

# Part IV. Plant Assessment Form

For use with “Criteria for Categorizing Invasive Non-Native Plants that Threaten Colorado’s Wildlands and Agriculture”

By the Colorado Noxious Weed Advisory Committee

Electronic version: December 4, 2008

**Table 1. Species and Evaluator Information**

<b>Species name (Latin binomial):</b>	<b><i>Pistia stratiotes L.</i></b>
<b>Synonyms:</b>	N/A
<b>Common names:</b>	water lettuce, pistie, tropical duckweed
<b>Evaluation date (mm/dd/yy):</b>	4/8/2010
<b>Evaluator #1 Name/Title:</b>	Joseph Vassios, Graduate Research Assistant
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<b>Evaluator #2 Name/Title:</b>	Scott Nissen, Professor
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Section below for list committee use—please leave blank

<b>List committee members:</b>	enter text here
<b>Committee review date:</b>	enter text here
<b>List date:</b>	enter text here
<b>Re-evaluation date(s):</b>	enter text here

**General comments on this assessment:**

Agricultural/Human Impact Score = 5 --> B.

Overall Agricultural Score: Moderate - With Alert

**Table 2. Criteria, Section, and Overall Scores**

<a href="#">1.1</a>	Impact on abiotic ecosystem processes	<b>B</b>	<b>Other Pub. Mat'l</b>	<p><b>Impact</b></p> <p><i>Enter four characters from Q1.1-1.4 below:</i></p> <p><b>BBBD</b></p> <p><i>Using matrix, determine score and enter below:</i></p> <p><b>B</b></p>	<p><b>Wildlands Plant Score</b></p> <p><i>Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:</i></p> <p><b>Moderate</b></p> <p><b>Red Alert</b></p>
<a href="#">1.2</a>	Impact on plant community	<b>B</b>	<b>Other Pub. Mat'l</b>		
<a href="#">1.3</a>	Impact on higher trophic levels	<b>B</b>	<b>Other Pub. Mat'l</b>		
<a href="#">1.4</a>	Impact on genetic integrity	<b>D</b>	<b>Other Pub. Mat'l</b>		
<a href="#">2.1</a>	Role of anthropogenic and natural disturbance	<b>A (3 pts)</b>	<b>Other Pub. Mat'l</b>	<p><b>Invasiveness</b></p> <p><i>Enter the sum total of all points for Q2.1-2.7 below:</i></p> <p><b>15</b></p> <p><i>Use matrix to determine score and enter below:</i></p> <p><b>B</b></p>	
<a href="#">2.2</a>	Local rate of spread with no management	<b>A (3 pts)</b>	<b>Other Pub. Mat'l</b>		
<a href="#">2.3</a>	Recent trend in total area infested within state	<b>U (0 pts)</b>	<b>Other Pub. Mat'l</b>		
<a href="#">2.4</a>	Innate reproductive potential <a href="#">Wksht A</a>	<b>B (2 pts)</b>	<b>Rev'd, Sci. Pub'n</b>		
<a href="#">2.5</a>	Potential for human-caused dispersal	<b>A (3 pts)</b>	<b>Other Pub. Mat'l</b>		
<a href="#">2.6</a>	Potential for natural long-distance dispersal	<b>B (2 pts)</b>	<b>Observational</b>		
<a href="#">2.7</a>	Other regions invaded	<b>B (2 pts)</b>	<b>Other Pub. Mat'l</b>		
<a href="#">3.1</a>	Ecological amplitude/Range	<b>U</b>	<b>Observational</b>	<p><b>Distribution</b></p> <p><i>Using matrix, determine score and enter below:</i></p> <p><b>U</b></p>	
<a href="#">3.2</a>	Distribution/Peak frequency <a href="#">Wrksht B</a>	<b>U</b>	<b>Anecdotal</b>		

