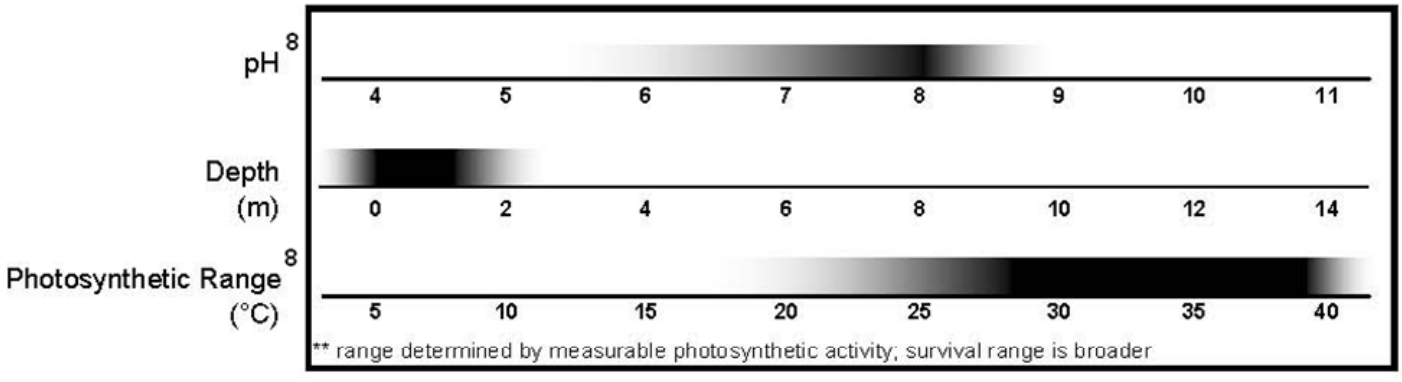
Aquatic Plant	Water Spinach; Swamp Morning-Glory

I. Current Status and Distribution — *Ipomoea aquatica*

a. Range	Global/Continental	Wisconsin
Native Range Old World tropics[1], central to south China[3,4]	 *Figure 1: U.S and Canada Distribution Map*[2]	Not recorded in Wisconsin
Abundance/Range		
Widespread:	Philippines, Florida[3]	Not applicable
Locally Abundant:	California; canals and ditches[4]	Not applicable
Sparse:	Undocumented	Not applicable
Range Expansion		
Date Introduced:	Introduced repeatedly in Florida since 1979[4]	Not applicable
Rate of Spread:	Very rapid; growth rate of 4 inches per day[5]; 84 tons/acre fresh weight biomass in 9 months[3,4]	Not applicable
Density		
Risk of Monoculture:	High	Unknown
Facilitated By:	Ability to outcompete native plants	Unknown
b. Habitat	Canals, ditches, marshes, wetlands, ponds, lakes, muddy streambanks[3]; rice and sugar cane fields[5]	
Tolerance	Chart of tolerances: Increasingly dark color indicates increasingly optimal range	



Preferences	Moist soil, still to flowing waters[3,7]; clay-loam and loam soils[6], warm, wet climate[8]

