

**PLANT INVASIVENESS ASSESSMENT FORM**

Botanical name: *Cirsium vulgare* (Savi) Ten

Common name: bull thistle, common thistle, spear thistle

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**Outcome score:**

<b>A. Climatic Comparison</b>		
This species is present or may potentially establish in the following eco-geographic regions:		
1	South Coastal	Yes
2	Interior-Boreal	Yes
3	Arctic-Alpine	Yes
This species is unlikely to establish in any region in Alaska		

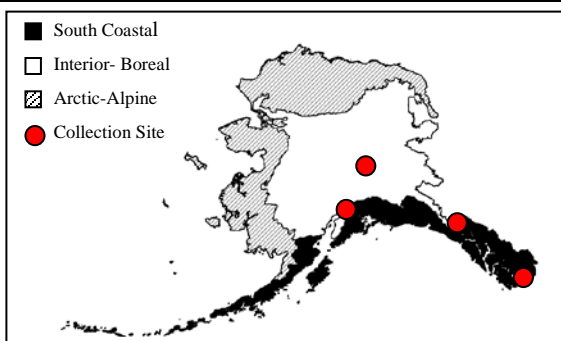
<b>B. Invasiveness Ranking</b>	Total (Total Answered*) Possible	Total	
1	Ecological impact	40 (40)	20
2	Biological characteristic and dispersal ability	25 (23)	19
3	Ecological amplitude and distribution	25 (25)	18
4	Feasibility of control	10 (10)	3
	Outcome score	100 (98) <sup>b</sup>	60 <sup>a</sup>
	Relative maximum score†		0.61

\* For questions answered "unknown" do not include point value for the question in parentheses for "Total Answered Points Possible."

† Calculated as <sup>a/b</sup>.

**A. CLIMATIC COMPARISON:**

1.1 Has this species ever been collected or documented in Alaska?	
Yes	Yes – continue to 1.2
	No – continue to 2.1
1.2. Which eco-geographic region has it been collected or documented (see inset map)? <i>Proceed to Section B. Invasiveness Ranking.</i>	
Yes	South Coastal
Yes	Interior-Boreal
	Arctic-Alpine



**Documentation:** Has been collected in South Coastal Region, at the Haines airport (University of Alaska Museum 2003), Prince of Wales Island (AKEPIC 2003) and in Ketchikan (Hultén 1968); and in Interior-Boreal Region, in Anchorage and Fairbanks (AKEPIC 2003, University of Alaska Museum 2003).

**Sources of information:**

AKEPIC Database. 2003. U.S. Department of the Interior, U.S. Geological Survey, Alaska Geographic Science Office, Anchorage, Alaska, USA URL: <http://agdc.usgs.gov/akepic/> [April 26, 2004].

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

University of Alaska Museum. University of Alaska Fairbanks. 2003.

<http://hispidamuseum.uaf.edu:8080/home.cfm>

2.1. Is there a 40% or higher similarity (based on CLIMEX climate matching) between climates any where the species currently occurs and

a. Juneau (South Coastal Region)?

Yes – record locations and similarity; proceed to Section B. Invasiveness Ranking

No

b. Fairbanks (Interior-Boreal)?

Yes – record locations and similarity; proceed to Section B. Invasiveness Ranking

No

c. Nome (Arctic-Alpine)?

Yes Yes – record locations and similarity; proceed to Section B. Invasiveness Ranking

No

– If “No” is answered for all regions, reject species from consideration

**Documentation:** Using CLIMEX matching program, climatic similarity between Nome and areas where the species is documented is high. Native range of the species includes Røros, Norway, Vytegra, Russia, and Vologda, Russia (Hultén 1968), which has a 76%, 67%, and 63% climatic match with Nome, respectively. Thus establishment of bull thistle in arctic alpine ecogeographic region in Alaska is possible.

**Sources of information:**

CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.

Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

## B. INVASIVENESS RANKING

### 1. ECOLOGICAL IMPACT

#### 1.1. Impact on Natural Ecosystem Processes

- |    |   |    |
|----|---|----|
| A. | No perceivable impact on ecosystem processes  | 0  |
| B. | Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)   | 3  |
| C. | Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)   | 7  |
| D. | Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology; hydrology; or affects fire frequency, altering community composition; species fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species) | 10 |
| U. | Unknown   |    |

Score 

3
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**Documentation:**

Identify ecosystem processes impacted:

Bull thistle is known to retard the establishment and growth of conifers following timber harvest, thus impeding succession (Randall and Rejmáneck 1993), but it is generally associated only with highly degraded habitats.

