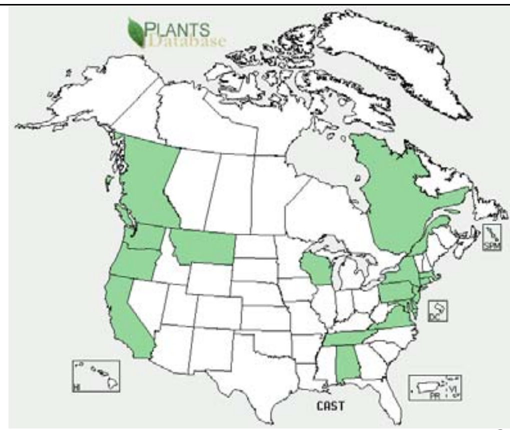
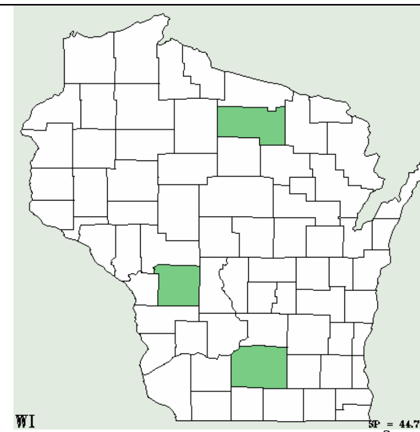
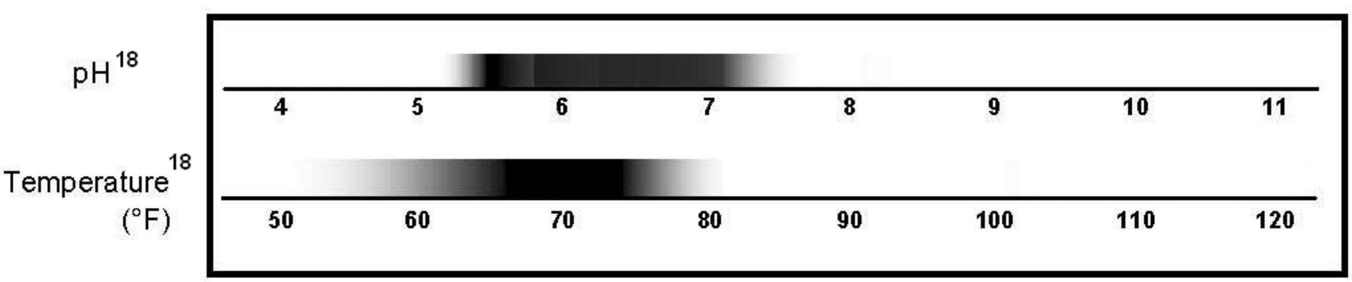
I. Current Status and Distribution *Callitriche stagnalis*

a. Range	Global/Continental	Wisconsin
Native Range Europe, Northern Africa, Asia[1]	 *Figure 1: U.S and Canada Distribution Map*[2]	 *Figure 2: WI Distribution Map*[3]
Abundance/Range		
Widespread:	Northwest U.S. and parts of New England	No populations reported as widespread
Locally Abundant:	Shallow, slow waters[4]	Undocumented
Sparse:	Less adapted to deep, fast flowing water[4]	Undocumented
Range Expansion		
Date Introduced:	New York coast, 1861[5]	First recorded in a swamp south of Rhinelander, 1925[3]
Rate of Spread:	Relatively slow; higher in Pacific Northwest[6]	Concentrated around points of introduction; spread is limited (no effective seed disperser)[6]
Density		
Risk of Monoculture:	Not usually thought of as weedy, but capable of dense clonal growth[6]	Appears to be low
Facilitated By:	Undocumented	Undocumented

b. Habitat	Habitat generalist[7]: static to flowing waters of lakes, ponds, reservoirs, streams, wetlands, mudflats, ditches, canals; shallow water and margins of waterbodies[8]
Tolerance	Chart of tolerances: Increasingly dark color indicates increasingly optimal range