<a href="#"><u>4.1</u></a>	Poisonous to livestock	<b>D (0 pts)</b>	<b>Rev'd, Sci. Pub'n</b>
<a href="#"><u>4.2</u></a>	Detrimental to economic crops	<b>C (1 pt)</b>	<b>Other Pub. Mat'l</b>
<a href="#"><u>4.3</u></a>	Detrimental to management of agricultural system, rangeland and pasture	<b>C (1 pt)</b>	<b>Other Pub. Mat'l</b>
<a href="#"><u>4.4</u></a>	Human impacts <a href="#"><u>Wrksht C</u></a>	<b>A (3 pts)</b>	<b>Other Pub. Mat'l</b>

**Table 3. Documentation**

<p><b>Question 1.1</b> Impact on abiotic ecosystem processes</p>	<p>B Other Pub. Mat'l <a href="#">back</a></p>
<p>Identify ecosystem processes impacted: May negatively impact chemical water flow, chemical properties, and light penetration when present.</p>	
<p>Rationale: Forms very dense stands covering the water surface and may impede flow, reduce dissolved oxygen, alter pH levels, decrease light penetration . Decomposing plants may also increase water turbidity</p>	
<p>Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources.</p>	
<p><b>Question 1.2</b> Impact on plant community composition, structure, and interactions</p>	<p>B Other Pub. Mat'l <a href="#">back</a></p>
<p>Identify type of impact or alteration: May displace native vegetation. Water Hyacinth will usually replace if both are present in the same water body.</p>	
<p>Rationale: Forms dense stands that will reduce light availability for native species. Water hyacinth is usually more competitive and will outcompete water lettuce when both are present.</p>	
<p>Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources.</p>	
<p><b>Question 1.3</b> Impact on higher trophic levels</p>	<p>B Other Pub. Mat'l <a href="#">back</a></p>
<p>Identify type of impact or alteration: May provide habitat for pest insects and decrease habitat for animals that use native species as food.</p>	
<p>Rationale: Dense mats of plants in stagnant or slow moving waters provides ideal habitat for mosquitoes. Reduction in dissolved oxygen may negatively impact fish. If animal species depend on native plants for food, shading of native plants may negatively impact wildlife.</p>	
<p>Sources of information: Joseph Vassios, Personal Observation. 2010.</p> <p>DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources.</p> <p>Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a></p>	

<b>Question 1.4</b> Impact on genetic integrity	D Other Pub. Mat'l <a href="#">back</a>
Identify impacts: No related species present in Colorado.	
Rationale: Native to South America, possibly Africa and Southeastern United States. Origin has been disputed, but no other related species occur in the USA, so hybridization is unlikely.	
Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources. Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a> USDA Plants Database. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.usda.gov/java/profile?symbol=PIST2">http://plants.usda.gov/java/profile?symbol=PIST2</a>	
<b>Question 2.1</b> Role of anthropogenic and natural disturbance in establishment	A Other Pub. Mat'l <a href="#">back</a>
Describe role of disturbance: Still water conditions may provide an area for plants to establish.	
Rationale: Addition of dams or reservoirs may slow water flows or provide standing water suitable for establishment of this species.	
Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources.	
<b>Question 2.2</b> Local rate of spread with no management	A Other Pub. Mat'l <a href="#">back</a>
Describe rate of spread: Reproduces vegetatively through stolons and seed. Possesses the ability to spread rapidly.	
Rationale: Produces stolons that can produce daughter plants within one month. This paired with its ability to spread through seed would allow small infestations to increase in size quickly.	
Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources.	
<b>Question 2.3</b> Recent trend in total area infested within state	U Other Pub. Mat'l <a href="#">back</a>
Describe trend: Not currently known to occur in Colorado in wild populations.	

Rationale: Is commonly sold as an ornamental species across Colorado. Only herbarium report of existence in Colorado was in a pond in El Paso county, but no other occurrences have been reported in the wild.	
Sources of information: Checklist of the Vascular Plants of Colorado, by RL Hartman and BE Nelson of the Rocky Mt. Herbarium in WY (2001). Accessed April 8, 2010. <a href="http://www.rmh.uwyo.edu/data/co_checklist.php">http://www.rmh.uwyo.edu/data/co_checklist.php</a>	
<b>Question 2.4</b> Innate reproductive potential	B Rev'd, Sci. Pub'n <a href="#">back</a>
Describe key reproductive characteristics: Seed production can be high, can be self or cross pollinated, can reproduce by fragmentation or stolons.	
Rationale: Can produce >4,700 seeds per square meter. Is capable of being self or cross pollinated. Spreads vegetatively through stolons or fragmentation.	
Sources of information: F.Allen Dray Jr. and T.D. Center. Seed production by Pistia stratiotes L. (water lettuce) in the United States. Aquatic Botany, 33: 155-160 (1989). DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources. Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a>	
<b>Question 2.5</b> Potential for human-caused dispersal	A Other Pub. Mat'l <a href="#">back</a>
Identify dispersal mechanisms: Can be transported by humans as a result of ornamental introductions and recreational equipment.	
Rationale: Since commonly sold as an ornamental, there is the possibility of human caused dispersal. Also, moving boats or other watercraft between water bodies may lead to the spread of the species.	
Sources of information: DiTomaso, JM, EA Healy. 2003. Aquatic and Riparian Weeds of the West. University of California Agriculture and Natural Resources. Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a> Joseph Vassios, Personal Observation. 2010.	
<b>Question 2.6</b> Potential for natural long-distance dispersal	B Observational <a href="#">back</a>
Identify dispersal mechanisms: Long distance dispersal may occur as a result of water flow if present in streams,	

rivers, or canals.	
Rationale: Since grows as a floating species, may be transferred in flowing water over long distances.	
Sources of information: Joseph Vassios, Personal Observation. 2010.	
<b>Question 2.7</b> Other regions invaded	B Other Pub. Mat'l <a href="#">back</a>
Identify other regions: Can become established in lakes, ponds, reservoirs, streams, rivers and canals.	
Rationale: Can become established in still water or flowing water.	
Sources of information: Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a>	
<b>Question 3.1</b> Ecological amplitude/Range	U Other Pub. Mat'l <a href="#">back</a>
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Is not known to be established in Colorado outside of ornamental plantings.	
Rationale: No reports of existence in Colorado outside of one report in a pond in El Paso county, and could be part of an ornamental introduction.	
Sources of information: Checklist of the Vascular Plants of Colorado, by RL Hartman and BE Nelson of the Rocky Mt. Herbarium in WY (2001). Accessed April 8, 2010. <a href="http://www.rmh.uwyo.edu/data/co_checklist.php">http://www.rmh.uwyo.edu/data/co_checklist.php</a>	
<b>Question 3.2</b> Distribution/Peak frequency	U Anecdotal <a href="#">back</a>
Describe distribution: Not known to be established in the state outside of ornamental introductions.	
Rationale:	
Sources of information:	
<b>Question 4.1</b> Poisonous to Livestock	D Rev'd, Sci. Pub'n <a href="#">back</a>
Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: No known toxicity in livestock, has been evaluated as a food source.	
Rationale: Feeding trials have been conducted examining the use of plants as feed.	
Sources of information: G.O Ayoade, B.M. Sharma, and M.K.C. Sridhar. Trials of Pistia-stratiotes L. as animal	

feed. Journal of Aquatic Plant Management, 20: 56-57 (1982).	
<b>Question 4.2</b> Detrimental to Economic Crops	C Other Pub. Mat'l <a href="#">back</a>
Describe impacts to all aspects of cropping systems (see guidelines): Presence may impede water delivery and floating mats may clog irrigation equipment.	
Rationale: enter text here	
Sources of information: Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a>	
<b>Question 4.3</b> Detrimental to Mgmt of Agricultural System, Rangeland and Pasture	C Other Pub. Mat'l <a href="#">back</a>
Describe impacts to water diversion systems, increased water use, reduced forage for livestock: Presence may impede water delivery and floating mats may clog irrigation equipment.	
Rationale:	
Sources of information: Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a>	
<b>Question 4.4</b> Human Health Impacts	A Other Pub. Mat'l <a href="#">back</a>
Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Dense infestations could negatively impact recreational use of water bodies, in turn decreasing property values. Also, since is used as an ornamental, listing may negatively impact the horticultural industry.	
Rationale: enter text here	
Sources of information: Center for Aquatic and Invasive Plants, University of Florida. Water Lettuce. Accessed April 8, 2010. <a href="http://plants.ifas.ufl.edu/node/328">http://plants.ifas.ufl.edu/node/328</a>	

## Worksheet A

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Reaches reproductive maturity in 2 years or less	<b>Yes: 1 pt</b>
Dense infestations produce >1,000 viable seed per square meter	<b>Unknown: 0 pts</b>
Populations of this species produce seeds every year.	<b>Unknown: 0 pts</b>
Seed production sustained over 3 or more months within a population annually	<b>Unknown: 0 pts</b>
Seeds remain viable in soil for three or more years	<b>Unknown: 0 pts</b>

Viable seed produced with <i>both</i> self-pollination and cross-pollination	<b>Yes: 1 pt</b>
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	<b>Yes: 1 pt</b>
Fragments easily and fragments can become established elsewhere	<b>Yes: 2 pts</b>
Resprouts readily when cut, grazed, or burned	<b>No: 0 pt</b>
	<b>5 pts      4 unknowns</b>
	<b>B (4-5 pts)</b>
<b>Note any related traits:</b> enter text here	

**Worksheet B - Colorado Ecological Types and Land Use**

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<b>Major Ecological and Land Use Types</b>	<b>Minor Ecological and Land Use Types</b>	<b>Code*</b>
<b>Freshwater and Aquatic Systems</b>	lakes, ponds, reservoirs	<b>Unknown</b>
	rivers, streams, canals	<b>Unknown</b>
<b>Riparian and wetlands</b>	Riparian forest	<b>score</b>
	Riparian shrublands	<b>score</b>
	Wet meadows	<b>score</b>
<b>Grasslands</b>	Shortgrass prairie	<b>score</b>
	Tallgrass prairie	<b>score</b>
	Sandsage prairie	<b>score</b>
	Montane meadows	<b>score</b>
<b>Irrigated Agriculture</b>	Hay meadows	<b>score</b>
	Irrigated crops (alfalfa, corn, sugar beets)	<b>score</b>
<b>Dryland Agriculture</b>	Dryland crops (wheat, corn, millet, dryland grass hay, sunflowers, mustard for biodiesel)	<b>score</b>
<b>Developed Lands</b>	Urban, exurban, industrial	<b>score</b>
<b>Arid Shrublands</b>	Sagebrush shrublands	<b>score</b>
	Foothills shrublands	<b>score</b>
	Gambel oak shrublands	<b>score</b>
<b>Woodlands</b>	Pinyon - juniper	<b>score</b>
	Ponderosa pine	<b>score</b>
	Limber pine	<b>score</b>
<b>Forest</b>	Lodgepole pine	<b>score</b>
	Spruce-fir	<b>score</b>
<b>Alpine</b>	Boulder and rock fields	<b>score</b>
	Dwarf shrublands	<b>score</b>
	Tundra	<b>score</b>
<b>Barrens (lower elevation)</b>	Dunes	<b>score</b>
	Rock outcrops	<b>score</b>
	Canyonlands	<b>score</b>

\* A. means >50% of type occurrences are invaded; B means >20% to 50%; C. means >5% to 20%; D. means present but ≤5%; U. means unknown (unable to estimate percentage of occurrences invaded).

### Worksheet C – Human Impacts

Human health impacts; irritants (sap), spines, poisonous, and/or smoke impacts	<b>No: 0 pt</b>
Property values are decreased due to increased risk of fire	<b>No: 0 pts</b>
Decreased property value due to moderate to heavy infestations	<b>Yes: 2 pts</b>
Decreased land value for recreational use; boating, fishing, camping, etc.	<b>Yes: 1 pt</b>
Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed	<b>Yes: 2 pt</b>
	<b>5 pts      Total Unknowns</b>
	<b>A (4+ pts)</b>
<b>Note any related traits:</b> enter text here	