

WEED RISK ASSESSMENT FORM

Botanical name: *Marticaia discoidea* DC.

Common name: disc mayweed, pineappleweed

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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
This species is unlikely to establish in any region in Alaska		

B. Invasiveness Ranking	Total (Total Answered*) Possible	Total	
1	Ecological impact	40 (40)	6
2	Biological characteristic and dispersal ability	25 (25)	9
3	Ecological amplitude and distribution	25 (25)	11
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:

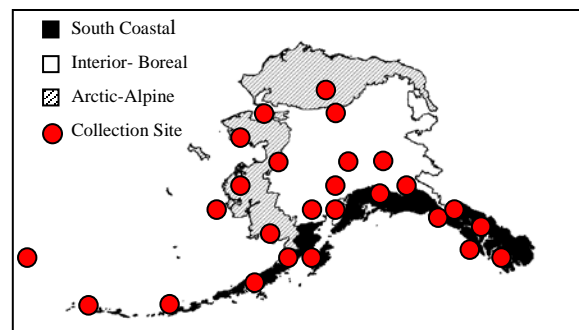
1.1 Has this species ever been collected or documented in Alaska?

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
 Yes Arctic-Alpine



Documentation: *Marticularia discoidea* has been collected in Fairbanks, Anchorage, Iditarod, Seward, Juneau, Kodiak, Baird Inlet (Hultén 1968, University of Alaska Museum 2003, Welsh 1974). Has been observed in Denali National Park and Preserve, Kenai Fjords National Park, Katmai National Park and Preserve, and Wrangell-St. Elias National Park and Preserve (Densmore 2001, Fubrish 2001), and in right-of-way of the Trans Alaska Pipeline (McKendrick 1987).

Sources of information:

Densmore, R.V., P.C. McKee and C. Roland. 2001. Exotic plants in Alaskan National Park Units.

Fubrish C.E. 2001. Exotic Plant Survey of the Chilkoot Trail Unit, Klondike Gold Rush National Historical Park.

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

McKendrick, J.D. 1987. Plant succession on disturbed sites, North Slope, Alaska, U.S.A. Arctic and Alpine Research. 19 (4): 554-565.

University of Alaska Museum. University of Alaska Fairbanks. 2003.

<http://hispidamuseum.uaf.edu:8080/home.cfm>

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 – record locations and similarity; proceed to Section B. Invasiveness Ranking

No

– If “No” is answered for all regions, reject species from consideration

Documentation:

Sources of information:

B. INVASIVENESS RANKING

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes

- | | |
|--|----|
| A. No perceivable impact on ecosystem processes | 0 |
| B. Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability) | 3 |
| C. Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl) | 7 |
| D. Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology; hydrology; or affects fire frequency, altering community composition; species fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species) | 10 |
| U. Unknown | |

Score

1

Documentation:

Identify ecosystem processes impacted:

Though pineappleweed is only found in highly disturbed environments (Densmore et al. 2001, Hultén 1968, Welsh 1974) it has potential for retardation succession after sites have been cultivated (J. Conn pers. comm.).

Rational:

Sources of information:

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200

Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184 – Pers. comm.

Densmore, R.V., P.C. McKee and C. Roland. 2001. Exotic plants in Alaskan National Park Units.

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

Welsh, S.L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 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 1

Documentation:

Identify type of impact or alteration:

Pineappleweed establishes in an existing layer and changes the density of the layer (M.L. Carlson – pers. obs., I. Lapina – pers. obs.).

Rational:

Increases total percent cover in open, disturbed sites

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.

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 0

Documentation:

Identify type of impact or alteration:

None

Rational:

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

Sources of information:

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

1.4. Impact on higher trophic levels (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades)

- A. Negligible perceived impact 0
- B. Minor alteration 3
- C. Moderate alteration (minor reduction in nesting/foraging sites, reduction in habitat connectivity, interference with native pollinators, injurious components such as spines, toxins) 7
- D. Severe alteration of higher trophic populations (extirpation or endangerment of an existing native species/population, or significant reduction in nesting or foraging sites) 10
- U. Unknown

Score

3

Documentation:

Identify type of impact or alteration:

Pineappleweed may have possible minor alterations due to disease transference (Royer and Dickinson 1999).

Rational:

Pineappleweed has been reported as an alternate host for raspberry Scottish leaf curl virus (Royer and Dickinson 1999).

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

40

Total

5

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):

Pineappleweed reproduces by seeds only. Single plant is capable of producing as much as 850 fruits (Stevens 1932).

Rational:

Sources of information:

Stevens, O.A. 1932. The number and weight of seeds produced by weeds. American Journal of Botany 19(9): 784-789.

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 are gelatinous when wet. Seeds may be dispersed by rainwash (Rutledge and McLendon 1996).

Rational:

Sources of information:

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. 97pp. Northern Prairie Wildlife Research Center Home Page.

<http://www.npwr.usgs.gov/resource/othrdata/explant/explant.html> (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

Documentation:

Identify dispersal mechanisms:

Fruits disperse in mud attached to motor vehicles, can contaminate topsoil (Baker 1974, Densmore et al. 2001, Hodkinson and Thompson 1997).

Rational:

Sources of information:

Baker, H.G. 1974. The evolution of weeds. Annual Review of Ecology and Systematics 5: 1-24.

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

Hodkinson, D. and K. Thompson. 1997. Plant dispersal: the role of man. Journal of Applied Ecology, 34: 1484-1496.