Rational:

Sources of information:

Randall, J.M. and M. Rejmánek. 1993. Interference of bull thistle (*Cirsium vulgare*) with growth of ponderosa pine (*Pinus ponderosa*) seedlings in a forest plantation. *Canadian J. of Forest Research*. 23: 1507-13.

### 1.2. Impact on Natural Community Structure

- A. No perceived impact; establishes in an existing layer without influencing its structure 0
- B. Influences structure in one layer (e.g., changes the density of one layer) 3
- C. Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer) 7
- D. Major alteration of structure (e.g., covers canopy, eradicating most or all layers below) 10
- U. Unknown

Score 

3
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#### Documentation:

Identify type of impact or alteration:

Bull thistle can maintain high population densities in clearcuts and areas of high grazing disturbance (Zouhar 2002).

Rational:

Sources of information:

Zouhar, K. 2002. *Cirsium vulgare*. In: Fire Effect Information System, (Online). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) Available: <http://www.fs.fed.us/database/feis/> [2004, March 25].

### 1.3. Impact on Natural Community Composition

- A. No perceived impact; causes no apparent change in native populations 0
- B. Influences community composition (e.g., reduces the number of individuals in one or more native species in the community) 3
- C. Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community) 7
- D. Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community) 10
- U. Unknown

Score 

7
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#### Documentation:

Identify type of impact or alteration:

Bull thistle competes with and displaces native species (Bossard et al. 2000).

Rational:

Sources of information:

Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

### 1.4. Impact on higher trophic levels (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades)

- A. Negligible perceived impact 0
- B. Minor alteration 3
- C. Moderate alteration (minor reduction in nesting/foraging sites, reduction in habitat connectivity, interference with native pollinators, injurious components such as spines, toxins) 7
- D. Severe alteration of higher trophic populations (extirpation or endangerment of an existing native species/population, or significant reduction in nesting or foraging sites) 10
- U. Unknown

Score 

7
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#### Documentation:

Identify type of impact or alteration:

Bull thistle displaces native species, including forage species favored by native ungulates such as deer and elk (Bossard et al. 2000). Phenolic acids found in *C. vulgare* may serve as defensive or allelopathic agents. Flavonoids and polyacetylenes

may be toxic to insects and mammals. It is a host for numerous pathogenic fungi and viruses (Klinkhamer and De Jong 1993).

Rational:

Sources of information:

Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

Klinkhamer, P.G.L. and T.J. De Jong. 1993. *Cirsium vulgare* (Savi) Ten. (*Carduus lanceolatus* L., *Cirsium lanceolatum* (L.) Scop., non Hill). Biological flora of the British Isles. Journal of Ecology 81: 177-191.

Total Possible	40
Total	20

## 2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

### 2.1. Mode of reproduction

- A. Not aggressive reproduction (few [0-10] seeds per plant and no vegetative reproduction) 0
- B. Somewhat aggressive (reproduces only by seeds (11-1,000/m<sup>2</sup>) 1
- C. Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed, <1,000/m<sup>2</sup>) 2
- D. Highly aggressive reproduction (extensive vegetative spread and/or many seeded, >1,000/m<sup>2</sup>) 3
- U. Unknown

Score **3**

Documentation:

Describe key reproductive characteristics (including seeds per plant):

Average seed production is nearly 4000 per plant (Rutledge and McLendon 1996). Successful individual may produce up to 8000 seeds (Klinkhamer et al. 1988). Though, losses in the seed stage are severe as a result of herbivory on the flowering stem and seed predation and number of seedlings produced per flowering individual is usually low (Klinkhamer and De Jong 1993). Reproduction is entirely by seed.

Rational:

Sources of information:

Klinkhamer, P.G.L. and T.J. De Jong. 1993. *Cirsium vulgare* (Savi) Ten. (*Carduus lanceolatus* L., *Cirsium lanceolatum* (L.) Scop., non Hill). Biological flora of the British Isles. Journal of Ecology 81: 177-191.

Klinkhamer, P. G., T. J. De Jong, E. van der Meijen. 1988. Production, dispersal and predation of seeds in the biennial *Cirsium vulgare*. Journal of Ecology. 76:403-414.

