WEED RISK ASSESSMENT FORM

Botanical name: *Medicago sativa* ssp. *falcata* (L.) Arcang.

Common name: yellow alfalfa

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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	

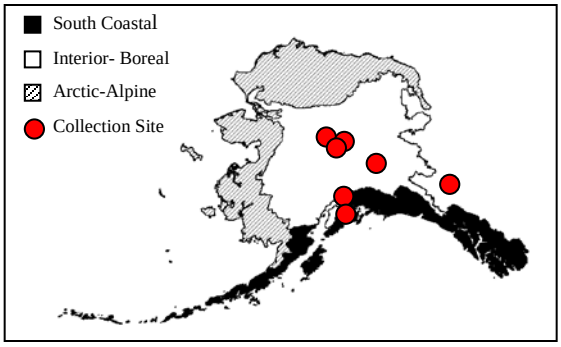
B.	**Invasiveness Ranking**	Total (Total Answered*) Possible	Total
1	Ecological impact	40 (30)	15
2	Biological characteristic and dispersal ability	25 (25)	17
3	Ecological amplitude and distribution	25 (19)	15
4	Feasibility of control	10 (10)	7
	Outcome score	100 (84)[b]	54 [a]
	Relative maximum score†		0.64

* 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:
Medicago sativa ssp. *falcata* has been collected in South-Coastal (Seward, Exit Glacier) and Interior-Boreal (Anchorage, Fairbanks, Wasilla, Palmer, Gakona, Haines Junction) ecogeographic regions in Alaska (Weeds of Alaska Database 2005, Hultén 1968, UAM 2005).
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. 2005. 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/

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 matching program indicates the climatic similarity between Nome and areas where yellow alfalfa is well established is moderately high. The range of yellow alfalfa includes Røros, Norway, Zlatoust, and Kirov, Russia (Gubanov et al. 2003, Hultén 1968). The climate of these cities has a 76%, 71%, and 66% match with Nome, respectively. The similar climates suggest that the establishment of yellow alfalfa in Arctic-Alpine eco-geographic region of Alaska may be possible.
Sources of information:
CLIMEX for Windows, Version 1.1a. 1999. CISRO Publishing, Australia.
Gubanov, I.A., K.V. Kiseleva, V.S. Novikov, V.N. Tihomirov. 2003. An illustrated identification book of the plants of Middle Russia, Vol.2: Angiosperms (dicots: archichlamydeans). Moscow. Institute of Technological Researches; 666 p.
Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.

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:
Yellow alfalfa in symbiosis with the bacteria *Rhizobia*, increases soil nitrogen levels by fixing atmospheric nitrogen (USDA 2002). The alteration of soil condition may facilitate colonization by other plant species. Alfalfa increases the growth of aspen seedlings (Powell and Bork 2004). In Saskatchewan ranchlands seeded with alfalfa were susceptible to regrowth of aspen and prickly rose (*Rosa acicularis*) (Bowes 1981,

Sullivan 1992).
Rational:

Sources of information:
Bowes, G.G. 1982. Changes in the yield of forage following the use of herbicides to control aspen poplar. Journal of Range Management. 35: 246-248.
Powell, G.W. and E.W. Bork. 2004. Competition and facilitation in mixtures of aspen seedlings, alfalfa, and marsh reedgrass. Can. J. For. Res. 34: 1858-1869.
Sullivan, Janet. 1992. *Medicago sativa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].
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.

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:
Yellow alfalfa establishes in an existing layer of vegetation and subsequently increases the density of the layer (I. Lapina – pers. obs., Klett et al. 1984, Duebbert et al. 1981). There are no records concerning the elimination of existing layers of vegetation by the presence of alfalfa.
Rational:

Sources of information:
Duebbert, H.F., E.T. Jacobson, K.F. Higgins, and E.B. Podoll. Establishment of seeded grasslands for wildlife habitat in the prairie pothole region. Special Scientific Report – Wildlife No. 234. Washington, D.C.: U.S. Department of the Interior, Fish and Wildlife Service; 1981. 21 p.
Klett, A.T., H.F. Duebbert, and G.L. Heismeyer. 1984. Use of seeded native grasses as nesting cover by ducks. Wildlife Society Bulletin, 12: 134-138.
Lapina, L., 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 U

Documentation:
Identify type of impact or alteration:
Documentation specific to the alteration of community composition was not found in this review.
Rational:

Sources of information:

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:

27 species of birds and 46 mammals are known to use alfalfa (Graham 1941). Yellow alfalfa is consumed by most big game animals, including moose and mule deer (Kufeld 1973, Leach 1956). Many small mammals, including marmots, mice, and ground squirrels graze alfalfa. Waterfowl such as the American wigeon and mallards eat the leaves, flowers, or seeds. Seeds are also consumed by rodents, rabbits, and upland birds. Yellow alfalfa is a source of nectar and pollen for insects (Stanton 1974, Graham 1941) and it is particularly attractive to solitary bees (Carlson – pers. obs.). Dabbling ducks (mallards, blue-winged teals, northern pintail, northern shovelers, and American wigeons) will nest in yellow alfalfa stands (Klett et al. 1984). Undisturbed alfalfa fields provide food and cover for a variety of birds, including sharp-tailed grouse, American bitterns, marsh hawks, short-eared owls, and passerines (Duebbert et al. 1981). Alfalfa is a host for numerous pathogens (Sullivan 1992).

