WEED RISK ASSESSMENT FORM

Botanical and common name:	*Silene noctiflora* L night-flowering catchfly, *S. latifolia* ssp. *alba* L. white cockle, *S. vulgaris* (Moench) Garcke bladder campion, *S. dioica* (L.) Clairville red catchfly

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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)	13
2	Biological characteristic and dispersal ability	25 (25)	9
3	Ecological amplitude and distribution	25 (25)	13
4	Feasibility of control	10 (10)	7
	Outcome score	100 (100)[b]	42 [a]
	Relative maximum score†		0.42

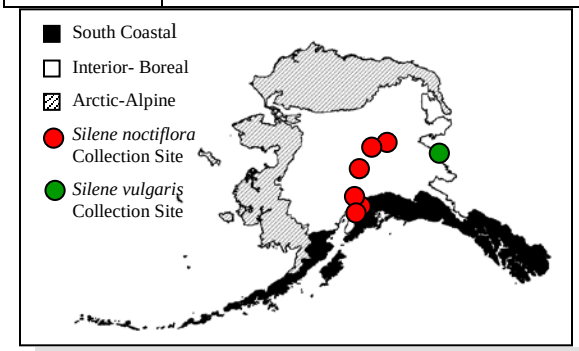
* For questions answered "unknown" do not include point value for the question in parentheses for "Total Answered Points Possible."

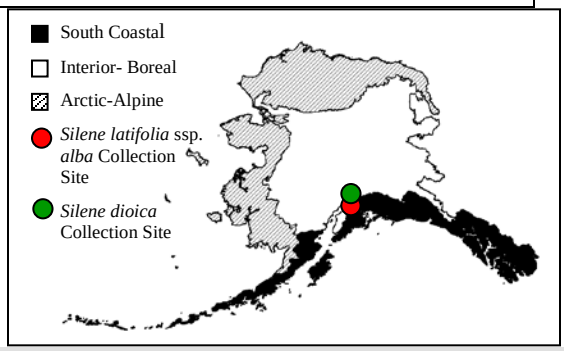
† Calculated as [a]/[b].

SPECIAL NOTE: A number of *Silene* species have been introduced to Alaska. Because these species share similar biological and ecological attributes we treat each species description, distribution and abundance separately, but combine the discussion of ecological impacts and control methods.

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*.
	South Coastal
Yes	Interior-Boreal
	Arctic-Alpine





Documentation: *Silene noctiflora* has been collected from Fairbanks, Anchorage, Healy, and the Kenai Peninsula (Hultén 1968, UAM 2004). Although this species is reported by Hultén (1968) from Nome and Juneau, these specimens appear to be misidentified (McNeill 1980). *Silene vulgaris* has been documented from the Yukon Territory in the vicinity of Dawson (Cody 1996, UAM 2004).

Documentation: *Silene latifolia* ssp. *alba* has been documented from Eklutna Valley and the Matanuska and Susitna valleys in Alaska (AK Weed Database 2004, UAM 2004). *Silene dioica* has been collected from Palmer, Alaska (AK Weed Database 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. Available: http://akweeds.uaa.alaska.edu/

Cody, W.J. 1996. Flora of the Yukon Territory. Eastern Cereal and Oilseed Research Centre Research Branch, Agriculture and Agri-Food Canada, Ottawa, Ontario. NRC Research Press. 643 p.

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

McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.

University of Alaska Museum. University of Alaska Fairbanks. 2003. http://hispida.museum.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 – 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 Alaska and areas where *Silene noctiflora, S. latifolis* ssp. *alba, S. vulgaris,* and *S. dioica* are 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; they have been collected from Bergen, Norway which has a 73% climatic match with Juneau. *Silene latifolia* ssp. *alba* and *S. dioica* also have been documented from arctic and subarctic Norway and Finland (Lid and Lid 1994, Thompson 1975). Thus establishment of these non-native *Silene* species in Arctic-Alpine and South Coastal ecogeographic regions 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.
Thompson, P.A. 1975. Characterization of the germination responses of *Silene dioica* (L.) Clairv., Populations from Europe. Annals of Botany 39(159): 1-19.

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:
Silene species occupy disturbed ground and likely hinders colonization by native species. These weeds can decrease soil moisture and nutrient availability (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.

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:
These species have been observed in the existing layer of vegetation in disturbed areas (I. Lapina – pers. obs.). Red catchfly is capable of forming almost complete monocultures on bare soil (Matlack and Harper 1986).
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.
Matlack, G.R. and J.L. Harper. 1986. Spatial distribution and the performance of individual plants in a natural population of *Silene dioica*. Oecologia 70: 121-127.