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.

<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

### 2.2. Innate potential for long-distance dispersal (bird dispersal, sticks to animal hair, buoyant fruits, wind-dispersal)

- A. Does not occur (no long-distance dispersal mechanisms) 0
- B. Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations) 2
- C. Numerous opportunities for long-distance dispersal (species has adaptations such as pappus, hooked fruit-coats, etc.) 3
- U. Unknown

Score **3**

Documentation:

Identify dispersal mechanisms:

Seeds possess a hairy pappus, and are well suited for wind dispersal (Rutledge and

McLendon 1996).  
 Rational:

Sources of information:  
 Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contamination, etc.)

- A. Does not occur 0
- B. Low (human dispersal is infrequent or inefficient) 1
- C. Moderate (human dispersal occurs) 2
- D. High (there are numerous opportunities for dispersal to new areas) 3
- U. Unknown

Score 

3
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Documentation:  
 Identify dispersal mechanisms:  
 Extensive and rapid migration of bull thistle is likely results from the movement of livestock, vehicles, farm machines, and plant products such as seed and hay (Bossard et al. 2000, Rutledge and McLendon 1996, Zouhar 2002).  
 Rational:

Sources of information:  
 Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.  
 Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).  
 Zouhar, K. 2002. *Cirsium vulgare*. In: Fire Effect Information System, (Online). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) Available: <http://www.fs.fed.us/database/feis/> [2004, March 25].

2.4. Allelopathic

- A. No 0
- B. Yes 2
- U. Unknown

Score 

U
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Documentation:  
 Describe effect on adjacent plants:  
 Not known to be allelopathic.  
 Rational:

Sources of information:

2.5. Competitive ability

- A. Poor competitor for limiting factors 0
- B. Moderately competitive for limiting factors 1
- C. Highly competitive for limiting factors and/or nitrogen fixing ability 3
- U. Unknown

Score **3**

**Documentation:**

Evidence of competitive ability:

Bull thistle outcompetes native plant species for water, nutrients, and space (Bossard et al. 2000) and has been termed a “highly competitive weed” (Rutledge and McLendon 1996).

Rational:

Sources of information:

Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California’s wildlands. University of California Press. 360 pp.

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.

<http://www.npwr.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

2.6. Forms dense thickets, climbing or smothering growth habit, or otherwise taller than the surrounding vegetation

- |   |   |
|---|---|
| A. No   | 0 |
| B. Forms dense thickets   | 1 |
| C. Has climbing or smothering growth habit, or otherwise taller than the surrounding vegetation | 2 |
| U. Unknown  |   |

Score **2**

**Documentation:**

Describe grow form:

The plant stem is 2 to 5 feet tall, bearing many spreading branches. In areas of introduction with some grazing densities can be as high as 570 seedling/m<sup>2</sup> (Forcella and Wood 1986, Whitson et al. 2000).

Rational:

Sources of information:

Forcella, F. and H. Wood. 1986. Demography and control of *Cirsium vulgare* (Savi) Ten. in relation to grazing. Weed Research 26:199-206.

Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, R. Parker. 2000. Weeds of the West. The Western Society of Weed Science in cooperation with the Western United States Land Grant Universities, Cooperative Extension Services. University of Wyoming. Laramie, Wyoming. 630 pp.

2.7. Germination requirements

- |  |   |
|--|---|
| A. Requires open soil and disturbance to germinate                                 | 0 |
| B. Can germinate in vegetated areas but in a narrow range or in special conditions | 2 |
| C. Can germinate in existing vegetation in a wide range of conditions              | 3 |
| U. Unknown   |   |

Score **2**

**Documentation:**

Describe germination requirements:

Bull thistle germination is not inhibited by dense cover; however, subsequent seedling survival is reduced. It cannot tolerate dense shade (Klinkhamer and de Jong 1993, Rutledge and McLendon 1996).

Rational:

Sources of information:

Klinkhamer, P.G.L. and T.J. De Jong. 1993. *Cirsium vulgare* (Savi) Ten. (*Carduus lanceolatus* L., *Cirsium lanceolatum* (L.) Scop., non Hill). Biological flora of the British Isles. Journal of Ecology 81: 177-191.

