled in order to manage Japanese knotweed populations. Manual removal of established plants is usually ineffective due to the easily fragmented rhizomes. A range of chemical control methods, used alone or in conjunction with cutting, have been proven effective on smaller infestations, including foliar spray, cut-and-wipe, and stem injection. If plant materials are to be removed from the site, they should be bagged and disposed of; any root fragment or stem fragment containing an internode can start a new plant. Treatment of large infestations rarely results in the eradication of knotweed from the site, but can suppress the population and prevent spread.







REFERENCE - Japanese Knotweed. Michigan Department of Natural Resources. http://www.michigan.gov/documents/dnr/knotweed_ BCP_372280_7.pdf November 10, 2017



JAPANESE STILTGRASS

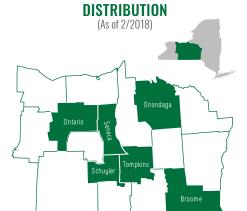
Microstegium vimineum Origin: Asia

INVASIVE RANKING, NYS

Very High

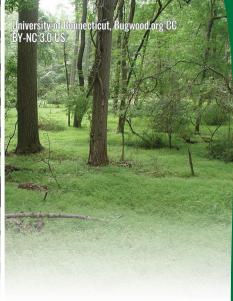
MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention



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Japanese stiltgrass is an annual grass that is adapted to low light levels. It grows in a sprawling habit up to 1 m in height. The leaves are 3-13 cm long, asymmetrical with an off-center mid-rib, and are alternately arranged on the stalk. The leaves feel smooth, although each leaf has a line of silvery hairs on the upper surface. Japanese stiltgrass blooms in the late summer and early fall. Flowers are arranged in one or two delicate spikes at the top of each stem. Roots are weak, but can form at stem nodes.

HABITAT

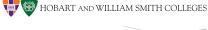
Japanese stiltgrass grows in a wide range of habitats, from roadsides to undisturbed forest understory. It is most often associated with moist, acidic to neutral soils that are high in nitrogen. Japanese stiltgrass readily takes advantage of disturbed areas.

THREAT

Japanese stiltgrass grows densely, crowding out native vegetation. This results in decreased biodiversity and wildlife value, as well as disrupted ecosystem functioning.

MANAGEMENT

Prevent infestations by limiting disturbance and quickly remediating disturbed areas. Hand pulling, mowing, and soil tilling of small infestations can be effective before the seeds set in late summer. Herbicides can be used to control larger Japanese stiltgrass infestations.











KUDZU

Pueraria montana var. lobata Origin: Eastern Asia

rhizomes.

HABITAT

Kudzu tends to live in open, disturbed habitats including forest edges, roadsides, and old fields.

of three-lobed leaflets. Fragrant purple flowers grow in clusters during the summer and produce green or brown, flat, hairy seed pods that are about 6 cm long. Kudzu can also spread via roots and

INVASIVE RANKING. NYS

Very High

THREAT

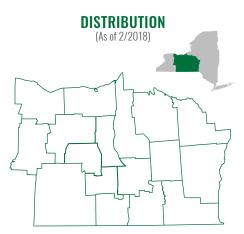
The vine grows rapidly and kills other plants by smothering, girdling, or uprooting them due to its weight.

MANAGEMENT STRATEGY

Physical Chemical Prevention

MANAGEMENT

Prevention is the best management practice to ensure that this species remains unintroduced. Education of the public about practices such as cleaning outdoor gear, as well as timely reporting of sightings, can keep this invasive at bay. The extensive root system must be destroyed for control to be successful. Vines can be cut and fed to livestock or bagged and sent to a landfill. Herbicides can also be effective in controlling infestations.



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REFERENCE - Pennsylvania Department of Conservation and Natural Resources. Invasive Plants in Pennsylvania, Kudzu. PADCNR. http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_010253.pdf











LEAFY SPURGE

Euphorbia esula Origin: Eurasia

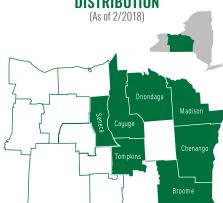
INVASIVE RANKING. NYS

High

MANAGEMENT STRATEGY

Chemical Mechanical Biocontrol Prevention

DISTRIBUTION



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Leafy spurge is a deep-rooted perennial. It propagates by seed and extensive roots, which can grow as deep as 9 m. Smooth, pale green stems grow up to 1 m tall in thick clusters. Narrow, linear leaves are alternately arranged and 2-10 cm long. Small, yellowgreen flowers are enclosed by visible yellowish-green, heartshaped bracts. The entire plant contains white, milky sap that can damage eyes and sensitive skin.

