NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

Scientific name:	Iris pseudacorus	USDA Plants Code: IRPS
Common names:	Yellow iris	
Native distribution:	Europe, Asia, northern Africa, and Mediterranean region	
Date assessed:	17 March 2008, 18 June 2008, 1 July 2008	
Assessors:	Jinshuang Ma, Steven Clemants, Gerry Moore, Marilyn Jordan	
Reviewers:	LIISMA SRC	
Date Approved:	9 July 2008; edited Dec. 15, 2008	Form version date: 22 October 2008

New York Invasiveness Rank: High (Relative Maximum Score 70.00-80.00)

Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Common	High
6	Lower Hudson	Not Assessed	Not Assessed
7	Saint Lawrence/Eastern Lake Ontario	Not Assessed	Not Assessed
8	Western New York	Not Assessed	Not Assessed

Invasiveness Ranking Summary (see details under appropriate sub-section)		Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	24
2	Biological characteristic and dispersal ability	25 (25)	19
3	Ecological amplitude and distribution	25 (25)	21
4	Difficulty of control	10 (10)	7
	Outcome score	100 (100)[b]	76[a]
	Relative maximum score †		76.00
	New York Invasiveness Rank §	High (Relative Maximum Score 70.00-80.00)	

* For questions answered "unknown" do not include point value in "Total Answered Points Possible." If "Total Answered Points Possible" is less than 70.00 points, then the overall invasive rank should be listed as "Unknown."
†Calculated as 100(a/b) to two decimal places.
§Very High >80.00; High 70.00–80.00; Moderate 50.00–69.99; Low 40.00–49.99; Insignificant <40.00

A. DISTRIBUTION (KNOWN/POTENTIAL): Summarized from individual PRISM forms

A1.1. Has this species been documented to persist without cultivation in NY? (reliable source; voucher not required)	
☒	Yes – continue to A1.2
☐	No – continue to A2.1
A1.2. In which PRISMs is it known (see inset map)?	
☒	Adirondack Park Invasive Program
☒	Capital/Mohawk
☒	Catskill Regional Invasive Species Partnership
☒	Finger Lakes
☒	Long Island Invasive Species Management Area
☒	Lower Hudson
☒	Saint Lawrence/Eastern Lake Ontario
☒	Western New York

Documentation:
Sources of information:
Weldy & Werier, 2005; Brooklyn Botanic Garden, 2008.

A2.1. What is the likelihood that this species will occur and persist outside of cultivation, given the climate in the following PRISMs? (obtain from PRISM invasiveness ranking form)

Not Assessed	Adirondack Park Invasive Program
Not Assessed	Capital/Mohawk
Not Assessed	Catskill Regional Invasive Species Partnership
Not Assessed	Finger Lakes
Very Likely	Long Island Invasive Species Management Area
Not Assessed	Lower Hudson
Not Assessed	Saint Lawrence/Eastern Lake Ontario
Not Assessed	Western New York

Documentation:
Sources of information (e.g.: distribution models, literature, expert opinions):
Weldy & Werier, 2005; Brooklyn Botanic Garden, 2008.

If the species does not occur and is not likely to occur with any of the PRISMs, then stop here as there is no need to assess the species.

A2.2. What is the current distribution of the species in each PRISM? (obtain rank *from PRISM invasiveness ranking forms*)

	Distribution
Adirondack Park Invasive Program	Not Assessed
Capital/Mohawk	Not Assessed
Catskill Regional Invasive Species Partnership	Not Assessed
Finger Lakes	Not Assessed
Long Island Invasive Species Management Area	Common
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation:
Sources of information:
Brooklyn Botanic Garden, 2008; Weldy & Werier, 2005.

A2.3. Describe the potential or known suitable habitats within New York. Natural habitats include all habitats not under active human management. Managed habitats are indicated with an asterisk.

Aquatic Habitats	Wetland Habitats	Upland Habitats
☐ Salt/brackish waters	☐ Salt/brackish marshes	☐ Cultivated*
☒ Freshwater tidal	☒ Freshwater marshes	☐ Grasslands/old fields
☒ Rivers/streams	☐ Peatlands	☐ Shrublands
☒ Natural lakes and ponds	☒ Shrub swamps	☐ Forests/woodlands
☐ Vernal pools	☒ Forested wetlands/riparian	☐ Alpine
☒ Reservoirs/impoundments*	☒ Ditches*	☐ Roadsides*
	☐ Beaches and/or coastal dunes	

Other potential or known suitable habitats within New York:
Tu 2003 reports species in brackish habitats but we have no other evidence of it being salt tolerant. Moore has seen it in freshwater tidal zones but not in saline habitats.