Preferences	Disturbed systems (cutting/dredging)[9]; indicator of high phosphorus[10]; sensitive to turbidity, eutrophication, and pollution[11]; soft water[18]

c. Regulation	
Noxious/Regulated[2]:	CT
Minnesota Regulations:	*Not regulated*
Michigan Regulations:	*Not regulated*
Washington Regulations:	*Not regulated*
II. Establishment Potential and Life History Traits	
a. Life History	Submersed to amphibious aquatic monoecious herb[4]; annual[3,6]; perennial[2,4]
Fecundity	Can be high (self-pollinator)[4]
Reproduction	Sexual[12]; Asexual[6]
Importance of Seeds:	Primary unit of dispersal[5]; fruits only in quiet waters or mudflats[4,6]
Vegetative:	Clonally spread by fragmentation[4]
Hybridization	Hybridizes with *C. platycarpa* (believed to be short-lived)[13], and *C. cophocarpa*[14]
Overwintering	
Winter Tolerance:	High[6]
Phenology:	Flowering period from April to November in North America[5]
b. Establishment	
Climate	
Weather:	Undocumented
Wisconsin-Adapted:	Yes
Climate Change:	Undocumented
Taxonomic Similarity	
Wisconsin Natives:	High[8]; five native *Callitriche* spp. recorded in Wisconsin[2,3]
Other US Exotics:	Low
Competition	
Natural Predators:	Ducks eat seeds and foliage[8]; contains catalpol and aucubin (unpalatable iridoid glucosides which are herbivore-deterrent)[15]
Natural Pathogens:	Undocumented
Competitive Strategy:	Disturbance and stress tolerant[9]
Known Interactions:	Outcompeted *Potamogeton crispus* in non-stressed, undisturbed experimental conditions[9]
Reproduction	
Rate of Spread:	Low; distribution concentrated around points of introduction; lack of seed dispersal vector[6]
Adaptive Strategies:	Vegetative spread; disturbance-tolerant
Timeframe	Undocumented
c. Dispersal	
Intentional:	Listed as good oxygenator for ponds
Unintentional:	Ballast and aquarium disposal; seed transport in mud attached to motor vehicles[6]; birds[4]
Propagule Pressure:	May be high as plant is recommended for use in aquarium trade

Figure 3: Courtesy of Clayton Antieau, Washington State Department of Ecology[16]
Figure 4: Courtesy of Leslie J. Mehrhoff, University of Connecticut, Bugwood.org[17]

III. Damage Potential

a. Ecosystem Impacts	
Composition	Invertebrate abundance and diversity increases relative to unvegetated areas (in riffle sections of a Scottish river)[19]; dense clonal growth less common, but can impact native species[6]
Structure	Undocumented
Function	Undocumented
Allelopathic Effects	Contains catalpol and aucubin (unpalatable iridoid glucosides which are herbivore-deterrent)[15]
Keystone Species	Undocumented
Ecosystem Engineer	Undocumented
Sustainability	Undocumented
Biodiversity	Increases in certain cases, may decrease in others[6,19]
Biotic Effects	Can impact native species[6]
Abiotic Effects	Undocumented
Benefits	May provide some cover for young fish and aquatic insects[8,19]
b. Socio-Economic Effects	
Benefits Caveats	Pond oxygenator (recommended by aquarium trade) Risk of release and population expansion outweighs benefits of use
Impacts of Restriction	Increase in monitoring, education, and research costs
Negatives	Dense growth may inhibit recreation
Expectations	Seems to have mild and localized effects when compared to other highly invasive species
Cost of Impacts	Decreased recreational and aesthetic value; decline in ecological integrity; increased research and management expenses
"Eradication" Cost	Undocumented

IV. Control and Prevention

a. Detection	
Crypsis:	Very high; confused with native *Callitriche* spp., need fruits to distinguish; may also be confused with *Elatine* spp.[8]
Benefits of Early Response:	Undocumented

b. Control	
Management Goal 1	Nuisance relief
Tool:	Diquat, paraquat, chlorinated aromatics[20], mechanical removal
Caveat:	Harvesting causes fragmentation which increases distribution and density; non-target species may be negatively impacted
Cost:	Undocumented
Efficacy, Time Frame:	Undocumented
Tool:	Grass carp (*Ctenopharyngodon idella*)[21,22]
Caveat:	Non-selective grazers; stocking is illegal due to occasional fertility
Cost:	Unknown
Efficacy, Time Frame:	Reduced standing crop of *C. stagnalis*[21], but not preferred food choice[22]

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