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 2

Documentation:
Identify type of impact or alteration:
These species compete for moisture, nutrients, and sunlight in pastures and crowd native plants (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.

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 5

Documentation:
Identify type of impact or alteration:
Grazing animals find *Silene* species unpalatable. These plants are alternate hosts for numerous viruses (Royer and Dickinson 1999). Hybrids of *S. dioica* and *S. latifolia* ssp. *alba* have been collected in Canada (Douglas and MacKinnon 1998). The flowers of most *Silene* species open in the evening and are moth-pollinated. Red catchfly flowers open during the day and are typically pollinated by bees or butterflies (McNeill 1978).
Rational:

Sources of information:
Douglas, G.W. and A. MacKinnon. Caryophyllaceae. In: Douglas, G.W., G. B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Decotyledons (Balsaminaceae through Cuscutaceae). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. p 230-304.
McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.
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	13

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/m²) 3

U. Unknown

Score 3

Documentation:

Describe key reproductive characteristics (including seeds per plant):

Silene species reproduce primarily by seed. Each plant of night-flowering catchfly is capable of producing up to 2,600 seeds. White cockle plant produces over 24,000 seeds (Royer and Dickinson 1999) and red catchfly plants produced more than 4,500 seeds in an experimental garden in Britain (Kay et al. 1984).White campion and bladder campion are able to reproduce vegetativley by root and stem fragments (Whitson et al. 2000).

Rational:

Sources of information:

Kay, Q.O.N., A.J. Lack, F.C. Bamber, C.R. Davies. 1984. Differences between sexes in floral morphology, nectar production and insect visits in a dioecious species, *Silene dioica*. New Phytologist 98(3): 515-529.

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

2.2. 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 0

Documentation:

Identify dispersal mechanisms:

Most seeds fall from the parent plant to the ground (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, 2005].

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:

Seeds are very similar to those of crop clovers and are difficult to separate. Consequently, seed impurities have been a major source of dispersal. Seeds also are

capable of germination after passing through the digestive tract of domestic animals (McNeill 1980, Royer and Dickinson 1999, Whitson et al. 2000).
Rational:

Sources of information:
McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 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.

2.4. Allelopathic

A.	No	0
B.	Yes	2
U.	Unknown	

Score 0

Documentation:
Describe effect on adjacent plants:
There are no records of allelophathy.
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 1

Documentation:
Evidence of competitive ability:
Silene species can rapidly colonize disturbed sites and compete with other vegetation (Royer and Dickinson 1999) however; cultivated field experiments demonstrated that bladder campion did not compete well with alfalfa and barley (Wall and Morrison 1990).
Rational:
Bladder campion and red catchfly tolerate high concentrations of copper, nickel, zinc, lead, and air pollution and are highly adapted to water and nutrient deficient conditions (Brooks and Crooks 1980, Leopold et al. 1999, Wierzbicka and Paufnik 1998).
Sources of information:
Brooks, R.R. and H.M. Crooks. 1980. Studies on uptake of heavy metals by the Scandinavian ‘kisplanten’ *Lychnis alpina* and *Silene dioica*. Plant and Soil 54: 491-496.
Leopold, I., D.Günther, J. Schmidt, D. Neumann. 1999. Phytochelatins and heavy metal tolerance. Phytochemistry 50: 1323-1328.
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
Wierzbicka, M. and D. Panufnik. 1998. The adaptation of *Silene vulgaris* to growth on a calamine waste heap (S. Poland). Environmental Pollution 101: 415-426.
Wall, D.A. and I.N. Morrison. 1990. Competition between *Silene vulgaris* (Moench) Garcke and alfalfa (*Medicago sativa* L.). Weed Research 30: 145-151.

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:
Silene species can grow up to 3 feet tall, but are not characterized by a climbing or smothering growth habit (Douglas and MacKinnon 1998, Royer and Dickinson 1999, Whitson et al. 2000).
Rational:

Sources of information:
Douglas, G.W. and A. MacKinnon. Caryophyllaceae. In: Douglas, G.W., G. B. Straley, D. Meidinger, and J. Pojar, editors. Volume 2. Dicotyledons (Balsaminaceae through Cuscutaceae). Illustrated flora of British Columbia. British Columbia: Ministry of Environment, Lands and Parks, Ministry of Forest; 1998. p 230-304.
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 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 0

Documentation:
Describe germination requirements:
Buried seeds germinate readily after soil disturbance (Guide to Weeds in British Columbia 2002). Some populations may require light for germination.
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, 2005].

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

A. No 0
B. Yes 3
U. Unknown

Score 3

Documentation:
Species:
The genus *Silene* consists of a number of serious agricultural weeds (Royer and Dickinson 1999, Whitson et al. 2000).
Sources of information:
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 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.

2.9. 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:

These plants are important weeds of pastures, grain fields, and gardens. They are also found along highways, railroad tracks, and in waste places (Gubanov et al. 2003, McNeill 1980, Royer and Dickinson 1999).

Rational:

Sources of information:

Gubanov IA, Kiseleva KV, Novikov VS, Tihomirov VN. An Illustrated identification book of the plants of Middle Russia, Vol. 2: Angiosperms (dicots: archichlamydeans). Moscow: Institute of Technological Researches; 2003. 666 p.

McNeill, J. 1980. The biology of Canadian weeds. 46. Silene *noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.

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 9

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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 3

Documentation:

Identify reason for selection, or evidence of weedy history:

Silene species are found in most agricultural areas of United States and Canada, they are important weeds particularly of grain and leguminous crops (Royer and Dickinson 1999, McNeill 1980, Whitson et al. 2000).

Rational:

Sources of information:

McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.

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

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 0

Documentation:
Identify type of habitat and states or provinces where it occurs:
Silene species are known as agricultural weeds but have not been reported to impact natural habitats (Royer and Dickinson 1999, Whitson et al. 2000).
Sources of information:
Royer, F. and R. Dickinson. 1999. Weeds of the Northern U.S. and Canada. The University of Alberta press. 434 pp.
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.

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:
Silene species can colonize open ground. Buried seeds remain viable and germinate and establish easily after soil disturbance (Guide to Weeds in British Columbia 2002, Matlack and Harper 1986).
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, 2005].
Matlack, G.R. and J.L. Harper. 1986. Spatial distribution and the performance of individual plants in a natural population of *Silene dioica*. Oecologia 70: 121-127.

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:
The native range of *Silene* species extends accross Europe and southwest Asia. They are now found throughout Canada and the United States with the exception of Alabama, Arkansas, Hawaii, Nevada, Arizona, South Carolina, Tennessee, and Texas (USDA 2002). *Silene noctiflora* has been recorded from Australia and Greenland (McNeill 1980). *Silene noctiflora* and *S. dioica* have been recorded from arctic Norway and Finland (Lid and Lid 1994, Thompson 1975).
Rational:

Sources of information:
Lid, J. and D.T. Lid. 1994. Flora of Norway. The Norske Samlaget, Oslo. Pp. 1014.
McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.

Thompson, P.A. 1975. Characterization of the germination responses of *Silene dioica* (L.) Clairv., Populations from Europe. Annals of Botany 39(159): 1-19.
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:
Night-flowering catchfly, white cockle, and bladder campion are declared Federal noxious weeds in Canada. These species are also listed as weeds in Connecticut, Wisconsin, and Washington (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.

Total Possible 25
Total 13

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4. FEASIBILITY OF CONTROL

4.1. Seed banks

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

Score 3

Documentation:
Identify longevity of seed bank:
Seeds of night-flowering catchfly and bladder campion can remain viable in the soil for at least 5 years (Chepil 1946). Seeds of red catchfly older than 2 years normally do not germinate (Carlsson-Graner et al. 1998).
Rational:

Sources of information:
Carlsson-Graner, U., T. Elmqvist, J. Ågren, H. Gardfjell, and P. Ingvarsson. 1998. Floral sex ratios, disease and seed set in dioecious *Silene dioica*. Journal of Ecology 86: 79-91.
Chepil, W.S. 1946. Germination of weed seeds. I. Longevity, periodicity of germination, and vitality of seeds in cultivated soil. Scientific agriculture 26: 307-346.

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 1

Documentation:
Describe vegetative response:
White campion and bladder campion can resprout from root and stem fragments (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.

4.3. Level of effort required

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

Score 3

Documentation:
Identify types of control methods and time-term required:
Mowing or burning is unlikely to control *Silene* species because of its large seed bank. Cultivation usually increases the infestation by facilitating the spread of *Silene*. Herbicides provide limited control, as these species are resistant or somewhat resistant to many common herbicides. No biological control agent is available (Guide to weeds in British Columbia 2002, McNeill 1980).
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, 2005].
McNeill, J. 1980. The biology of Canadian weeds. 46. *Silene noctiflora* L. Canadian Journal of Plant Science 60: 1243-1253.

Total Possible 10
Total 7

Total for 4 sections Possible 100
Total for 4 sections 42

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