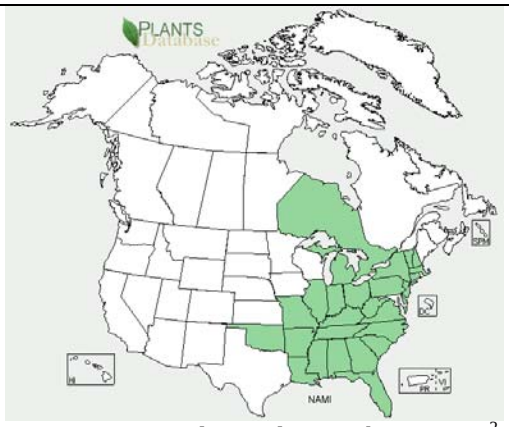
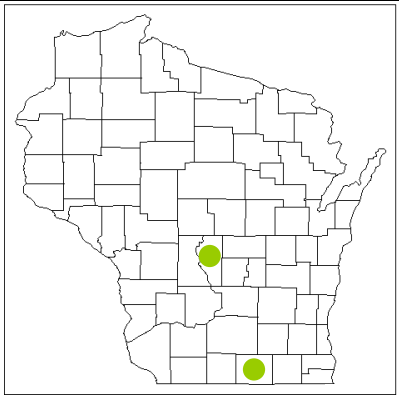
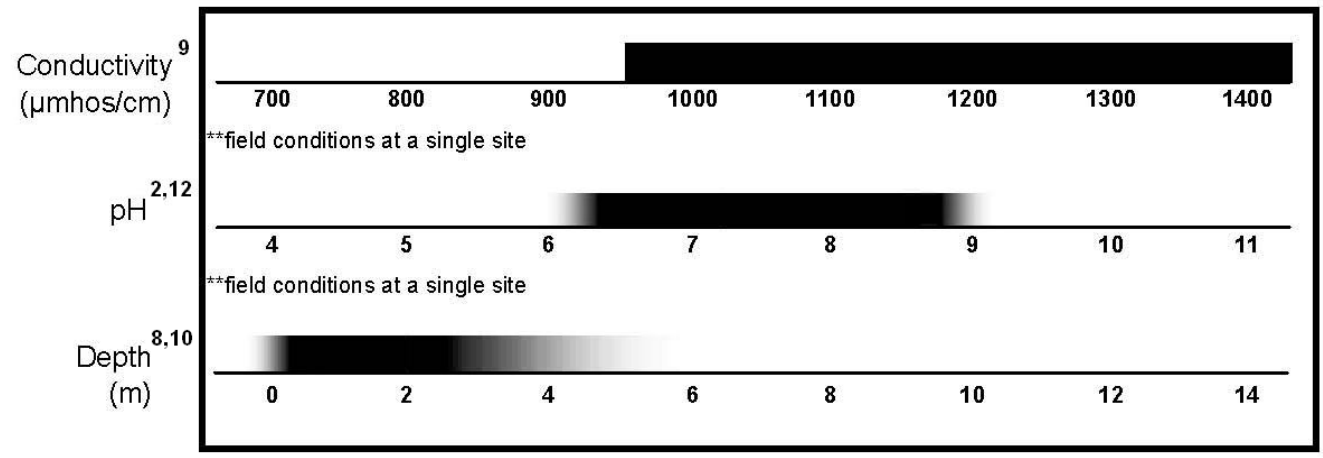
Aquatic Plant	Brittle/Lesser/Bushy/Slender/Spiny/Minor Naiad; Waternymph

I. Current Status and Distribution — *Najas minor*

a. Range	Global/Continental	Wisconsin
Native Range Europe, Asia, Turkey, Japan, India, Northern Africa[1]	 *Figure 1: U.S and Canada Distribution Map*[2]	 *Figure 2: WI Distribution Map*
Abundance/Range Widespread: Locally Abundant: Sparse:	 Eastern United States[3,4] Southeastern United States[5] Not often reported as a problem in the United States[5]	 Not widespread Rock Co., Adams Co. Unknown
Range Expansion Date Introduced: Rate of Spread:	 Hudson River, 1934[6,7] Slow in Massachusetts[6]; rapid in southeastern and mid-Atlantic states[5]	 First discovered in Rock Co., August 2007 Unknown
Density Risk of Monoculture: Facilitated By:	 Medium to high[2,7] Eutrophic conditions[3]	 Unknown Unknown
b. Habitat	Lakes, ponds, reservoirs, slow-moving streams, canals[7]	
Tolerance	Chart of tolerances: Increasingly dark color indicates increasingly optimal range[1,2,8,9]	



Preferences	More tolerant of turbidity and eutrophic conditions[6,7]; alkaline waters streams, ponds, and lakes[8]; reports of growth up to 5 meters deep[10]; sand or gravel substrate[10]

c. Regulation	
Noxious/Regulated[2]:	AL, CT, MA, ME, SC, WA
Minnesota Regulations:	*Prohibited*; One may not possess, import, purchase, propagate, or transport
Michigan Regulations:	*Not regulated*
Washington Regulations:	*Not regulated*
II. Establishment Potential and Life History Traits	
a. Life History	Submersed, aquatic, monoecious annual herb[6]
Fecundity	High[4]
Reproduction	Sexual; Asexual[7]
Importance of Seeds:	Primary means of reproduction; seed set is prolific[4,7]
Vegetative:	Yes; species fragments very easily; fragments may also carry seeds[5,7]
Hybridization	Undocumented
Overwintering	
Winter Tolerance:	Reported low winter tolerance; 8°C (47°F) minimum temperature[2]
Phenology:	Seed germination occurs in early spring[5]
b. Establishment	
Climate	
Weather:	Weather events may increase fragmentation
Wisconsin-Adapted:	Likely; healthy overwintering populations found in south-central Wisconsin
Climate Change:	Likely to facilitate distribution and growth
Taxonomic Similarity	
Wisconsin Natives:	High; genus *Najas*
Other US Exotics:	High; genus *Najas*
Competition	
Natural Predators:	Waterfowl[6]
Natural Pathogens:	Undocumented
Competitive Strategy:	Prolific seed set (tens of millions of seeds/ha in productive sites); spread by fragmentation[7]
Known Interactions:	Replaces native *Najas* spp.[7]; effective competition with Hydrilla in North Carolina[11]; may replace Hydrilla following management actions[5]
Reproduction	
Rate of Spread:	Medium to high[2,7]
Adaptive Strategies:	Readily fragments; prolific seed production, seeds easily transported[4,6,7]
Timeframe	Undocumented
c. Dispersal	
Intentional:	Planting for waterfowl food was highly encouraged in the 1930s[6]
Unintentional:	Wind and water currents[7]; waterfowl-mediated dispersal[6]; aquarium disposal[6]; international shipping[6]; boats and trailers[8]
Propagule Pressure:	High; seeds spread easily, plant becomes brittle and readily fragments in fall[7]


Figure 3: Courtesy of Stratford Kay and Steve Hoyle, North Carolina State University[5]
Figure 4: Courtesy of US Army Corps of Engineers, ERDC[7]

III. Damage Potential	
a. Ecosystem Impacts	
Composition	Replaces native *Najas* spp.[7]; monocultures exclude native plants and produce conditions adverse to fish and waterfowl[5]
Structure	Can form dense shoals and surface mats in water up to 12 feet deep[5]
Function	Undocumented
Allelopathic Effects	Undocumented
Keystone Species	Undocumented
Ecosystem Engineer	Undocumented
Sustainability	Undocumented
Biodiversity	Undocumented
Biotic Effects	Undocumented
Abiotic Effects	Undocumented
Benefits	Important waterfowl food[6]; may provide habitat for fish and aquatic invertebrates
b. Socio-Economic Effects	
Benefits Caveats	Preferred waterfowl food[6] Risk of release and population expansion outweighs benefits of use
Impacts of Restriction	Increase in monitoring, education, and research costs
Negatives	Dense monocultures hinder swimming, fishing, boating, recreation[7,8]; reduced discharge capacity of channels[12]
Expectations	More negative impacts can be expected in nutrient enriched, low-energy systems
Cost of Impacts	Decreased recreational and aesthetic value; decline in ecological integrity; increased research expenses
"Eradication" Cost	Undocumented
IV. Control and Prevention	
a. Detection	
Crypsis: Benefits of Early Response:	High; confused with other *Najas* spp.; seeds are beneficial in identification[2,7,8] Undocumented

b. Control	
Management Goal 1	Nuisance relief
Tool:	Small-scale chemical treatments: endothall dipotassium, endothall monopotassium
Caveat:	Non-target plant species are negatively impacted
Cost:	Undocumented
Efficacy, Time Frame:	Undocumented

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[7] Army Corps Engineer Research and Development Center Aquatic Plant Information System. Retrieved December 28, 2010 from: http://el.erdc.usace.army.mil/aqua/apis/PlantInfo/plantinfo.aspx?plantid=36

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