NEW YORK

NON-NATIVE PLANT INVASIVENESS RANKING FORM FOR NATURAL / MINIMALLY MANAGED AREAS

Scientific name:	Impatiens glandulifera Royle	USDA Plants Code: IMGL
Common names:	Ornamental jewelweed	
Native distribution:	Asia (Western Himalayas)	
Date assessed:	May 16, 2008; edited April 2009; Sept. 26, 2012; Nov.16, 2012; Jan.17, 2013	
Assessors:	Steve Glenn, Gerry Moore; edits by Marilyn Jordan and SRC	
Reviewers:	LIISMA SRC	
Date Approved:	15 April 2009; 26 Sept. 2012; 17 Jan. 2013 Form version date: 28 Nov. 2012	

New York Invasiveness Rank: Moderate (Relative Maximum Score 50.00-69.99)

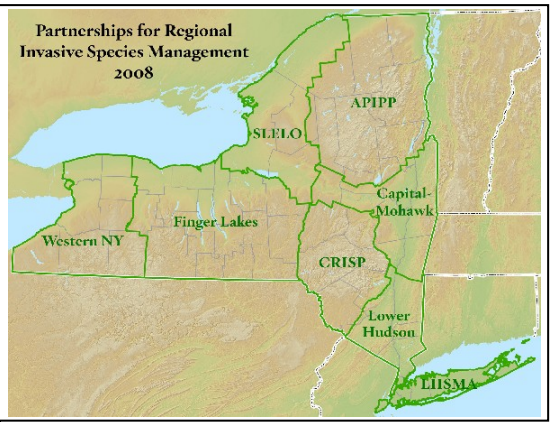
Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Not Present	Insignificant
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 (30)	13
2	Biological characteristic and dispersal ability	25 (25)	20
3	Ecological amplitude and distribution	25 (25)	21
4	Difficulty of control	10 (10)	6
	Outcome score	100 (90)[b]	60[a]
	Relative maximum score †		66.67
	New York Invasiveness Rank (for natural areas)§	Moderate (Relative Maximum Score 50.00-69.99)	

* 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
Not Assessable: not persistent in NY, or not found outside of cultivation.

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.

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: Present in seven counties in NYS by 2012 as shown in NYFA (Columbia, Essex, Jefferson, Lewis, Madison, Schuyler and Sullivan). The NYS Museum also has a 1992 collection from Greene County (S.Young pers. comm.) As of 2008 I. glandulifera was widespread along the Maine coast, with scattered populations in interior ME, VT and CT and Ontario, Quebec, and the Canadian Maritime Provinces.
Sources of information (e.g.: distribution models, literature, expert opinions):
Weldy & Werier, 2005; Brooklyn Botanic Garden, 200 8; Tabak and von Wettburg 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	Not Present
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation:
Sources of information:

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:

Documentation:
Sources of information:
Brooklyn Botanic Garden, 2008; Polly Weigand personal observations.

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 there are no reports of impacts and the 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 3

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
Studies on ecosystem processes in the U.S. have not been performed but in Europe it is considered one of the most invasive riparian plants and a "serious weed in wetlands woodlands and waste grounds" (Tabak&Wettburg 2008). Appears likely to reduce light levels based on density information from C. Beans, and to alter litter layer density in dense stands but data are lacking. May lead to increased riverbank erosion in Europe when it replaces perennial vegetation.
Sources of information:
Tomaino, 2004; Tabak and von Wettburg 2008; C. Beans pers.comm.

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 7

Documentation:
Identify type of impact or alteration:
In Europe it has been shown to form dense stands changing the density in the herb layer and preventing the development of shrub and tree layers. In New Brunswick, Canada It absolutely does create a new layer at a height where no other plants were before, although populations in NYS are less dense than those in Canada at the present time (C.Beans). More information should be obtained about impact on structure for the northeast.
Sources of information:
Beerling & Perrins, 1993; Perrnis et al., 1993; Tomaino, 2004; K. Verschoor , S. Flint, S. Young, C.Beans and D. Werier, pers obs.;N. Tabka

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 U

Documentation:
Identify type of impact or alteration:
Reported to form dense monospecific stands in other locations outside of its native range, displacing other species (both native and nonnative) (Hulm&Bremmner 2006); In the British Isles it forms dense infestations that support few native species and prevent the establishment of shrubs and trees (Weber 2003). SRC thinks the climate of the British Isles is more like that of the Pacific Northwest than of the Northeast US so behavior in the British Isles is not applicable to NYS although data from Europe may be applicable. "Although much of the study of Impatiens glandulifera has been outside the region of interest, it is presumed that it has similar characteristics in the region of interest" (Tomaino 2004). Recent European studies conclude that Impatiens glandulifera exerts negligible effects on the characteristics of invaded riparian communities and that many of the species negatively influenced by Impatiens are widespread ruderal species. However Tabak & Wettburg state that in Europe it is considered to be one of the most invasive riparian weeds. C. Beans is studying I. glandulifera in the Northeast in 2012 and believes it has the potential to eliminate low-growing vegetation, and that the dense litter layer would inhibit germination of other species. SRC members recall no other plants being present beneath I. glandlifera in Lewis Co. and that along the Chateaugay river in Clinton County I. glandulifera did not create an absolute monoculture or greatly hinder the growth of other vegetation. Tabak observed many monospecific stands in the northeast suggesting competitive exclusion of other species but data confirming impacts on native species are not sufficient to answer question 1.3.
Sources of information:
Essl & Hauser, 2003; Hejda & Pysek, 2006; Hulme & Bremner, 2006; Perrins et al., 1993; Tomaino 2004),Weber 2003; K. Verschoor , S. Flint, S. Young and D. Werier, personal observations; SRC (P. Weigand. B. Quirion).

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 3

Documentation:
Identify type of impact or alteration:
VEGETATIVE IMPACTS:
--In a greenhouse competition experiment I. glandulifera reduced the final height of I. capensis (compared with intraspecific effects of I. capensis) by 17.8% ($p>0.0001$) and reduced aboveground biomass by 41.6% ($P=0.01$).
-- When I. glandulifera was present, there was a significant positive correlation between the number of nodes produced and the number of fruits produced. When I. capensis was the competitor, this relationship was not as strong. (C.Beans unpub. data).
--N. Tabak (2005) found that in New England I. glandulifera has higher relative growth rates than I. capensis under a range of light and moisture conditions which may contribute to vegetative and reproductive impacts on I. capensis.

REPRODUCTIVE IMPACTS:
--The rich and abundant nectar of I. glandulifera attracts pollinators at the expense of co-occurring species in Europe (Chittka and Schurkens 2001). Pollinators choose I. glandulifera over the native Impatiens capensis 4 to 1 (Beans unpub. data).
-- In a field experiment Beans found no difference in seed production between I. capensis plants positioned with I. glandulifera and those positioned with other I. capensis plants. I. glandulifera did, however, alter natural selection on I. capensis corolla height, spur angle, and corolla spotting. It is surprising that no impact of I. glandulifera on seed production of I. capensis was found given results of other experiments and field observations:
-- In a hand pollination study Beans conducted in 2012 she found I. capensis stigmas pollinated with a mixture of pollen from I. capensis and I glandulifera resulted in 42.3% less seed than stigmas pollenated only with I. capensis pollen even though enough conspecific pollen was provided for fertilization of all ovules.
-- In a greenhouse experiment *I. glandulifera* reduced the average number of chasmogamous (cross-pollinating) flowers produced by *I. capensis* by nearly 50%. However these results were not statistically significant due to large variance (C.Beans unpub. data).
-- In natural populations I. capensis growing intermixed with *I.glandulifera* produced 22.2% fewer cross-pollinating) flowers than those growing without *I. glandulifera* ($p<0.0001$). This result means that when *I. glandulifera* is present there is a higher ratio of selfed to outcrossed seed produced by *I. capensis*, which could further reduce the potential for *I. capensis* to successfully compete with *I. glandulifera* (C.Beans unpub. data). In 2013 the competitive ability of selfed versus outcrossed seed will be tested in the greenhouse (C.Beans pers. comm.).

Sources of information:
Tomaino, 2004; Chittka and Schurkens 2001. C. Beans pers. comm. to M. Jordan .

Total Possible	30
Section One Total	13

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode and rate of reproduction

A.	No reproduction by seeds or vegetative propagules (i.e. plant sterile with no sexual or asexual reproduction). Such a species should be ranked "Not Assessable" as it will occur only in cultivated settings and cannot escape into natural/minimally managed areas. End the assessment here.	0
B.	Limited reproduction (fewer than 10 viable seeds per plant; if seed viability is not known, then maximum seed production is less than 100 seeds per plant) AND no reproduction by vegetative propagules (e.g. bulbils, turions, pieces of rhizomes, etc.) is documented as a natural (not spread by people) mode of dispersal across gaps by the species.	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 reproduction by vegetative propagules (e.g. bulbils, turions, pieces of rhizomes, etc.) is documented as a natural (not spread by people) mode of dispersal across gaps by the species. For aquatic species viable plant fragments may be treated as vegetative propagules.	2
D.	Significant reproduction by seeds (more than 100 viable seeds per plant; if viability is not known, then maximum seed production reported to be greater than 1000 seeds per plant) –OR abundant reproduction by vegetative propagules (e.g. bulbils, turions, pieces of rhizomes, etc.) is documented as a natural (not spread by people) mode of dispersal across gaps by the species. For aquatic species viable plant fragments may be treated as vegetative propagules.	4
U.	Unknown	

Score 4

Documentation:
Describe key reproductive characteristics (including seeds per plant):
One study found an upper level of 1700 seeds per plant under the most favorable growing conditions.
Sources of information:

Perrins et al., 1993.

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:
Seeds can be readily transported by water. One study in Great britain found a maximum rate of spread at 38 km. per year.
Sources of information:
Pysek & Prach, 1993; Wadsworth et al, 2000; Willis & Hulme. 2002.

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 2

Documentation:
Identify dispersal mechanisms:
Utlilized as a garden plant.
Sources of information:
Perrins, J. et al. 1993; Tomaino, 2004.

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 (annual); early synchronous germination; high growth rate; relative frost tolerance . Germination and phenology of I. glandulifera and native I. capensis are similar but I. glandulifera has a higher growth rates than I. capensis under a similar range of light and moisture conditions (Tabak 2005) which suggests that I.glandulifera has great potential to compete with native jewelweeds (Tabak pers. comm.).
Sources of information:
Beerling & Perrins. 1993; Grime 1979; Keonies & Glavac 1979;Perrins et al. 1993;Willis & Hulme 2004.

K. Verschoor personal observation.

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 2

Documentation:
Describe growth form:
Forms a dense new layer up to 3 m tall above shorter vegetation.
Sources of information:
Essl & Hauser. 2003; Hejda & Pysek 2006; Hulme & Bremner. 2006; Perrins et al. 1993

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:
Seeds which have undergone cold stratification can have a germination rate of 100% and are capable of high germination across a broader range of soil moisture than *I. capensis* seeds. Seeds can almost certainly germinate in vegetated areas based on Tabak's field observations but she did not want to risk germination experiments in the field. Though studies done under field conditions are lacking Tabak's observations support germination in the field under at least some conditions.
Sources of information:
Mumford, 1988; Tabak 2005; Tabak pers.comm. to M. Jordan.

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:
Weldy & Werier, 2005.

Total Possible 20
Section Two Total 25

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: "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 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	2

landscapes

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 0

Documentation:
Identify reason for selection, or evidence of weedy history:
Does form large stands in Great Britain but information for the Northeast is lacking. C.Beans has not seen stands >1/4 acre in NYS but N.Tabak is "…almost certain that some of the stands in the Northeast are >1/4 acre in disturbed areas. Often they are long, narrow strips (along roads or connecting through several back yards)." Can invade pristine stream banks (C.Beans) but all occurrences seen by Tabak are in disturbed areas (e.g. roadsides, yards) either monospecific I. glandulifera or with other species including invasives.
Sources of information:
Perrins et al., 1993. C.Beans and N.Tabak (pers. comm. to M. Jordan); K. Verschoor , S. Flint, S. Young and D. Werier, 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 A2.3.
Sources of information:
Beerling & Perrins, 1993; Pysek & Prach, 1993; Willis & Hulme, 2002.

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 2

Documentation:
Identify type of disturbance:
Most frequently invades moist habitats with moderate amount of disturbance.
Sources of information:
Beerling & Perrins, 1993; Pysek & Prach, 1993; Willis & Hulme, 2002; Perrins et al., 1993. K. Verschoor , S. Flint, S. Young and D. Werier, 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:

Temperate Asia
Sources of information:
Beerling & Perrins, 1993

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, MA, ME, MI, NY, VT; New Brunswick, Newfoundland, Nova Scotia, Ontario, Prince Edward Island, Quebec, Canada.
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:
See A1.2.
Sources of information:
Weldy & Werier, 2005.

Total Possible 25
Section Three Total 21

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:
One study found seeds can remain viable for at least 3 years. Other studies have found a more limited seed bank up to 18 months.
Sources of information:
Beerling & Perrins, 1993; Mumford, 1988; Perrins et al. 1993;Willis & Hulme, 2002.

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 0

Documentation:
Describe vegetative response:
Annual without regrowth.
Sources of information:
Beerling & Perrins. 1993.

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 may be 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. Eradication may be impossible (infestation as above). 4
U. Unknown

Score 4

Documentation:
Identify types of control methods and time-term required:
Herbicide; according to literature complete eradication requires several years; once I. glandulifera is removed, communities recover without any consequences for species diversity. However, a small infestation (100 plants) in a ditch in the Adirondacks received foliar spray of 2% AI Rodeo herbicide, and no plants were detected in 2008. Larger infestations might be more difficult to control, but herbicide may still be needed. However if seed bank lives only 18 months eradiction might be easiser.
Sources of information:
Beerling, D. J. & J. M. Perrins. 1993; Hejda, M. & Pysek, P. 2006; Wadsworth, R. A. et al. 2000; S. Flint personal communication.

Total Possible 10
Section Four Total 6

Total for 4 sections Possible 90
Total for 4 sections 60

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:

References for species assessment:

Beans, C. 2012. Ph.D. candidate, Dept. Biology, University of VA, Charlottesville, VA 22904. Pesonal communications with M. Jordan 2012.

Beerling, D. J. & J. M. Perrins. 1993. Impatiens glandulifera Royle (Impatiens roylei Walp.). Journal of Ecology 81: 367-382. (in part as reported by Tabak and Wetteburg 2008).

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