

Aquatic Plant

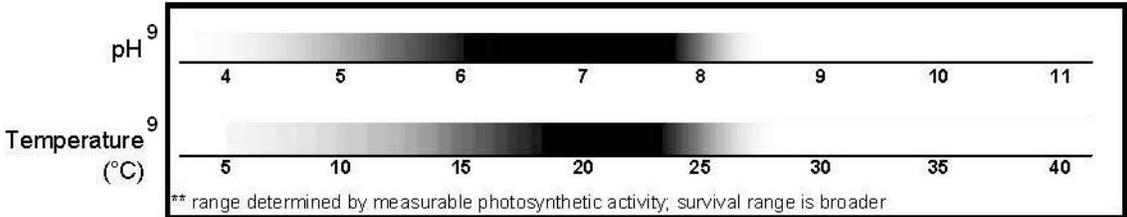
Watercress

**I. Current Status and Distribution**

*Nasturtium officinale*  
(formerly *Rorippa nasturtium-aquaticum*)

a. Range	Global/Continental	Wisconsin
<b>Native Range</b> Western Asia, India, Europe, Africa <sup>1</sup>	 <p>Figure 1: U.S and Canada Distribution Map<sup>2</sup></p>	 <p>Figure 2: WI Distribution Map<sup>3</sup></p>
<b>Abundance/Range</b> Widespread:  Locally Abundant: Sparse:	Moderately invasive in northeastern United States <sup>4</sup> Nutrient rich, flowing waters Undocumented	Karst springs in driftless area <sup>5</sup> Logan Creek spring, Door Co. <sup>6</sup> Undocumented
<b>Range Expansion</b> Date Introduced: Rate of Spread:	1831, United States <sup>7</sup> Shallow ponds can rapidly become covered <sup>4</sup>	Herbarium record from 1877 <sup>3</sup> Undocumented
<b>Density</b> Risk of Monoculture:  Facilitated By:	Can be high  Disturbance	Can be very thick and block stream flow Indicative of groundwater flow <sup>8</sup>

<b>b. Habitat</b>	Gently flowing water in lakes, reservoirs, streams, rivers; damp soil <sup>9</sup>
<b>Tolerance</b>	Chart of tolerances: Increasingly dark color indicates increasingly optimal range



<b>Preferences</b>	Cool, wet conditions with ample sunlight <sup>10</sup> ; less tolerant of stagnant or very fast moving water <sup>5</sup>
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<b>c. Regulation</b>	
Noxious/Regulated <sup>2</sup> :	CT
Minnesota Regulations:	<i>Not regulated</i>
Michigan Regulations:	<i>Not regulated</i>
Washington Regulations:	<i>Not regulated</i>

**II. Establishment Potential and Life History Traits**

<b>a. Life History</b>	Aquatic perennial herb <sup>11</sup>
<b>Fecundity</b>	Undocumented
<b>Reproduction</b>	Sexual; Asexual
Importance of Seeds:	Undocumented
Vegetative:	Likely most important <sup>5</sup> ; fragments form roots at nodes <sup>10</sup>
<b>Hybridization</b>	Hybridizes with <i>Nasturtium microphyllum</i> Boenn. Ex Rchb. <sup>3</sup>
<b>Overwintering</b>	
Winter Tolerance:	High <sup>5</sup>
Phenology:	Grows throughout winter, continually occupying surface space in southwestern Wisconsin <sup>5</sup> ; most abundant in summer and autumn <sup>12</sup>

**b. Establishment**

<b>Climate</b>	
Weather:	Undocumented
Wisconsin-Adapted:	Yes
Climate Change:	Likely to facilitate growth and distribution
<b>Taxonomic Similarity</b>	
Wisconsin Natives:	Medium; family Brassicaceae <sup>3</sup>
Other US Exotics:	High; <i>Nasturtium microphyllum</i> (limited distribution) <sup>3</sup>
<b>Competition</b>	
Natural Predators:	Many invertebrates, mammals
Natural Pathogens:	<i>Spongospora subterranea</i> (crook root fungus); yellow spot virus <sup>13</sup>
Competitive Strategy:	Fragmentation
Known Interactions:	Not reported to outcompete natives
<b>Reproduction</b>	
Rate of Spread:	Undocumented
Adaptive Strategies:	Fragments disperse in flowing water
<b>Timeframe</b>	Undocumented

**c. Dispersal**

Intentional:	Green industry, cultivation
Unintentional:	Wind, water, animals, humans
Propagule Pressure:	High; fragments easily introduced



Figures 3 and 4: Courtesy of Kenneth J. Sytsma; University of Wisconsin, *Wisflora*<sup>14</sup>