HABITAT

Leafy spurge is found in a wide variety of habitats, ranging from streambanks to dry, upland sites. It can invade disturbed and undisturbed areas, including roadsides, woodlands, riparian zones, grasslands, mountain ridges, and land used for agriculture.

THREAT

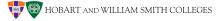
Leafy spurge can displace native vegetation, is toxic to cattle and horses, and can damage skin. It can be difficult to control once it has established in an area.

MANAGEMENT

Hand pulling this plant is not a viable option due to its extensive root system. Mowing will reduce seed production if repeated every two to four weeks during the growing season. Herbicides alone have limited effectiveness because of a waxy layer on the leaves and stems. They are most effective during the fall, after flowering. Some biological controls are available in areas where this species has invaded and can be effective, especially when combined with herbicide treatment and/or grazing by sheep or goats.

REFERENCE - Leafy spurge Identification and Management. 2015. Colorado State University. https://www.colorado.gov/agconservation/ Factsheets/LeafySpurgeFactSheet.pdf

USDA, NRCS. 2010. The PLANTS Database. National Plant Data Center, Baton Rouge, LA, USA. https://www.invasive.org/browse/subinfo. cfm?sub=3405. June 12, 2017.











LESSER CELANDINE, FIG BUTTERCUP

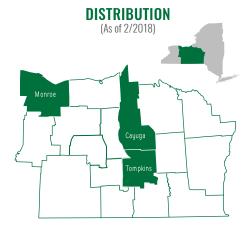
Ranunculus ficaria Origin: Eurasia

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Physical Prevention



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Lesser celandine is an invasive spring ephemeral that grows in a dense rosette. The shiny, dark green leaves are 4-9 cm wide, kidney or heart-shaped, and smooth with wavy edges. Leaf stalks are U-shaped in cross section. Flowers are eight petaled and bright yellow in color. Plants emerge early in the growing season, bloom late-April to mid-May, and die back by summer. They can reproduce vegetatively by bulbils, which are cream colored and hang from leaf stalks, making them easily dislodged if disturbed. Lesser celandine also has small, gray, fingerlike tuberous roots that overwinter and can create new plants.

HABITAT

Lesser celandine typically grows along stream banks, forested floodplains, and other wetlands.

THREAT

Lesser celandine can outcompete and displace native spring-flowering or short-lived plants. It emerges earlier in the spring than most native species, giving it a competitive advantage. Once established, it spreads rapidly, forming a solid green blanket across the ground making it difficult for important pollen and nectar providing native plants to grow.

MANAGEMENT

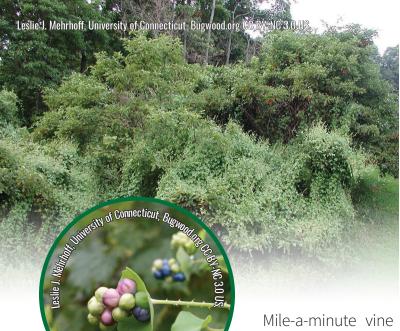
Prevention through education and awareness is an important management strategy to impede the spread of this invasive species. Hiking boots and other outdoor gear should be cleaned between uses at different sites. Small infestations may be pulled by hand or dug up using a shovel. However, entire plants and as many tubers as possible must be removed in order to prevent the spread of this invasive species. Chemical control using herbicides is also an option but should be done as early as possible to avoid impact to native plant species.







REFERENCE - Swearingen, J., C. Bargeron. 2016 Invasive Plant Atlas of the United States. University of Georgia Center for Invasive Species and Ecosystem Health.http://www.invasiveplantatlas.org/http://www.nyis.info/index.php?action=invasive_detail&id=71





MILE-A-MINUTE VINE

Persicaria perfoliata Origin: India & Eastern Asia

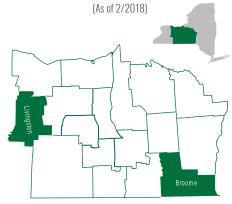
INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Biocontrol Prevention

DISTRIBUTION



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Mile-a-minute vine is an annual herbaceous vine with distinct triangular leaves and prickly stems. Leaves are 5-7 cm wide and 7-9 cm long, alternate in arrangement, and light green with barbs on the underside. Vines are narrow and covered in small, curved spines; older vines are reddish and woody. The flowering structure of mile-a-minute vine has a distinctive leafy, cup-shaped ocrea at its base. Small white flowers bloom in early summer. Berries are pale green when immature and ripen to a deep purple-blue from mid July until the first frost.

