

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

Species name (Latin binomial):	Salvinia molesta Mitchell
Synonyms:	N/A
Common names:	giant salvinia, kariba weed, African payal, salvinia, water fern
Evaluation date (mm/dd/yy):	1/23/2010
Evaluator #1 Name/Title:	Joseph Vassios, Graduate Research Assistant
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Section below for list committee use—please leave blank

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

General comments on this assessment:

Agriculture and Human Impacts - 4 pts. - B.

Overall Agricultural Score - Moderate, No Alert

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	A	Rev'd, Sci. Pub'n	<p>Impact</p> <p><i>Enter four characters from Q1.1-1.4 below:</i></p> <p>AABD</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>A</p>	<p>Wildlands Plant Score</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>High</p> <p>Red Alert</p>
1.2	Impact on plant community	A	Rev'd, Sci. Pub'n		
1.3	Impact on higher trophic levels	B	Rev'd, Sci. Pub'n		
1.4	Impact on genetic integrity	D	Rev'd, Sci. Pub'n		
2.1	Role of anthropogenic and natural disturbance	A (3 pts)	Rev'd, Sci. Pub'n	<p>Invasiveness</p> <p><i>Enter the sum total of all points for Q2.1-2.7 below:</i></p> <p>12</p> <p><i>Use matrix to determine score and enter below:</i></p> <p>B</p>	
2.2	Local rate of spread with no management	A (3 pts)	Rev'd, Sci. Pub'n		
2.3	Recent trend in total area infested within state	U (0 pts)	Other Pub. Mat'l		
2.4	Innate reproductive potential Wksht A	B (2 pts)	Rev'd, Sci. Pub'n		
2.5	Potential for human-caused dispersal	B (2 pts)	Other Pub. Mat'l		
2.6	Potential for natural long-distance dispersal	B (2 pts)	Other Pub. Mat'l		
2.7	Other regions invaded	U (0 pts)	Other Pub. Mat'l		
3.1	Ecological amplitude/Range	B	Other Pub. Mat'l	<p>Distribution</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>C</p>	
3.2	Distribution/Peak frequency Wrksht B	U	Other Pub. Mat'l		

<u>4.1</u>	Poisonous to livestock	D (0 pts)	Rev'd, Sci. Pub'n
<u>4.2</u>	Detrimental to economic crops	C (1 pt)	Other Pub. Mat'l
<u>4.3</u>	Detrimental to management of agricultural system, rangeland and pasture	C (1 pt)	Other Pub. Mat'l
<u>4.4</u>	Human impacts <u>Wrksht C</u>	B (2 pts)	Observational

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Identify ecosystem processes impacted: Has the ability to alter light penetration, chemical properties, and water temperature.</p>	
<p>Rationale: Can grow in mats up to 3 feet thick. These dense mats restrict light penetration. Limited light penetration reduces water temperature. Mats also impede gas exchange between the water body and atmosphere, resulting in low dissolved oxygen levels in the water. Decomposition of organic matter in the mats may lead to further reductions in dissolved oxygen.</p>	
<p>Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA. Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). Journal of Aquatic Plant Management. 51: 227-231.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>A Rev'd, Sci. Pub'n back</p>
<p>Identify type of impact or alteration: Can result in declines in plant density and diversity. May also alter the make up of plant communities. Plant mats may provide habitat for new plant to establish.</p>	
<p>Rationale: Decreased light penetration can result in reduced photosynthesis for submersed aquatic plants. Other changes in water quality, such as dissolved oxygen, can result in changes to plant communities and displace native vegetation. Other species of plants may establish on the surface of the floating mats.</p>	
<p>Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA. Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). Journal of Aquatic Plant Management. 51: 227-231.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>B Rev'd, Sci. Pub'n back</p>
<p>Identify type of impact or alteration: Provides habitat for mosquitoes. Changes in water quality may also alter habitat for other invertebrate and animal communities. Loss of habitat may also effect migrating waterfowl and wading birds.</p>	
<p>Rationale: Stagnant water on and around mats provides an ideal habitat for mosquitoes. Changes in water quality may result in reduced density and number of invertebrates and animals.</p>	
<p>Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA. Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). Journal of Aquatic Plant Management. 51: 227-231.</p>	

Question 1.4 Impact on genetic integrity	D Rev'd, Sci. Pub'n back
Identify impacts: There are no other <i>Salvinia</i> species known to exist in Colorado, and hybridization is very unlikely.	
Rationale: No other species of <i>Salvinia</i> are known to exist in Colorado. All known reproduction is vegetative, so hybridization is unlikely. Spores produced by <i>Salvinia</i> , which is an aquatic fern, have all been identified as infertile.	
Sources of information: DiTomaso, JM, EA Healy. 2003. <i>Aquatic and Riparian Weeds of the West</i> . University of California Agriculture and Natural Resources.	
Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best management practices handbook</i> . Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). <i>Journal of Aquatic Plant Management</i> . 51: 227-231.	
USDA Plants Database. 2010. <i>Eichhornia crassipes</i> . Accessed online Jan. 23. http://plants.usda.gov/java/profile?symbol=EICR	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	A Rev'd, Sci. Pub'n back
Describe role of disturbance: Disturbed habitats can allow for establishment of giant salvinia. May also become established in natural areas that provide adequate water.	
Rationale: Prefers stagnant or slow moving waters. Can commonly become established in disturbed areas such as canals, and reservoirs. May also grow in natural areas including streams, rivers, ponds, reservoirs, swamps and wetlands.	
Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best management practices handbook</i> . Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). <i>Journal of Aquatic Plant Management</i> . 51: 227-231.	
Question 2.2 Local rate of spread with no management	A Rev'd, Sci. Pub'n back
Describe rate of spread: Individual plants may double biomass in 2 to 3 days. Infestations spread rapidly.	
Rationale: Individual plants grow very quickly, doubling in size every 2-3 days. Infestations grow rapidly at around 5% per day, allowing them to double in size in approximately 14 days. Other reports have calculated that a single plant may multiply to cover 40 square miles in 3 months under optimal conditions.	
Sources of information: DiTomaso, JM, EA Healy. 2003. <i>Aquatic and Riparian Weeds of the West</i> . University of California Agriculture and Natural Resources.	
Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best management practices handbook</i> . Aquatic Ecosystem Restoration Foundation, Marietta GA.	

Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). <i>Journal of Aquatic Plant Management</i> . 51: 227-231.	
Question 2.3 Recent trend in total area infested within state	U Other Pub. Mat'l back
Describe trend: Giant salvinia is currently only know to exist in Colorado as an ornamental.	
Rationale: enter text here	
Sources of information: USDA Plants Database. 2010. <i>Eichhornia crassipes</i> . Accessed online Jan. 23. http://plants.usda.gov/java/profile?symbol=EICR	
Question 2.4 Innate reproductive potential	B Rev'd, Sci. Pub'n back
Describe key reproductive characteristics: Only current means of reproduction is vegetative.	
Rationale: Reproduces by fragmentation, lateral buds, and rhizomes. Produces spores, but none are viable.	
Sources of information: DiTomaso, JM, EA Healy. 2003. <i>Aquatic and Riparian Weeds of the West</i> . University of California Agriculture and Natural Resources.	
Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best management practices handbook</i> . Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Oliver, JD. 1993. A review of the biology of giant salvinia (<i>Salvinia molesta</i> Mitchell). <i>Journal of Aquatic Plant Management</i> . 51: 227-231.	
Question 2.5 Potential for human-caused dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Can be easily transported by recreational equipment	
Rationale: Can be transported between water bodies by boats, trailers, or motors.	
Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best management practices handbook</i> . Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Question 2.6 Potential for natural long-distance dispersal	B Other Pub. Mat'l back
Identify dispersal mechanisms: Transported by water flow and wind. May also be transported by animals.	
Rationale: Easily transported between water bodies by water flow and wind. Can be transported by animals such as livestock and waterfowl.	
Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. <i>Biology and control of aquatic plants: a best</i>	

