NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

Scientific name:	Glyceria maxima (Hartm.) Holb.	USDA Plants Code: GLMA3
Common names:	Tall glyceria, English watergrass, reed mannagrass	
Native distribution:	Eurasia	
Date assessed:	February 1, 2010	
Assessors:	Steve Glenn, Gerry Moore	
Reviewers:	LIISMA SRC	
Date Approved:	3 February 2010	Form version date: 10 July 2009

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

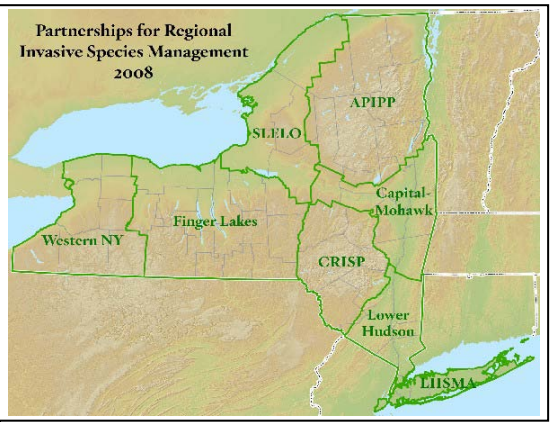
Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Unknown	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 (30)	24
2	Biological characteristic and dispersal ability	25 (22)	18
3	Ecological amplitude and distribution	25 (21)	16
4	Difficulty of control	10 (10)	8
	Outcome score	100 (83)[b]	66[a]
	Relative maximum score †		79.52
	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
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: Reported from Suffolk Co., NY (Weldy & Werier, 2010), however, they state that "due to taxonomic problems, all Glyceria grandis and Glyceria maxima specimens need to be verified. There are likely specimens of each misidentified." Furthermore, Barkworth & Anderton (2007) state that the non-native G. maxima is easily confused with large specimens of the native G. grandis due to small, subtle differences in flower structure.
There are no NY-NJ-CT specimens of either G. grandis or G. maxima at BKL for examination.
Sources of information:
Barkworth & Anderton, 2007; Weldy & Werier, 2010.

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: At present, Gyceria maxima is confirmed from only one site in the Northeast- Essex County, Massachusetts; this Massachusetts population appears to be under control (Mehrhoff et al., 2003; Davis, 2007). In North America, Glyceria maxima appears to mostly spread vegetatively (Mehrhoff et al., 2003; Barkworth & Anderton, 2007), and is not reported to be increasing in abundance within its current non-native range in the U.S. (Davis, 2007).
Sources of information (e.g.: distribution models, literature, expert opinions):
Mehrhoff et al., 2003; Barkworth & Anderton, 2007; Davis, 2007.

If the species does not occur and is not likely to occur in any of the PRISMs, then stop here as there is no need to assess the species. Rank is "Not Assessable."

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	Unknown
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation: No confirmed records of this species from NY. May be confused with the native G. grandis. Reported from Suffolk Co., NY (Weldy & Werier, 2010), however, they state that "due to taxonomic problems, all Glyceria grandis and Glyceria maxima specimens need to be verified. There are likely specimens of each misidentified." Furthermore, Barkworth & Anderton (2007) state that the non-native G. maxima is easily confused with large specimens of the native G. grandis due to small, subtle differences in flower structure.
There are no NY-NJ-CT specimens of either G. grandis or G. maxima at BKL for examination.
Sources of information:
Barkworth & Anderton, 2007; Brooklyn Botanic Garden, 2010; Weldy & Werier, 2010.

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:
Dore & McNeil, 1980; Mehrhoff et al., 2003; Davis, 2007.

B. INVASIVENESS RANKING

Questions apply to areas similar in climate and habitats to New York unless specified otherwise.

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 10

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
Davis (2007): "Glyceria maxima can form huge stands in wetlands (Martin 2000), therefore reducing open water. It can also convert fast-flowing aerobic streams into partially anaerobic swamps (Howard, 2007)." In Wisconsin, one stand was estimated to be at least 15 acres of monoculture.
Sources of information:
Anderson & Reznicek, 1994; Mehrhoff et al., 2003; Davis, 2007; Howard, 2007.

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:
Davis (2007): "Stems of Glyceria maxima can be 2.5 meters high (Martin 2000); in monocultures there would be little open area." In many cases this would result in a significant impact to the herb layer.
Sources of information:
Martin, 2000; Mehrhoff et al., 2003; Davis, 2007.

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:
Davis (2007): "Glyceria maxima affects all species in the areas it successfully invades but there is no evidence that it impacts particular natives greater than any other." Clearly the establishment of large monocultures would at least result in the significant reduction of native species in that community.
Sources of information:
Martin, 2000; Mehrhoff et al., 2003; Davis 2007

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 U

Documentation:
Identify type of impact or alteration:
Conversion of aerobic system into partially anaerobic swamps no doubt would have effects on numerous organisms especially the microflora. However, specific studies on this not known. No published evidence was found that indicates Glyceria maxima hybridizes with the closely related native G. grandis. However, this warrants further research.
Sources of information:
Authors' pers. comm.

Total Possible 24
Section One Total 30

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILLITY

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).	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 known, then maximum seed production reported to be greater than 1000 seeds per plant.)	4
U.	Unknown	

Score 4

Documentation:
Describe key reproductive characteristics (including seeds per plant):
Davis (2007): "Glyceria maxima produces large numbers of seeds which have varying levels of dormancy with the majority germinating immediately but some remaining dormant for several years; seedlings quickly generate an extensive mat of roots and rhizomes which can then break off and spread vegetative growth further (Tasmanian DPIW 2002). A single rootstock may cover 25 square meters in 3 years; trailing stems growing in water produce roots and lateral shoots abundantly (Weber 2003)." Barkworth & Anderton (2007) report that the species reproduces at some sites largely largely through vegetative means. Mehrhoff et al (2003) suggest that reproduction is primarily through vegetative means at the one occurrence in Mass.
Sources of information:
Tasmanian Department of Primary Industries and Water 2002; Mehrhoff et al., 2003; Barkworth & Anderton, 2007; Davis, 2007

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:
Davis (2007) reported that the seeds and rhizomes could be spread through water and in mud, thus making it quite capable of long distance dispersal.
Sources of information:
Tasmanian Department of Primary Industries and Water 2002; Davis, 2007.

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:
Davis (2007): "The seed and small sections of rhizomes of Glyceria maxima may be spread on water, in mud on machinery and vehicles, on footwear and on livestock (Tasmanian Department of Primary Industries and Water 2002) which makes it quite capable of long distance dispersal." Spread could occur through recreational activities (boating, fishermen). Some potential is lessened by the possible reducued amount of seed production and its occurrence wetland where human visitation and use of machinery is less likely. The plant also is occasionally sold for use in water gardens.
Sources of information:
Tasmanian Department of Primary Industries and Water 2002; Davis, 2007; authors' pers. comm.; SRC pers. comm .

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:
Perennial, some shade tolerance, fast growth.
Sources of information:
Weber, 2003; Davis, 2007.

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 very dense layer above shorter vegetation in marshes.
Sources of information:
Davis, 2007.

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 U

Documentation:
Describe germination requirements:
Davis (2007): "Glyceria maxima produces large numbers of seeds which have varying levels of dormancy with the majority germinating immediately but some remaining dormant for several years; seedlings quickly generate an extensive mat of roots and rhizomes which can then break off and spread vegetative growth further (Tasmanian DPIW 2002). A single rootstock may cover 25 square meters in 3 years; trailing stems growing in water produce roots and lateral shoots abundantly (Weber 2003)." Evidence, however, is lacking for the populations in North America.
Sources of information:
Tasmanian DPIW, 2002; Weber, 2003; Davis, 2007

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:
Glyceria declinata, G. fluitans, but neither is tracked as invasive in New York or elsewhere.
Brooklyn Botanic Garden, 2010; Weldy & Werier, 2010; U.S.D.A. NRCS, 2010.

Total Possible 22
Section Two Total 18

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 2

Documentation:
Identify reason for selection, or evidence of weedy history:
Anderson & Rezniceck (1994): "The Wenham population, within a high marsh system of the Great Wenham Swamp [Mass.], forms a near monoculture of about two-thirds an acre." Other invasives from this area include Iris pseudacorus, Rhamnus frangula, Lythrum salicaria. Freckman and Reed (1979) reported the site in Wisconsin to cover at least 15 acres
Sources of information:
Freckman & Reed, 1979; Anderson & Rezniceck, 1994; Mehrhoff, 2003; Davis, 2007; authors' pers. comm.

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 one natural habitat given at A2.3	1
C.	Known to occur in two natural habitats given at A2.3	2
D.	Known to occur in three natural habitat given at A2.3	4
E.	Known to occur in four or more natural habitats given at A2.3	6
U.	Unknown	

Score: 6

Documentation:
Identify type of habitats where it occurs and degree/type of impacts:
See A2.3.
Sources of information:
Dore & McNeill, 1980; Mehrhoff et al., 2003; Davis, 2007.

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:
Readily establishes in disturbed areas; not known to require anthropogenic disturbance to establish.
Sources of information:
Davis, 2007; authors' pers. comm.

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:
Europe and temperate Asia.
Sources of information:
Davis, 2007; Brooklyn Botanic Garden, 2010

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: 3

Documentation:
Identify states and provinces invaded:
MA, (NY?), WI; ON, QB.
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.
U.S.D.A. NRCS, 2010.

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: U

Documentation:
Describe distribution:
See A1.1.
Sources of information:
Brooklyn Botanic Garden, 2010; Weldy & Werier, 2010.