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwr.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

2.8. Other species in the genus invasive in Alaska or elsewhere

- A. No 0
- B. Yes 3
- U. Unknown

Score 

3
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**Documentation:**  
**Species:**  
*Cirsium arvense* (L.) Scop. is declared noxious in nearly all American states and Canadian provinces (Invaders Database System 2003).  
**Sources of information:**  
 Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agriculture. <http://invader.dbs.umt.edu/>  
 USDA (United States Department of Agriculture), NRCS (Natural Resource Conservation Service). 2002. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

2.9. Aquatic, wetland, or riparian species

- A. Not invasive in wetland communities 0
- B. Invasive in riparian communities 1
- C. Invasive in wetland communities 3
- U. Unknown

Score 

0
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**Documentation:**  
**Describe type of habitat:**  
 Bull thistle is most common in recently or repeatedly disturbed areas such as pastures, rangelands, along roads and ditches (Bossard et al. 2000).  
**Rational:**  
  
**Sources of information:**  
 Bossard, C.C., J.M. Randall and M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

Total Possible	23
Total	19

**3. DISTRIBUTION**

3.1. Is the species highly domesticated or a weed of agriculture

- A. No 0
- B. Is occasionally an agricultural pest 2
- C. Has been grown deliberately, bred, or is known as a significant agricultural pest 4
- U. Unknown

Score 

2
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**Documentation:**  
**Identify reason for selection, or evidence of weedy history:**  
 It is a serious weed of pastures and rangelands as well as clearcuts. It is known as a seed contaminant (Bossard et al. 2000, Rutledge and McLendon 1996).  
**Rational:**  
  
**Sources of information:**  
 Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwr.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

3.2. Known level of impact in natural areas

- A. Not known to cause impact in any other natural area 0
- B. Known to cause impacts in natural areas, but in dissimilar habitats and climate zones than exist in regions of Alaska 1
- C. Known to cause low impact in natural areas in similar habitats and climate zones to those present in Alaska 3
- D. Known to cause moderate impact in natural areas in similar habitat and climate zones 4
- E. Known to cause high impact in natural areas in similar habitat and climate zones 6
- U. Unknown

Score 3

**Documentation:**

Identify type of habitat and states or provinces where it occurs:

In the Pacific Northwest, bull thistle invades foothills and dry meadows (Hitchcock and Cronquist 1973). It occurs in riparian areas, clearcuts, and alder flats in the western hemlock-Sitka spruce zones in Washington, in riparian areas and ponderosa pine communities in Oregon (Zouhar 2002). Bull thistle often dominates in clearcuts in redwood and mixed evergreen forests in California (Bossard et al. 2000, Zouhar 2002). It is found in open meadows and ponderosa pine savannas in Colorado (Rutledge and McLendon 1996).

Sources of information:

- Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.
- Hitchcock, C.L., A. Cronquist. 1973. Flora of the Pacific Northwest. Seattle, WA: University of Washington Press. 730 p.
- Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwr.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).
- Zouhar, K. 2002. *Cirsium vulgare*. In: Fire Effect Information System, (Online). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) Available:  
<http://www.fs.fed.us/database/feis/> [2004, March 25].

3.3. Role of anthropogenic and natural disturbance in establishment

- A. Requires anthropogenic disturbances to establish 0
- B. May occasionally establish in undisturbed areas but can readily establish in areas with natural disturbances 3
- C. Can establish independent of any known natural or anthropogenic disturbances 5
- U. Unknown

Score 3

**Documentation:**

Identify type of disturbance:

Disturbance of soil and vegetation increases greatly seedling emergence and establishment of bull thistle. Even small-scale disturbances such as gopher mounds promote bull thistle establishment and survival (Klinkhamer and De Jong 1988). Spread of bull thistle is favored by trampling and soil disturbance (Rutledge and McLendon 1996). It can also colonize areas in relatively undisturbed grasslands, meadows, and forest openings (Bossard et al. 2000).

Rational:

Sources of information:



Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

Klinkhamer, P. G., T. J. De Jong. 1988. The importance of small-scale disturbance for seedling establishment in *Cirsium vulgare* and *Cynoglossum officinale*. *J. of Ecology*. 76:383-392.

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

3.4. Current global distribution

- A. Occurs in one or two continents or regions (e.g., Mediterranean region) 0
- B. Extends over three or more continents 3
- C. Extends over three or more continents, including successful introductions in arctic or subarctic regions 5
- U. Unknown

Score 

5
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**Documentation:**  
 Describe distribution:  
 Bull thistle is native to Europe, from Britain and Iberia northward to Scandinavia, eastward to western Asia, and southward to northern Africa. It is found on every continent except Antarctica (Zouhar 2002).  
 Rational:  
 Zouhar, K. 2002. *Cirsium vulgare*. In: Fire Effect Information System, (Online). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) Available: <http://www.fs.fed.us/database/feis/> [2004, March 25].

3.5. Extent of the species U.S. range and/or occurrence of formal state or provincial listing

- A. 0-5% of the states 0
- B. 6-20% of the states 2
- C. 21-50%, and/or state listed as a problem weed (e.g., "Noxious," or "Invasive") in 1 state or Canadian province 4
- D. Greater than 50%, and/or identified as "Noxious" in 2 or more states or Canadian provinces 5
- U. Unknown

Score 

5
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**Documentation:**  
 Identify states invaded:  
 Bull thistle has been reported in all 50 states and most Canadian provinces (Zouhar 2002). It is considered noxious in 10 states and 2 Canadian provinces (Invaders Database System 2003).  
 Rational:  
 Sources of information:  
 Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agriculture. <http://invader.dbs.umt.edu/>  
 Zouhar, K. 2002. *Cirsium vulgare*. In: Fire Effect Information System, (Online). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer) Available: <http://www.fs.fed.us/database/feis/> [2004, March 25].

Total Possible 

25
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 Total 

18
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4. FEASIBILITY OF CONTROL

#### 4.1. Seed banks

- A. Seeds remain viable in the soil for less than 3 years 0
- B. Seeds remain viable in the soil for between 3 and 5 years 2
- C. Seeds remain viable in the soil for 5 years and more 3
- U. Unknown

Score 0

##### Documentation:

Identify longevity of seed bank:

*Cirsium vulgare* does not accumulate a persistent seedbank (De Jong and Klinkhamer 1988, Klinkhamer and De Jong 1988). Seed dry-stored, at room temperature, for more than 3 years did not germinate (Klinkhamer and De Jong 1993).

Rational:

Sources of information:

de Jong, T.J. and P.G.L. Klinkhamer. 1988. Population ecology of the biennials *Cirsium vulgare* and *Cynoglossum officinale* in a coastal sand-dune area. *Journal of Ecology* 76:366-382.

Klinkhamer, P. G., T. J. De Jong. 1988. The importance of small-scale disturbance for seedling establishment in *Cirsium vulgare* and *Cynoglossum officinale*. *Journal of Ecology*. 76:383-392.

Klinkhamer, P.G.L. and T.J. De Jong. 1993. *Cirsium vulgare* (Savi) Ten. (*Carduus lanceolatus* L., *Cirsium lanceolatum* (L.) Scop., non Hill). Biological flora of the British Isles. *Journal of Ecology* 81: 177-191.

#### 4.2. Vegetative regeneration

- A. No resprouting following removal of aboveground growth 0
- B. Resprouting from ground-level meristems 1
- C. Resprouting from extensive underground system 2
- D. Any plant part is a viable propagule 3
- U. Unknown

Score 0

##### Documentation:

Describe vegetative respond:

Bull thistle propagates only by seed (Bossard et al. 2000).

Rational:

Sources of information:

Bossard, C.C., J.M. Randall, M.C. Hoshovsky. 2000. Invasive plants of California's wildlands. University of California Press. 360 pp.

#### 4.3. Level of effort required

- A. Management is not required (e.g., species does not persist without repeated anthropogenic disturbance) 0
- B. Management is relatively easy and inexpensive; requires a minor investment in human and financial resources 2
- C. Management requires a major short-term investment of human and financial resources, or a moderate long-term investment 3
- D. Management requires a major, long-term investment of human and financial resources 4
- U. Unknown

Score 3

##### Documentation:

Identify types of control methods and time-term required:

Bull thistle will not withstand cultivation. Mechanically cutting the thistles at the soil surface is an effective method of control. A program that involves cutting should be maintained for at least four years. Chemicals can be used to control bull thistle as well (Rutledge and McLendon 1996).

Rational:

Sources of information:

Rutledge, C.R. and Dr. T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97pp. Northern Prairie Wildlife Research Center Home Page.  
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

Total Possible	10
Total	3

<b>Total for 4 sections Possible</b>	<b>98</b>
<b>Total for 4 sections</b>	<b>60</b>

References:

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