Documentation:
Sources of information:
Goldblatt, 2002; Tu, 2003; Brooklyn Botanic Garden, 2008.

B. INVASIVENESS RANKING

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes and System-Wide Parameters (e.g. fire regime, geomorphological changes (erosion, sedimentation rates), hydrologic regime, nutrient and mineral dynamics, light availability, salinity, pH)

A.	No perceivable impact on ecosystem processes based on research studies, or the absence of impact information if a species is widespread (>10 occurrences in minimally managed areas), has been well-studied (>10 reports/publications), and has been present in the northeast for >100 years.	0
B.	Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)	3
C.	Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)	7
D.	Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology and/or hydrology, affects fire frequency, alters soil pH, or fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)	10
U.	Unknown	

Score: 7

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
Can form a rhizome mat that collects sediment, elevates topography, and interferes with stream flow, resulting in a drier habitat.
Sources of information:
Thomas, 1980; Tu, 2003; Gravuer, 2005; Heckman, 2005.

1.2. Impact on Natural Community Structure

A.	No perceived impact; establishes in an existing layer without influencing its structure	0
B.	Influences structure in one layer (e.g., changes the density of one layer)	3
C.	Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer)	7
D.	Major alteration of structure (e.g., covers canopy, eradicating most or all layers below)	10
U.	Unknown	

Score: 3

Documentation:
Identify type of impact or alteration:
Can dominate the herb layer thus changing its density.
Sources of information:
Thomas, 1980; Tu, 2003; Gravuer, 2005; Heckman, 2005; S.Flint 2008 pers. comm.

1.3. Impact on Natural Community Composition

A.	No perceived impact; causes no apparent change in native populations	0
B.	Influences community composition (e.g., reduces the number of individuals in one or more native species in the community)	3
C.	Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community)	7
D.	Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community)	10
U.	Unknown	

Score 7

Documentation:
Identify type of impact or alteration:
The rhizome mats have been shown to alter microhabitats and prevent germination of native species (Hickman, 2005) and alter succesional trajectories (Tu, 2003). Along the lower Potomac River, yellow iris's elevation of the seed bank is believed to have facilitated the conversion of riparian marshes into mesic forest (Thomas 1980). Greatly reduces abundance of native species and may ultimately eliminate natives in older infestations in the Adirondacks (S.FlintP. If similar impacts were documented from our area that would warrant the answer of D.
Sources of information:
Thomas, 1980; Tu, 2003; Heckman, 2005; S. Flint 2008 pers comm .

1.4. Impact on other species or species groups (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades. Examples include reduction in nesting/foraging sites; reduction in habitat connectivity; injurious components such as spines, thorns, burrs, toxins; suppresses soil/sediment microflora; interferes with native pollinators and/or pollination of a native species; hybridizes with a native species; hosts a non-native disease which impacts a native species)

A.	Negligible perceived impact	0
B.	Minor impact	3
C.	Moderate impact	7
D.	Severe impact on other species or species groups	10
U.	Unknown	

Score 7

Documentation:
Identify type of impact or alteration:
In Connecticut, I. pseudacorus has been shown to exclude the native arrow-arum (Peltandra virginica), a plant whose fruits are an important food for wildlife (Cox 1999, cited in Tu, 2003). It has also been shown to outcompete cat-tail (Typha latifolia) (Washington State Noxious Weed Control Board, 2003) and impact willows (Salix spp.) (Thomas, 1980). The species does not provide food for native wildlife species (Mehrhoff, 2003; Tu, 2003). However, sites in NY are not generally large.
Sources of information:
Thomas, 1980; Cox, 1999; Mehrhoff et al., 2003; Tu, 2003; Washington State Noxious Weed Control Board, 2003.

Total Possible 40
Section One Total 24

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode and rate of reproduction (provisional thresholds, more investigation needed)

A.	No reproduction by seeds or vegetative propagules (i.e. plant sterile with no sexual or asexual reproduction).	0
B.	Limited reproduction (fewer than 10 viable seeds per plant AND no vegetative reproduction; if viability is not known, then maximum seed production is less than 100 seeds per plant and no vegetative reproduction)	1
C.	Moderate reproduction (fewer than 100 viable seeds per plant - if viability is not known, then maximum seed production is less than 1000 seeds per plant - OR limited successful vegetative spread documented)	2
D.	Abundant reproduction with vegetative asexual spread documented as one of the plants prime reproductive means OR more than 100 viable seeds per plant (if viability is not	4

known, then maximum seed production reported to be greater than 1000 seeds per plant.)