<b>III. Damage Potential</b>	
<b>a. Ecosystem Impacts</b>	
<b>Composition</b>	Little impact on natural communities <sup>10</sup> ; not considered a management concern in the northeastern United States <sup>10</sup>
<b>Structure</b>	In arid regions of western states, species can become weedy and alter function and flow in shallow mountain streams <sup>15</sup>
<b>Function</b>	Reported to block water flow in springs in south central Wisconsin <sup>8</sup>
<b>Allelopathic Effects</b>	Yes; herbivory deterrent <sup>16</sup>
<b>Keystone Species</b>	Undocumented
<b>Ecosystem Engineer</b>	Undocumented
<b>Sustainability</b>	Undocumented
<b>Biodiversity</b>	Undocumented
<b>Biotic Effects</b>	Undocumented
<b>Abiotic Effects</b>	Undocumented
<b>Benefits</b>	Undocumented
<b>b. Socio-Economic Effects</b>	
<b>Benefits</b>	Edible green used in salads, cooking <sup>17</sup> ; homeopathic properties <sup>18</sup> ; wastewater treatment <sup>19</sup> ; rich source of potential anticarcinogen <sup>11</sup>
Caveats	Inconclusive evidence regarding anticarcinogenic qualities; risk of release and population expansion outweighs benefits of use
<b>Impacts of Restriction</b>	Increase in monitoring, education, and research costs
<b>Negatives</b>	Extracts can attract schistosomiasis host <i>Biomphalaria glabrata</i> (snail) <sup>20</sup>
<b>Expectations</b>	More negative impacts in western, arid, small stream systems <sup>15</sup>
<b>Cost of Impacts</b>	Undocumented
<b>“Eradication” Cost</b>	Undocumented
<b>IV. Control and Prevention</b>	
<b>a. Detection</b>	
Crypsis:	Medium; <i>Armoracia lacustris</i> and <i>Nasturtium microphyllum</i> <sup>3,12</sup>
Benefits of Early Response:	Undocumented
<b>b. Control</b>	
<b>Management Goal 1</b>	Nuisance relief
Tool:	Chemical (glyphosate) <sup>21</sup>
Caveat:	Non-target plant species are negatively impacted
Cost:	Depends on size of population
Efficacy, Time Frame:	Herbicide use ineffective in flowing water where species often thrives <sup>8</sup>
Tool:	Hand pulling
Caveat:	Labor intensive
Cost:	Undocumented
Efficacy, Time Frame:	Relatively easy to control with hand pulling <sup>22</sup>

<sup>1</sup> United States Department of Agriculture Germplasm Resources Information Network. 2008. Taxon: *Nasturtium officinale* W. T. Aiton Retrieved December 28, 2010 from: <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?25072>

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- <sup>2</sup> United States Department of Agriculture, Natural Resources Conservation Service. 2010. The PLANTS Database. National Plant Data Center, Baton Rouge, LA, USA. Retrieved December 28, 2010 from: <http://plants.usda.gov/java/profile?symbol=NAOF>
- <sup>3</sup> University of Wisconsin – Madison. 2005. Family - Brassicaceae. Wisconsin Botanical Information System Wisflora. Retrieved November 24, 2010 from: <http://wisplants.uwsp.edu/scripts/SearchResults.asp?Genus=Nasturtium>
- <sup>4</sup> United States Department of Agriculture Forest Service. Eastern Region invasive plants, ranked by degree of invasiveness as based on information from States. Retrieved December 28, 2010 from: <http://www.fs.fed.us/r9/wildlife/range/weed/Sec3B.htm>
- <sup>5</sup> Tenorio, R.C. and T.D. Drezner. 2006. Native and invasive vegetation of karst springs in Wisconsin's Driftless area. *Hydrobiologia* 568(1):499-505.
- <sup>6</sup> Gansberg, M. 2007. Personal communication.
- <sup>7</sup> Cao, L. 2008. *Nasturtium officinale*. United States Geological Survey Nonindigenous Aquatic Species Database, Gainesville, FL. Retrieved December 28, 2010 from: <http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=229>
- <sup>8</sup> Graham, S. 2007. Personal communication.
- <sup>9</sup> Simon, J.E., A.F. Chadwick and L.E. Craker. 1984. Herbs: An Indexed Bibliography. 1971-1980. The Scientific Literature on Selected Herbs, and Aromatic and Medicinal Plants of the Temperate Zone. Archon Books, 770 pp., Hamden, CT. Retrieved December 28, 2010 from: <http://www.hort.purdue.edu/newcrop/med-aro/factsheets/WATERCRESS.html>
- <sup>10</sup> Schippers, R.R. 2004. *Nasturtium officinale* R.Br. Record from Protabase. Grubben, G.J.H. and O.A. Denton (eds). PROTA (Plant Resources of Tropical Africa/ Resources vegetales de l'Afrique tropicale), Wageningen, Netherlands Retrieved December 28, 2010 from: <http://database.prota.org/search.htm>
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- <sup>13</sup> Walsh, J.A. and K. Phelps. 1991. Development and evaluation of a technique for screening watercress (*Rorippa nasturtium-aquaticum*) for resistance to watercress yellow spot virus and crook-root fungus (*Spongospora subterranea* f. sp. *nasturtii*). *Plant Pathology* 40(2):212-220.
- <sup>14</sup> Sytsma, K.J. Wisflora. Retrieved December 28, 2010 from: <http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=NASOFF>
- <sup>15</sup> Benson, A.J., C.C. Jacono, P.L. Fuller, E.R. McKercher, and M.M. Richerson. 2004. Summary Report of Nonindigenous Aquatic Species in U.S. Fish and Wildlife Service Region 5. US Geological Survey, Gainesville, FL. Retrieved December 28, 2010 from: <http://cars.er.usgs.gov/R5finalreport.pdf>
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