Rational:

Sources of information:

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

Duebbert, H.F., Jacobson, E.T., Haggins, K.F., Podoll, E.B. 1981. Establishment of seeded grasslands for wildlife habitat in the prairie pothole region. Special Scientific Report-Wildlife No. 234. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 21 p.

Graham, E.H. 1941. Legumes for erosion control and wildlife. Misc. Publ. 412. Washington, DC: U.S. Department of Agriculture. 153 p.

Klett, A.T., H.F. Duebbert, G.L. Heismeyer. 1984. Use of seeded native grasses as nesting cover by ducks. Wildlife Society Bulletin. 12: 134-138.

Kufeld, R.C. 1973. Foods eaten by the Rocky Mountain elk. Journal of Range Management. 26: 106-113.

Leach, H.R. 1956. Food habits of the Great Basin deer herds of California. California Fish and Game. 38: 243-308.

Stanton, F. 1974. Wildlife guidelines for range fire rehabilitation. Tech. Note 6712. Denver, CO: U.S. Department of the Interior, Bureau of Land Management. 90 p.

Sullivan, Janet. 1992. *Medicago sativa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

Total Possible 30

Total 15

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):
Yellow alfalfa reproduces by seed only (USDA 2002). The mean number of seed produced by an individual plant has been documented at 5,320 (Stevens 1932).
Rational:

Sources of information:
Stevens, O.A. 1932. The number and weight of seeds produced by weeds. American Journal of Botany 19: 784-794.
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.

2.2. 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 2

Documentation:
Identify dispersal mechanisms:
Yellow alfalfa seeds are large and not easily dispersed. Herbivores likely facilitate the spread of the plant's seeds (Duebbert et al. 1981, Kufeld 1973, Leach 1956).
Rational:

Sources of information:
Duebbert, H.F., Jacobson, E.T., Haggins, K.F., Podoll, E.B. 1981. Establishment of seeded grasslands for wildlife habitat in the prairie pothole region. Special Scientific Report-Wildlife No. 234. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service. 21 p.
Kufeld, R.C. 1973. Foods eaten by the Rocky Mountain elk. Journal of Range Management. 26: 106-113.
Leach, H.R. 1956. Food habits of the Great Basin deer herds of California. California Fish and Game. 38: 243-308.

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:
Yellow alfalfa is cultivated worldwide and is used in erosion-control projects, for rangeland and wildlife habitat restoration, and for hay production. The utility of the plant probably contributes to its spread (Klett et al. 1984, McLean et al. 1971).
Rational:

Sources of information:
Klett, A.T., H.F. Duebbert, G.L. Heismeyer. 1984. Use of seeded native grasses as nesting cover by ducks. Wildlife Society Bulletin. 12: 134-138.
McLean, A., T.M. Lord, A.J. Green. 1971. Utilization of the major plant communities in the Similkameen Valley, British Columbia. Journal of Range Management. 24: 346-142.

2.4. Allelopathic

A.	No	0
B.	Yes	2
U.	Unknown	

Score 0

Documentation:
Describe effect on adjacent plants:
Yellow alfalfa is not allelophathic (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.

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 3

Documentation:
Evidence of competitive ability:
Yellow alfalfa seedlings have faster root extension and greater total root length than other perennial legumes (Bell 2004). Established alfalfa plants can be very competitive (Sullivan 1992). However, in Saskatchewan ranchlands seeded with alfalfa were outcompeted by aspen and prickly rose (*Rosa acicularis*) (Bowes 1981).
Rational:

Sources of information:
Bell, L.W. 2004. Relative growth rate, resource allocation and root morphology in the perennial legumes, *Medicago sativa*, *Dorycnium rectum* and *D. hirsutum* grown under controlled conditions. Plant and Soil. 0: 1-13.
Bowes, G.G. 1982. Changes in the yield of forage following the use of herbicides to control aspen poplar. Journal of Range Management. 35: 246-248.
Sullivan, Janet. 1992. *Medicago sativa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

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:
Yellow alfalfa can grow very densely from 3 to 5 feet high and can be taller than surrounding forbs and grasses (USDA 2002, 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.
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.