c. Regulation	
Noxious/Regulated[2]:	Federal Noxious Weed List; AL, AZ, AR, CA, FL, MA, NC, OR, SC, TX, VT
Minnesota Regulations:	*Regulated*; One may not introduce without a permit
Michigan Regulations:	*Not regulated*
Washington Regulations:	*Not regulated*
II. Establishment Potential and Life History Traits	
a. Life History	Creeping herbaceous vine[4]; aquatic or terrestrial[7]; perennial (occasionally annual)[1,8]
Fecundity	High
Reproduction	Sexual; Asexual[8]
Importance of Seeds:	Important; 175-245 floating seeds/plant[4]; seeds do not germinate well under water[8]
Vegetative:	Most important; may root at every node, producing new plants when fragmented[4]
Hybridization	Undocumented; wild and cultivated biotypes occur in Florida[8]
Overwintering	
Winter Tolerance:	Low; susceptible to frosts and does not grow well below 23.9°C (75°F)[3]
Phenology:	Produces flowers in the warm months[4]
b. Establishment	
Climate	
Weather:	Tropical to subtropical[3]; warm, humid conditions[9]
Wisconsin-Adapted:	Unlikely; susceptible to frost and temperatures below 24°C[(3)]
Climate Change:	Warmer climate may facilitate growth and distribution[6]
Taxonomic Similarity	
Wisconsin Natives:	Low/Medium; (family Convolvulaceae, genus *Calystegia*)
Other US Exotics:	High; many other species in genus *Ipomoea* are considered noxious
Competition	
Natural Predators:	*Meloidogyne incognita* (root-knot nematode)[10]
Natural Pathogens:	*Phyllosticta ipomoeae*, *Cercospora ipomoeae*, and *Pseudomonas syringae* pv. *syringae*[11]; *Albugo ipomoeae-aquaticae* (white rust)[12]
Competitive Strategy:	Rapid growth rate, shades out native vegetation
Known Interactions:	Competes with native emergents[3]; displaced *Pistia*, *Azolla*, and *Utricularia* (due to shading)[8]
Reproduction	
Rate of Spread:	High
Adaptive Strategies:	Able to spread from floating seed, plant fragment, or whole plant[8]
Timeframe	84 tons/acre fresh weight biomass in 9 months[4]
c. Dispersal	
Intentional:	Introduced for culinary and medicinal purposes[3]
Unintentional:	Water currents[13], animals and humans[8]
Propagule Pressure:	Medium; fragments easily accidentally introduced; but no source population near Wisconsin

Figure 2: Courtesy of Florida Exotic Pest Plant Council[4]
Figure 3: Courtesy of John Rodgers; University of Florida[14]

III. Damage Potential	
a. Ecosystem Impacts	
Composition	Dense mats shade out native submersed plants[3]; displaces native plants that are important for fish and wildlife[3]; dense canopies create ideal breeding environments for mosquitos[13]
Structure	Forms dense mats of intertwined stems over the surface of the water[3]; alters native plant and fish communities[9]
Function	Decreased light penetration and dissolved oxygen[9]
Allelopathic Effects	Undocumented
Keystone Species	Undocumented
Ecosystem Engineer	Yes; dense canopy decreases light penetration[9]
Sustainability	Undocumented
Biodiversity	Decreases
Biotic Effects	Impacts native species at multiple trophic levels
Abiotic Effects	Decreases light penetration; reduces dissolved oxygen[9]
Benefits	Undocumented
b. Socio-Economic Effects	
Benefits Caveats	Cultivated for culinary and medicinal use[3]; livestock fodder[7,8]; removal of nitrogen and phosphorous from eutrophic water bodies[15] Risk of release and population expansion outweighs benefits of use
Impacts of Restriction	Increase in monitoring, education, and research costs
Negatives	Tangled mats obstruct water flow in drainage and flood canals[3]; dense canopies create ideal breeding environments for mosquitos[13]; a major weed of rice and other crops in 60 countries[7]; interferes with fisheries and inhibits boat passage[7]
Expectations	More negative impacts can be expected in warm, humid systems
Cost of Impacts	Decreased recreational and aesthetic value; decline in ecological integrity; increased research expenses
"Eradication" Cost	Expensive
IV. Control and Prevention	
a. Detection	
Crypsis: Benefits of Early Response:	Medium; other *Ipomoea* spp. and creeping herbaceous vines High

b. Control	
Management Goal 1	Eradication
Tool:	Chemical herbicide[3]
Caveat:	Herbicides are non-specific and non-target plant species are negatively impacted
Cost:	Expensive; likely requires multi-year treatment scheme[16]
Efficacy, Time Frame:	Temporary results, limited efficacy

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[13] Fears, N.A. Aquatic Exotics on the Move - Water Spinach. Retrieved December 23, 2010 from: http://www.iisgcp.org/EXOTICSP/waterspinach.htm

[14] Rodgers, J. University of Florida. Retrieved December 23, 2010 from: http://plants.ifas.ufl.edu/ipaqpic.html

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