HABITAT

Mile-a-minute vine is generally found colonizing disturbed and open areas, including along the edges of woods, streams, wetlands, and roads. While it will grow in drier soils, mile-a-minute vine prefers wet environments with poor soil structure. The plant is most aggressive in full sun, but minimal shade can be tolerated. Using its specially adapted recurved barbs, mile-a-minute weed can reach maximum sunlight by growing over shrubs and trees.

THREAT

Extremely rapid growth of up to 15 cm per day allows mile-a-minute vine to form dense populations that smother tree seedlings and native plants. New outbreaks can occur great distances from the original source due to seed distribution by birds, small rodents, and water.

MANAGEMENT

Biological, mechanical, physical and chemical control are options for the removal and management of mile-a-minute vine. The vines can be mowed, cut, or removed by hand and disposed of in plastic bags before seeds are produced. Vines should be allowed to dry prior to disposal. Low-growing infestations may be repeatedly cut or mowed to reduce flowering and seed production. Biological control is available through the use of mile-a-minute weevils (*Rhinoncomimus latipes*). Herbicides have also proven effective against this species.

REFERENCE - Abbey, Tim. Mile-A-Minute or Devil's Tearthumb. May 2000. Connecticut Invasive Plant Working Group. http://www.hort.uconn.edu/cipwg/pdfs/mile_a_minute.pdf. June 6, 2017. Mile-A-Minute (Persicaria perfoliate). New York Invasive Species Information: Cornell University

Corporate Extension. http://nyis.info/index.php?action=invasive_detail&id=31. June 6, 2017.



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PARROT FEATHER

Myriophyllum aquaticum Origin: South America

INVASIVE RANKING, NYS

High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention

DISTRIBUTION



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Parrot feather is an invasive aquatic plant with both submerged and emergent leaves. Submerged leaves are feathery, reddigh-orange, and grow in whorls of four to six leaves. Where the plant reaches the water surface, it creates dense mats of short spikelets up to 30 cm above the water surface. Leaves are still whorled and feathery, but are stiffer and gray-green or bright blue-green. Small, white flowers may be present along the emergent part of the stem.

HABITAT

Parrot feather grows well in high nutrient, shallow, slow moving water to depths of 9 m, and can survive a wider range of environmental conditions.

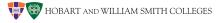
THREAT

Parrot feather can form dense mats, which may compete with native vegetation, constrict water flow, and reduce dissolved oxygen concentrations leading to stress of aquatic organisms. These can all negatively impact human activities in the water.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Management of parrot feather is difficult once it is established. Mechanical control methods may be utilized. However, this can spread fragments that re-establish the plant. Chemical control has had mixed results due to a waxy layer on the leaves. There are no biological controls permitted for use on this species in the US.

REFERENCE - Myriophyllum aquaticum USGS Nonindigenous Aquatic Species Database, Gainesville, FL, and NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI. https://nas.er.usgs.gov/queries/greatlakes/FactSheet. aspx?SpeciesID=14&Potential=Y-Type=2&HUCNumber Revision Date: 2/3/2015











PURPLE LOOSESTRIFE

Lythrum salicaria Origin: Eurasia

INVASIVE RANKING. NYS

Very High

MANAGEMENT STRATEGY

Chemical Physical Biocontrol Prevention

DISTRIBUTION



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Purple loosestrife is a showy wetland plant that grows up to 2.5 m tall. Leaves are 5-14 cm long, sword-shaped, and oppositely arranged. Stems are square and hairy, with an upright growth habit. Purple flowers have five to seven petals and grow in pairs or clusters on tall spikes; flowering starts in June and lasts into early fall. Older plants can have many woody stems growing from a single root crown.

HABITAT

Purple loosestrife will grow in wet meadows, tidal and non-tidal marshes, the edges of waterways and ponds, and in ditches. It can tolerate a wide range of conditions, including shading and flooding, but prefers moist, organic soils.

THREAT

Once established, purple loosestrife outcompetes and replaces native wetland species, which decreases biodiversity. This reduces the quality of habitat and food sources important to wetland wildlife, such as marsh birds and waterfowl. Dense stands of purple loosestrife also alter biogeochemcial and hydrological processes in wetlands.

MANAGEMENT

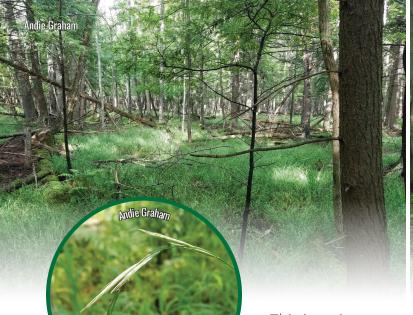
Small infestations can be pulled by hand, though this must be completed before seeds are produced. Care must be taken to completely remove the root crown. The soil should not be overly disturbed when removing plants in case it releases seeds from the seedbank. All plant parts should be bagged and removed, and may be burned. Herbicides approved for aquatic use, preferably broadleaf-specific, can also effectively control small stands. Biocontrol options include: Galerucella spp. beetles, which eat the leaves and target the area of the plant that produces seeds; Hylobius transversovittatus, a root-mining weevil: and seed-eating beetles Nanophyes marmoratus and N. brevis. These insects can suppress populations to nonsignificant levels, although they do not eradicate them.

