**New York Non-Native Plant Invasiveness Ranking Form**

Scientific name: *Najas minor* All.  
USDA Plants Code: NAMI

Common names: brittle water nymph

Native distribution: Eurasia; Africa?

Date assessed: 1 July 2008; edited August 13, 2009

Assessors: Steve Glenn

Reviewers: LIISMA SRC

Date Approved: 9 July 2008  
Form version date: 10 July 2009

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

### Distribution and Invasiveness Rank (Obtain from PRISM invasiveness ranking form)

<table>
<thead>
<tr>
<th>Status of this species in each PRISM:</th>
<th>Current Distribution</th>
<th>PRISM Invasiveness Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adirondack Park Invasive Program</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>2 Capital/Mohawk</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>3 Catskill Regional Invasive Species Partnership</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>4 Finger Lakes</td>
<td>Not Assessed</td>
<td>Low</td>
</tr>
<tr>
<td>5 Long Island Invasive Species Management Area</td>
<td>Restricted</td>
<td>Low</td>
</tr>
<tr>
<td>6 Lower Hudson</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>7 Saint Lawrence/Eastern Lake Ontario</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
<tr>
<td>8 Western New York</td>
<td>Not Assessed</td>
<td>Not Assessed</td>
</tr>
</tbody>
</table>

### Invasiveness Ranking Summary

<table>
<thead>
<tr>
<th>(see details under appropriate sub-section)</th>
<th>Total (Total Answered*) Possible</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ecological impact</td>
<td>40 (40)</td>
<td>12</td>
</tr>
<tr>
<td>2 Biological characteristic and dispersal ability</td>
<td>25 (19)</td>
<td>17</td>
</tr>
<tr>
<td>3 Ecological amplitude and distribution</td>
<td>25 (25)</td>
<td>17</td>
</tr>
<tr>
<td>4 Difficulty of control</td>
<td>10 (7)</td>
<td>7</td>
</tr>
<tr>
<td>Outcome score</td>
<td>100 (91)†</td>
<td>59^a</td>
</tr>
<tr>
<td>Relative maximum score †</td>
<td></td>
<td>64.84</td>
</tr>
<tr>
<td>New York Invasiveness Rank §</td>
<td></td>
<td>Moderate (Relative Maximum Score 50.00-69.99)</td>
</tr>
</tbody>
</table>

* 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) top**
  - 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
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
Moderately Likely Long Island Invasive Species Management Area
Not Assessed Lower Hudson
Not Assessed Saint Lawrence/Eastern Lake Ontario
Not Assessed Western New York

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)

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

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
- Salt/brackish waters
- Freshwater tidal
- Rivers/streams
- Natural lakes and ponds
- Vernal pools
- Reservoirs/impoundments*

Wetland Habitats
- Salt/brackish marshes
- Freshwater marshes
- Peatlands
- Shrub swamps
- Forested wetlands/riparian
- Ditches*
- Beaches and/or coastal dunes

Upland Habitats
- Cultivated*
- Grasslands/old fields
- Shrublands
- Forests/woodlands
- Alpine
- Roadsides*

Other potential or known suitable habitats within New York:
First reported in the United States from the Hudson River in 1934. (Mehrhoff et al., 2003).

Documentation:
Sources of information:
NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

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.

B. Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)

C. Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)

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)

U. Unknown

Score 7

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
This species can form thick, dense, monospecific mats and stands reducing light availability and can deplete oxygen levels. Sediment levels often increase with increasing abundance of this species.

Sources of information:

1.2. Impact on Natural Community Structure

A. No perceived impact; establishes in an existing layer without influencing its structure

B. Influences structure in one layer (e.g., changes the density of one layer)

C. Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer)

D. Major alteration of structure (e.g., covers canopy, eradicating most or all layers below)

U. Unknown

Score 3

Documentation:
Identify type of impact or alteration:
Can form thick, dense, monospecific mats and stands that can cover or clog a lake or stream. Although one study (Trebitz & Taylor, 2007) found Najas minor rarely dominant in Lake Erie and Lake Ontario. Has not yet caused major problems in New England (Mehrhoff et al. 2003), except perhaps Connecticut (NatureServe, 2008). NatureServe states that “... the true spread dynamics of this species are somewhat obscured by the difficulty of differentiating it from several similar Najas species (Les and Mehrhoff 1999, USACE 2002).”