2.4. Allelopathic

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

Score

Documentation:

Describe effect on adjacent plants:

None

Rational:

Sources of information:

No records about allelopathy potential

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

Documentation:

Evidence of competitive ability:

Pineappleweed does not compete with native species (Densmore et al. 2001, Royer and Dickinson 1999).

Rational:

Pineappleweed does not persist in areas with moderate percent cover of other plants

Sources of information:

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

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

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

Documentation:

Describe grow form:

Pineappleweed is an annual with leafy stems up to 1 foot tall. Usually it does not form dense stands and if formed they do not shade other species (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.

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

Documentation:

Describe germination requirements:

Pineappleweed requires open soil and disturbance to germinate. Disturbance is necessary for breaking of seed dormancy (Densmore et al. 2001).

Rational:

Sources of information:

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

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

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

Score

Documentation:

Species:

None

Sources of information:

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:

Pineappleweed can be found in grains fields, farms, farm yards, waste places and roadsides (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. 97 pp. Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

Total Possible	25
Total	9

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:

Pineappleweed is a weed of cultivated fields (Rutledge and McLendon 1996). This is the most common weed in Alaska (J.Conn pers. com.).

Rational:

Sources of information:

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

Rutledge, C.R. and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

3.2. 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

1

Documentation:

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

Pineappleweed appears to be having minor effects on native communities in Rocky Mountain National Park, Colorado (Rutledge and McLendon 1996).

Sources of information:

Rutledge, C.R. and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

3.3. Role of anthropogenic and natural disturbance in establishment

- A. Requires anthropogenic disturbances to establish 0
- B. May occasionally establish in undisturbed areas but can readily establish in areas with natural disturbances 3

- C. Can establish independent of any known natural or anthropogenic disturbances 5
- U. Unknown

Score

0

Documentation:

Identify type of disturbance:

Soil disturbance breaks seed dormancy. Plants emerge from sites altered by construction or trampling, especially if the area has a history of previous human use (Densmore et al. 2001).

Rational:

Sources of information:

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

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:

Pineappleweed is a native of Western North America now it is found in Europe, Asia, Greenland, Iceland, S. America, and New Zealand (Hultén 1968).

Rational:

Sources of information:

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

3.5. Extent of the species U.S. range and/or occurrence of formal state or provincial listing

- A. 0-5% of the states 0
- B. 6-20% of the states 2
- C. 21-50%, and/or state listed as a problem weed (e.g., “Noxious,” or “Invasive”) in 1 state or Canadian province 4
- D. Greater than 50%, and/or identified as “Noxious” in 2 or more states or Canadian provinces 5
- U. Unknown

Score

5

Documentation:

Identify states invaded:

Pineappleweed is found in 45 states. It is listed as a weed in Kentucky, Nebraska in the United State, and Manitoba, Canada (Royer and Dickinson 1999, USDA 2002).

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.

Total Possible

25

Total

15

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:

Roberts and Neilson (1981) found 7.8% to 9.6% of seeds remain viable after 5 years in the soil. Viability of seeds was 20% after 6.7 years, and 1% after 9.7 years in seed viability experiment conducted in Fairbanks, Alaska (Conn and Deck 1995).

Rational:

Sources of information:

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 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

0

Documentation:

Describe vegetative response:

Pineappleweed has no resprouting following removal of aboveground growth (Densmore et al. 2001).

Rational:

Sources of information:

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

4.3. Level of effort required

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

Score

0

Documentation:

Identify types of control methods and time-term required:

This species does not persist without repeated anthropogenic disturbance. However multiple weeding treatments across years may be necessary to eliminate plants germinating from buried seeds. However, hand pulling may be inefficient/ineffective for large and dense populations. It is resistant to a number of standard herbicides (J. Conn – pers. com., Densmore et al. 2001, Rutledge and McLendon 1996).

Rational:

Sources of information:

Conn, J. Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184.
Densmore, R.V., P.C. McKee and C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
Rutledge, C.R. and T. McLendon. 1996. An Assessment of Exotic Plant Species of Rocky Mountain National Park. Department of Rangeland Ecosystem Science, Colorado State University. 97 pp. Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).

Total Possible	10
Total	3

Total for 4 sections Possible	100
Total for 4 sections	32

References:

- Conn, J., Weed Scientist, USDA Agricultural Research Service PO Box 757200 Fairbanks, Alaska 99775 tel: (907) 474-7652; fax (907) 474-6184. – Pers. com.
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.
Baker, H.G. 1974. The evolution of weeds. *Annual Review of Ecology and Systematics* 5: 1-24.
Densmore, R.V., P.C. McKee and C. Roland. 2001. Exotic plants in Alaskan National Park Units. Report on file with the National Park Service – Alaska Region, Anchorage, Alaska. 143 pp.
Hodkinson, D. and K. Thompson. 1997. Plant dispersal: the role of man. *Journal of Applied Ecology*, 34: 1484-1496.
Hultén, E. 1968. *Flora of Alaska and Neighboring Territories*. Stanford University Press, Stanford, CA. 1008 p.
ITIS – Integrated Taxonomic Information System. 2002. <http://www.itis.usda.gov>
Roberts, 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. 97 pp. Northern Prairie Wildlife Research Center Home Page.
<http://www.npwrc.usgs.gov/resource/othrdata/Explant/explant.htm> (Version 15DEC98).
Stevens, O.A. 1932. The number and weight of seeds produced by weeds. *American Journal of Botany* 19(9): 784-789.
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.
Welsh, S.L. 1974. Anderson's flora of Alaska and adjacent parts of Canada. Brigham University Press. 724 pp.