

WEED RISK ASSESSMENT FORM

Botanical name:	<i>Descurainia sophia</i> (L.) Webb ex Prantl.	
Common name:	flixweed, herb sophia	
Assessors:	Irina Lapina Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 tel: (907) 257-2710; fax (907) 257-2789	Matthew L. Carlson, Ph.D. Assistant Professor, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska 99501 tel: (907) 257-2790; fax (907) 257-2789
	Michael Shephard Vegetation Ecologist Forest Health Protection State & Private Forestry, 3301 C Street, Suite 202, Anchorage, AK 99503 (907) 743-9454; fax 907 743-9479	Jeff Conn, Ph.D. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184
Reviewers:	Roseann Densmore, Ph.D. Research Ecologist, US Geological Survey, Alaska Biological Science Center, 1101 East Tudor Road Anchorage, AK 99503 tel: (907) 786-3916, fax (907) 786-3636	Julie Riley Horticulture Agent, UAF Cooperative Extension Service 2221 E. Northern Lights Blvd. #118 Anchorage, AK 99508-4143 tel: (907) 786-6306
	Jamie M. Snyder UAF Cooperative Extension Service 2221 E. Northern Lights Blvd. #118 Anchorage, AK 99508-4143 tel: (907) 786-6310 alt.tel: (907) 743-9448	

Outcome score:

A. Climatic Comparison		
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		

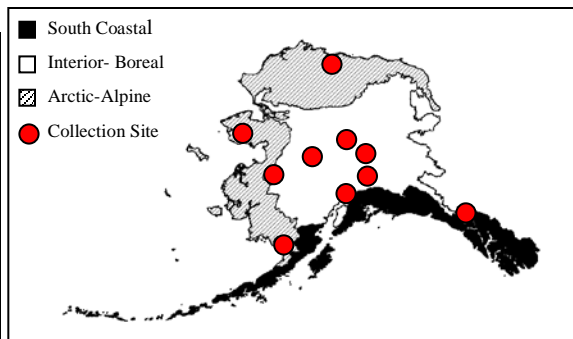
B.	Invasiveness Ranking	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	8
2	Biological characteristic and dispersal ability	25 (25)	13
3	Ecological amplitude and distribution	25 (25)	18
4	Feasibility of control	10 (10)	2
	Outcome score	100 (100) ^b	41
	Relative maximum score [†]		0.41

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

[†] Calculated as ^a/_b.

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
Yes	Arctic-Alpine



Documentation: *Descurainia sophia* has been collected from South Coastal, Interior-Boreal, and Arctic-Alpine ecoregions of 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

0

Documentation:

Identify ecosystem processes impacted:

Flixweed is a pioneer species of disturbed soils, facilitating the establishment of other weedy species. It can form dense stands that become dried, creating a fire hazard. If flixweed stands do not burn, dried plants facilitate cheatgrass establishment (Howard 2003). Nevertheless in Alaska, this species does not tend to invade natural plant communities (M. Carlson – pers. obs., I. Lapina – pers. obs.).

Rational:

Sources of information:

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

Howard, J.L. 2002. *Descurainia sophia*. 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/>
 Lapina, I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.

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

Documentation:

Identify type of impact or alteration:

Flixweed establishes in an existing layer and changes the density of the layer on disturbed sites (I. Lapina – pers. obs., WSSA 2003). No impact on the natural community structure has been documented.

Rational:

Increases total percent cover in open, disturbed sites.

Sources of information:

Lapina I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.
 WSSA – Weed Science Society of America. 2003. Flixweed (*Descurainia sophia*). Available: <http://www.wssa.net/subpages/weed/larrymitich/flixweed.html>. [Nov 24, 2003].

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

Documentation:

Identify type of impact or alteration:

Flixweed has not been observed in undisturbed areas in Alaska - no perceived impact on native populations has been documented (Densmore et al. 2001).

