

WEED RISK ASSESSMENT FORM

Botanical name:	<i>Sonchus arvensis</i> ssp. <i>uliginosus</i> (Bieb.) Nyman		
Common name:	perennial sowthistle, moist sowthistle		
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	
	Reviewers:	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
	Page Spencer, Ph.D. Ecologist, National Park Service, Alaska Region - Biological Resources Team, 240 W. 5th Ave, #114, Anchorage, AK 99501 tel: (907) 644-3448	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	
	Julie Riley Horticulture Agent, UAF Cooperative Extension Service 2221 E. Northern Lights Blvd. #118 Anchorage, AK 99508-4143 tel: (907) 786-6306		

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		No
This species is unlikely to establish in any region in Alaska			

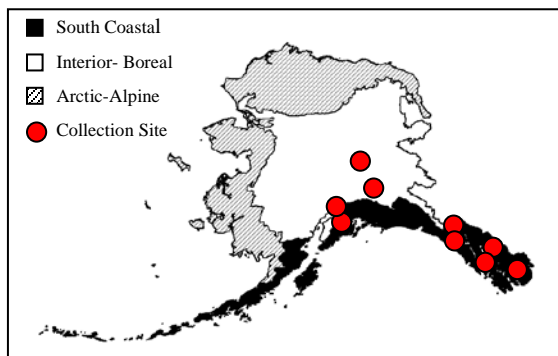
B.	Invasiveness Ranking	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	22
2	Biological characteristic and dispersal ability	25 (25)	21
3	Ecological amplitude and distribution	25 (25)	21
4	Feasibility of control	10 (10)	9
	Outcome score	100 (100) ^b	73 ^a
	Relative maximum score [†]		0.73

* 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
	Arctic-Alpine



Documentation: *Sonchus arvensis* has been collected in South Coastal (Hyder, Hoonah) and Interior-Boreal (Fairbanks, Anchorage, Delta Junction, Palmer) eco-geographic regions (AK Weeds Database 2004, UAM 2004).

Sources of information:

AK Weeds Database. 2004. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database.

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

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. Introduces range of the species includes Anchorage and Fairbanks (AK Weed database 2004) which has a 61% and 56% climatic match with Nome respectively.

However, winter temperatures in Nome are too low for *Sonchus arvensis* (Noxious Weed Control Board 2003). This suggesting that establishment in Arctic-Alpine Alaska may not be possible.

Sources of information:

AK Weeds Database. 2004. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database.

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

Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 2004].

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

5

Documentation:

Identify ecosystem processes impacted:

Perennial sowthistle may modify or retard the successional establishment of native species (Butterfield et al. 1996).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

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:

Perennial sowthistle not been observed in natural communities in Alaska. On disturbed sites it is capable of creating of a new layer (I. Lapina – pers. obs.).

Rational:

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.

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:

At high densities perennial sowthistle has drastically reduced water resources (Zollinger and Kells 1993) and possibly decreased number of plants in communities. Such densities have not been observed in natural communities in Alaska (I. Lapina – pers. obs.).

Rational:

Perennial sowthistle reduced soil moisture by 33% to 47% in field experiments (Zollinger and Kells 1993).

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.

Zollinger, R.K. and J.J. Kells. 1993. Perennial sowthistle (*Sonchus arvensis*) interference in soybean (*Glycine max*) and dry edible bean (*Phaseolus vulgaris*). *Weed Technology* 7: 52-57.

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

3

Documentation:

Identify type of impact or alteration:

Perennial sowthistle is a host of number of plant pests. This plant is acceptable forage for rabbits and other animals (Noxious Weed Control Board 2003).

Rational:

Sources of information:

Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 2004].

Total Possible

40

Total

22

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):

Perennial sowthistle reproduces by seeds and horizontal roots. Each plant can produce 4,000-13,000 seeds (Royer and Dickinson 1999, Rutledge and McLendon 1996, Stevens 1957).

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.

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. Jamestown ND: Northern Prairie Wildlife Research Center Online.

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

Stevens, O.A. 1957. Weights of seeds and numbers per plant. Weeds 5: 46-55.

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 perennial sowthistle possess long hairs and are spread by the wind (Royer and Dickinson 1999, Rutledge and McLendon 1996). Seeds may also become attached to animals (Butterfield et al. 1996).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwr.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

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. Jamestown ND: Northern Prairie Wildlife Research Center Online.
<http://www.npwr.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

Documentation:

Identify dispersal mechanisms:

Seeds of perennial sowthistle can be transported by vehicles and farm equipment. The seeds also often contaminate commercial seeds and hay (Butterfield et al. 1996, Noxious Weed Control Board 2003).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwr.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 2004].

