WEED RISK ASSESSMENT FORM

Botanical name: *Spergula arvensis* L.

Common name: Corn spurry

Assessors:

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Outcome score:

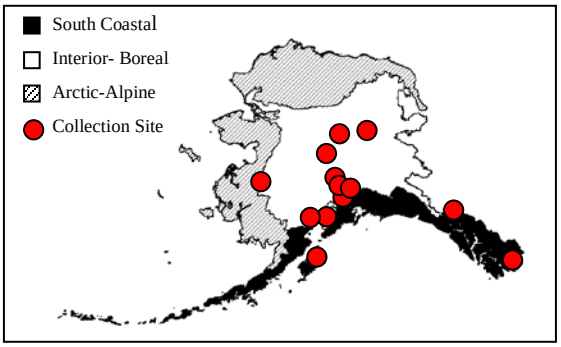
A.	**Climatic Comparison**		
	This species is present or may potentially establish in the following eco-geographic regions:		
1	South Coastal	Yes	
2	Interior-Boreal	Yes	
3	Arctic-Alpine	Yes	

B.	**Invasiveness Ranking**	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	2
2	Biological characteristic and dispersal ability	25 (25)	11
3	Ecological amplitude and distribution	25 (25)	14
4	Feasibility of control	10 (10)	5
	Outcome score	100 (100)[b]	32 [a]
	Relative maximum score†		0.32

* 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)? *Proceed to Section B. Invasiveness Ranking.*
Yes	South Coastal
Yes	Interior-Boreal
	Arctic-Alpine



Documentation: *Spergula arvensis* has been documented in South Coastal and Interior Boreal ecogeographic regions of Alaska (Weeds of Alaska Database 2005, Hultén 1968, UAM 2004, Welsh 1974).
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://hispida.museum.uaf.edu:8080/home.cfm
Weeds of Alaska Database. 2005. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database. Available: http://akweeds.uaa.alaska.edu/
Welsh, S. L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.

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: The CLIMEX computer matching program indicates the climatic similarity between Arctic Alpine ecogeographic region of Alaska and areas where *Spergula arvensis* has been documented is moderately high. These species' ranges include Røros and Dombås, Norway (Lid and Lid 1994), which have a 76% and 63% climatic match with Nome. *Spergula arvensis* is known to occur in arctic regions of Norway and Greenland (Lid and Lid 1994, Natur Historiska Riksmuseet Database 2005) Thus establishment of corn spurry in the Arctic-Alpine ecogeographic region is likely.
Sources of information: CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.
Lid, J. and D. T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.
Natur Historiska Riksmuseet Database. 2005. Available from: http://www.nrm.se/wise/

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:
Corn spurry has not been observed in undisturbed areas in Alaska (UAM 2006, Weeds of Alaska Database 2006). It is unlikely that measurable impacts to ecosystem processes occur due to its presence.
Rational:

Sources of information:
University of Alaska Museum. University of Alaska Fairbanks. 2006. http://hispida.museum.uaf.edu:8080/home.cfm
Weeds of Alaska Database. 2005. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database. Available: http://akweeds.uaa.alaska.edu/

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 0

Documentation:
Identify type of impact or alteration:
Corn spurry establishes in an existing layer and very likely increases the density of the layer (Mann 1934) in ruderal or roadside plant communities. No impact on the natural community structure has been documented.
Rational:

Sources of information:
Mann, H.H. 1939. The weed herbage of a slightly acid arable soil. The Journal of Ecology 27: 89-113.

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 0

Documentation:
Identify type of impact or alteration:
Corn spurry has not been observed in undisturbed areas in Alaska (UAM 2006, Weeds of Alaska Database 2006); no perceived impacts on native populations has been documented.
Rational:

Sources of information:
University of Alaska Museum. University of Alaska Fairbanks. 2006. http://hispida.museum.uaf.edu:8080/home.cfm
Weeds of Alaska Database. 2005. Database of exotic vegetation collected in Alaska. University of Alaska, Alaska Natural Heritage Program – US Forest Service – National Park Service Database. Available: http://akweeds.uaa.alaska.edu/

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 2

Documentation:
Identify type of impact or alteration:
Corn spurry is readily eaten by livestock and poultry and likely can be used by wildlife species as a food. Corn spurry is an alternate host for a number of viruses (Royer and

Dickinson 1999). Flowers of corn spurry are self-pollinating, nevertheless bees, solitary wasps, and syrphids are occasionally seen visiting the flowers (New 1961).
Rational:

Sources of information:
New, J.K. 1961. Spergula arvensis L. The Journal of Ecology 49: 205-215.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Total Possible	40
Total	2

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

Score 3

Documentation:
Describe key reproductive characteristics (including seeds per plant):
Corn spurry reproduces by seed. An average plant can produce 2,000 to 7,000 seeds (New 1961, Trivedi and Tripathi 1982a, b).
Rational:

Sources of information:
New, J.K. 1961. Spergula arvensis L. The Journal of Ecology 49: 205-215.
Trivedi, S. and R.S. Tripathi. 1982a. The effect of soil texture and moisture on reproductive strategies of *Spergula arvensis* L. and *Plantago major* L. Weed Research 22: 41-49.
Trivedi, S. and R.S. Tripathi. 1982b. Growth and reproductive strategies of two annual weeds as affected by soil nitrogen and density levels. New Phytologist 91: 489-500.

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 1

Documentation:
Identify dispersal mechanisms:
Seeds do not tend to spread long distances naturally. Occasionally they can be carried in digestive tracts of deer, or on animal's fur (New 1961, Guide to Weeds in British Columbia 2002).
Rational:

Sources of information:
Guide to weeds in British Columbia. 2002. British Columbia, Ministry of Agriculture, Food and Fisheries, Open Learning Agency. Available: http://www.weedsbc.ca/resources.html [April 23, 2006].
New, J.K. 1961. Spergula arvensis L. The Journal of Ecology 49: 205-215.

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 can contaminate soil and crop seed (Volkart 1924, Board 1952, Guide to Weeds in British Columbia 2002). Seeds can also be spread by vehicles or in mud on agricultural equipment (New 1961).
Rational:

Sources of information:
Broad, P.D. 1952. The occurrence of weed seeds in samples submitted for testing by the O.S.T.S. Journal of the National Institute of Agricultural Botany 6: 275-286.
Guide to weeds in British Columbia. 2002. British Columbia, Ministry of Agriculture, Food and Fisheries, Open Learning Agency. Available: http://www.weedsbc.ca/resources.html [April 23, 2006].
New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.
Volkart, A. 1924. Report on the determination of provenance of clover and grass seeds. Report of the 4th International Seed Testing Conference. Pp. 83-97.

2.4. Allelopathic

A.	No	0
B.	Yes	2
U.	Unknown	

Score 2

Documentation:
Describe effect on adjacent plants:
Corn spurry causes strong inhibition of germination and growth of crops (Harrison and Peterson 1997, Peterson et al. 1998).
Rational:

Sources of information:
Harrison, H.F., Jr. and J.K. Peterson. 1997. Inhibitory effects of corn spurry (*Spergula arvensis* L.) on cole crops and English pea. Allelopathy Journal 4: 283-290.
Peterson, J.K., M.E. Snook, H. F. Harrison, Jr and P.F. Mason. 1998. Isolation and structural identification of sucrose esters from corn spurrey (*Spergula arvensis*); inhibition of seed germination. Journal of Chemical Ecology 24: 1803-1816.

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 0

Documentation:
Evidence of competitive ability:
Corn spurry has never been observed in closed plant community. It is very susceptible to shade and is a less effective competitor than perennial species (Fenner 1978a, b).
Rational:
In an experiment by Fenner (1978b) the growth rate of corn spurry was higher in bare

soil when compared to short and tall turf.
Sources of information:
Fenner, M. 1978a. Susceptibility to shade in seedlings of colonizing and closed turf species. New Phytologist 81: 739-744.
Fenner, M. 1978b. A comparison of the abilities of colonizers and closed-turf species to establish from seed in artificial swards. Journal of Ecology 66: 953-963.

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 0

Documentation:
Describe grow form:
Although corn spurry is capable of forming a dense stand, up to 7,000 seedlings per sq. yd (Mann 1939) it is a short plant and does not have a climbing or smothering growth habit (Welsh 1974, Royer and Dickinson 1999, Whitson et al. 2000).
Rational:

Sources of information:
Mann, H.H. 1939. The weed herbage of a slightly acid arable soil. The Journal of Ecology 27: 89-113.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
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.

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:
Germination of corn spurry is markedly higher in bare soil compared to turf (Fenner 1978b).
Rational:
About 43% of seeds germinated in bare soil, 35% in short turf, and 10% in tall turf of *Festuca rubra* in experiment (Fenner 1978b).
Sources of information:
Fenner, M. 1978b. A comparison of the abilities of colonizers and closed-turf species to establish from seed in artificial swards. Journal of Ecology 66: 953-963.

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

A.	No	0
B.	Yes	3
U.	Unknown	

Score 0

Documentation:
Species:
Other species of *Spergula* have been introduced into North America but none of them

appears to be weedy (USDA, NRCS 2006).
Sources of information:
USDA, NRCS. 2006. *The PLANTS Database*, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. 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

Documentation:
Describe type of habitat:
Corn spurry is a plant of disturbed open habitats. It typically occurs on cultivated fields (Royer and Dickinson 1999, Guide to Weeds in British Columbia 2002), roadsides, and sometimes sea-shore (New 1961).
Rational:

Sources of information:
Guide to weeds in British Columbia. 2002. British Columbia, Ministry of Agriculture, Food and Fisheries, Open Learning Agency. Available: http://www.weedsbc.ca/resources.html [April 23, 2006].
New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.

Total Possible 25
Total 11

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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:
Corn spurry has been found as a weed in cultivated wheat, oats, and flax (New 1961). Records of fossil seeds suggest that corn spurry has been a common weed of flax from Iron Age (Jessen and Helbaek 1944 cited in New 1961).
Rational:

Sources of information:
Jessen, K. and H. Helbaek. 1944. Cereal and weeds in Great Britain and Ireland in prehistoric and early historic times. K. danske vidensk. Selsk. Biol. Skr., 3: 1-68.
New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.

3.2. Known level of ecological 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 0

Documentation:
Identify type of habitat and states or provinces where it occurs:
Corn spurry has been recorded only in disturbed habitats (New 1961). It is not known to cause an impact in any natural areas.
Sources of information:
New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.

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 0

Documentation:
Identify type of disturbance:
Corn spurry requires bare soil for successful establishment (Fenner 1978a, b).
Rational:

Sources of information:
Fenner, M. 1978a. Susceptibility to shade in seedlings of colonizing and closed turf species. New Phytologist 81: 739-744.
Fenner, M. 1978b. A comparison of the abilities of colonizers and closed-turf species to establish from seed in artificial swards. Journal of Ecology 66: 953-963.

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:
Corn spurry originated from Eurasia. It occurs throughout Europe and also in Asia, North and South Africa, North and South America, Australia, and New Zealand (Hultén 1968). It has been recorded in the Arctic Circle (Natur Historiska Riksmuseet Database 2005).
Rational:

Sources of information:
Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.
Natur Historiska Riksmuseet Database. 2005. Available from: http://www.nrm.se/wise/

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:

Corn spurry is found in most American States, and nearly all Canadian provinces (Royer and Dickinson 1999, USDA, NRCS 2006). *Spergula arvensis* is declared Noxious in Alberta and Quebec (Rice 2006).
Rational:

Sources of information:
Rice, P.M. 2006. INVADERS Database System (http://invader.dbs.umt.edu). Division of Biological Sciences, University of Montana, Missoula, MT 59812-4824.
Royer, F., and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
USDA, NRCS. 2006. *The PLANTS Database*, Version 3.5 (http://plants.usda.gov). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Total Possible	25
Total	14

