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)**:**	Sphaerophysa salsula
Synonyms:	Phaca salsula Pall., Swainsona salsula (Pall.) Taubert
Common names:	Swainsonpea, Austrian peaweed, Swainsona
Evaluation date (mm/dd/yy)**:**	01/18/2010
Evaluator #1 Name/Title:	Nicholas Krick/Graduate Student
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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:
Sphaerophysa salsula (swainsonpea) is an introduced perennial legume native to Asia. It is designated as a noxious weed in California, Nevada, Oregon, and Washington. Large infestations capable of displacing desirable vegetation or lowering crop yields have not been documented. S. salsula is most commonly found in distrubed areas such as roadsides, ditches, and poor soils. The most detrimental impact this species will have is on alfalfa seed producers. It is mechanically not possible to separate S. salsula seed from alfalfa seed because they are so similar in weight, size, and shape.

S. salsula seed morphology (very similar to alfalfa seed morphology) could impact the hay growers of Colorado. Distribution of this species is restricted; however, its potential impact to alfalfa production makes this plant a candidate for the B-list. It does not appear to be a threat to natural communities.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	D	Other Pub. Mat'l		**Impact** *Enter four characters from Q1.1-1.4 below:* **DDCD** *Using matrix, determine score and enter below:* **D**		
1.2	Impact on plant community	D	Other Pub. Mat'l				
1.3	Impact on higher trophic levels	C	Other Pub. Mat'l				
1.4	Impact on genetic integrity	D	Rev'd, Sci. Pub'n				
2.1	Role of anthropogenic and natural disturbance	B (2 pts)	Other Pub. Mat'l		**Invasiveness** *Enter the sum total of all points for Q2.1-2.7 below:* **17** *Use matrix to determine score and enter below:* **A**		
2.2	Local rate of spread with no management	A (3 pts)	Rev'd, Sci. Pub'n				**Wildlands Plant Score** *Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:* **Not listed** **No Alert**
2.3	Recent trend in total area infested within state	D (0 pts)	Other Pub. Mat'l				
2.4	Innate reproductive potential Wksht A	A (3 pts)	Rev'd, Sci. Pub'n				
2.5	Potential for human-caused dispersal	A (3 pts)	Other Pub. Mat'l				
2.6	Potential for natural long-distance dispersal	A (3 pts)	Other Pub. Mat'l				
2.7	Other regions invaded	A (3 pts)	Other Pub. Mat'l				
3.1	Ecological amplitude/Range	B	Other Pub. Mat'l		**Distribution** *Using matrix, determine score and enter below:* **C**		
3.2	Distribution/Peak frequency Wrksht B	D	Other Pub. Mat'l				

4.1	Poisonous to livestock	**D (0 pts)**	**Other Pub. Mat'l**
4.2	Detrimental to economic crops	**A (3 pts)**	**Other Pub. Mat'l**
4.3	Detrimental to management of agricultural system, rangeland and pasture	**C (1 pt)**	**Other Pub. Mat'l**
4.4	Human impacts Wrksht C	**A (3 pts)**	**Other Pub. Mat'l**

Agricultural / Human Impact

Enter the sum total of all points for Q4.1-4.4 below:

7

Use matrix to determine score and enter below:

B

Agricultural Plant Score

Using matrix, determine Overall Score and Alert Status from the second, third and fourth section scores and enter below:

High

Red Alert

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes	D Other Pub. Mat'l back
Identify ecosystem processes impacted: S. salsula may impact mineral cycling or nutrient dynamics.	
Rationale: S. salsula is commonly found growing on alkaline and saline soils where few plants will grow. As a perennial legume, it is capable of fixing nitrogen and altering soil nutrient complexes. Research has found that S. salsula is moderately sensitive to salt.	
Sources of information: Bargeron, C.T., C.R. Minteer, C.W. Evans, D.J. Moorhead, G.K. Douce and R.C. Reardon. Technical Coordinators. 2008. Invasive Plants of the United States: Identification, Biology and Control. USDA Forest Service. Forest Health Technology Enterprise Team. Morgantown, WV. FHTET-08-11. [http://www.invasive.org/weedcd/species/6484.htm] Sphaerophysa salsula.Generated 4/2010 Maas. 1990. Relative salt tolerance of herbaceous crops. [http://www.ussl.ars.usda.gov/pls/caliche/SALTT42B] Generated 4/2010.	
Question 1.2 Impact on plant community composition, structure, and interactions	D Other Pub. Mat'l back
Identify type of impact or alteration: Literature doesn't indicate that S. salsula is a strong competitor in established plant communities; however, it may be able to occupy a niche where other plants cannot survive (alkaline or saline soils).	
Rationale: S. salsula is commonly found growing along roadsides, ditches, and fence rows - not commonly found in crops or established plant communities.	
Sources of information: Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300] Maas. 1990. Relative salt tolerance of herbaceous crops. [http://www.ussl.ars.usda.gov/pls/caliche/SALTT42B] Generated 4/2010. Graham, J. 2003.Managing Austrian Pea Weed. [http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010. Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml] Generated 4/2010	
Question 1.3 Impact on higher trophic levels	C Other Pub. Mat'l back
Identify type of impact or alteration: As a legume, S. salsula is likely to interact with nitrogen fixing Rhizobium.	
Rationale: Legume species are capable of forming symbiotic relationships with nitrogen fixing soil bacteria. This interaction may increase soil fertility in locations of invasion. Cattle like to eat the seed pods	

Sources of information:

Graham, J. 2003.Managing Austrian Pea Weed.
[http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010.

Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009.
[http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml] Generated 4/2010

Question 1.4 Impact on genetic integrity D Rev'd, Sci. Pub'n back

Identify impacts: No known hybridization known among S. salsula and other species.

Rationale:

Sources of information:

Wagstaff, Heenan, Sanderson. 1999. Classification, origins, and patterns of diversification in New Zealand Carmighaelinae (Fabaceae). American Journal of Botany. 86(9): 1346-1356.

Question 2.1 Role of anthropogenic and natural disturbance in establishment B Other Pub. Mat'l back

Describe role of disturbance: S. salsula is commonly found in disturbed areas.

Rationale: Herbarium specimens have been collected from roadsides, ditches, alkaline ground in fields, and along fence rows. This suggests that disturbance may play an important role for S. salsula in becoming established. Roadsides, ditches, trails, and fences are areas of disturbance, which may facilitate establishment.

Sources of information:

Graham and Ackerfield, CSU Herbarium. 2008.
[http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300]

Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009.
[http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml] Generated 4/2010

Question 2.2 Local rate of spread with no management A Rev'd, Sci. Pub'n back

Describe rate of spread: S. salsula has the potential to increase rapidly with no management under suitable growing conditions.

Rationale: The large creeping root systems of S. salsula promote expansion of populations. Robocker (1964) found that during a period of 8 months, 1 seedling established lateral roots that were greater than 3 feet in diameter. From the same root system, 11 new clumps of above ground ramets were produced with several underground buds. This indicates that S. salsula has the potential to spread rapidly and expansively with no management. This growth habit has not been recorded in field settings.

Sources of information:

Robocker, Harold, Kerr, and Bruns. 1964. Characteristics and Control of Swainsonpea Weeds, Vol. 12, No. 3 pp. 189-191

Question 2.3 Recent trend in total area infested within state D Other Pub. Mat'l back
Describe trend: S. salsula has been collected from 5 counties in Colorado. The most recent record is from 1986 in Alamosa county. One source (BONAP) indicates that S. salsula is present in 11 counties in Colorado.
Rationale: Herbarium records are from: Alamosa, Conejos, Constilla, Delta, Saguache, and Weld counties. The latest record is from 1986, suggesting that populations are declining or remaining stable. The Biota of North America Program indicates the presence of S. salsula in Prowers, Bent, Otero, Pueblo, and Rio Grande counties.
Sources of information: The Biota of North America Program - County-Level Atlas of the Vascular Flora of North America. 2010. [http://bonap.org/dist%20maps%202009/Sphaerophysa.html] Generated 4/2010. Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300] University of Colorado at Boulder - Museum of Natural History, Botany Database. [http://cumuseum.colorado.edu/Research/Botany/Databases/county_species.html]
Question 2.4 Innate reproductive potential A Rev'd, Sci. Pub'n back
Describe key reproductive characteristics: Reproduces by seed and a large creeping root system.
Rationale: Capable of producing 300+ viable seeds per stem, but scarification is important to break dormancy before germination. Creeping root system forms adventitious buds that develop into new shoots.
Sources of information: Robocker, Harold, Kerr, and Bruns. 1964. Characteristics and Control of Swainsonpea Weeds, Vol. 12, No. 3 pp. 189-191
Question 2.5 Potential for human-caused dispersal A Other Pub. Mat'l back
Identify dispersal mechanisms: There is a high potential for S. salsula to be spread as seed with alfalfa seed.
Rationale: The size, shape, and weight of S. salsula seed is very similar to alfalfa and cannot be mechanically separated.
Sources of information: Oregon Department of Agriculture. 2009. Austrian peaweed. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml]
Question 2.6 Potential for natural long-distance dispersal A Other Pub. Mat'l back
Identify dispersal mechanisms: Rarely dispersed long distances by natural means.

Rationale: Cattle will readily graze seed pods. Seeds have hard seed coats that will likely survive digestive tracts and may be dispersed long distances. Seeds may also be consumed by birds or small mammals. Ants may be responsible for dispersing the seed short distances.

Sources of information:

California Department of Food and Agriculture. 2010. Encycloweedia data sheets - Sphaerophysa genus. [http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm] Generated 4/2010.

Question 2.7 Other regions invaded A Other Pub. Mat'l back

Identify other regions: S. salsula has invaded cultivated crops, rangelands, and pastures outside its home range (Asia).

Rationale: S. salsula is commonly found growing in distrubed areas, roadsides, fence rows, trails, ditches, and poor soils in pastures. Although it has invaded these regions, it hasn't been reported as a problem in Colorado for more than 60 years. It is a noxious weed in California, Nevada, Oregon, and Washington.

Sources of information:

Graham, J. 2003.Managing Austrian Pea Weed. [http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010.

Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml] Generated 4/2010http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm

USDA-NRCS PLANTS Database. Plants Profile for Sphaerophysa salsula (alkali swainsonpea). [http://plants.usda.gov/java/profile?symbol=SPSA3]

Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300]

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: Records from 1937 indicate the presence of S. salsula in Colorado.

Rationale: Herbarium specimens were collected in 1937 from Conjeos county and Costilla county. It was likely introduced as contaminated alfalfa seed.

Sources of information:

Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300]

The Biota of North America Program - County-Level Atlas of the Vascular Flora of North America. 2010. [http://bonap.org/dist%20maps%202009/Sphaerophysa.html] Generated 4/2010.

Question 3.2 Distribution/Peak frequency D Other Pub. Mat'l back

Describe distribution: Few available records of populations.

Rationale: Current information suggests that S. salsula has a highly limited distribution with few populations. 1986 is the most recent record available, which makes suggests a declining population and makes it difficult to assess the extent of any infestation.

Sources of information:

USDA-NRCS PLANTS Database. Plants Profile for Sphaerophysa salsula (alkali swainsonpea). [http://plants.usda.gov/java/profile?symbol=SPSA3]

Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=3300]

Question 4.1 Poisonous to Livestock D Other Pub. Mat'l back

Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: No poisonous effects have been recorded.