2.4. Allelopathic

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

Score

2

Documentation:

Describe effect on adjacent plants:

Perennial sowthistle inhibits seed germination of native species (Weeds BC 2004).

Rational:

Sources of information:

Weeds BC. 2004. Perennial sow thistle *Sonchus arvensis*. Available:
http://www.weedsbc.ca/weed_desc/per_sow.html [October 29, 2004].

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 2

Documentation:

Evidence of competitive ability:

Perennial sowthistle is competitive for soil water (Zollinger and Kells 1993). It is also considered a vigorous competitor for removing minerals from soil (Lemna and Messersmith 1990).

Rational:

Sources of information:

Lemna, W.K. and C.G. Messersmith. 1990. The biology of Canadian weeds. 94. *Sonchus arvensis* L. Canadian Journal of Plant Science 70: 509-532.
Zollinger, R.K. and J.J. Kells. 1993. Perennial sowthistle (*Sonchus arvensis*) interference in soybean (*Glycine max*) and dry edible bean (*Phaseolus vulgaris*). Weed Technology 7: 52-57.

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:

Perennial sowthistle can grow 2 to 4 feet tall (Whitson et al. 2000). In Alaska it usually does not form dense stands (I. Lapina – pers. obs.).

Rational:

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.
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 3

Documentation:

Describe germination requirements:

Seedlings emerge and survival is best in areas with plant cover or litter. Achenes require a continual water supply for germination. Seedlings emerged from less than one inch seeding depth have higher rate of survival and establishment (Hakansson and Wallgren 1972).

Rational:

Sources of information:

Hakansson, S. and B. Wallgren. 1972. Experiments with *Sonchus arvensis* L. II. Reproduction, plant development and response to mechanical disturbance. Swedish Journal of Agricultural Research 2: 3-14.

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

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

Score

Documentation:

Species:

Sonchus arvensis ssp. *uliginosus* (Bieb.) Nyman, *S. asper* (L.) Hill, *S. oleraceus* L. (Whitson et al. 2000).

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.

2.9. 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:

Perennial sowthistle is common in gardens, cultivated crops, roadsides, and fertile waste areas (Rutledge and McLendon 1996, Whitson et al. 2000). It may occur on disturbed sites of meadows, beaches, ditches, and river and lake shores (Butterfield et al. 1996, Gubanov et al. 1995, Noxious Weed Control Board 2003).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.

<http://www.npwr.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

Gubanov, I.A., K.B. Kiseleva, B.C. Novikov, B.N. Tihomirov. 1995. Flora of vascular plants of Center European Russia. Moscow. Argus. 558 pp.

Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 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. Jamestown ND: Northern Prairie Wildlife Research Center Online.

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

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.

Total Possible

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:

Perennial sowthistle is common weed of gardens and cultivated fields (Gubanov et al. 1995, Rutledge and McLendon 1996, Whitson et al. 2000).

Rational:

Sources of information:

Gubanov, I.A., K.B. Kiseleva, B.C. Novikov, B.N. Tihomirov. 1995. Flora of vascular plants of Center European Russia. Moscow. Argus. 558 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. Jamestown ND: Northern Prairie Wildlife Research Center Online.

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

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.

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

4

Documentation:

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

Perennial sowthistle is ranked as exotic plant with a moderate impact on natural communities in Pipestone National Monument in Minnesota. It is found in mid-successional sites that have been disturbed in the last 11 to 50 years (Butterfield et al. 1996). It is found in Rocky Mountain National Park of Colorado (Rutledge and McLendon 1996).

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

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. Jamestown ND: Northern Prairie Wildlife Research Center Online.

<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 3

Documentation:

Identify type of disturbance:

Perennial sowthistle requires disturbances to establish (Butterfield et al. 1996). This species will likely invade steep slopes, riparian banks, and loss slopes (J. Conn – pers. com., M. Shephard – pers. com.).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

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

Shephard, M., Vegetation Ecologist, USDA, Forest Service, Forest Health Protection, State and Private Forestry, 3301 C Street, Suite 202, Anchorage, Alaska 99503 Division. Tel: (907) 743-9454 - Pers. com.

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:

Perennial sowthistle is native to Europe, western Asia, and Iceland. It has spread widely throughout the northern United States and southern Canada. The plant has also established in South America, Australia, and New Zealand (Noxious Weed Control Board 2003).