Sources of information:

1.3. Impact on Natural Community Composition

A. No perceived impact; causes no apparent change in native populations

B. Influences community composition (e.g., reduces the number of individuals in one or more
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

Documentation:
Identify type of impact or alteration:
Decay of dense mats can deplete oxygen levels in the water, to the detriment of aquatic animals.
Sources of information:

Score 3

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). 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
**NEW YORK**

**NON-NATIVE PLANT INVASIVENESS RANKING FORM**

| Category                                                                 | Score | Documentation:                                                                                                                                                                                                 |
|-------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------------------------------------------------- reprint text here |
### New York

**Non-Native Plant Invasiveness Ranking Form**

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5. Growth vigor</td>
<td>A. Does not form thickets or have a climbing or smothering growth habit</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>U. Unknown</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Score</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

**Documentation:**
- **Evidence of competitive ability:**
  - Perennial habit. Shade tolerant. Also “It is apparently more tolerant of turbid and eutrophic conditions than native Najas species, providing it a competitive advantage at heavily modified sites.”
  - **Sources of information:**

| 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 growth form:**
  - Reported to form thick, dense, monospecific mats and stands.
  - **Sources of information:**
    - Author’s (Glenn’s) personal observations; Mehrhoff et al., 2003

| 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:**

<table>
<thead>
<tr>
<th>3. Ecological Amplitude and Distribution</th>
<th>Total Possible</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section Two Total</td>
<td></td>
<td>19</td>
</tr>
</tbody>
</table>

### 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...
# New York

## Non-Native Plant Invasiveness Ranking Form

### 1. Expandability

| 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 0 |

**Documentation:**
Identify reason for selection, or evidence of weedy history:
Reported to form thick, dense, monospecific mats and stands; but this not observed in the NY. One source (NatureServe. 2008) states- "probably only occasionally threatens high-quality communities, since the species appears to be at greatest advantage compared to natives in eutrophic and/or turbid conditions."

**Sources of information:**
Author's (Glenn's) personal observations; Mehrhoff et al., 2003; NatureServe, 2008

### 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 4 |

**Documentation:**
Identify type of habitats where it occurs and degree/type of impacts:
Rivers, ponds, reservoirs, marshes.

**Sources of information:**
NatureServe, 2008

### 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:
Apparently can inhabit sites with only moderate disturbance (i.e. significant disturbance not necessary for establishment) (IPAW 2003). No evidence that anthropogenic disturbance is required.

**Sources of information:**
NatureServe, 2008

### 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:**
New York
Non-Native Plant Invasiveness Ranking Form

Describe what part of the native range is similar in climate to New York:
Europe, Asia
Sources of information:
NatureServe, 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, DE, IL, IN, KY, MA, MI, NH, NJ, NY, OH, PA, VA, VT, WV; Ontario Canada
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.

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:
All Prisms except western NY.
Sources of information:
Brooklyn Botanic Garden, 2008; Weldy & Werier, 2005.

Total Possible 25
Section Three Total 17

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 |
NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

U. Unknown

Documentation:
Identify longevity of seed bank:
Data collected from reservoirs in the Tennessee River system have shown seed banks to be tens of millions of seed per hectare at productive sites; but longevity unknown.
Sources of information:
NatureServe, 2008

Score U

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 3

Documentation:
Describe vegetative response:
Stems can break into fragments capable of regenerating new plants.
Sources of information:

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 ft²). 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:
Harvesting (manual removal) of this species can greatly reduce biomass at a site, but can be challenging because the brittle plants fragment so easily (with fragments capable of dispersing and regenerating). Several herbicides have been used with success. Benthic barriers have also been used. The presence of a significant seed bank may require several years of follow-up. Follow-up may also be necessary if manual control methods are used, to check for fragments that escaped the initial treatment. Some invaded areas such as isolated ponds and sloughs may be difficult to reach.
Sources of information:
NatureServe, 2008

Total Possible 7
Section Four Total 7
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:


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.
Acknowledgments: The NY form incorporates components and approaches used in several other systems, cited in the references below. Valuable contributions by members of the Long Island Invasive Species Management Area’s Scientific Review Committee were incorporated in revisions of this form. Original members of the LIISMA SRC included representatives of the Brooklyn Botanic Garden; The Nature Conservancy; New York Natural Heritage Program, New York Sea Grant; New York State Office of Parks, Recreation and Historic Preservation; National Park Service; Brookhaven National Laboratory; New York State Department of Environmental Conservation Region 1; Cornell Cooperative Extension of Suffolk/Nassau Counties; Long Island Nursery and Landscape Association; Long Island Farm Bureau; SUNY Farmingdale Ornamental Horticulture Department; Queens College Biology Department; Long Island Botanical Society; Long Island Weed Information Management System database manager; Suffolk County Department of Parks, Recreation and Conservation; Nassau County Department of Parks, Recreation and Museums; Suffolk County Soil & Water Conservation District.

References for ranking form:


