# ALASKA NON-NATIVE PLANT INVASIVENESS RANKING FORM

*Botanical name:* *Crepis tectorum* L.
*Common name*: narrowleaf hawksbeard
*Assessors:*

| | |
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*Date:* 3/15/2011
*Date of previous ranking, if any:* 8/1/2008

**OUTCOME SCORE:**

**CLIMATIC COMPARISON**

*This species is present or may potentially establish in the following eco-geographic regions:*

| | |
|---|---|
| Pacific Maritime | Yes |
| Interior-Boreal | Yes |
| Arctic-Alpine | Yes |

| **INVASIVENESS RANKING** | **Total** (total answered points possible[1]) | **Total** |
|---|---|---|
| Ecological impact | 40 (40) | 16 |
| Biological characteristics and dispersal ability | 25 (25) | 16 |
| Ecological amplitude and distribution | 25 (25) | 20 |
| Feasibility of control | 10 (10) | 4 |
| Outcome score | 100 (100)[b] | 56[a] |
| Relative maximum score[2] | | **56** |

[1] For questions answered "unknown" do not include point value for the question in parentheses for "total answered points possible."
[2] Calculated as a/b × 100

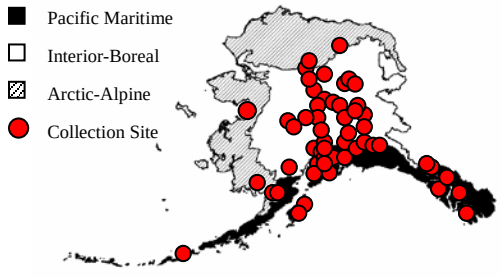
A. CLIMATIC COMPARISON

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

☒ Yes - continue to 1.2
☐ No - continue to 2.1

*1.2. From which eco-geographic region has it been collected or documented (see inset map)?*
*Proceed to* Section B. INVASIVNESS RANKING

☒ Pacific Maritime
☒ Interior-Boreal
☒ Arctic-Alpine




**Documentation**: *Crepis tectorum* has been documented from all three ecogeographic regions of Alaska (Hultén 1968, Densmore et al. 2001, AKEPIC 2011, UAM 2011).

*2.1. Is there a 40 percent or higher similarity (based on CLIMEX climate matching, see references) between climates where this species currently occurs and:*

a. Juneau (Pacific Maritime region)?
☐ Yes – record locations and percent similarity; proceed to Section B.
☐ No

b. Fairbanks (Interior-Boreal region)?
☐ Yes – record locations and percent similarity; proceed to Section B.
☐ No

c. Nome (Arctic-Alpine region)?
☐ Yes – record locations and percent similarity; proceed to Section B.
☐ No

*If "No" is answered for all regions; reject species from consideration*

**Documentation:**

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B. INVASIVENESS RANKING

**1. Ecological Impact**

*1.1. Impact on Natural Ecosystem Processes*

| | | |
|---|---|---|
| a. | No perceivable impact on ecosystem processes | 0 |
| b. | Has the potential to influence ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability) | 3 |
| c. | Has the potential to cause significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, degrades habitat important to waterfowl) | 7 |
| d. | Has the potential to cause major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology, hydrology, or affects fire frequency thereby 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 |
| e. | Unknown | U |

Score **3**

**Documentation:** *Crepis tectorum* likely reduces the availability of soil moisture. It may delay the establishment of native species on naturally disturbed soil such as erosion and fire (Conn pers.comm., Cortés-Burns et al. 2008). This species is associated with *Melilotus alba* along the Matanuska and Stikine Rivers (Conn and Seefeldt 2009).

*1.2. Impact on Natural Community Structure*

| | | |
|---|---|---|
| a. | No perceived impact; establishes in an existing layer without influencing its structure | 0 |
| b. | Has the potential to influence structure in one layer (e.g., changes the density of one layer) | 3 |
| c. | Has the potential to cause significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer) | 7 |
| d. | Likely to cause major alteration of structure (e.g., covers canopy, eliminating most or all lower layers) | 10 |
| e. | Unknown | U |

Score **5**

**Documentation:** *Crepis tectorum* has established along the Knik River, where it changes the density of vegetation (Shephard pers. comm.). Plants growing in a stand of *Festuca rubra* in British Columbia reached a density of 300 plants per square meter (Najda et al. 1982). In Alaska, 7% of recorded infestations occur at or above 50% ground cover (AKEPIC 2011), suggesting that this species can significantly increase the density of forb layers.

*1.3. Impact on Natural Community Composition*

| | | |
|---|---|---|
| a. | No perceived impact; causes no apparent change in native populations | 0 |
| b. | Has the potential to influence community composition (e.g., reduces the population size of one or more native species in the community) | 3 |

c. Has the potential to significantly alter community composition (e.g., significantly reduces the population size of one or more native species in the community) 7

d. Likely to cause major alteration in community composition (e.g., results in the extirpation of one or more native species, thereby reducing local biodiversity and/or shifting the community composition towards exotic species) 10

e. Unknown U

Score **5**

**Documentation:** Dense stands of *Crepis tectorum* in Denali National Park and Healy have displaced native colonizers (Densmore pers. comm.). This species invaded native vegetation in lightly burned areas along the Dalton Highway in interior Alaska (Cortés-Burns et al. 2008). It was observed growing in native *Chamerion angustifolium – Calamagrostis canadensis* meadows surrounding Rohn Cabin (Flagstad and Cortés-Burns 2010). Some populations appear to be highly aggressive in Alaska (AKEPIC 2011).

*1.4. Impact on associated 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. Has the potential to cause minor alteration (e.g., causes a minor reduction in nesting or foraging sites) 3

c. Has the potential to cause moderate alteration (e.g., causes a moderate reduction in habitat connectivity, interferes with native pollinators, or introduces injurious components such as spines, toxins) 7

d. Likely to cause severe alteration of associated trophic populations (e.g., extirpation or endangerment of an existing native species or population, or significant reduction in nesting or foraging sites) 10

e. Unknown U

Score **3**

**Documentation:** *Crepis tectorum* is pollinated by flies, butterflies, and insects in the Hymenoptera order (NatureGate 2011); the presence of this species may therefore alter native plant-pollinator interactions. This species is associated with many insect pests, parasites, fungi, and diseases (Najda et al. 1982).

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Total Possible 40

Total **16**

**2. Biological Characteristics and Dispersal Ability**

*2.1. Mode of reproduction*

a. Not aggressive (produces few seeds per plant [0-10/$m^2$] and not able to reproduce vegetatively). 0

b. Somewhat aggressive (reproduces by seed only [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 (extensive vegetative spread and/or many seeded [>1,000/$m^2$]) 3

e. Unknown U

Score **3**

**Documentation:** *Crepis tectorum* reproduces by seeds only. Plants in Canada produced from 3,360 to 49,420 seeds per plant (Najda et al. 1982).

*2.2. Innate potential for long-distance dispersal (wind-, water- or animal-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 |
| d. | Unknown | U |

Score **3**

**Documentation:** Seeds are relatively light and has extensive pappus that enables them to disperse long distances with wind and moving water. They rapidly colonize disturbed and open areas. Seeds adhere to fur and feathers (Najda et al. 1982).

*2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sale of species, use as forage or for revegetation, dispersal along highways, transport on boats, common contaminant of landscape materials, etc.).*

| | | |
|---|---|---|
| a. | Does not occur | 0 |
| b. | Low (human dispersal is infrequent or inefficient) | 1 |
| c. | Moderate (human dispersal occurs regularly) | 2 |
| d. | High (there are numerous opportunities for dispersal to new areas) | 3 |
| e. | Unknown | U |

Score **3**

**Documentation:** *Crepis tectorum* is a contaminant in alfalfa seed (Najda et al. 1982). It spreads along roadsides in Alaska (Densmore et al. 2001). Seeds have been associated with imported and locally produced straw (Conn et al. 2010) and soil from container-grown ornamental plants (Conn et al. 2008). Seeds adhere to shoes, clothing, fur, and feathers (Najda et al. 1982).

*2.4. Allelopathic*

| | | |
|---|---|---|
| a. | No | 0 |
| b. | Yes | 2 |
| c. | Unknown | U |

Score **0**

**Documentation:** No evidence suggests that *Crepis tectorum* is allelopathic.

*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 able to fix nitrogen | 3 |
| d. | Unknown | U |

Score **1**

**Documentation:** *Crepis tectorum* competes with native species for soil moisture (Snyder pers. comm.). It successfully competes in hay crops (Conn pers. comm.) and pastures. Plants growing

in a stand of *Festuca rubra* in British Columbia reached a density of 300 plants per square meter (Najda et al. 1982). In Alaska, 10% of recorded infestations have been noted as having medium aggressiveness and 6% of recorded infestations have been noted as having high aggressiveness (AKEPIC 2011).

*2.6. Forms dense thickets, has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation.*

| | | |
|---|---|---|
| a. | Does not grow densely or above surrounding vegetation | 0 |
| b. | Forms dense thickets | 1 |
| c. | Has a climbing or smothering growth habit, or is otherwise taller than the surrounding vegetation | 2 |
| d. | Unknown | U |

Score **0**

**Documentation:** *Crepis tectorum* does not form dense thickets (Lapina pers. obs.).

*2.7. Germination requirements*

| | | |
|---|---|---|
| a. | Requires sparsely vegetated soil and disturbance to germinate | 0 |
| b. | Can germinate in vegetated areas, but in a narrow range of or in special conditions | 2 |
| c. | Can germinate in existing vegetation in a wide range of conditions | 3 |
| d. | Unknown | U |

Score **2**

**Documentation:** *Crepis tectorum* readily colonizes disturbed sites and open areas (Najda et al. 1982). In interior Alaska, this species has invaded native vegetation in lightly burned areas along the Dalton Highway (Cortés-Burns et al. 2008) and in meadows surrounding Rohn Cabin (Flagstad and Cortés-Burns 2010). It can germinate in established hay fields (Conn pers. obs.).

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

| | | |
|---|---|---|
| a. | No | 0 |
| b. | Yes | 3 |
| c. | Unknown | U |

Score **3**

**Documentation:** *Crepis capillaris* is considered a noxious weed in Minnesota (Invaders 2011).

*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 |
| d. | Unknown | U |

Score **1**

**Documentation:** *Crepis tectorum* grows in dry streambeds and on lakeshores in North America (Najda et al. 1982, Bogler 2006). It has established along the Knik (Shephard pers. comm.), Matanuska, and Stikine Rivers in Alaska (Conn and Seefeldt 2009).

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Total Possible 25

Total **16**

**3. Ecological Amplitude and Distribution**

*3.1. Is the species highly domesticated or a weed of agriculture?*

| | | |
|---|---|---|
| a. | Is not associated with agriculture | 0 |
| b. | Is occasionally an agricultural pest | 2 |
| c. | Has been grown deliberately, bred, or is known as a significant agricultural pest | 4 |
| d. | Unknown | U |

Score **4**

**Documentation:** *Crepis tectorum* is a serious agricultural weed in western Canada (Najda et al. 1982) and Russia (Nadtochii 2009). It is a contaminant in alfalfa seed (Najda et al. 1982). In Alaska, seeds have been found in imported and locally produced straw (Conn et al. 2010) and soil from container-grown ornamental plants (Conn et al. 2008).

*3.2. Known level of ecological impact in natural areas*

| | | |
|---|---|---|
| a. | Not known to impact other natural areas | 0 |
| b. | Known to impact other natural areas, but in habitats and climate zones dissimilar to those in Alaska | 1 |
| c. | Known to cause low impact in natural areas in habitats and climate zones similar to those in Alaska | 3 |
| d. | Known to cause moderate impact in natural areas in habitat and climate zones similar to those in Alaska | 4 |
| e. | Known to cause high impact in natural areas in habitat and climate zones similar to those in Alaska | 6 |
| f. | Unknown | U |

Score **3**

**Documentation:** *Crepis tectorum* degrades a number of habitat types in the Pacific Northwest; it persists in dispersed populations in disturbed headlands, grasslands, and clearcuts (Carlson pers. obs.). It invades native prairies in Canada (Najda et al. 1982).

*3.3. Role of anthropogenic and natural disturbance in establishment*

| | | |
|---|---|---|
| a. | Requires anthropogenic disturbance to establish | 0 |
| b. | May occasionally establish in undisturbed areas, readily establishes in naturally disturbed areas | 3 |
| c. | Can establish independently of natural or anthropogenic disturbances | 5 |
| e. | Unknown | U |

Score **3**

**Documentation:** *Crepis tectorum* is often associated with anthropogenic disturbances (Najda et al. 1982, Klinkenberg 2010, AKEPIC 2011); however, it also establishes in naturally disturbed areas (Shephard pers. obs.), including areas disturbed by wild animals, rivers or streams, and fires (Bogler 2006, Cortés-Burns et al. 2008, AKEPIC 2011, UAM 2011). It has been found on river bars in Southeast Alaska (Conn and Seefeldt 2009, Shephard pers. obs.), often associated with *Melilotus alba* (Conn and Seefeldt 2009). In interior Alaska, this species has invaded native vegetation in lightly burned areas along the Dalton Highway (Cortés-Burns et al. 2008) and in

meadows surrounding Rohn Cabin (Flagstad and Cortés-Burns 2010). It can occur at high densities in poor stands of forage crops (Najda et al. 1982).

*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 |
| e. | Unknown | U |

Score **5**

**Documentation:** *Crepis tectorum* is native to Siberia. It was introduced to eastern North America before 1890. It has also been introduced to Europe, parts of Asia, and Australia. This species grows as far north as 70°N in Scandinavia (Najda et al. 1982) and is known to occur in arctic regions in western and central Russia (Nadtochii and Budrevskaya 2003).

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

| | | |
|---|---|---|
| a. | Occurs in 0-5 percent of the states | 0 |
| b. | Occurs in 6-20 percent of the states | 2 |
| c. | Occurs in 21-50 percent of the states and/or listed as a problem weed (e.g., "Noxious," or "Invasive") in one state or Canadian province | 4 |
| d. | Occurs in more than 50 percent of the states and/or listed as a problem weed in two or more states or Canadian provinces | 5 |
| e. | Unknown | U |

Score **5**

**Documentation:** *Crepis tectorum* grows in 26 states of the U.S., mainly in the northern half, and most of Canada (USDA 2011). It is considered a noxious weed in Minnesota, Alberta, and Manitoba (Invaders 2011).

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| | |
|---|---|
| Total Possible | 25 |
| Total | **20** |

**4. Feasibility of Control**

*4.1. Seed banks*

| | | |
|---|---|---|
| a. | Seeds remain viable in the soil for less than three years | 0 |
| b. | Seeds remain viable in the soil for three to five years | 2 |
| c. | Seeds remain viable in the soil for five years or longer | 3 |
| e. | Unknown | U |

Score **0**

**Documentation:** Seeds lack dormancy, and nearly all seeds lose their viability within 2½ years of maturation (Najda et al. 1982).

*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 |
| e. | Unknown | U |

Score **1**

**Documentation:** Plants can resprout from the caudex after the removal of the aboveground growth (Seefeldt 2007).

*4.3. Level of effort required*

| | | |
|---|---|---|
| a. | Management is not required (e.g., species does not persist in the absence of repeated anthropogenic disturbance) | 0 |
| b. | Management is relatively easy and inexpensive; requires a minor investment of human and financial resources | 2 |
| c. | Management requires a major short-term or moderate long-term investment of human and financial resources | 3 |
| d. | Management requires a major, long-term investment of human and financial resources | 4 |
| e. | Unknown | U |

Score **3**

**Documentation:** Small populations of *Crepis tectorum* in natural areas as well as small infestations in anthropogenically disturbed areas can be removed by repeated cycles of hand pulling within the same season. The entire plant, including the caudex, must be removed prior to seed set. All plants should be bagged and removed from the site to prevent seeds from dispersing after treatment. Hand pulling can be inefficient because seedlings are hard to find and are not easily removed. Herbicides should be applied for large or persistent (those not reduced after one year of hand pulling) populations of *Crepis tectorum*. Glyphosate or metsulfuron-methyl provide effective control of *Crepis tectorum* without harming native grass species. Populations should be treated when plants are in the cotyledon stage of growth; this appears to be the only stage at which the plants can be killed. Control during stem elongation, flowering, and seed set appears only to weaken the plants. Metsulfuron-methyl applied early in the spring when *Crepis tectorum* is in the cotyledon stage is the most effective method of control for this species. Because *Crepis tectorum* is able to overwinter as a rosette, it typically develops cotyledons before most of the native broadleaf vegetation has sprouted. The short soil residence time of metsulfuron-methyl makes a second application in the fall necessary to weaken rosettes prior to overwintering. Metsulfuron-methyl should be applied to the infested area, plus a 15 m buffer, at a rate of 70 grams per hectare. The area within at least a 200-meter radius and any disturbed areas within 0.8 km should be scouted for new plants. Annual monitoring for at least three years following treatment is necessary to confirm that no new plants have established (Seefeldt 2007).

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| | |
|---|---|
| Total Possible | 10 |
| Total | **4** |

| | |
|---|---|
| Total for four sections possible | 100 |
| Total for four sections | **56** |

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