Rational:

Sources of information:

Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 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

Documentation:

Identify type of impact or alteration:

All parts of the plant are poisonous, causing blindness, staggering, and loss of ability to swallow. Flixweed is a larval food for pierid butterflies. It is an alternate host for several viruses (Howard 2003, MAFRI 2004).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].

Total Possible

40

Total

8

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/m²) 1
- C. Moderately aggressive (reproduces vegetatively and/or by a moderate amount of seed, <1,000/m²) 2
- D. Highly aggressive reproduction (extensive vegetative spread and/or many seeded, >1,000/m²) 3
- U. Unknown

Score

3

Documentation:

Describe key reproductive characteristics (including seeds per plant):

Flixweed reproduces entirely by seed. It generally produces 75-650 seeds per plant. Some plants can produce over 700,000 seeds (Howard 2003, Rutledge and McLendon 1996).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>

Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. 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 of flixweed can be dispersed by multiple vectors: wind, water, and animals. It has a mucilaginous seedcoat that sticks to feathers or fur (Howard 2003, WSSA 2003). However, most seed falls near the parent plant (Howard 2003).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>
WSSA – Weed Science Society of America. 2003. Flixweed (*Descurainia sophia*). Available: <http://www.wssa.net/subpages/weed/larrymitich/flixweed.html>. [Nov 24, 2003].

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 2

Documentation:

Identify dispersal mechanisms:

Flixweed is spread by vehicles and machinery (Howard 2003). It is also known as a contaminant in cereal and forage seed (MAFRI 2004, Rutledge and McLendon 1996).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>
MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].
Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

2.4. Allelopathic

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

Score 0

Documentation:

Describe effect on adjacent plants:

None

Rational:

Sources of information:

No records concerning allelopathy.

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 1

Documentation:

Evidence of competitive ability:

Flixweed can be quite competitive with crops for moisture and nutrients, severely reducing crop yields (MAFRI 2004). However, in natural late-seral communities of perennial grasses and forbs, flixweed is a poor competitor (Baker et al. 2003, SAFRR 1984).

Rational:

Sources of information:

Baker, D.V., T.L. Steinke, and S.K. McDonald. 2003. Flixweed *Descurainia sophia*. Colorado State University.

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].

SAFRR - Saskatchewan Agriculture, Food and Rural Revitalization. 1984. Flixweed (*Descurainia sophia*). Available: <http://www.agr.gov.sk.ca/default.asp> [June 29, 2004].

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 1

Documentation:

Describe grow form:

Flixweed tends to form dense and crowded stands up to 3 feet tall (Howard 2003, WSSA 2003). Populations in Alaska are generally dispersed (I. Lapina – pers. obs.).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>

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

WSSA – Weed Science Society of America. 2003. Flixweed (*Descurainia sophia*). Available: <http://www.wssa.net/subpages/weed/larrymitich/flixweed.html>. [Nov 24, 2003].

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 0

Documentation:

Describe germination requirements:

Flixweed requires open soil and disturbance for germination (Densmore et al. 2001).
Rational:

Sources of information:

Densmore, R. V., P. C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

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

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

Score

Documentation:

Species:

Descurainia pinnata (Walt.) Britt. is considered an invasive weed (USDA 2002).

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.

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

Documentation:

Describe type of habitat:

Flixweed has not been observed in undisturbed areas in Alaska - no perceived impact on native populations has been documented (Densmore et al. 2001). It is common in dry, well-drained anthropogenically disturbed areas (e.g., roadsides, railroads, pastures, cultivated areas, old fields) where the native vegetation has been damaged or destroyed (Baker et al. 2003, Howard 2003, MAFRI 2004).

Rational:

Sources of information:

Baker, D.V., T.L. Steinke, and S.K. McDonald. 2003. Flixweed *Descurainia sophia*. Colorado State University.

Howard, J.L. 2002. *Descurainia sophia*. 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/>

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].