U. Unknown

Score 4

Documentation:
Describe key reproductive characteristics (including seeds per plant):
Abundant reproduction and spread through abundant production of seeds and rhizome fragments, both of which are buoyant.
Sources of information:
Cody, 1961; Dalton, 1983; Ramsey and Peichel, 2001; Goldblatt, 2002; Tu, 2003; Washington State Noxious Weed Control Board, 2003; Weber, 2003; Gravuer, 2005; Heckman, 2005; ISSG, 2005.

2.2. Innate potential for long-distance dispersal (e.g. bird dispersal, sticks to animal hair, buoyant fruits, pappus for wind-dispersal)

A. Does not occur (no long-distance dispersal mechanisms) 0
B. Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations) 1
C. Moderate opportunities for long-distance dispersal (adaptations exist for long-distance dispersal, but studies report that 95% of seeds land within 100 meters of the parent plant) 2
D. Numerous opportunities for long-distance dispersal (adaptations exist for long-distance dispersal and evidence that many seeds disperse greater than 100 meters from the parent plant) 4
U. Unknown

Score 4

Documentation:
Identify dispersal mechanisms:
Buoyant seeds and rhizomes could travel long distances, certainly beyond 100 meters.
Sources of information:
Tu, 2003; Gravuer, 2005; Heckman, 2005; ISSG, 2005.

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contaminated compost, land and vegetation management equipment such as mowers and excavators, etc.)

A. Does not occur 0
B. Low (human dispersal to new areas occurs almost exclusively by direct means and is infrequent or inefficient) 1
C. Moderate (human dispersal to new areas occurs by direct and indirect means to a moderate extent) 2
D. High (opportunities for human dispersal to new areas by direct and indirect means are numerous, frequent, and successful) 3
U. Unknown

Score 3

Documentation:
Identify dispersal mechanisms:
Can be found for sale in nurseries, although it is not a popular horticultural plant since its flowering period is short. Boating activities might spread the seeds and rhizomes.
Sources of information:
Ramey & Peichel, 2001; Tu, 2003; Gravuer, 2005; Heckman, 2005; ISSG, 2005.

2.4. Characteristics that increase competitive advantage, such as shade tolerance, ability to grow on infertile soils, perennial habit, fast growth, nitrogen fixation, allelopathy, etc.

A. Possesses no characteristics that increase competitive advantage 0

B. Possesses one characteristic that increases competitive advantage 3
C. Possesses two or more characteristics that increase competitive advantage 6
U. Unknown

Score 6

Documentation:
Evidence of competitive ability:
Shade tolerant, perennial, fast growth, fire tolerant.
Sources of information:
Ramey & Peichel, 2001; Tu, 2003; Washington State Noxious Weed Control Board, 2003; Weber, 2003; Gravuer, 2005; Heckman, 2005; ISSG, 2005.

2.5. Growth vigor

A. Does not form thickets or have a climbing or smothering growth habit 0
B. Has climbing or smothering growth habit, forms a dense layer above shorter vegetation, forms dense thickets, or forms a dense floating mat in aquatic systems where it smothers other vegetation or organisms 2
U. Unknown

Score 0

Documentation:
Describe growth form:
Can form large stands but does not exhibit a climbing or smothering habit, nor does it form dense thickets or mats.
Sources of information:
Tu, 2003; Washington State Noxious Weed Control Board, 2003; Gravuer, 2005; Heckman, 2005; ISSG, 2005; author's (Moore's) personal obervations.

2.6. Germination/Regeneration

A. Requires open soil or water and disturbance for seed germination, or regeneration from vegetative propagules. 0
B. Can germinate/regenerate in vegetated areas but in a narrow range or in special conditions 2
C. Can germinate/regenerate in existing vegetation in a wide range of conditions 3
U. Unknown (No studies have been completed)

Score 2

Documentation:
Describe germination requirements:
Germination of seeds in the field is rather low. Requires moist, but not inundated soil for germination but even here germination rates in the field were less than 20%. Scarification (such as heat from a fire) may increase germination rate. Seeds do appear to be tolerant of saline exposure.
Sources of information:
Dymes, 1920; Jesson, 1955; Thomas, 1980; Sutherland, 1990; Coops & Van Der Velde, 1995.

2.7. Other species in the genus invasive in New York or elsewhere

A. No 0
B. Yes 3
U. Unknown

Score 0

Documentation:
Species:
Iris x conglomerata, Iris cristata, Iris verna var. smalliana, and Iris sibirica all reported from New York but none currently reported as invasive in NY or elsewhere.

Total Possible 25

Section Two Total 19

3. ECOLOGICAL AMPLITUDE AND DISTRIBUTION

3.1. Density of stands in natural areas in the northeastern USA and eastern Canada (use same definition as Gleason & Cronquist which is: "The part of the United States covered extends from the Atlantic Ocean west to the western boundaries of Minnesota, Iowa, northern Missouri, and southern Illinois, south to the southern boundaries of Virginia, Kentucky, and Illinois, and south to the Missouri River in Missouri. In Canada the area covered includes Nova Scotia, Prince Edward Island, New Brunswick, and parts of Quebec and Ontario lying south of the 47th parallel of latitude")

A.	No large stands (no areas greater than 1/4 acre or 1000 square meters)	0
B.	Large dense stands present in areas with numerous invasive species already present or disturbed landscapes	2
C.	Large dense stands present in areas with few other invasive species present (i.e. ability to invade relatively pristine natural areas)	4
U.	Unknown	

Score 4

Documentation:
Identify reason for selection, or evidence of weedy history:
Large dense stands are usually present in disturbed areas with other invasive species in the NY metro area. However, in the Adirondacks yellow iris has rapidly invaded pristine areas with few/no other invasive species, and formed large stands (Bouquet River and Mt. Arab Lake; S. Flint 2008 pers comm).
Sources of information:
Cody, 1961; Dalton, 1983; Tu, 2003; Invasive Species Specialist Group 2005; author's (Moore's) personal observations; Steve Glenn's personal observations.

3.2. Number of habitats the species may invade

A.	Not known to invade any natural habitats given at A2.3	0
B.	Known to occur in two or more of the habitats given at A2.3, with at least one a natural habitat.	1
C.	Known to occur in three or more of the habitats given at A2.3, with at least two a natural habitat.	2
D.	Known to occur in four or more of the habitats given at A2.3, with at least three a natural habitat.	4
E.	Known to occur in more than four of the habitats given at A2.3, with at least four a natural habitat.	6
U.	Unknown	

Score 6

Documentation:
Identify type of habitats where it occurs and degree/type of impacts:
See A 2.3.
Sources of information:
Tu, 2003; Brooklyn Botanic Garden, 2008.

3.3. Role of disturbance in establishment

A.	Requires anthropogenic disturbances to establish.	0
B.	May occasionally establish in undisturbed areas but can readily establish in areas with natural or anthropogenic disturbances.	2
C.	Can establish independent of any known natural or anthropogenic disturbances.	4
U.	Unknown	

Score 4

Documentation:
Identify type of disturbance:
Generally found in areas with disturbance in NY metro area, but in the Adirondacks yellow iris rapidly invades undisturbed, pristine ares (e.g. Siamese Wilderness Area; S.Flint 2008 pers. comm.)
Sources of information:
Cody, 1961; Dalton, 1983; Tu, 2003; Gravuer, 2005; Invasive Species Specialist Group 2005; author's (Moore's) personal observations; Steve Glenn's personal observations.

3.4. Climate in native range

A.	Native range does not include climates similar to New York	0
B.	Native range possibly includes climates similar to at least part of New York.	1
C.	Native range includes climates similar to those in New York	3
U.	Unknown	

Score 3

Documentation:
Describe what part of the native range is similar in climate to New York:
Range in Europe and Asia with climates similar to NY.
Sources of information:
Gravuer, 2005; Brooklyn Botanic Garden, 2008.

3.5. Current introduced distribution in the northeastern USA and eastern Canada (see question 3.1 for definition of geographic scope)

A.	Not known from the northeastern US and adjacent Canada	0
B.	Present as a non-native in one northeastern USA state and/or eastern Canadian province.	1
C.	Present as a non-native in 2 or 3 northeastern USA states and/or eastern Canadian provinces.	2
D.	Present as a non-native in 4–8 northeastern USA states and/or eastern Canadian provinces, and/or categorized as a problem weed (e.g., “Noxious” or “Invasive”) in 1 northeastern state or eastern Canadian province.	3
E.	Present as a non-native in >8 northeastern USA states and/or eastern Canadian provinces. and/or categorized as a problem weed (e.g., “Noxious” or “Invasive”) in 2 northeastern states or eastern Canadian provinces.	4
U.	Unknown	

Score 4

Documentation:
Identify states and provinces invaded:
CT, DC, DE, IA, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, PA, RI, VA, VT, WI, WV; NB, NF, NS, ON, PE, QC.
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.
U.S.D.A., 2008.

3.6. Current introduced distribution of the species in natural areas in the eight New York State PRISMs (Partnerships for Regional Invasive Species Management)

A.	Present in none of the PRISMs	0
B.	Present in 1 PRISM	1
C.	Present in 2 PRISMs	2
D.	Present in 3 PRISMs	3
E.	Present in more than 3 PRISMs or on the Federal noxious weed lists	4

U. Unknown

Score 4

Documentation:
Describe distribution:
Present in all PRISMs
Sources of information:
Weldy & Werier, 2005; Brooklyn Botanic Garden, 2008.

Total Possible 25
Section Three Total 25

4. DIFFICULTY OF CONTROL

4.1. Seed banks

A. Seeds (or vegetative propagules) remain viable in soil for less than 1 year, or does not make viable seeds or persistent propagules. 0
B. Seeds (or vegetative propagules) remain viable in soil for at least 1 to 10 years 2
C. Seeds (or vegetative propagules) remain viable in soil for more than 10 years 3
U. Unknown

Score 2

Documentation:
Identify longevity of seed bank:
Evidence that seeds can germinate the season after ripening.
Sources of information:
Dymes, 1920; Sutherland, 1990; Peat & Fitter, 2005.

4.2. Vegetative regeneration

A. No regrowth following removal of aboveground growth 0
B. Regrowth from ground-level meristems 1
C. Regrowth from extensive underground system 2
D. Any plant part is a viable propagule 3
U. Unknown

Score 2

Documentation:
Describe vegetative response:
Extensive underground rhizome system.
Sources of information:
Tu, 2003; Gravuer, 2005.

4.3. Level of effort required

A. Management is not required: e.g., species does not persist without repeated anthropogenic disturbance. 0
B. Management is relatively easy and inexpensive: e.g. 10 or fewer person-hours of manual effort (pulling, cutting and/or digging) can eradicate a 1 acre infestation in 1 year (infestation averages 50% cover or 1 plant/100 ft^2). 2
C. Management requires a major short-term investment: e.g. 100 or fewer person-hours/year of manual effort, or up to 10 person-hours/year using mechanical equipment (chain saws, mowers, etc.) for 2-5 years to suppress a 1 acre infestation. Eradication is difficult, but possible (infestation as above). 3
D. Management requires a major investment: e.g. more than 100 person-hours/year of manual effort, or more than 10 person hours/year using mechanical equipment, or the use of herbicide, grazing animals, fire, etc. for more than 5 years to suppress a 1 acre infestation. 4

Eradication may be impossible (infestation as above).

U. Unknown

Score	4

Documentation:
Identify types of control methods and time-term required:
Mechanical methods useful for small populations where one can be sure that all of the underground tubers are removed (long-lived seed bank does not exist). However, complete removal by mechanical methods is not possible for larger infestations. Early season use of Rodeo has been shown to be effective (Russ McClain, pers. obs. in Tu, 2003). Stem injection is the most effective method in the Adirondacks, but the seasonal window for treatment is small, thus limiting the number and size of infestations that can be controlled. Note that some people are sensitive to the resinous substances found in the leaves.
Sources of information:
Jacono, 2001; Tu, 2003; S. Flint 2008 pers. comm.

Total Possible	10
Section Four Total	8
Total for 4 sections Possible	100
Total for 4 sections	76

C. STATUS OF CULTIVARS AND HYBRIDS:

At the present time (May 2008) there is no protocol or criteria for assessing the invasiveness of cultivars independent of the species to which they belong. Such a protocol is needed, and individuals with the appropriate expertise should address this issue in the future. Such a protocol will likely require data on cultivar fertility and identification in both experimental and natural settings.

Hybrids (crosses between different parent species) should be assessed individually and separately from the parent species wherever taxonomically possible, since their invasiveness may differ from that of the parent species. An exception should be made if the taxonomy of the species and hybrids are uncertain, and species and hybrids can not be clearly distinguished in the field. In such cases it is not feasible to distinguish species and hybrids, and they can only be assessed as a single unit.

Some cultivars of the species known to be available: ‘Alba,’ ‘Gigantea,’ ‘ Golden Fleece,’ ‘Holden Clough,’ ‘Mandschurica’

References for species assessment:

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