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REFERENCE - New York Invasive Species Information. Purple Loosestrife. Cornell University Corporate Extension. http://www. nyis.info/index.php?action=invasive_detail&id=64





SLENDER FALSE BROME

Brachypodium sylvaticum Origin: Europe, Asia, North Africa

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention

DISTRIBUTION



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This invasive, perennial grass forms distinctive bunches of broad, arching leaves up to 12 mm wide and 1 m tall. Foliage emerges early in the spring and remains bright yellow-green into the late fall. Slender false brome can be distinguished from most other grasses by its drooping flower spikes, which bloom June-September, and hair on lower stems and leaf veins.

HABITAT

Slender false brome can tolerate a wide range of habitats, from shaded upland hardwood and conifer forests to full sun grasslands, but it is especially competitive in shaded or drought conditions.

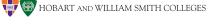
THREAT

Slender false brome emerges earlier than many native species in the spring and can outcompete and replace native vegetation, which decreases biodiversity and habitat quality. It can prevent tree seedling establishment and has little nutritional value for wildlife. This plant is self-fertilizing and can produce hundreds of seeds per plant.

MANAGEMENT

Prevention is the best management option for uninfested sites. Cleaning hiking clothes, boots, management equipment, and recreational equipment between sites is critical to prevent spread. Hand removal in the spring before seed set can be effective for small populations. Mowing can prevent seed set if timed appropriately, but will not kill existing plants. Herbicides have been effective at controlling larger populations of slender false brome. Because seeds may remain viable in the seedbank for up to two years, any management should include site visits for several years to ensure eradication.

REFERENCE - Oregon State University. 2008. Slender False Brome. Slender False Brome. New York Department of Conservation. http://www.dec.ny.gov/docs/lands_forests_pdf/sfbfactsheet.pdf. November 15, 2017.











STARRY STONEWORT

Nitellopsis obtusa Origin: Eurasia

INVASIVE RANKING, NYS

Not Applicable

MANAGEMENT STRATEGY

Chemical Physical Mechanical Prevention

DISTRIBUTION (As of 2/2018) Monroe Wayne Onondaga Ontario Cayuga Cortland Tompkins

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Starry stonewort is a macroalgae that is easily spread by fragmentation. It is anchored to the sediment by clear root-like structures (*rhizoids*), and can grow more than 2 m long with whorls of four to six long, blunt-tipped branchlets. While it is similar to native stoneworts, it can be identified by production of white, star-shaped bulbils, asymmetrical branching structure, and orange structures (antheridium) at the branchlet and rhizoid nodes in low oxygen conditions.

HABITAT

Starry stonewort grows at depths up to 9 m in a broad range of slow-moving aquatic habitats, including low light and low nutrient conditions. It is adapted to both fresh and brackish habitats.

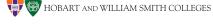
THREAT

Starry stonewort forms dense 'pillows' of vegetation, which outcompete aquatic plants and interfere with human and fish movement. Dense infestations are correlated with low abundance and diversity of plant species, and can completely block fish spawning.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Once established, the algae spreads readily through its easily dislodged bulbils and fragments, making manual or mechanical control challenging. Manual or mechanical control is more likely to succeed if the infestation is small and detected early. Starry stonewort's response to copper-based algaecides and herbicides is mixed and requires further research, although this may be a feasible management option.

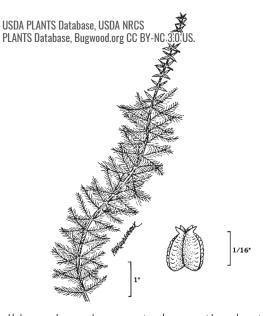
REFERENCE - P. Douglas Pullman and Crawford, Gary. 2010. A Decade of Starry Stonewort in Michigan. Lakeline. Accessed [12/16/2017]. Sleith, R.S., Havens, A.J., Stewart, R.A. et al. 2015. Distribution of Nitellopsis obtusa (Characeae) in New York, U.S.A. Brittonia 67: 166 State of Michigan's Status and Strategy for Starry Stonewort (Nitellopsis obtusa (Desv. in Loisel.) J. Groves) Management. Updated August 2017; accessed [12/16/17]. http://www.michigan.gov/documents/deg/wrd-ais-nitellopsis-obtusa-strategy_499687_7.pdf











