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)**:**	Anchusa officinalis
Synonyms:	Anchusa procera Besser ex Link
Common names:	common bugloss, common anchusa, alkanet, bee bread, ox's tongue, starflower, common borage, orchanet, Spanish bugloss, enchusa, lingua bovina, and blue bugloss
Evaluation date (mm/dd/yy)**:**	4/21/2010
Evaluator #1 Name/Title:	Nicholas Krick/Graduate research assistant
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Evaluator #2 Name/Title:	enter text here
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Address:	enter text here

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:
Anchusa officinalis (common bugloss) is designated as a noxious weed in Oregon and Washington where it is problematic in hay production, pastures, rangelands, and disturbed areas. It is commonly cultivated as an ornamental and for medicinal purposes. Herbarium records indicate that A. officinalis was introduced to Colorado in the early 1900's and Boulder county is the only county where it is currently found. Knowing that this plant has been in state for nearly 100 years and has yet to be a problematic species, it is likely that this species poses little risk to agriculture or native ecosystems in Colorado.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	C	Anecdotal		**Impact** *Enter four characters from Q1.1-1.4 below:* **CBBD** *Using matrix, determine score and enter below:* **B**		
1.2	Impact on plant community	B	Other Pub. Mat'l				
1.3	Impact on higher trophic levels	B	Other Pub. Mat'l				
1.4	Impact on genetic integrity	D	Other Pub. Mat'l				
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:* **16** *Use matrix to determine score and enter below:* **B**		
2.2	Local rate of spread with no management	A (3 pts)	Other Pub. Mat'l				**Wildlands Plant Score** *Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:* **Moderate** **No Alert**
2.3	Recent trend in total area infested within state	C (1 pt)	Other Pub. Mat'l				
2.4	Innate reproductive potential Wksht A	A (3 pts)	Other Pub. Mat'l				
2.5	Potential for human-caused dispersal	A (3 pts)	Other Pub. Mat'l				
2.6	Potential for natural long-distance dispersal	C (1 pt)	Other Pub. Mat'l				
2.7	Other regions invaded	A (3 pts)	Other Pub. Mat'l				
3.1	Ecological amplitude/Range	A	Other Pub. Mat'l		**Distribution** *Using matrix, determine score and enter below:* **B**		
3.2	Distribution/Peak frequency Wrksht B	D	Other Pub. Mat'l				

4.1	Poisonous to livestock	**C (1pts)**	**Anecdotal**
4.2	Detrimental to economic crops	**B (2 pts)**	**Other Pub. Mat'l**
4.3	Detrimental to management of agricultural system, rangeland and pasture	**B (2 pts)**	**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:

8

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:

Moderate

No Alert

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes	C Anecdotal back
Identify ecosystem processes impacted: Large infestations of A. officinalis may alter nutrient cycling and natural hydrology.	
Rationale: As a perennial species, A. officinalis can change nutrient cycling and large infestations may decrease erosion.	
Sources of information: Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_commonbugloss.shtml] Generated 4/2010	
Question 1.2 Impact on plant community composition, structure, and interactions	B Other Pub. Mat'l back
Identify type of impact or alteration: Large, dense stands can occur, resulting in strong competition with native plant communities.	
Rationale: Although it tends to establish in available areas where the plant community is not dense, such as waste areas, it can invade alfalfa fields, pastures, and range lands.	
Sources of information: Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_commonbugloss.shtml] Generated 4/2010	
Question 1.3 Impact on higher trophic levels	B Other Pub. Mat'l back
Identify type of impact or alteration: May reduce forage for livestock and wildlife.	
Rationale: Can invade hay meadows, alfalfa fields, pastures, and rangelands and compete for resources with desirable vegetation.	
Sources of information: Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_commonbugloss.shtml] Generated 4/2010	
Question 1.4 Impact on genetic integrity	D Other Pub. Mat'l back
Identify impacts: Literature does not include any threats to genetic integrity of native species.	
Rationale: No successful hybridization has been observed.	
Sources of information:	

British Columbia - Ministry of Agriculture and Food. common bugloss. [http://www.agf.gov.bc.ca/cropprot/weedguid/bugloss.htm] Generated 4/2010.