Rationale: S. salsula is highly unpalatable for livestock according to Robocker (1964), but other literature indicates that cattle will graze seed pods of S. salsula.

Sources of information:

Robocker, Harold, Kerr, and Bruns. 1964. Characteristics and Control of Swainsonpea Weeds, Vol. 12, No. 3 pp. 189-191

California Department of Food and Agriculture. 2010. Encycloweedia data sheets - Sphaerophysa genus. [http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm] Generated 4/2010.

Question 4.2 Detrimental to Economic Crops A Other Pub. Mat'l back

Describe impacts to all aspects of cropping systems (see guidelines): Can be a serious problem in alfalfa seed production.

Rationale: S. salsula seeds are nearly identical in weight and size to seeds of alfalfa; therefore, it is nearly impossible to sort them by mechanical means. S. salsula can be competitive once established, which may reduce yields in crops; however, the biggest threat is to alfalfa seed producers.

Sources of information:

California Department of Food and Agriculture. 2010. Encycloweedia data sheets - Sphaerophysa genus. [http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm] Generated 4/2010.

Graham, J. 2003.Managing Austrian Pea Weed. [http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010.

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: S. salsula will not likely be detrimental to the management of agricultural systems, rangeland or pasture.

Rationale: Large infestations capable of displacing desired vegetation or decreasing crop yields have not been recorded in the literature. The biggest impact S. salsula will have on agriculture is becoming a contaminant in alfalfa seed production.
Sources of information: California Department of Food and Agriculture. 2010. Encycloweedia data sheets - Sphaerophysa genus. [http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm] Generated 4/2010. Graham, J. 2003.Managing Austrian Pea Weed. [http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010. Oregon Department of Agriculture. 2009. Austrian peaweed. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml]
Question 4.4 Human Health Impacts A Other Pub. Mat'l back
Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Moderate to heavy infestations can decrease property values and seed contamination could be detrimental to alfalfa producers.
Rationale: The biggest impact S. salsula will have on agriculture is becoming a contaminant in alfalfa seed production. Large infestations may also decrease property values.
Sources of information: California Department of Food and Agriculture. 2010. Encycloweedia data sheets - Sphaerophysa genus. [http://www.cdfa.ca.gov/phpps/ipc/weedinfo/sphaerophysa-salsula.htm] Generated 4/2010. Graham, J. 2003.Managing Austrian Pea Weed. [http://www.unce.unr.edu/publications/files/nr/2003/FS0342.pdf] Generated 4/2010. Oregon Department of Agriculture. 2009. Austrian peaweed. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_austrianpeaweed.shtml]

Worksheet A

back

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

Resprouts readily when cut, grazed, or burned		**Yes: 1 pt**
	9 pts	**1 unknown**
	A (6+ 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	**score**
	rivers, streams, canals	**score**
Riparian and wetlands	Riparian forest	**score**
	Riparian shrublands	**Unknown**
	Wet meadows	**Unknown**
Grasslands	Shortgrass prairie	**Unknown**
	Tallgrass prairie	**Unknown**
	Sandsage prairie	**score**
	Montane meadows	**score**
Irrigated Agriculture	Hay meadows	**Unknown**
	Irrigated crops (alfalfa, corn, sugar beets)	**Unknown**
Dryland Agriculture	Dryland crops (wheat, corn, millet, dryland grass hay, sunflowers, mustard for biodiesel)	**Unknown**
Developed Lands	Urban, exurban, industrial	**Unknown**
Arid Shrublands	Sagebrush shrublands	**Unknown**
	Foothills shrublands	**Unknown**
	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	**No: 0 pts**
Decreased property value due to moderate to heavy infestations	**Yes: 2 pts**
Decreased land value for recreational use; boating, fishing, camping, etc.	**No: 0 pts**
Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed	**Yes: 2 pt**
	4 pts Total Unknowns
	A (4+ pts)
Note any related traits: enter text here	