VARIABLE-LEAF WATERMILFOIL

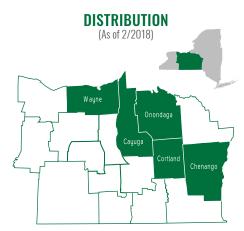
Myriophyllum heterophyllum Origin: Eastern Asia

INVASIVE RANKING. NYS

Very High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention



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can grow to 15-20 cm above the water; leaves are highly variable bracts that are stiff, usually toothed, and may reach 2.5 cm in length. Flowers grow in spikes 7-15 cm tall in late June to August.

HABITAT

Variable-leaf watermilfoil grows in lakes, ponds, and pools in streams up to depths of about 1.8 m, occasionally deeper. This species prefers clear and neutral to slightly acidic water.

arranged in whorls of 4-6 around red-brown stems. Emergent parts

THREAT

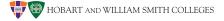
Variable-leaf watermilfoil is an aggressive plant competitor that can outcompete and displace native vegetation, which can alter habitats for fish, waterfowl, and aquatic organisms. Dense growth inhibits recreational activities including boating, fishing, and swimming.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Small infestations can be managed using a variety of manual or mechanical control options, but fragments may spread the infestation so care must be taken to remove all parts of the plant. Plants should be disposed of away from the water. Some herbicides have also been effective.

REFERENCE - Rook. Earl. 2002. Two Leaf Milfoil. http://www.rook.org/earl/ bwca/nature/aquatics/myriophyllumhet.html. June 12, 2017. New Hampshire Department of Environmental Services. 2010. Variable Milfoil. Environmental Fact Sheet. https://www.des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-23.pdf. June 12, 2017. Washington Invasive Species Council. 2016. Variable-Leaf Watermilfoil. Stop The Invasion. http://www.invasivespecies.wa.gov/documents/priorities/ VariableLeafMilfoilFactsheet.pdf. June 12,2017.

King County Noxious Weed Control Program BEST MANAGEMENT PRAC-TICES: Eurasian and variable-leaf milfoil. Published January 2010; accessed Dec 17, 2017. https://www.nwcb.wa.gov/images/weeds/Milfoil_Myriophyllum_control_King.p.









WATER CHESTNUT

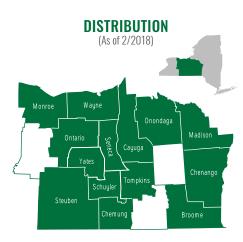
Trapa natans Origin: Eurasia

INVASIVE RANKING, NYS

Very High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention



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Water chestnut is a floating-leaved, annual, aquatic plant. Linear, oppositely arranged submersed leaves are replaced by feathery adventitious roots early in the growing season. On the water surface, the plant forms a rosette of green, glossy, triangular floating leaves with toothed edges and inflated petioles. Plant stems are cord-like and can grow up to 5 m. Small, white, four-petaled flowers bloom from the center of the rosette during the summer, eventually producing large, four-spined seeds.

HABITAT

Water chestnut grows best in quiet, shallow, high nutrient water bodies with a soft bottom substrate. They prefer waters with an alkaline or neutral pH.

THREAT

Populations of this species can form very dense mats of interlocking and stacking rosettes. These thick mats completely shade the water column and suppress most other aquatic plant growth in the area. Dense mats also inhibit boating, swimming, and fishing. The seeds are painful when stepped upon.

MANAGEMENT

Small populations can be controlled by hand pulling the plants prior to seed maturation. Large infestations have been controlled by the use of mechanical harvesters or the application of aquatic herbicides. Biocontrol options are in development. As always, the best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.











WATER HYACINTH

Eichhornia crassipes Origin: Amazon basin, Brazil

HABITAT

Water hyacinth inhabits slow-moving freshwaters including ponds, lakes, swamps, and canals. It can tolerate short-term exposure to freezing temperatures.

made of round or elliptical glossy green leaves that are usually about 15 cm wide. Spongy, inflated petioles are about 30 cm long. Six-petaled flowers are lavender-blue with a yellow spot and bloom in a showy spike. The fruit has three chambers filled

with many seeds. Water hyacinth also reproduces vegetatively

from brittle stolons (horizontal stems).