USDA-NRCS PLANTS Database. Plants profile for Anchusa officinalis-common bugloss. [http://plants.usda.gov/java/profile?symbol=ANOF] Generated 4/2010.

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

Describe role of disturbance: Disturbance may help A. officinalis become established.

Rationale: Although A. officinalis prefers dry, sandy to gravelly soils, it has invaded established hay meadows and pastures. It is commonly found along roadsides and areas of disturbance.

Sources of information:

British Columbia - Ministry of Agriculture and Food. common bugloss. [http://www.agf.gov.bc.ca/cropprot/weedguid/bugloss.htm] Generated 4/2010.

Question 2.2 Local rate of spread with no management A Other Pub. Mat'l back

Describe rate of spread: High seed production and competitive nature can lead to a rapid rate of spread.

Rationale: An infested area in Washington was 14 square miles. Within 7 years, that infestation grew to 200 square miles. However, there is no indication that the plant community became cover occupied in the report; much less, if any plants were displaced by the infestation.

Sources of information:

Washington State Noxious Weed Board. Information about common bugloss (Anchusa officinalis). 2007. [http://www.nwcb.wa.gov/weed_info/Written_findings/Anchusa_officinalis.html] Generated 4/2010.

Question 2.3 Recent trend in total area infested within state C Other Pub. Mat'l back

Describe trend: Current records indicate that A. officinalis is only in Boulder county.

Rationale: CSU Herbarium records from 1919 - 2004. It is unlikely that this plant has a 100 year lag phase.

Sources of information:

Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=943]

Question 2.4 Innate reproductive potential A Other Pub. Mat'l back

Describe key reproductive characteristics: Reproduces primarily by seed, but can resprout from root fragments.

Rationale: Plants can produce upwards of 900 seeds in a season. Root fragmentation occurs rarely.

Sources of information: Bayer Crop Science Crop Compendium common bugloss - Anchusa officinalis. [http://compendium.bayercropscience.com/bayer/cropscience/cropcompendium/bcscropcomp.nsf/id/EN_Anchusa_officinalis?open&ccm=200030] Generated 4/2010.
Question 2.5 Potential for human-caused dispersal A Other Pub. Mat'l back
Identify dispersal mechanisms: High potential for human-caused dispersal.
Rationale: A. officinalis is cultivated as an ornamental and medicinal plant. Can also be trasported in hay.
Sources of information: Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009. [http://www.oregon.gov/ODA/PLANT/WEEDS/profile_commonbugloss.shtml] Generated 4/2010
Question 2.6 Potential for natural long-distance dispersal C Other Pub. Mat'l back
Identify dispersal mechanisms: Not likely to be transported long distances naturally.
Rationale: Seeds are not 'sticky' like other members of the borage family. Seeds are likely moved about by ants.
Sources of information: Finland Nature and Species. common bugloss-Anchusa officinalis. 2010. [http://www.luontoportti.com/suomi/en/kukkakasvit/common-bugloss] Generated 4/2010.
Question 2.7 Other regions invaded A Other Pub. Mat'l back
Identify other regions: Has invaded irrigated crops, dryland crops, rangelands, pastures, and urban areas outside of its native range.
Rationale: These ecological types exist in Colorado, but have yet to be invaded. A. officinalis is a noxious weed in Washington and Oregon.
Sources of information: Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=943] USDA-NRCS PLANTS Database. Plants profile for Anchusa officinalis-common bugloss. [http://plants.usda.gov/java/profile?symbol=ANOF] Generated 4/2010.
Question 3.1 Ecological amplitude/Range A Other Pub. Mat'l back
Describe ecological amplitude, identifying date of source information and approximate date of introduction to