Total Possible

Total

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

Documentation:

Identify reason for selection, or evidence of weedy history:
 Flixweed is a serious weed of crops. It has been reported to reduce crop yields drastically (Howard 2003, MAFRI 2004, Royer and Dickinson 1999).
 Rational:

Sources of information:
 Howard, J.L. 2002. *Descurainia sophia*. 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/>
 MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].
 Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

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:
 Flixweed occurs in sagebrush, pinyon, and juniper communities of Washington, Oregon, Nevada, Utah, and California (Howard 2003). This weed may therefore invade Alaska’s sagebrush-steppe communities of the Interior ecogeographic region. Flixweed appears to have little impact on native plant communities and succession processes in Rocky Mountain National Park, Colorado (Rutledge and McLendon 1996).
 Sources of information:
 Howard, J.L. 2002. *Descurainia sophia*. 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/>
 Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

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

1

Documentation:
 Identify type of disturbance:
 Flixweed appears to establish only in areas with non-natural soil disturbance and an open canopy. Intensive grazing makes rangelands vulnerable to flixweed invasion (Howard 2003).
 Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>

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:

Flixweed is native to southern Europe and northern Africa. Its current distribution includes all Nordic countries to 70°N, Siberia, East Asia, South Africa, North and South America, and New Zealand (Howard 2003, Hultén 1968).

Rational:

Sources of information:

Howard, J.L. 2002. *Descurainia sophia*. 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/>

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

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:

Flixweed now occurs in 48 states and throughout Canada. It is classified as a noxious weed in Colorado and Minnesota (USDA 2002).

Rational:

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.

Total Possible

25

Total

18

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 2

Documentation:

Identify longevity of seed bank:

The seed bank of flixweed can be large. Buried seeds remained viable four years or more in interior Alaska (Conn 1990, Densmore et al. 2001).

Rational:

Sources of information:

Conn, J.S. 1990. Seed viability and dormancy of 17 weed species after burial for 4.7 years in Alaska. *Weed Science*. 38: 134-138.

Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

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 response:

Flixweed does not resprout after removal of aboveground growth (Densmore et al. 2001).

Rational:

Sources of information:

Densmore, R. V., P. C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 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 0

Documentation:

Identify types of control methods and time-term required:

Flixweed is not maintained in late-seral communities. It may not require directed control measures (Densmore et al. 2001, Howard 2003). Control can be achieved with mechanical treatment. Seedlings are very sensitive to most herbicides, even at low dosages.

Rational:

Sources of information:

Densmore, R. V., P. C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.

Howard, J.L. 2002. *Descurainia sophia*. 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/>

Total Possible 10

Total

2

Total for 4 sections Possible

100

Total for 4 sections

41

References:

- Baker, D.V., T.L. Steinke, and S.K. McDonald. 2003. Flixweed *Descurainia sophia*. Colorado State University.
- Conn, J.S. 1990. Seed viability and dormancy of 17 weed species after burial for 4.7 years in Alaska. *Weed Science*. 38: 134-138.
- Densmore, R.V., P.C. McKee, C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
- Howard, J.L. 2002. *Descurainia sophia*. 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/>
- Hultén, E. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press, Stanford, CA. 1008 pp.
- Lapina I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.
- MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Pest management – Weeds – Flixweed. Available: <http://www.gov.mb.ca/agriculture/index.shtml> [June 29, 2004].
- Royer, F. and R. Dickinson. 1999. *Weeds of the Northern U.S. and Canada*. The University of Alberta press. 434 pp.
- Rutledge, C.R., and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page. <http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).
- SAFRR - Saskatchewan Agriculture, Food and Rural Revitalization. 1984. Flixweed (*Descurainia sophia*). Available: <http://www.agr.gov.sk.ca/default.asp> [June 29, 2004].
- University of Alaska Museum. University of Alaska Fairbanks. 2003. <http://hispidamuseum.uaf.edu:8080/home.cfm>
- 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.
- WSSA – Weed Science Society of America. 2003. Flixweed (*Descurainia sophia*). Available: <http://www.wssa.net/subpages/weed/larrymitich/flixweed.html>. [Nov 24, 2003].