INVASIVE RANKING. NYS

Not Applicable

MANAGEMENT STRATEGY

Physical Chemical Prevention

THREAT

Thick mats of water hyacinth can obstruct waterways, alterwater temperatures and chemistry, and displace native species. Mats reduce light and oxygen availability in aquatic ecosystems. Water hyacinth can also provide habitat for diseasecarrying mosquitoes. Obstructed waterways can negatively affect transportation, irrigation, and recreation.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As these species are most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Plants may be cut and removed from the waterbody. Herbicide treatment can be effective. Bioherbicides have been developed for control of this plant.



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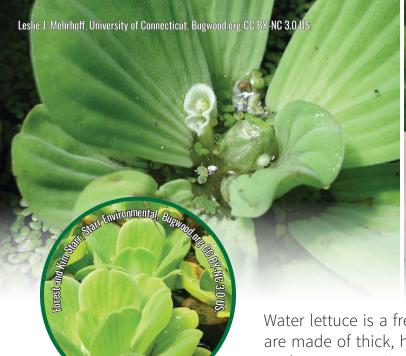
REFERENCE - Jacono, C.C., M.M. Richerson, V. Howard, E. Baker. C. Stottlemyer, and J. Li, 2017, Eichhornia crassipes (Mart.) Solms: U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, FL,

NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI, https://nas.er.usgs.gov/queries/greatlakes/ FactSheet.aspx?SpeciesID=11&Potential=Y&Type=2&HUCNumber=, Revision Date: 1/30/2015, Access Date: 9/15/2017











WATER LETTUCE

Pistia stratiotes Origin: Not clear, occurs on all continents except Antarctica, pantropical

INVASIVE RANKING. NYS

Not Applicable

MANAGEMENT STRATEGY

Physical Chemical Prevention

DISTRIBUTION



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Water lettuce is a free-floating aquatic perennial plant. Rosettes are made of thick, hairy, light green leaves that are usually 2-15 cm long. Inconspicuous flowers occur in the center of the rosette, producing green berries. Water lettuce also reproduces vegetatively from brittle stolons (horizontal stems).

HABITAT

Water lettuce is native to tropical and subtropical lakes and will inhabit slowmoving waters including ponds, lakes, swamps, and canals. It is restricted by cold sensitivity, although the seeds have the to potential to overwinter.

THREAT

Thick mats of water lettuce can obstruct waterways, reduce water flow, reduce dissolved oxygen concentrations, degrade aquatic habitats, displace native species, and impact recreation and infrastructure. Water lettuce also provides habitat for disease-carrying mosquitoes.

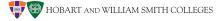
MANAGEMENT

Prevention is the best management practice to ensure that this species remains unintroduced. Education of the public about practices such as clean, drain, and dry, as well as timely reporting of sightings, can keep this invasive at bay. Plants may be physically removed and transported to shore for disposal. Manipulation of water levels in conjunction with physical removal of plants prior to flowering can reduce seed germination. Chemical treatment is also an effective treatment, although herbicides may not affect the seeds.

REFERENCE - Pennsylvania Department of Conservation and Natural Resources. Invasive Plants in Pennsylvania, Water Lettuce. PADCNR. http://www.docs.dcnr.pa.gov/cs/groups/public/documents/document/dcnr_010308.pdf

Howard, V., E. Baker, J. Li, and P. Alsip, 2017, Pistia stratiotes Linnaeus: U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, FL,

NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI, https://nas.er.usgs.gov/queries/greatlakes/ FactSheet.aspx?SpeciesID=15&Potential=Y&Type=2&HUCNumber, Revision Date: 4/13/2017, Access Date: 9/14/2017











WATER SOLDIERS

Stratiotes aloides Origin: Eurasia

INVASIVE RANKING, NYS

Not Applicable

MANAGEMENT STRATEGY

Physical Chemical Prevention

DISTRIBITION



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Water soldiers is a loosely-rooted aquatic plant with submerged and emergent growth forms that resemble the household spider plant. Submerged leaves can grow to about 60 cm and are thin and brittle with weak spines. The emergent growth form produces rosettes of thick, rigid, brittle leaves with strongly developed spines on the margins. These leaves are generally about 40 cm in length. Water soldiers can reproduce vegetatively via buds that are released when the rosette decays.

HABITAT

Water soldiers inhabits shallow, stagnant freshwaters with muddy substrate. It can grow in depths up to about 6 m.

THREAT

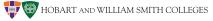
This plant can form dense monocultures that outcompetes native vegetation. It also has the potential to alter the surrounding water chemistry. Dense mats can hinder recreational activities and sharp leaves can cut skin.

MANAGEMENT

Prevention is the best management practice to ensure that this species remains unintroduced. Education of the public about practices such as clean, drain, and dry, as well as efficient reporting of sightings, can keep this invasive at bay. These plants may be removed by hand, covered using shade-cloth, or chemically treated.