Rational:

Sources of information:

Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 2004].

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:

Perennial sowthistle has spread widely throughout the northern United States and southern Canada (USDA 2002). It is noxious weed in 20 states of the United States and 5 Canadian provinces. It is declared federal noxious weed in US and Canada (Invader Database System 2003, Royer and Dickinson 1999). It is a prohibited noxious weed in Alaska (Alaska Administrative Code 1987).

Rational:

Sources of information:

Alaska Administrative Code. Title 11, Chapter 34. 1987. Alaska Department of Natural Resources. Division of Agriculture.
Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agricultural. <http://invader.dbs.umt.edu/>
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
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	21

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:

Seeds of perennial sowthistle may remain dormant in the soil for up to five years. Most of seeds germinate the first year. Viability in subsequent years is commonly low (Roberts and Neilson 1981).

Rational:

Sources of information:

Robert, H.A. and J.E. Neilson. 1981. Seed survival and periodicity of seedling emergence in twelve weedy species of Compositae. *Annals of Applied Biology* 97: 325-334.

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:

Perennial sowthistle is capable of producing new plants from rhizomes (Royer and Dickinson 1999, Rutledge and McLendon 1996).

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.
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. Jamestown ND: Northern Prairie Wildlife Research Center Online.
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

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:

Biological, chemical, and mechanical control methods have been used on perennial sowthistle. Mechanical treatment for several years should be done few times a season to reduce seed production and root reserves. This weed is relatively resistant to many common broadleaf herbicides (Butterfield et al. 1996, Rutledge and McLendon 1996).

Rational:

Sources of information:

Butterfield, C., J. Stubbendieck, and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).

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. Jamestown ND: Northern Prairie Wildlife Research Center Online.
<http://www.npwrc.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).

Total Possible

10

Total

9

Total for 4 sections Possible

100

Total for 4 sections

73

References:

Alaska Administrative Code. Title 11, Chapter 34. 1987. Alaska Department of Natural Resources. Division of Agriculture.
 AK Weeds Database. 2004. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database.
 Butterfield, C., J. Stubbendieck and J. Stumpf. 1996. Species abstracts of highly disruptive exotic plants. Jamestown, ND: Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/exoticab/exoticab.htm> (Version 16JUL97).
 CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.

- Gubanov, I.A., K.B. Kiseleva, B.C. Novikov and B.N. Tihomirov. 1995. Flora of vascular plants of Center European Russia. Moscow. Argus. 558 pp.
- Hakansson, S. and B. Wallgren. 1972. Experiments with *Sonchus arvensis* L. II. Reproduction, plant development and response to mechanical disturbance. Swedish Journal of Agricultural Research 2: 3-14.
- Invaders Database System. The University of Montana. 2003. Montana Noxious Weed Trust Fund. Department of Agricultural. <http://invader.dbs.umt.edu/>
- Lapina, I., Botanist, Alaska Natural Heritage Program, University of Alaska Anchorage, 707 A Street, Anchorage, Alaska. Tel: (907) 257-2710 – Pers. obs.
- Lemna, W.K. and C.G. Messersmith. 1990. The biology of Canadian weeds. 94. *Sonchus arvensis* L. Canadian Journal of Plant Science 70: 509-532.
- Noxious Weed Control Board. Washington State. 2003. Perennial sowthistle (*Sonchus arvensis* L. ssp. *arvensis*). Available: <http://www.nwcb.wa.gov/INDEX.htm> [October 7, 2004].
- Robert, H.A. and J.E. Neilson. 1981. Seed survival and periodicity of seedling emergence in twelve weedy species of Compositae. Annals of Applied Biology 97: 325-334.
- 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. Jamestown ND: Northern Prairie Wildlife Research Center Online. <http://www.npwr.usgs.gov/resource/othrdata/explant/explant.htm> (Version 15DEC98).
- Stevens, O.A. 1957. Weights of seeds and numbers per plant. Weeds 5: 46-55.
- 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.
- Weeds BC. 2004. Perennial sow thistle *Sonchus arvensis*. Available: http://www.weedsbc.ca/weed_desc/per_sow.html [October 29, 2004].
- Whitson, T.D., L.C. Burrill, S.A. Dewey, D.W. Cudney, B.E. Nelson, R.D. Lee and 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.
- Zollinger, R.K. and J.J. Kells. 1993. Perennial sowthistle (*Sonchus arvensis*) interference in soybean (*Glycine max*) and dry edible bean (*Phaseolus vulgaris*). Weed Technology 7: 52-57.