2.7. 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:
Although seed germination can be inhibited by the presence of pine and juniper litter (Sullivan 1992), seeding undisturbed rangelands and woodlands can be successful (MAFRI 2004).
Rational:

Sources of information:
MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Crops, Alfalfa seed production. Available: http://www.gov.mb.ca/agriculture/index.shtml [October 4, 2005].
Sullivan, Janet. 1992. *Medicago sativa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

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

A. No 0
B. Yes 3
U. Unknown

Score 3

Documentation:
Species:
Medicago sativa ssp. *sativa* L., *Medicago lupulina* L., *M. polymorpha* L., M. minima (L.) L. (USDA 2002, Royer and Dickinson 1999, Hultén, E. 1968).
Sources of information:
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.

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:
Yellow alfalfa has established along roadsides, in waste areas, (Hitchcock and Cronquist 1973, Hultén 1968) and active and abandoned agricultural fields (Royer and Dickinson 1999). It is not known to invade wetlands or riparian communities.
Rational:

Sources of information:
Hitchcock, C. L., A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle and London. 730 p.
Hultén, E. 1968. Flora of Alaska and Neighboring Territories. Stanford University Press, Stanford, CA. 1008 p.
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 17

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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:
Yellow alfalfa is one of the most widely grown forage crops in the world (Powell and Bork 2004, Sullivan 1992). A number of agricultural varieties have been developed.
Rational:

Sources of information:
Powell, G.W. and E.W. Bork. 2004. Competition and facilitation in mixtures of aspen seedlings, alfalfa, and marsh reedgrass. Can. J. For. Res. 34: 1858-1869.
Sullivan, Janet. 1992. *Medicago sativa*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

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 U

Documentation:
Identify type of habitat and states or provinces where it occurs:
Ecological impact of yellow alfalfa is unknown.
Sources of information:

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:

Yellow alfalfa readily establishes on natural rangelands and burned areas (MAFRI 2004). This species failed to establish in areas disturbed by grazing (Sullivan 1992, Smith 1963).

Rational:

Sources of information:

MAFRI - Manitoba Agriculture, Food and Rural Initiatives. 2004. Crops, Alfalfa seed production. Available: http://www.gov.mb.ca/agriculture/index.shtml [October 4, 2005].

Smith, J.G. 1963. A subalpine grassland seeding trial. Journal of Range Management. 16: 208-210.

Sullivan, Janet. 1992. Medicago sativa. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

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:

Yellow alfalfa is native to southwestern Asia and northern Africa (USDA, ARS 2005). It was first cultivated in Iran, and now has a worldwide distribution as an agricultural crop (Sullivan 1992).

Rational:

Sources of information:

Sullivan, Janet. 1992. Medicago sativa. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].

USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/var/apache/cgi-bin/npgs/html/taxon.pl?300618 [October 5, 2005].

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:

Yellow alfalfa is planted in all 50 states and is widely planted in Canada (USDA 2002, Sullivan 1992).
Rational:

Sources of information:
Sullivan, Janet. 1992. Medicago sativa. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2005, October 4].
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	19
Total	15

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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:
A study on the longevity of crop and weed seeds showed that seeds of alfalfa remain for 20 years in soil (Lewis 1973).
Rational:

Sources of information:
Lewis, J. 1973. Longevity of crop and weed seeds: survival after 20 years in soil. Weed Research. 13: 179-191.

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:
Alfalfa is capable of sprouting from stumps. In Utah, increased herbivore access was correlated with increased lateral shoots sprouting (Rosenstock and Stevens 1989).
Rational:

Sources of information:
Rosenstock, S.S. and R. Stevens. 1989. Herbivore effects on seeded alfalfa at four pinyon-juniper sites in central Utah. Journal of Range Management 42: 483-490.

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 2

Documentation:

Identify types of control methods and time-term required:

Control measures have not been developed due to the value of this plant as an agricultural crop. It is known to persist on fields that were previously cultivated for forage or hay (Royer and Dickinson 1999). Alfalfa is susceptible to herbicides (Bowes 1982, Cogliastro et al. 1990).

Rational:

Sources of information:

Bowes, G.G. 1982. Changes in the yield of forage following the use of herbicides to control aspen poplar. Journal of Range Management 35: 246-248.

Cogliastro, A., D. Gagnon, D. Coderre, P. Bhereur. 1990. Response of seven hardwood tree species to herbicide, rototilling, and legume cover at two southern Quebec plantation sites. Canadian Journal of Forestry. 20: 1172-1182.

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

Total Possible	10
Total	7

Total for 4 sections Possible	84
Total for 4 sections	54

References:

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