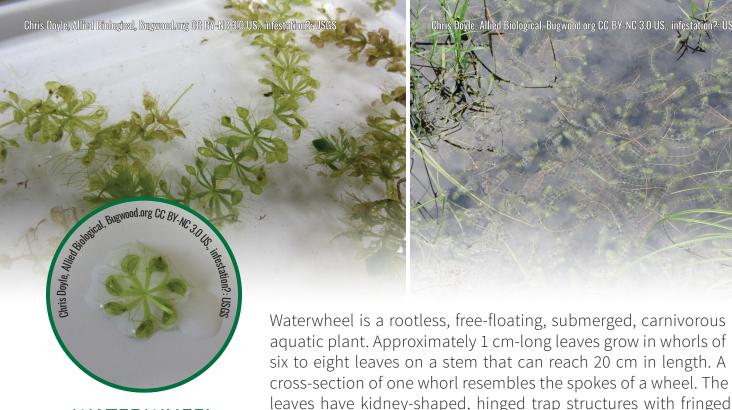
REFERENCE - Fusaro, A., A. Davidson, K. Alame, M. Gappy, E. Baker, G. Nunez, J. Larson, W. Conard, and P. Alsip, 2017, Stratiotes aloides (Linnaeus, 1758): U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, FL

NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI, https://nas.er.usgs.gov/queries/greatlakes/FactSheet.aspx?SpeciesID=70&Potential=Y&Type=2&HUCNumber=, Revision Date: 5/11/2017, Access Date: 9/15/2017











WATERWHEEL

Aldrovanda vesiculosa Origin: Europe, Asia, Africa, & Australia

INVASIVE RANKING. NYS

Not Applicable

MANAGEMENT STRATEGY

Prevention

HABITAT

reproduce by fragmentation.

Waterwheel grows in slightly acidic, nutrient poor waters with high organic matter content.

hairs. Waterwheel plants can have up to 20 whorls of leaves. Small,

emergent, pinkish flowers bloom in late summer. This species also

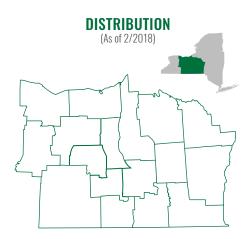
produces turions, which overwinter in temperate climates, and can

THREAT

This species may compete with other submersed, carnivorous species, including native bladderworts. It could also affect invertebrate populations and food webs in the aquatic community.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As these species are most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body.



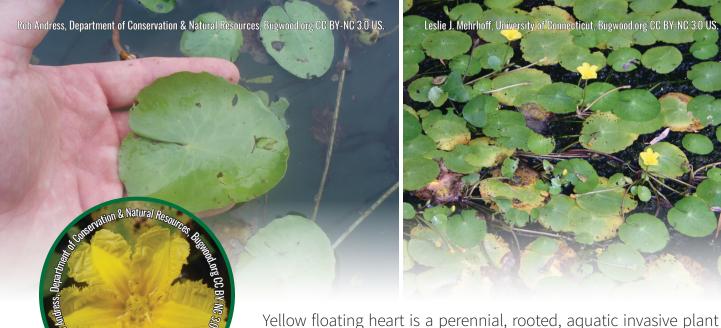
www.fingerlakesinvasives.org

REFERENCE - U.S. Geological Survey. [2017]. Nonindigenous Aquatic Species Database. Gainesville, Florida. Accessed [6/7/2017].











YELLOW FLOATING **HEART**

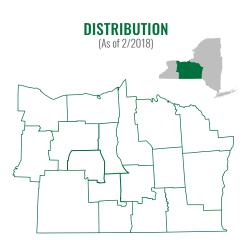
Nymphoides peltata Origin: Eurasia

INVASIVE RANKING, NYS

High

MANAGEMENT STRATEGY

Chemical Mechanical Physical Prevention



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HABITAT

Yellow floating heart grows in slow-moving waters to 4 m depths, including lakes, ponds, swamps, and channels. It can tolerate anaerobic environments and survive on mudflats. This species overwinters as rhizomes.

that resembles water lilies. The stems can grow up to 2 m long and lie just below the water surface, where they may and branch into smaller plantlets. Round or heart-shaped floating leaves grow to 3-12 cm in diameter and are green or yellow-green with slightly wavy

margins. The undersides of the leaves can be purple in color. Yellow floating heart can produce two to five bright yellow, five-petaled flow-

ers, between May and October, depending on the temperature. These

produce a capsule of flat, shiny seeds that have margins of stiff hairs.

They can also reproduce vegetatively from fragments and rhizomes.