management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Question 2.7 Other regions invaded	U Other Pub. Mat'l back
Identify other regions: Is not known to occur in Colorado in natural systems.	
Rationale: enter text here	
Sources of information: USDA Plants Database. 2010. Eichhornia crassipes. Accessed online Jan. 23. http://plants.usda.gov/java/profile?symbol=EICR	
Question 3.1 Ecological amplitude/Range	B Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Does not currently occur in Colorado, but occurs in 2 ecological types in other states.	
Rationale: Although it does not occur in Colorado, commonly grows in canals, streams, rivers, ponds, lakes, and reservoirs in other states.	
Sources of information: USDA Plants Database. 2010. Eichhornia crassipes. Accessed online Jan. 23. http://plants.usda.gov/java/profile?symbol=EICR	
Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Question 3.2 Distribution/Peak frequency	U Other Pub. Mat'l back
Describe distribution: Is not known to occur in Colorado.	
Rationale: enter text here	
Sources of information: USDA Plants Database. 2010. Eichhornia crassipes. Accessed online Jan. 23. http://plants.usda.gov/java/profile?symbol=EICR	
Question 4.1 Poisonous to Livestock	D Rev'd, Sci. Pub'n back
Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: Is not likely poisonous to livestock.	
Rationale: Is not known to be poisonous to livestock. Has been evaluated as a possible source of livestock forage.	
Sources of information: Banerjee, A, S Matai. 1990. Composition of Indian aquatic plants in relation to utilization as animal forage. Journal of Aquatic Plant Management. 28: 69-73.	

Question 4.2 Detrimental to Economic Crops	C Other Pub. Mat'l back
Describe impacts to all aspects of cropping systems (see guidelines): May cause problems with water delivery if present in irrigation systems.	
Rationale: enter text here	
Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Question 4.3 Detrimental to Mgmt of Agricultural System, Rangeland and Pasture	C Other Pub. Mat'l back
Describe impacts to water diversion systems, increased water use, reduced forage for livestock: Can impact flow of water in irrigation canals.	
Rationale: Mats may impede water flow and clog irrigation equipment.	
Sources of information: Gettys, LA, WT Haller, M Bellaud. 2009. Biology and control of aquatic plants: a best management practices handbook. Aquatic Ecosystem Restoration Foundation, Marietta GA.	
Question 4.4 Human Health Impacts	B Observational back
Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Infestations may effect property values of property surrounding water bodies. Also may interfere with recreational activities and harbor insects such as mosquitoes.	
Rationale: enter text here	
Sources of information: Joseph Vassios, 2010. Personal Observation.	

Worksheet A

[back](#)

Reaches reproductive maturity in 2 years or less	Yes: 1 pt
Dense infestations produce >1,000 viable seed per square meter	No: 0 pts
Populations of this species produce seeds every year.	No: 0 pt
Seed production sustained over 3 or more months within a population annually	No: 0 pt
Seeds remain viable in soil for three or more years	No: 0 pts
Viable seed produced with <i>both</i> self-pollination and cross-pollination	No: 0 pt
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	Yes: 1 pt

Fragments easily and fragments can become established elsewhere	Yes: 2 pts
Resprouts readily when cut, grazed, or burned	No: 0 pt
	4 pts 1 unknown
B (4-5 pts)	
Note any related traits: enter text here	

Worksheet B - Colorado Ecological Types and Land Use

[back](#)

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

* 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	No: 0 pt
Property values are decreased due to increased risk of fire	Unknown: 0 pts
Decreased property value due to moderate to heavy infestations	Yes: 2 pts
Decreased land value for recreational use; boating, fishing, camping, etc.	Yes: 1 pt
Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed	No: 0 pt
	3 pts 1 unknown
	B (3 pts)
Note any related traits: enter text here	