Total Possible: 21
Section Three Total: 16

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:
Davis (2007): "Glyceria maxima produces large numbers of seeds which have varying levels of dormancy with the majority germinating immediately but some remaining dormant for several years; seedlings quickly generate an extensive mat of roots and rhizomes which can then break off and spread vegetative growth further (Tasmanian DPIW 2002). A single rootstock may cover 25 square meters in 3 years; trailing stems growing in water produce roots and lateral shoots abundantly (Weber 2003)." Evidence lacking for viability lasting longer than 10 years.
Sources of information:
Tasmanian DPIW, 2002; Weber, 2003; Davis, 2007.

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 rhizome systems serve as viable propagules.
Sources of information:
Davis, 2007.

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

Score 4

Documentation:
Identify types of control methods and time-term required:
Davis (2007): "Glyceria maxima's extensive rhizome system can quickly re-establish a population making removal difficult; scattered plants can be dug out but all rhizomes must be removed; glyphosate applied when the plant is in full flower has been effective (Weber 2003; Tasmanian DPIW 2002). Because complete removal of rhizomes in water environments can be difficult and rhizomes can move into the site from adjacent sites via water, multi-year treatments of a site would likely be necessary. Removal of the species by removing rhizomes is likely to have a significant impact on the ecology of an area; use of glyphosate may create less impact if applied carefully only to the target species. Glyceria maxima is likely to invade water habitats which can be difficult to access." Presence in wetlands also creates regulatory issues relating to some control measures, such as using herbicide.
Sources of information:
Tasmanain DPIW, 2002; Weber, 2003; Davis, 2007.

Total Possible	10
Section Four Total	8
Total for 4 sections Possible	83
Total for 4 sections	66

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: 'variegata'

References for species assessment:

Anderson, J. E. and A. A. Reznicek. 1994. Glyceria maxima (Poaceae) in New England. Rhodora 96 (885): 97-101.

Barkworth, M. E. and L. K. Anderton. 2007. Glyceria. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 15+ vols. New York and Oxford. Vol. 24, pp. 68-88.

Brooklyn Botanic Garden. 2010. AILANTHUS database. [Accessed Feb. 1, 2010].

Davis, G. 2007. Glyceria maxima. U.S. Invasive Species Impact Rank (I-Rank). NatureServe Explorer <www.natureserve.org> [Accessed Feb. 1, 2010].

Dore, L. and J. McNeil. 1980. Grasses of Ontario. Research Branch, Agriculture Canada Monograph No. 26, Canadian Publishing Centre, Hull, Quebec, 572 pp.

Freckman, W.R. and D.M. Reed. 1979. Glyceria maxima: a new potentially troublesome weed. Bulletin Botanical Club of Wisconsin 11: 30-35.

Howard, V.M. 2007. Glyceria maxima. USGS Nonindigenous Aquatic Species Database, Gainesville, FL.

Martin, T. 2000. Weed Alert! Glyceria maxima (C. Hartm.) Holmb. (Reed sweetgrass). The Nature Conservancy Global Invasive Species Initiative. <tncweeds.ucdavis.edu/alert/alrtglyc.html>.

Mehrhoff, L. J., J. A. Silander, Jr., S. A. Leicht, E. S. Mosher and N. M. Tabak. 2003. IPANE: Invasive Plant Atlas of New England. Department of Ecology & Evolutionary Biology, University of Connecticut, Storrs, CT, USA. <www.ipane.org> [Accessed February 1, 2010].

Tasmanian Department of Primary Industries and Water. 2002. Glyceria, Reed Sweet Grass (Glyceria maxima - Poa aquatica [Hartm.] Holmb) Control Guide. <www.dpiw.tas.gov.au/inter.nsf/WebPages/RPIO-4ZV7D8?open> [Accessed Feb., 1, 2010.].

United States Department of Agriculture, National Resources Conservation Service. 2010. The PLANTS Database. National Plant Data Center, Baton Rouge, Louisiana. < http://plants.usda.gov/> [Accessed Feb. 1, 2010].

Weber, E. 2003. Invasive plant species of the world: a reference guide to environmental weeds. CABI Publishing, Cambridge, Massachusetts. 548 pp.

Weldy, T. and D. Werier. 2010. New York Flora Atlas. [S.M. Landry, K.N. Campbell, and L.D. Mabe (original application development), Florida Center for Community Design and Research. University of

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Citation: This NY ranking form may be cited as: Jordan, M.J., G. Moore and T.W. Weldy. 2008. Invasiveness ranking system for non-native plants of New York. Unpublished. The Nature Conservancy, Cold Spring Harbor, NY; Brooklyn Botanic Garden, Brooklyn, NY; The Nature Conservancy, Albany, NY. Note that the order of authorship is alphabetical; all three authors contributed substantially to the development of this protocol.

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