THREAT

Yellow floating heart can form dense patches of vegetation that can outcompete and displace native plants and create stagnant, low-oxygen conditions in the water below. If a population of yellow floating heart is large enough, fish and other wildlife may be forced to relocate. The patches can also impede recreational activities, including boating, fishing, and swimming.

MANAGEMENT

The best management strategy is prevention through education and stewardship. As this species is most commonly spread through fishing and boating equipment, it is important to use precautions such as cleaning, draining, and drying your boat and other aquatic equipment before moving to another water body. Hand-pulling and mechanical removal may be used to control populations, although care should be taken to remove all plant pieces from the water. Chemical treatment can also be effective in managing infestations. HOBART AND WILLIAM SMITH COLLEGES

REFERENCE - Nymphoides peltata USGS Nonindigenous Aquatic Species Database, Gainesville, FL, and NOAA Great Lakes Aquatic Nonindigenous Species Information System, Ann Arbor, MI. https://nas.er.usgs.gov/queries/GreatLakes/FactSheet. aspx?NoCache=12%2F10%2F2013+7%3A53%3A28+PM&SpeciesID=243&State=&HUCNumber Revision Date: 3/23/2016









YELLOW IRIS

Iris pseudacorus Origin: Eurasia

INVASIVE RANKING. NYS

High

MANAGEMENT STRATEGY

Physical Chemical Prevention

DISTRIBUTION



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Yellow iris is an herbaceous perennial plant that grows in clusters to 1.5 m tall, connected by rhizomes. The leaves are elongated and dark green with a gray-blue tint. Showy yellow flowers bloom between May and July. This species may be mistaken for the native blue flag (Iris versicolor). Flowers and fruits are important for identification. Blue flag does not grow in large, dense stands and has blue-purple flowers and three-angled fruit capsules that remain closed upon maturity. Yellow iris has yellow flowers and a six-angled fruit capsule that spreads into three wide segments upon maturity.

HABITAT

Yellow iris commonly grows in wetlands and on stream banks, ponds, and ditches. It is tolerant of a wide range of conditions.

THREAT

Yellow iris has escaped gardens and can form dense colonies. Such monocultures alter habitat and displace native species. This plant is also poisonous to livestock and other animals.

MANAGEMENT

New infestations may be prevented through education and awareness of invasive species and native garden species that may be more suitable to cultivate. Smallscale infestations may be removed by hand via digging, although resin can cause skin irritation. The entire root system must be removed to eliminate the plant. Removing the flowers and seed pods will help slow its dispersal. Large-scale infestations likely require multiple herbicide applications.

REFERENCE - Pennsylvania Department of Conservation and Natural Resources. Invasive Plants in Pennsylvania, Yellow Flag Iris. PADCNR. http://www.docs.dcnr.pa.gov/cs/groups/public/ documents/document/dcnr 010300.pdf Sarver, M.J., A. Treher, L. Wilson, R. Naczi, and F.B. Kuehn, 2008. Mistaken Identity? Invasive Plants and their Native Look-alikes: an Identification Guide for the Mid-Atlantic. Dover, DE: Delaware Department of Agriculture and USDA Natural Resources Conservation Service.









FINGER LAKES
INSTITUTE



The Finger Lakes Partnership for Regional Invasive Species Management (Finger Lakes PRISM) is a collaborative program designed to address the threat of invasive species. Housed within the Hobart and William Smith Colleges Finger Lakes Institute (FLI), the program is one of eight across New York that focuses on managing invasive species, developing detection programs, employing response efforts, providing education programs and outreach, and working with communities. PRISM programs are administered through the New York State Department of Environmental Conservation.

Hobart and William Smith are nationally recognized liberal arts colleges defined by a longstanding focus on educating across academic disciplines and an intellectual environment that cultivates faculty and student connections.

With a strong commitment to inclusive excellence, the Colleges have a distinguished history of interdisciplinary teaching and scholarship, curricular innovation and exceptional outcomes. Hobart and William Smith provide robust programs in career development, study abroad, service, leadership and athletics. There are 45 majors and 67 minors. With an enrollment of 2,237, more than 60 percent of students study abroad through the No. 1 global education program in the country and all participate in community service. Located in the heart of the Finger Lakes region, Hobart and William Smith enjoy a lakeside campus on the shore of Seneca Lake. Originally founded as two separate colleges (Hobart for men in 1822 and William Smith for women in 1908), Hobart and William Smith students share the same campus, faculty, administration and curriculum.







Reducing the introduction, spread and impact of invasive species within the Finger Lakes PRISM region through coordinated education, detection, prevention, and control measures.

Finger Lakes PRISM

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www.fingerlakesinvasives.org

Funding for this project provided by:







