

**WEED RISK ASSESSMENT FORM**

Botanical name: *Hordeum jubatum* L.  
 Common name: Foxtail barley  
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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 |

| <b>B.</b> | <b>Invasiveness Ranking</b>                     | Total (Total Answered*)<br>Possible | Total           |
|-----------|---|-------------------------------------|-----------------|
| 1         | Ecological impact                               | 40 (40)                             | 18              |
| 2         | Biological characteristic and dispersal ability | 25 (25)                             | 16              |
| 3         | Ecological amplitude and distribution           | 25 (25)                             | 20              |
| 4         | Feasibility of control                          | 10 (10)                             | 9               |
|           | Outcome score                                   | 100 (100) <sup>b</sup>              | 63 <sup>a</sup> |
|           | Relative maximum score†                         |                                     | 0.63            |

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

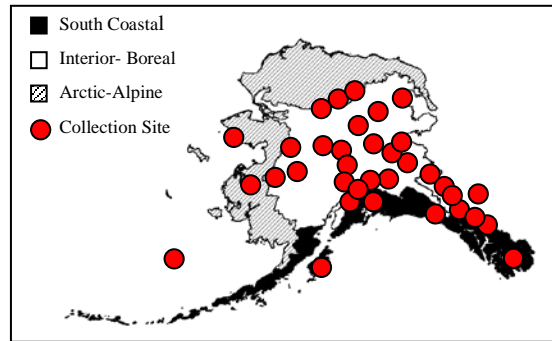
† Calculated as <sup>a</sup>/<sub>b</sub>.

**SPECIAL NOTE - NATIVITY:** *Hordeum jubatum* is native to western North America and has become naturalized in eastern North America, as well as Europe (Hitcock and Cronquest 1971, ITIS 2002, USDA 2002). Judging from herbarium records (University of Alaska Museum 2004), it is most likely to have been present in eastern interior Alaska prior to contact. However, it appears to have spread dramatically in the last half century associated with accelerated human disturbances. Populations in much of Alaska are generally associated with anthropogenic disturbance and are most likely introduced or introgressed genotypes as in *Phalaris arundinacea* in the Pacific Northwest (see Merigliano and Lesica 1998).

Greater study, using molecular and morphological markers and paleoecological study is necessary to tease apart the patterns of nativity of this species in Alaska.

## 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)?<br><i>Proceed to Section B. Invasiveness Ranking.</i> |
| Yes | South Coastal   |
| Yes | Interior-Boreal   |
| Yes | Arctic-Alpine   |



Documentation: *Hordeum jubatum* has been collected in all ecogeographic regions in Alaska (Hultén 1968, UAM 2004).

Sources of information:

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

University of Alaska Museum. University of Alaska Fairbanks. 2004.

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

No

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

Documentation:

Sources of information:

## 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

Documentation:

Identify ecosystem processes impacted:

*Foxtail barley accumulates high amounts of salt in stems and leaves, reducing soil*

salinity (Badger and Ungar 1990, Keiffer and Ungar 2002).

Rational:

Sources of information:

Badger, K.S. and I.A. Ungar. 1990. Effects of soil salinity on growth and ion content of the inland halophyte *Hordeum jubatum*. Botanical Gazette. 151(3): 314-321.

Keiffer, C.H. and I.A. Ungar. 2002. Germination and establishment of halophytes on brine-affected soils. Journal of Applied Ecology. 39: 402-415.

### 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

Documentation:

Identify type of impact or alteration:

Foxtail barley has been observed creating a dense graminoid layer (J. Conn – pers. obs., I. Lapina – pers. obs.).

Rational:

Sources of information:

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

Lapina, I. Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.

### 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 5

Documentation:

Identify type of impact or alteration:

*Hordeum jubatum* was often the dominant species in Ohio where soil salinity averaged about 0.6%. At moderate salinity concentrations, it made up 90% - 100% of the vegetation cover (Badger and Ungar 1990). In Alaska it has been recorded forming large component of the herbaceous vegetation (J. Conn – pers. obs.). These high densities are believed to reduce populations of other grasses and forbs.

Rational:

Sources of information:

Badger, K.S. and I.A. Ungar. 1990. Effects of soil salinity on growth and ion content of the inland halophyte *Hordeum jubatum*. Botanical Gazette. 151(3): 314-321.

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

### 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 |
|---|

**Documentation:**

Identify type of impact or alteration:

In early summer foxtail is palatable to browsing animals. Many waterfowl species eat the seeds and leaves of foxtail barley. In late summer, the sharp-pointed awns may cause damage to the mouth, eyes, and skin of animals. This plant is host for number of viruses (MAFRI 2004, Royer and Dickinson 1999, Tesky 1992, Whitson et al. 2000, Woodcock 1925). *Hordeum jubatum* is interfertile with numerous species, forming hybrids (Hultén 1968, Murry and Tai 1980, Welsh 1974).

Rational:

Sources of information:

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

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Weeds – Foxtail Barley. Available: <http://www.gov.mb.ca/agriculture/crops/weeds/index.html> [November 8, 2004].

Murry, L.E. and W. Tai. 1980. Genome relations of *Agropyron sericeum*, *Hordeum jubatum* and their hybrids. *American Journal of Botany*. 67(9):1374-1379.

Royer, F., and R. Dickinson. 1999. *Weeds of the Northern U.S. and Canada*. The University of Alberta press. 434 pp.

Tesky, J.L. 1992. *Hordeum jubatum*. In: *Fire Effects 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, November 10].

Welsh, S. L. 1974. *Anderson's flora of Alaska and adjacent parts of Canada*. Brigham University Press. 724 pp.

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.

Woodcock, E.F. 1925. Observations on the poisonous plants of Michigan. *American Journal of Botany*. 12(2):116-131.

Total Possible 

|    |
|----|
| 40 |
|----|

Total 

|    |
|----|
| 18 |
|----|

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## 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 

|   |
|---|
| 1 |
|---|

**Documentation:**

Describe key reproductive characteristics (including seeds per plant):

This plant reproduces primarily by seed. Each plant is capable of producing more than

180 seeds (Royer and Dickinson 1999).

Rational:

Sources of information:

Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

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 are dispersed by wind or transported in the hair of animals (Royer and Dickinson 1999, Tesky 1992).

Rational:

Sources of information:

Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

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 |
|---|

Documentation:

Identify dispersal mechanisms:

Foxtail barley has been grown as an ornamental (Tesky 1992). It is also potential crop contaminant (USDA, ARS 2004). This grass has increased in frequency as a response to human activities that increase soil salinity (Badger and Ungar 1994).

Rational:

Sources of information:

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

USDA, ARS, National Genetic Resources Program. *Germplasm Resources Information Network - (GRIN)* [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <http://www.ars-grin.gov/var/apache/cgi-bin/npgs/html/taxon.pl?300618> (November 9, 2004).

Badger, K.S. and I.A. Ungar. 1994. Seed bank dynamics in an inland salt marsh, with special emphasis on the halophyte *Hordeum jubatum* L. *International Journal of Plant Sciences*. 155(1):66-72.

2.4. Allelopathic

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

Score

**Documentation:**  
 Describe effect on adjacent plants:  
 No records are found concerning allelopathy.  
 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

**Documentation:**  
 Evidence of competitive ability:  
 Foxtail barley is capable of dominating sites with high soil salinity, but it is typically a poor competitor with other species at low salinities (Badger and Ungar 1994).  
 Rational:  
 Sources of information:  
 Badger, K.S. and I.A. Ungar. 1994. Seed bank dynamics in an inland salt marsh, with special emphasis on the halophyte *Hordeum jubatum* L. International Journal of Plant Sciences. 155(1):66-72.

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

**Documentation:**  
 Describe grow form:  
 This plant can grow 1 to 2 feet tall (Whitson et al. 2000)  
 Rational:  
 Sources of information:  
 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

**Documentation:**  
 Describe germination requirements:  
 As a pioneer on disturbed sites, foxtail barley is likely adapted to germination in open

soils (Tesky 1992). However, it has been observed in wet meadows without obviously open soils in Alaska (M. Carlson pers. obs.)

Rational:

Sources of information:

Carlson, M. L., Assistant Research Professor - Botany, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2790 – Pers. obs.

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

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

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

Score 

|   |
|---|
| 3 |
|---|

Documentation:

Species:

*Hordeum murinum* L., *H. pusillum* Nutt., and *H. vulgare* considered a weeds in United States (USDA 2002, Whitson et al. 2000).

Sources of information:

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.

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.

2.9. 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 

|   |
|---|
| 3 |
|---|

Documentation:

Describe type of habitat:

Foxtail barley can be found on roadsides and waste areas. It is common also on tidal flats, terraces, and river banks (Hultén 1968, Tesky 1992, Welsh 1974).

Rational:

Sources of information:

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

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

Total Possible 

|    |
|----|
| 23 |
|----|

Total 

|    |
|----|
| 16 |
|----|

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### 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 4

**Documentation:**

Identify reason for selection, or evidence of weedy history:

Foxtail barley is common weed in cultivated fields (MAFRI 2004, Robson et al. 2004). It is also considered a pasture weed because of the damage to animals (Tesky 1992).

Rational:

Sources of information:

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Weeds – Foxtail Barley. Available: <http://www.gov.mb.ca/agriculture/crops/weeds/index.html> [November 8, 2004].

Robson, D.B., J.D. Knight, R.E. Farrell, and J.J. Germida. 2004. Natural revegetation of hydrocarbon-contaminated soil in semi-arid grasslands. *Canadian Journal of Botany*.82: 22-30.

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

**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:

Foxtail barley is known to grow in grasslands throughout the West. It reaches its greatest abundance on the edges of sloughs and salt marshes, grassy slopes, and flatlands of the prairies. It is also abundant in sagebrush margins and irrigated meadows (Tesky 1992).

Sources of information:

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

**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:

Has been observed invading areas with natural disturbances such as flooding and river erosion (J. Conn – pers. obs.). Some types of disturbance, such as overgrazing, mowing, burning, increasing soil salinity and soil contamination increases the density of foxtail barley (Badger and Ungar 1990, Robson et al. 2004, Tesky 1992).

Rational:

Sources of information:



Badger, K.S. and I.A. Ungar. 1990. Effects of soil salinity on growth and ion content of the inland halophyte *Hordeum jubatum*. Botanical Gazette. 151(3): 314-321.

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

Robson, D.B., J.D. Knight, R.E. Farrell, and J.J. Germida. 2004. Natural revegetation of hydrocarbon-contaminated soil in semi-arid grasslands. Canadian Journal of Botany. 82: 22-30.

Tesky, J.L. 1992. *Hordeum jubatum*. In: Fire Effects 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, November 10].

### 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 |
|---|

#### Documentation:

##### Describe distribution:

Foxtail barley is native to western North America that has become naturalized in eastern North America, Europe, and Asia, including arctic and subarctic regions. It is also recorded from Mexico and Great Britain (Hultén 1968, ITIS 2002, USDA 2002).

##### Rational:

##### Sources of information:

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

ITIS – Integrated Taxonomic Information System. 2002. *Hordeum jubatum* L. Available: <http://www.itis.usda.gov/index.html>. [November 10, 2004].

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.

### 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 |
|---|

#### Documentation:

##### Identify states invaded:

The current range of *Hordeum jubatum* includes most of the United States except for the southeastern states (ITIS 2002, USDA 2002). Foxtail barley declared a noxious weed in Manitoba and Quebec (Invaders Database System 2003, USDA 2002).

##### 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/>.

ITIS – Integrated Taxonomic Information System. 2002. *Hordeum jubatum* L. Available: <http://www.itis.usda.gov/index.html>. [November 10, 2004].

USDA (United States Department of Agriculture), NRCS (Natural Resource

|                |    |
|----------------|----|
| Total Possible | 25 |
| Total          | 20 |

#### 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 

|   |
|---|
| 3 |
|---|

##### Documentation:

Identify longevity of seed bank:

Test in Alaska indicated that up to 67% of seeds remained viable during first year in the soil. Germinability decreased with burial and time. Less than 1% of buried seeds remaining viable for up to 7 years (Conn and Deck 1995, Badger and Ungar 1994).

Rational:

Sources of information:

Badger, K.S. and I.A. Ungar. 1994. Seed bank dynamics in an inland salt marsh, with special emphasis on the halophyte *Hordeum jubatum* L. International Journal of Plant Sciences. 155(1):66-72.

Conn, J.S. and R.E. Deck. 1995. Seed viability and dormancy of 17 weed species after 9.7 years of burial in Alaska. Weed Science. 43: 583-585.

##### 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 

|   |
|---|
| 2 |
|---|

##### Documentation:

Describe vegetative response:

Foxtail barley reproduces by seed (MAFRI 2004, Whitson et al. 2000). Reproduction vegetatively by tillering also has been reported (Tesky 1992). Foxtail barley has ability to resprout after mowing or cutting (J. Conn – pers. com.).

Rational:

Sources of information:

Conn, J.S. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Weeds – Foxtail Barley. Available: <http://www.gov.mb.ca/agriculture/crops/weeds/index.html> [November 8, 2004].

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##### 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 

|   |
|---|
| 4 |
|---|

**Documentation:**

Identify types of control methods and time-term required:

One established foxtail barley is hard to eradicate. Re-vegetating disturbed areas with desirable plants and controlling water levels is effective in reducing the amount of foxtail barley (Tesky 1992). This species can be control with herbicides (MAFRI 2004).

Rational:

Sources of information:

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Weeds – Foxtail Barley. Available: <http://www.gov.mb.ca/agriculture/crops/weeds/index.html> [November 8, 2004].

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Total Possible 

|    |
|----|
| 10 |
|----|

Total 

|   |
|---|
| 9 |
|---|

**Total for 4 sections Possible**

|     |
|-----|
| 100 |
|-----|

**Total for 4 sections**

|    |
|----|
| 63 |
|----|

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Carlson, M.L., Assistant Research Professor - Botany, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2790 Pers. obs.

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.

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