the state, if known: First documented plant was from Denver in 1914.
Rationale: Has been found only in Boulder county in recent years, but not as large infestations.
Sources of information: Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=943]
Question 3.2 Distribution/Peak frequency D Other Pub. Mat'l back
Describe distribution: Few plants found in disturbed areas.
Rationale: Information provided with herbarium records and PLANTS Database.
Sources of information: Graham and Ackerfield, CSU Herbarium. 2008. [http://wsprod.colostate.edu/cwis440/herbarium/plantinfo.asp?PlantID=943] USDA-NRCS PLANTS Database. Plants profile for Anchusa officinalis-common bugloss. [http://plants.usda.gov/java/profile?symbol=ANOF] Generated 4/2010.
Question 4.1 Poisonous to Livestock C Anecdotal back
Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: Can be poisonous to people and livestock.
Rationale: Flowers and leaves of old plants contain pyrrolizidine alkaloids (cinoglosine) and glikoalkaloids (consolidine), which are poisonous to people and domestic animals.
Sources of information: Evica S. MARKOŠ, Marina S. UZELAC and Milica D. POPOVIĆ. Some Poisonous Plants Around Sombor "Public Pharmacy Sombor", 25000 Sombor, FR Yugoslavia [http://www.amapseec.org/cmapseec.1/papers/pap_p100.htm] Generated 4/2010.
Question 4.2 Detrimental to Economic Crops B Other Pub. Mat'l back
Describe impacts to all aspects of cropping systems (see guidelines): A. officinalis can reduce the quality and value of hay. It can compete for nutrients and water with crops, which can reduce crop yields.
Rationale: Succulent leaves can cause molding in baled hay.
Sources of information: Oregon Dept of Ag. Plant Division Noxious Weed Control common bugloss. 2009.

[http://www.oregon.gov/ODA/PLANT/WEEDS/profile_commonbugloss.shtml] Generated 4/2010 Lincoln County Noxious Weed Control Board (WA). Common and annual bugloss control. [http://www.co.lincoln.wa.us/WeedBoard/controloptions/commonbugloss.pdf] Generated 4/2010.
Question 4.3 Detrimental to Mgmt of Agricultural System, Rangeland and Pasture B Other Pub. Mat'l back
Describe impacts to water diversion systems, increased water use, reduced forage for livestock: Large infestations can have detrimental effects.
Rationale: Competition may reduce forage for livestock, increase water use, and increase inputs necessary to manage lare infestations.
Sources of information: Lincoln County Noxious Weed Control Board (WA). Common and annual bugloss control. [http://www.co.lincoln.wa.us/WeedBoard/controloptions/commonbugloss.pdf] Generated 4/2010. Bayer Crop Science Crop Compendium common bugloss - Anchusa officinalis. [http://compendium.bayercropscience.com/bayer/cropscience/cropcompendium/bcscropcomp.nsf/id/EN_Anchusa_officinalis?open&ccm=200030] Generated 4/2010.
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: Has been found to contain compounds in older leaves and flowers that are poisonous to humans.
Rationale: This is confounding in that this plant is eaten as fresh greens and used medicinally.
Sources of information: Finland Nature and Species. common bugloss-Anchusa officinalis. 2010. [http://www.luontoportti.com/suomi/en/kukkakasvit/common-bugloss] Generated 4/2010. Evica S. MARKOŠ, Marina S. UZELAC and Milica D. POPOVIĆ. Some Poisonous Plants Around Sombor "Public Pharmacy Sombor", 25000 Sombor, FR Yugoslavia [http://www.amapseec.org/cmapseec.1/papers/pap_p100.htm] Generated 4/2010.

Worksheet A

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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	**No: 0 pt**
Fragments easily and fragments can become established elsewhere	**No: 0 pts**
Resprouts readily when cut, grazed, or burned	**Unknown: 0 pts**
	7 pts 2 unknowns
	A (6+ pts)
Note any related traits: enter text here	

Worksheet B - Colorado Ecological Types and Land Use

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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	**Unknown**
	Riparian shrublands	**Unknown**
	Wet meadows	**Unknown**
Grasslands	Shortgrass prairie	**score**
	Tallgrass prairie	**score**
	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	**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	**Yes: 1 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**
	5 pts **Total Unknowns**
	A (4+ pts)
Note any related traits: enter text here	