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 corn spurry have been reported to remain viable for 6 -8 years in formerly cultivated soil (Chippindale and Milton 1934, Roberts and Feast 1973).Viability of seeds was 18% after 6.7 years, and less than 1% after 9.7 years in a seed viability experiment conducted in Fairbanks, Alaska (Conn and Deck 1995). Seeds of corn spurry were found viable after 22 years in soil beneath pastures (Chippindale and Milton 1934).
Rational:

Sources of information:
Chippindale, H.G. and W.E.J. Milton. 1934. On the viable seeds present in the soil beneath pasture. The Journal of Ecology 22(2): 508-531.
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.
Roberts, H.A. and P.M. Feast. 1973. Emergence and longevity of seeds of annual weeds in cultivated and undisturbed soil. The Journal of Applied Ecology 10(1): 133-143.

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:
Corn spurry is able to produce new branches and often bear flowers and seeds when plants are cut off 2-3 nodes from the ground (New 1961).
Rational:

Sources of information:
New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.

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:

Mechanical methods (hand pulling, hoeing, or grazing) before seeds set can be successful in control of corn spurry. Control actions must be repeated as soil disturbance induces germination of dormant seeds. Chemicals can be used, but corn spurry is resistant to several herbicides. Biocontrol methods are not developed (New 1961, Guide to Weeds in British Columbia 2002). Liming significantly reduces the density of corn spurry in field (Mann 1939).

Rational:

Sources of information:

Guide to weeds in British Columbia. 2002. British Columbia, Ministry of Agriculture, Food and Fisheries, Open Learning Agency. Available: http://www.weedsbc.ca/resources.html [April 23, 2006].

Mann, H.H. 1939. The weed herbage of a slightly acid arable soil. The Journal of Ecology 27: 89-113.

New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.

Total Possible	10
Total	5

Total for 4 sections Possible	100
Total for 4 sections	32

References:

Broad, P.D. 1952. The occurrence of weed seeds in samples submitted for testing by the O.S.T.S. Journal of the National Institute of Agricultural Botany 6: 275-286.

Chippindale, H.G. and W.E.J. Milton. 1934. On the viable seeds present in the soil beneath pasture. The Journal of Ecology 22(2): 508-531.

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

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.

Fenner, M. 1978a. Susceptibility to shade in seedlings of colonizing and closed turf species. New Phytologist 81: 739-744.

Fenner, M. 1978b. A comparison of the abilities of colonizers and closed-turf species to establish from seed in artificial swards. Journal of Ecology 66: 953-963.

Guide to weeds in British Columbia. 2002. British Columbia, Ministry of Agriculture, Food and Fisheries, Open Learning Agency. Available: http://www.weedsbc.ca/resources.html [April 23, 2006].

Harrison, H.F., Jr. and J.K. Peterson. 1997. Inhibitory effects of corn spurry (*Spergula arvensis* L.) on cole crops and English pea. Allelopathy Journal 4: 283-290.

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

Jessen, K. and H. Helbaek. 1944. Cereal and weeds in Great Britain and Ireland in prehistoric and early historic times. K. danske vidensk. Selsk. Biol. Skr., 3: 1-68.

Lid, J. and D. T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.

Mann, H.H. 1939. The weed herbage of a slightly acid arable soil. The Journal of Ecology 27: 89-113.

Natur Historiska Riksmuseet Database. 2005. Available from: http://www.nrm.se/wise/

New, J.K. 1961. *Spergula arvensis* L. The Journal of Ecology 49: 205-215.

Peterson, J.K., M.E. Snook, H. F. Harrison, Jr and P.F. Mason. 1998. Isolation and structural identification of sucrose esters from corn spurrey (*Spergula arvensis*); inhibition of seed germination. Journal of Chemical Ecology 24: 1803-1816.

Rice, P.M. 2006. INVADERS Database System (http://invader.dbs.umt.edu). Division of Biological Sciences, University of Montana, Missoula, MT 59812-4824.

Roberts, H.A. and P.M. Feast. 1973. Emergence and longevity of seeds of annual weeds in cultivated and undisturbed soil. The Journal of Applied Ecology 10(1): 133-143.

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